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**Latvia University of Life Sciences and
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**Faculty of Economics and Social
Development**

19th International Scientific Conference

**ECONOMIC SCIENCE FOR RURAL
DEVELOPMENT 2018**

**9-11 May 2018, Jelgava,
Latvia**

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Time schedule of the conference

Preparation of the proceedings and organization: January 2018 – May 2018

Conference: 9-11 May 2018

Researchers from the following higher education institutions, research institutions, and professional organizations presented their scientific papers at the conference:

Academy of Agribusiness in Lomza	Poland
Alberta College	Latvia
Almaty University of Power Engineering and Telecommunications	Kazakhstan
Avesco Ltd	Latvia
Banking University of Ho Chi Minh City	Vietnam
College of Agriculture in Krizevci	Croatia
College of Law	Latvia
Cracow University of Economics	Poland
Czech University of Life Sciences Prague	Czech Republic
Estonian University of Life Sciences	Estonia
Gdynia Maritime University	Poland
Institute of Agricultural Resources and Economics	Latvia
Institute of Soil Science and Plant Cultivation State Research Institute	Poland
Institute of Technology and Life Sciences	Poland
ISTOM, College of International Agro-Development	France
Jan Kochanowski University in Kielce	Poland
Jelgava Municipality	Latvia
Kuban State University	Russia
Kujawsko-Pomorski Agricultural Advisory Centre in Minikowo	Poland
Latvia University of Life Sciences and Technologies	Latvia
Latvian Academy of Culture	Latvia
Latvian Academy of Sciences	Latvia
Latvian Association of Journalists	Latvia
Latvian Trade Union of Education and Science Employees (LIZDA)	Latvia
National Research Institute of Animal Production	Poland
Nicolaus Copernicus University in Torun	Poland
Pennsylvania State University	USA
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Samara State University of Economics	Russia
Skonto Plan Ltd	Latvia
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Every article included into the Proceedings was subjected to a scientific, including international review.

All reviewers were anonymous for the authors of the articles.

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Fundamental errors in published works

When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the editor or publisher and cooperate with the editor to retract or correct the paper.

Editorial Board

Foreword

The international scientific conference "Economic Science for Rural Development" is organized annually by the Faculty of Economics and Social Development of Latvia University of Agriculture.

The proceedings of the conference are published since 2000.

The scientific papers presented in the conference held on 9-11 May 2018 are published in 3 thematic volumes:

No 47 Rural Development and Entrepreneurship
Production and Co-operation in Agriculture

No 48 Integrated and Sustainable Regional Development
Marketing and Sustainable Consumption

No 49 Bioeconomy
Finance and Taxes
Home Economics
New Dimensions in the Development of Society

The proceedings contain scientific papers representing not only the science of economics in the diversity of its sub-branches, but also other social sciences (sociology, political science), thus confirming inter-disciplinary development of the contemporary social science.

This year for the first time the conference includes the section on a new emerging kind of economy-bioeconomy. The aim of bioeconomy is to use renewable biological resources in amore sustainable manner. Bioeconomy can also sustain a wide range of public goods, including biodiversity. It can increase competitiveness, enhance Europe's self-reliance and provide jobs and business opportunities.

The Conference Committee and Editorial Board are open to comments and recommendations concerning the preparation of future conference proceedings and organisation of the conference.

Acknowledgements

The Conference Committee and editorial Board are open to comments and recommendations for the development of future conference proceedings and organisation of international scientific conferences.

We would like to thank all the authors, reviewers, members of the Programme Committee and the Editorial Board as well as supporting staff for their contribution organising the conference.

On behalf of the conference organisers

Anita Auzina

Associate professor of Faculty of Economics and Social Development
Latvia University of Life Sciences and Technologies

Contents

BIOECONOMY.....	16
MUNICIPAL WASTE MANAGEMENT IN RURAL AREAS IN POLAND	17
Joanna Baran ¹ , PhD.....	17
THE ROLE OF ENVIRONMENT IN STIMULATING THE DEVELOPMENT OF GREEN ECONOMY.....	25
Katarzyn Brodzinska ¹ , PhD habilitated; Zbigniew Brodzinski ² , PhD habilitated	25
SPATIAL CONCENTRATION OF BIOECONOMY SECTORS IN POLAND	32
Jaroslav Golebiewski ¹ , PhD hab., prof. WULS	32
ECOSYSTEM SERVICES VALUE: CASE OF POLLINATION	41
Janusz Majewski ¹ , PhD eng.....	41
ECONOMIC AND ECOLOGICAL POTENTIAL OF THE PROTECTED AREAS IN THE PIENINY MOUNTAINS	48
Wieslaw Musial ¹ , prof.; Kamila Musial ² , PhD	48
CHARACTERISTICS OF THE FISHING INDUSTRY IN LATVIA.....	56
Liga Proskina ¹ , Dr.oec.; Irina Pilvere ² , Dr.oec.; Aleksejs Nipers ³ , Dr.oec.; Mihails Silovs ⁴ , MSc	56
ENVIRONMENTAL AND SOCIAL RISKS RELATED TO SEAFARING EMISSIONS IN THE BALTIC SEA	65
Dr.oec. Astrida Rijkure ¹	65
COST-EFFECTIVENESS OF POSTHARVEST DRIP IRRIGATION OF CHOSEN NORTH-AMERICAN CULTIVARS OF ASPARAGUS GROWN FOR GREEN SPEARS IN OPEN FIELD TECHNOLOGY IN THE CENTRAL POLAND.....	71
Roman Rolbiecki ¹ , Assoc. Prof.; Magdalena Rolbiecka ² , BSc; Stanislaw Rolbiecki ¹ , Prof.; Barbara Jagosz ³ , PhD; Malgorzata Michalcewicz-Kaniowska ¹ , PhD; Malgorzata Zajdel ² , PhD.....	71
INTEGRATED IMPACT ASSESSMENT OF AGRICULTURAL GHG ABATEMENT MEASURES.....	77
Kaspars Naglis-Liepa ¹ , Dr. oec; Dina Popluga ² , Dr.oec.; Arnis Lenerts ³ , MBA.; Peteris Rivza ⁴ Dr.ing., Dzidra Kreismane ⁵ , Dr.agr.	77
FINANCE AND TAXES	84
EFFECT OF AN UNDERDEVELOPED HIGH VALUE-ADDED SECTOR ON THE LOW VALUE-ADDED SECTOR IN LESS DEVELOPED COUNTRIES.....	85
Sandris Ancans ¹ , Mg.oec.....	85
FINANCIAL EFFICIENCY OF THE INDUSTRY PRODUCING FODDER IN COMPARISON WITH OTHER FOOD INDUSTRY SECTORS	93
Joanna Florek ¹ , PhD; Dorota Czerwinska-Kayzer ² , PhD	93
FINANCIALIZATION OF AGRICULTURE THROUGH PURCHASE OF FARMING LAND	102
Justyna Franc-Dabrowska ¹ , PhD hab., prof.	102
THE EUROPEAN UNION'S COMMON AGRICULTURAL POLICY AS AN INSTRUMENT OF EQUALIZING FARMS' INCOME.....	111
Piotr Golas ¹ , PhD	111
FINANCIAL HEALTH OF LITHUANIAN STATE UNIVERSITIES.....	117
Vilma Kazlauskienė ¹ , Dr./ assoc. professor; Renata Legenzova ² , Dr./ assoc. professor	117
THE DILEMMA OF CHOOSING THE FORM OF VAT TAXATION IN AGRICULTURE IN POLAND	124
Tomasz Kondraszuk ¹ , PhD; Jacek Jaworski ² , PhD	124
RURAL DEVELOPMENT PROGRAMME AS AN INSTRUMENT OF FINANCIAL SUPPORT FOR AGRICULTURAL PRODUCER GROUPS IN POLAND.....	131
Marzena Lemanowicz ¹ , PhD	131
THE KEY ROLE OF INTERNAL FINANCING AMONG ENTERPRISES FROM FOOD INDUSTRY – CASE OF POLAND, LATVIA AND LITHUANIA.....	138
Magdalena Madra-Sawicka ¹ , Dr./ assoc.professor	138
YIELD RISK AND THE POTENTIAL FOR INSURANCE IN AGRICULTURE	147
Maire Nurmet ¹ , PhD, associated professor; Katrin Lemsalu ¹ , MSc, PhD student; Anne Poder ¹ , PhD, researcher	147
MILK PRODUCTION COSTS IN POLISH AND OTHER EU COUNTRIES' DAIRY FARMS - ASSESSMENT IN 2009-2015.....	154
Andrzej Parzonko ¹ , Phd	154
PROFITABILITY OF OWN LABOUR VS. ECONOMIC AND FINANCIAL STANDING OF FARMS IN CENTRAL AND EASTERN EUROPEAN MEMBERS OF THE EUROPEAN UNION	162
Joanna Sredzinska ¹ , Ph.D.	162
ACCESS TO EU FUNDS VS. FINANCIAL RISKS FACED BY RURAL MUNICIPALITIES OF THE WIELKOPOLSKIE VOIVODESHIP	169
Aldona Standar ¹ , Ph.D.	169

CROP INSURANCE WITH SUBSIDIES IN POLAND – DO IT WORKS?	178
Aleksandra Wicka ¹	178
EFFICIENCY VERSUS VALUE OF JOINT-STOCK COMPANIES FROM AGRIBUSINESS SECTOR OF THE WARSAW STOCK EXCHANGE - A PERSPECTIVE TOWARDS TRADE-OFF DECISIONS.....	187
Serhiy Zabolotnyy ¹ , PhD, assistant professor; Mirosław Wasilewski ² , dr hab., associate professor	187
THE INVESTMENT EFFICIENCY OF THE SELECTED FOOD INDUSTRY COMPANIES LISTED ON THE WARSAW STOCK EXCHANGE IN THE YEARS 2007-2017.....	196
Dorota Zebrowska-Suchodolska ¹ , Ph.D.; Andrzej Karpio ² , Ph.D.....	196
ASSESSMENT OF INVESTMENT PROJECTS IMPLEMENTED BY FARMS IN ZEMGALE REGION	204
Ingrida Jakusonoka ¹ , Dr.oec., professor; Elina Lece ² , Mg.oec.	204
THE APPLICATION OF TAXONOMIC METHODS AND ORDERED LOGIT MODEL IN THE ASSESSMENT OF FINANCIAL SELF-SUFFICIENCY OF LOCAL ADMINISTRATIVE UNITS	212
Aleksandra Łuczak ¹ , Ph.D; Agnieszka Kozera ² , Ph.D. and Silvia Bacci ³ , Ph.D.	212
HOME ECONOMICS	221
THE ECONOMIC SITUATION OF THE FOOD INDUSTRY IN EU COUNTRIES	222
Piotr Borawski ¹ , phd habilitated; Aneta Beldycka-Borawska ² , msc., Ireneusz Zuchowski ³ , phd; James W Dunn ⁴ , professor.....	222
EVALUATION OF CHANGES IN HOUSING CONDITIONS THROUGHOUT THE POLISH RURAL AREAS USING METHODS OF RELATIVE TAXONOMY	232
Romana Glowicka-Woloszyn ¹ , Ph.D.; Agnieszka Kozera ² , Ph.D.; Joanna Stanisławska ³ , Ph.D.; Andrzej Woloszyn ⁴ , M.Sc. and Anna Rosa ⁵ , Ph.D.	232
THE EFFECTS OF PRIVATIZATION OF THE TOBACCO COMPANY IN THE OPINION OF EMPLOYEES	241
Grontkowska Anna ¹ , PhD; Gebaska Monika ² , PhD and Kosakowska Anna ³ , Msc.....	241
CONVERGENCE PROCESSES IN THE INCOME SITUATION OF ELDERLY HOUSEHOLDS IN THE BALTIC SEA COUNTRIES.....	251
Anna Jankowska ¹ , PhD	251
THE EFFECT OF MACROECONOMIC FACTORS ON BUSINESS MODELS IN FINTECH INDUSTRY	260
Rosita Zvirgzdina ¹ , Dr. oec, prof.; Helena Skadina ² , MBA	260
EFFICIENCY AND PRODUCTIVITY OF FIELD CROP FARMS IN LUBLIN PROVINCE IN 2014-2016.....	269
Alina Syp ¹ , Dr.hab., Assoc. Prof.; Dariusz Osuch ² , Dr.	269
SCALE EFFICIENCY OF FARMS WITH DIFFERENT SYSTEMS OF REARING PIGS	277
Elzbieta Jadwiga Szymanska ¹ , economist/ PhD, Associate Professor.....	277
NEW DIMENSIONS IN THE DEVELOPMENT OF SOCIETY	286
REMEMBERING THE RIVER DAUGAVA: THE ECONOMICS AND ETHICS OF HYDROELECTRIC DAMS	287
Gunars Brazma ¹ , Dr. phil.,.....	287
THE SOCIAL FIELD OF SMART VILLAGES CONCEPT: THE CASE OF PERIPHERAL REGION - LUBLIN PROVINCE IN POLAND.....	296
Danuta GUZAL-DEC ¹ , PhD, Professor; Magdalena ZWOLINSKA-LIGAJ ² , PhD	296
THE DEVELOPMENT OF GREEN CARE IN POLAND	307
Ryszard Kaminski ¹ , PhD; Tomasz Marcysiak ² , PhD and Piotr Prus ³ , PhD	307
CHANGES IN THE ADDED VALUE CHAIN IN ECONOMY 4.0	316
Jakub Kraciuk ¹ , Assoc. Prof.	316
POPULATION COMPOSITION OF MIGRANTS IN SUBURBS OF RIGA METROPOLITAN AREA	324
Janis Krumins ¹ , Msc. Geogr.; Toms Skadins ² , Bsc. Geogr.	324
DETERMINANTS OF INNOVATIVENESS OF THE "NEW" EUROPEAN UNION COUNTRIES BETWEEN 2004 AND 2016 – COMPARATIVE ANALYSIS.....	332
Irena Lacka ¹ , Professor.....	332
SOCIAL ENTREPRENEURSHIP AND SOCIAL INNOVATION: THEORETICAL DISCOURSE.....	341
Lasma Licite ¹ , Dr.oec., assistant professor; Gunta Grinberga-Zalite ² , Dr.oec., associate professor.....	341
SOCIAL INCLUSION CHALLENGES OF REFUGEES: A CASE STUDY	349
Jolanta Millere ¹ , PhD/ assistant professor; Signe Dobelniece ² , PhD/ associate professor	349
THE GREY MARKET OF "INVISIBLE RELIGION" IN LATVIA	356
Agita Misane ¹ , Dr.phil.	356
WORKPLACE ENVIRONMENT IN LATVIA	363
Mareks Niklass ¹ , Dr.sc.soc./ researcher.....	363
LEGAL AND POLICY FRAMEWORK OF EMPLOYMENT FOR PEOPLE WITH DISABILITIES IN LATVIA	372
Zaiga Oborenko ¹ , Mg.hist., MSc., Baiba Rivza ² , Dr.hab.oec	372

PROSPECTS FOR BUSINESS INTELLIGENCE DEVELOPMENT IN THE LATVIAN BUSINESS ENVIRONMENT	385
Oskars Onzevs¹ , Dr. sc. ing., assistant professor; Gita Kolerte² , MBA	385
CHALLENGES WHILE CARING FOR OLDER PEOPLE IN THEIR HOMES	394
Līga Rasnaca¹ , Dr.sc.soc., assoc.prof.; Endija Rezgale - Straidoma² , Mg.sc.soc.	394
CONTRIBUTION OF HIGHER EDUCATION IN REGIONAL COMPETIVENESS AND DEVELOPMENT: CASE STUDY OF KAZAKHSTAN	402
Gita Revalde¹ , Dr. and Saule Sagintayeva² , Dr.....	402
HIGHER EDUCATION INSTITUTIONS' ORGANIZATIONAL STRUCTURES IN THE CONTEXT OF MANAGEMENT BY OBJECTIVES APPROACH	411
Dita Stefenhagena¹ , Dr.sc.admin., Voldemars Bariss² , Dr.phil. assoc. professor.....	411
THE SIGNIFICANCE OF INDIVIDUAL CONTRIBUTIONS IN AMATEUR ART PROCESS IN LATVIA	419
Baiba Tjarve¹ , Dr.art./ Researcher; Ieva Zemite² , Dr.oec./ Researcher, lecturer and Kristine Freiberga³ , Mg.art./ Researcher	419
BIG DATA AND ASSOCIATED SKILLS: SYSTEMATIC OVERVIEW	427
Atis Verdenhofs¹ , MBA; Tatjana Tambovceva² , Dr.oec / Professor	427
STROKE LITERACY AMONG STROKE SURVIVORS' FAMILY CAREGIVERS	434
Kristine Vibane¹ , Mg.sc.soc.....	434

BIOECONOMY

MUNICIPAL WASTE MANAGEMENT IN RURAL AREAS IN POLAND

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Abstract. The article concerns the municipal waste management system in rural areas in Poland. The first part of the research presents levels of generated municipal waste, morphological properties of waste and differing waste management fees. The second part uses a questionnaire to study 300 residents of rural areas in order to identify their opinion about the waste management system in place. Residents of rural areas are generally content with the system in place; approximately 2/3 of them participate in selective waste collection and believe that the waste collection fee is appropriate.

Key words: rural areas, municipal waste management, recycling.

JEL code: Q53

Introduction

Poland generates approx. 200 kg/person less municipal waste than the EU average; on the other hand, approx. 50 % of municipal waste is directed to landfill sites, which is a negative aspect in the context of pursuing a circular economy. Poland's accession to the EU resulted in a requirement to adapt Polish law to the applicable provisions of EU law, also with respect to waste management and environmental protection (Wysokinski et al., 2015). Poland has undertaken to take actions aimed at organizing waste management, in particular to limit the amount of municipal waste deposited in landfill sites and to decrease the percentage of biodegradable waste. It has also undertaken to significantly increase recycling rates of other waste fractions. To this end, changes in previous provisions of law concerning waste management were introduced (Czyzyk et al., 2012; Pietrzykowski, Wicki 2011).

On 1 January 2012, the Act on *Maintaining Cleanliness and Order in Municipalities* (Dz. U. 2011 No 152/897) came into effect. The amended Act has obligated municipalities to make extensive changes to the previous waste management system and, primarily, to claim waste ownership and reduce the amount of waste arriving at landfill sites. Municipalities are obligated—within specified deadlines—to reach appropriate levels of biodegradable waste reduction and to increase the recycling rate of other waste fractions (Baran, 2016). The amended Act has given municipalities numerous duties and tasks, the execution of which will enable the implementation of an appropriate municipal waste management system.

The aim of the article is to characterize the waste management system in rural areas and to identify the opinion of residents of rural municipalities concerning the system in place. The research intends to identify the levels of generated waste and its morphological composition, and the number of landfill sites in rural areas, and to make a comparison with indicators for cities. The research also identifies key issues of waste management in rural areas.

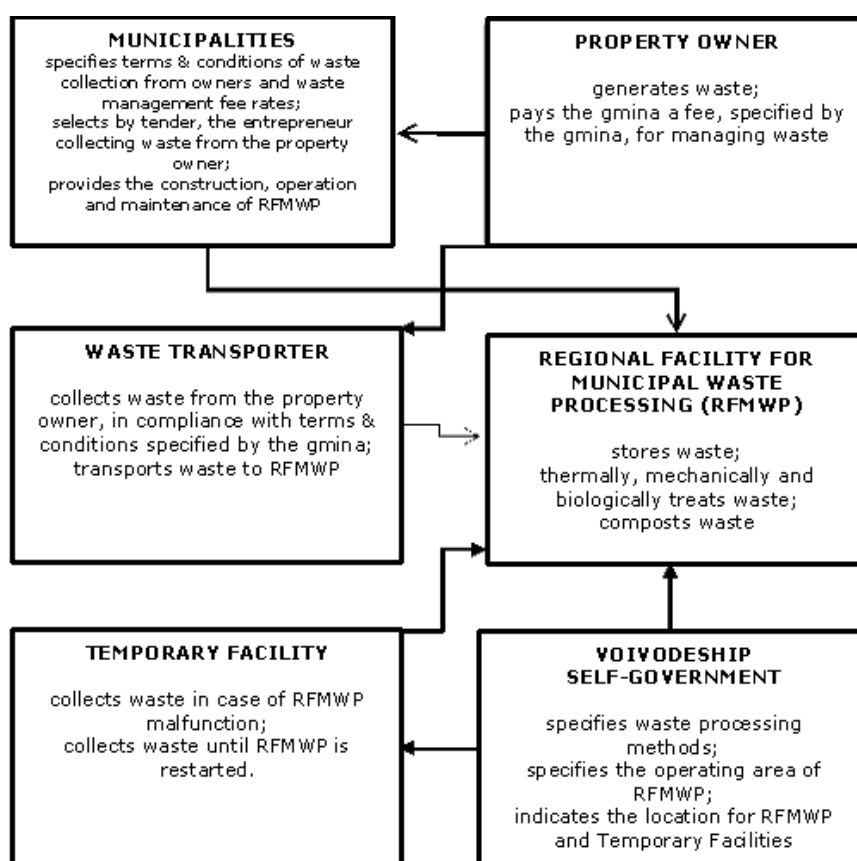
The research was conducted in two stages. In the first stage, sources included data published in Central Statistical Office databases, concerning waste management in rural areas in Poland. The second stage, in April–May 2017, consisted of a survey conducted among randomly selected residents of three rural municipalities from Mazowieckie Province. In total, 300 people were surveyed, including 165 women. The survey study concerned, inter alia, such things as the "waste tax" rate, frequency of waste collection, type of available waste receptacles, availability of information and environmental education.

Research results and discussion

As part of the current waste management system in Poland, municipal self-governments are responsible for organizing the collection of municipal waste from real property owners, as well as for most of the aspects of waste management, including organizational and investment processes. The most important tasks of municipal self-governments include (Stys, Foks 2014):

- preparation and acceptance of rules for maintaining cleanliness and order, i.e. specification of, among other things, terms and conditions and the subject matter of contracts for entities operating municipal waste management businesses;
- specification of rates for managing municipal waste;
- provision of construction, maintenance and operation of owned, or shared with other municipalities or economic entities, facilities and equipment for recycling and neutralizing municipal waste, or provision of conditions for construction, maintenance and operation of facilities and equipment for recycling and neutralizing municipal waste by economic entities;
- preparing and conducting tender proceedings for collection and management of municipal waste.

Figure 1 shows the scheme of the organization of the municipal waste collection system in Poland.



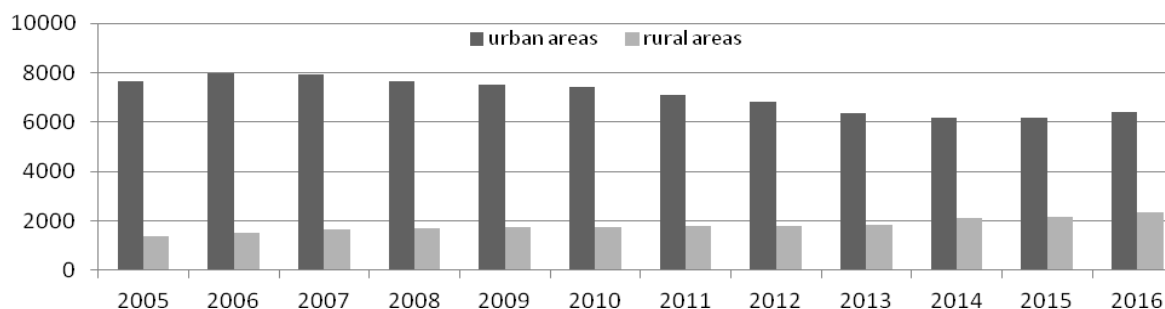
Source: Maciejczak, Baran, 2017

Fig. 1. Simplified organizational scheme of the municipal waste management system in Poland

Rural areas occupy about 93 % of Poland and almost 40 % of the population live in rural area; therefore, these areas cannot be marginalized in municipal waste management. Rural areas differ from urban areas in the field of waste generation and management (Baran, 2015). In rural areas in Poland, the generation of municipal waste is over three times lower than in urban areas (Figure 2).

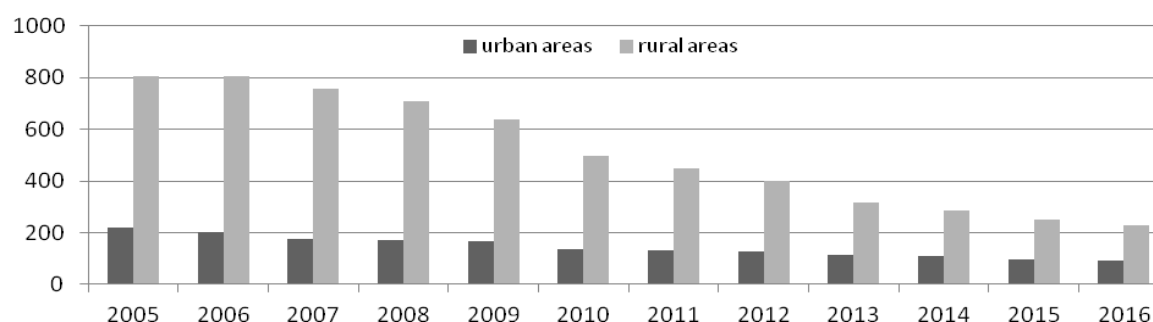
The rural community generated 2.3 million tons of municipal waste in 2016, which gives approx. 140 kg per 1 resident (in cities: 335 kg). Compared to 2005, the amount of waste generated by the rural community increased (by 56 %); therefore, the amount of waste per 1 resident is also higher. The most waste per 1 rural resident was identified in Zachodniopomorskie and Lubuskie Provinces, the least in Swietokrzyskie, Lubelskie and Podkarpackie Provinces (Table 1).

In rural areas in 2016, 30 controlled municipal waste landfill sites have ceased operation, which means that 228 landfill sites remained operational in 31 XII 2016. Compared to 2005, the number of landfill sites decreased over threefold, and their area decreased nearly twofold (figure 3). Illegal landfill sites are a significant problem, with over 2.000 such sites in rural areas.



Source: author's calculations based on Municipal Infrastructure, Central Statistical Office, 2005-2016

Fig. 2. Mixed municipal waste (without selectively collected waste) collected in rural areas and urban areas in 2005-2016 (thous. t)

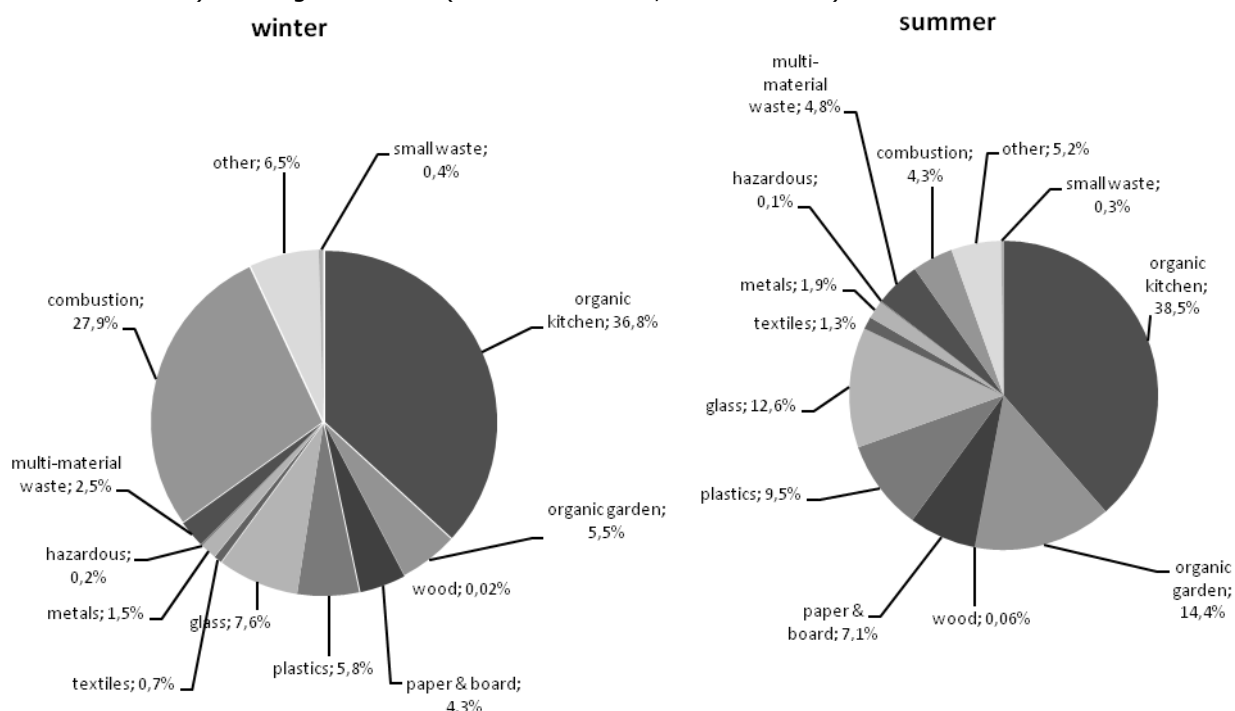


Source: author's calculations based on Municipal Infrastructure, Central Statistical Office, 2005-2016

Fig. 3. Controlled landfill sites in rural areas and urban areas in 2005-2016

The morphological composition of waste from households in rural areas is dominated by organic waste, which constitutes nearly a half of municipal waste (Figure 4). Such waste can be divided into two main streams: the first is organic kitchen waste (food remains, vegetable and fruit peelings etc.); the second is green waste generated when maintaining areas around buildings (grass, leaves, branches, weeds etc.). Per year, an average resident of rural areas generates approx. 61 kg of organic kitchen waste and approx. 15 kg of garden waste (Czyzyk et al., 2015). The majority of organic waste (as much as 90 %) can be managed at the household. The bulk of biowaste is suitable for composting, while food remains are often used to feed animals. Municipalities must search for solutions encouraging household owners to select biodegradable fractions from the waste stream and equip the households with, e.g. compost bins. The next significant fraction in the morphological composition of waste from rural households is combustion waste, which constitutes approx. 28 % of waste in winter. The next group of waste is waste suitable for recycling, including over 5 % of paper and board, 7.5 % of plastics, and 10 % of glass.

Morphological composition of waste from households varies depending on season (Figure 4). Pronounced seasonal changes can be seen in the percentage of combustion waste (more in winter, less in summer) and organic waste (more in summer, less in winter) in total waste.



Source: author's calculations based on Czyzyk et al., 2015

Fig. 4. Share of individual material fractions in municipal wastes originating from households in rural areas in winter and summer

Municipal waste per 1 resident and rates of waste management fees in rural and urban areas in 2015

Table 1

Provinces	Municipal waste* per capita in rural areas (kg)	Rural municipalities PLN/month/ resident		Rural-urban municipalities PLN/ month / resident	
		selected waste	mixed waste	selected waste	mixed waste
Lower Silesia	189.7	13.7	23.2	11.3	17.5
Kuyavia-Pomerania	144.6	10.1	19.2	7.5	13
Lublin	72.5	5	10.1	7.3	13.3
Lubusz	209.5	8.9	15.3	11.2	20.4
Lodzkie	121.3	6.6	12.5	7.8	13.9
Lesser Poland	109.8	6.1	11.2	6.1	10.2
Masovia	124.9	7	13.3	7.3	13.9
Opole	179	9.6	17.8	10.3	17.8
Subcarpathia	83.1	8	16.1	7.4	12.4
Podlasie	116.3	7	12.6	7.3	13
Pomerania	180.5	9.3	16	11	20
Silesia	173.2	7.4	15.1	7.3	15.3
Świętokrzyskie	61	7	13	3.8	7.3
Warmia-Masuria	141.5	8.9	12.4	8.3	12.1
Greater Poland	1187.4	7.6	13.4	8.5	14.7
West Pomerania	210.4	12.3	18.8	11.9	20.7

* excluding waste collected separately

Source: Steinhoff-Wrzesniewska 2015; Czyzyk et al., 2015

Waste management system should operate according to the waste management hierarchy. According to this hierarchy, actions concerning waste management should first consist of preventing the generation of waste, or limiting its amount. If waste is already generated, it should be prepared for reuse or subjected to the recycling process. Disposal consisting in long-term waste storage is relatively the simplest, but the least desirable method (Teodorowicz, 2013, p. 29; Michniewska, 2016, p. 22).

According to the waste management hierarchy, the primary tasks of municipalities, laid down in the provisions of the Act introduced in 2012, is the selective municipal waste collection "at the source." The majority of rural residents have declared their intention to sort waste, which is also connected with a lower fee. Fee variation was intended to encourage waste producers to sort waste. Experiences of other countries indicate, however, that the measured, actual sorting level is considerably lower than the one declared by residents. Therefore, we shouldn't confuse willingness to sort waste with the actual "recycling rate" (Dahlen, Lagerkvist, 2010).

It is worth mentioning that, for rural municipalities, the rate for both sorted and unsorted waste is lower than rates applicable in urban-rural municipalities (Table 1). Fees for unsorted waste were set by rural municipalities at a level approx. 100 % higher than fees for sorted waste. Average municipal waste fees in municipalities of the following provinces: Lubelskie, Mazowieckie, Podkarpackie and Świętokrzyskie were at a such low level, that there was a risk of not balancing the waste management system. Low rates for waste collection set by municipalities were probably connected with the expected social resistance with respect to paying the so-called "waste tax" (Malinowski, 2014; Golen, 2014; Gornicki, 2014; Steinhoff-Wrzesniewska, 2015).

The opinion research sample consisted of 300 residents of three rural municipalities. Among the surveyed, women were the majority (55 %). 45 % of respondents are people with tertiary education, while 33 % have secondary education (Table 2). The majority of respondents are people under 50 years of age who, after graduating, returned and settled in rural municipalities. The majority of people surveyed live in single-family homes.

Table 2

Properties of the research sample (in %)

Property		Women	Men	Total
Age	Under 25	22	12	34
	25-50	23	18	41
	Over 50	10	15	25
	Total	55	45	100
Education	Primary	3	3	6
	Vocational	2	14	16
	Secondary	22	11	33
	Tertiary	28	17	45
Type of residential housing	Single-family	49	29	78
	Multi-family	6	16	22
	Total	55	45	100

Source: author's research

The majority of people surveyed (66 %) declare that they sort municipal waste generated at their households and state that the main reason for undertaking this method of solid waste collection is the desire to care for the natural environment and the fact that the fees are lower when participating in selective collection (Figure 5). However, the respondents who declared that they collect only mixed waste at their households state that the reason for their decision is that

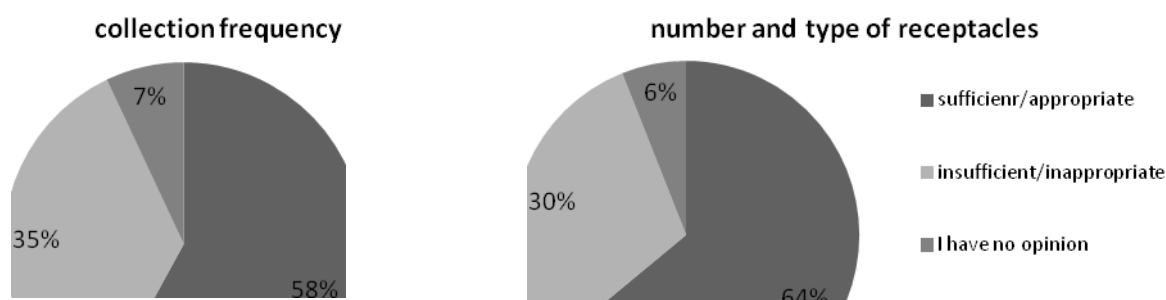
sorting is burdensome, because it takes a long time and requires a lot of space for receptacles intended for various waste fractions. The respondents who don't sort waste justify their decision with the reason that participation in selective collection by individuals will not change anything ("sorting would be reasonable if everyone did it, and they did it earnestly").



Source: author's research

Fig. 5. Respondents' answers concerning waste sorting

The interviewees were then asked to state their opinion about the frequency of waste collection and the type and number of receptacles provided by the waste collection company (Figure 6). Over a half of the interviewees believe that these two components of the system operate correctly. Nonetheless, approximately one third of the interviewees state that the waste collection frequency is insufficient, and the type and number of receptacles are inappropriate.



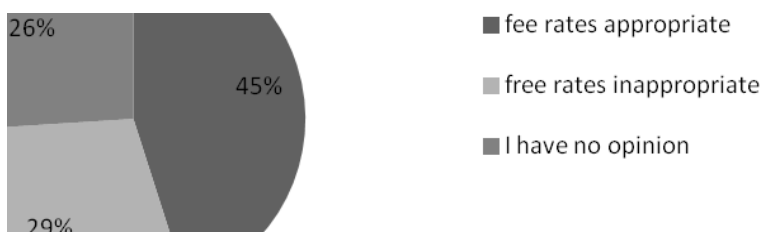
Source: author's research

Fig. 6. Interviewees' opinion on waste collection frequency and number and type of waste receptacles

45 % of interviewees believe that waste collection fees are appropriate. 29 % of respondents state that the rate should be lower (Figure 7). Some interviewees emphasize that the difference between fees for different types of collection (sorted/unsorted) should be higher, which could encourage people to participate in selective collection. However, implementing a larger difference could result in the aforementioned phenomenon of declaring selective collection (for money-saving reasons) and not observing it at households.

The interviewees were also asked to indicate how their waste collection expenses have changed since the introduction of waste management system changes. 52 % of respondents state that the costs have increased; 19 % say that they remain on the same level; 6 % state that they decreased, while 23 % of interviewed people are unable to determine this. It should be, however, noted that, until the second half of 2013, residents were managing municipal waste themselves—

some of them had contracts with waste collection companies, some deposited their waste in local landfill sites, while some burned the majority of generated waste in furnaces. Therefore, the increase in waste collection expenses should have been expected.



Source: author's research

Fig. 7. Interviewees' opinion on waste collection fee rates

The comparison of cost information with information obtained in the question about satisfaction with changes introduced in 2013 indicates that the financial factor is not a key factor determining the satisfaction with waste management system operation—19 % of respondents, despite stating that their expenses increased, are satisfied with waste management system changes.

The interviewees were also asked about their opinion on environmental education conducted by the municipality office. Study results in this aspect can be seen as unsettling, because only 44 % of respondents state that the municipality office has been conducting environmental education and, therefore, performed its statutory duty. Over 50 % of interviewees state that there were no environmental education campaigns (22 % of choices), or that they didn't know about such initiatives (34 % of choices). It should be stated that proper approach to waste largely depends on appropriate education in this respect.

Conclusions, proposals, recommendations

The analyses conducted in this article can be used to draw the following conclusions.

- 1) Correct organization of municipal waste management is a very complex task. Poland had to adjust to EU directives and accession-related obligations with respect to waste management, which included, in particular: reduction of biodegradable waste storage, increased recycling rates, adjusting municipal waste landfill sites to EU standards. Waste management policy in Poland has been a subject of dynamic changes since 2012. Municipalities were given the basic duties with respect to waste management. All municipality residents should fall under a statutory, organized municipal waste collection system.
- 2) Even though rural areas in Poland generate approximately three times less municipal waste, the majority of collected waste is deposited in landfill sites. Rural areas have over 2.5 times more controlled and uncontrolled landfill sites than in cities.
- 3) Main problems of rural areas include: aversion of residents to waste sorting, lack of discipline for observing selective waste collection and pollution of selectively collected waste, helplessness of municipalities in battling illegal waste landfill sites, burning waste in households, high transport costs (e.g. due to a colonial nature of development), lack of money for waste management infrastructure, ineffectiveness of conducted educational campaigns.

- 4) Despite the fact that residents of rural municipalities mainly declare satisfaction with the waste management system in place, we can assume that the new Act on Waste did not bring the expected results with respect to both the reduction of illegally stored waste management and the creation of modern waste processing facilities, mainly incinerators. The primary task standing in front of rural municipalities is therefore a correct organization of selective collection and processing of the organic fraction of municipal waste, as well as educational campaigns, which will increase the environmental consciousness of the residents and encourage them to participate in correct waste management.

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THE ROLE OF ENVIRONMENT IN STIMULATING THE DEVELOPMENT OF GREEN ECONOMY

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Abstract. In terms of supporting the development of green economy, it is important to understand the role of environment in stimulating its development. The results of an empirical study conducted in 2017 on a randomly selected sample of 578 enterprises of the SME sector, directly related to green economy, indicated that not only macroenvironment (the policy pursued, the creation of global institutional solutions supporting the development of resource-efficient technologies) but also meso- and microenvironment affected the development of green economy. A major role in this regard is served by the activity of local government units and by the activities of non-governmental organisations that form the institutional environment of enterprises. These institutions have tools and instruments, which they can use to stimulate the process of "greening" of the local economy.

Key words: green economy, enterprise, environment, development.

JEL code: R11, R58

Introduction

For the majority of Polish society, green economy is a completely new idea, both in terms of regulations that support its development and of practical effects of the implementation of technologies and organisational solutions aimed at the protection of natural environment (Kryk, 2011; Gorka, Luszczek, 2014; *Prospect for ...*, 2017). The concept of green economy is inextricably linked to the paradigm of sustainable socio-economic development, based on three attributes i.e. low-emission performance, resource efficiency, and social inclusion (Cato, 2009; *Adapting for ...*, 2011; Brand, 2012).

The implementation of measures conducive to the development of green branches of economy and green jobs is encouraged by international organisations including OECD¹ and the European Union². At the local level, the idea in question is supported by the measures taken by numerous non-governmental organisations and public institutions.

Given that enterprises operate within a specific external environment, this environment provides them with certain opportunities and possibilities while imposing requirements and restrictions on them. The group of factors which affect the rate of development of, generally, all enterprises, includes *inter alia* fiscal policy of the state, legal mechanisms and regulations concerning the freedom to conduct a business, the level of economic growth, economic conditions, availability of loans and lending rates, demand and supply of qualified workforce, and employment regulations. As regards the entities representing the broadly understood sphere of green economy, important issues include: the level of support for activities related *inter alia* to the development and implementation of environmentally-friendly products and services, the rate of implementation of pro-environmental investment projects (including as part of public procurement)³, the scope and scale of preferences for green economy entities and sectors, and the level of social awareness (Szyja, 2015). In terms of searching for the possibilities for supporting the development of green

¹ *Green Growth Indicators 2014*. OECD Green Growth Studies, OECD, Paris 2014, http://www.keepeek.com/Digital-Asset-Management/oecd/environment/green-growth-indicators2013_9789264202030-en (accessed on 02 December 2017).

² The Employment Package prepared by the Commission in 2012 presents the framework for job-rich recovery, emphasising the need for the further development of labour market tools and the identification of demand for skills in order to support both the transition to green economy and the progress in meeting the employment objectives defined in the Europe 2020 strategy.

³ Pursuant to EU regulations, Poland is obliged to take actions concerning low-emission and resource-efficient economy (Low-Emission Poland 2050 project, the National Programme for the Development of a Low-Emission Economy).

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economy, it is of importance to identify the factors determining its development, including primarily the understanding of the role of environment.

From the research perspective, the effects of green economy on the development of sectors and regions are interesting, therefore the research area was selected to be Warmia and Mazury Voivodeship i.e. a region unique in terms of environmental values. Two main geographical lands, namely Warmia and Mazury also referred to as "The Land of One Thousand Lakes", are an area in which the development of green economy should be particularly stimulated. In order to assess the measures taken in this regard, a study using the interview method and the CATI (Computer Assisted Telephone Interviewing) technology was conducted in 2017 on 578 randomly selected enterprises of the SME sector, directly related to green economy, including those involved in agri-food processing, provision of services, production, and rural tourism. Even though, in sectoral terms, green economy most frequently concerns the sectors connected with renewable energy sources, environmentally-friendly construction materials and energy-efficient construction, environmentally-friendly transport, water and waste management, and spatial management (Ayres, 2010), the main criterion for distinguishing it is the combination of environmental and social aspects (Ryszawska, 2013). The aim of the research is to know the determinants of the development of green economy. The tasks of the research include analysis of local environment of green economy indicates by subregions (NUTS 3) and the areas of economic activity of enterprises.

Research results and discussion

1. Environment as a determinant of the development of enterprises

The source literature provides many various methods for identifying and assessing the role of environment in stimulating the development of enterprises (*Institutional environment ...*, 1999; Walczak, 2010; Jablonski, Jablonski, 2012; Wasilczuk, 2015; *Prospects for ...*, 2017). The environment of enterprises, including those operating in green economy sectors, is formed by the elements and participants of the market that affect their activities (Flak, Glod, 2009; Rachwal, 2011). This environment is comprised of both the macroenvironment i.e. elements that are external in relation to the enterprise (e.g. technical, economic, social, demographic, political, legal, and cultural determinants) and which are not affected by the enterprise, and meso- and microenvironment which may be, to a certain extent, affected by the enterprise.

One of the major features of the environment is its variability and complexity, the strength of the influence on a particular organisation or processes (North, 1990; Hwang, Powell, 2005; Limanski, 2015). This is the complexity and uncertainty of the environment that have an effect on the process of the development and implementation of an enterprise's strategy, and thus on the structure of the instruments and actions applied. In this context, considerations concerning the possibilities for the development of enterprises of the green economy sector can be focused on searching for factors – both those having a direct effect on its operation and development and those affecting its environment indirectly. Practice shows that entrepreneurs pay more and more attention to factors related to the environment. Based on observations and analyses, it can be assumed that such an attitude in business thinking and acting is a consequence of the increase in importance of network and project organisations in which the boundaries between the enterprises and the environment are very flexible (Krupski et al., 2009).

What is also important is the issue of globalisation of the economy, which is conducive to the formation of strong economic groups stimulating the activity of enterprises (e.g. support as part of

EU programmes). Such a situation supports the efforts to disseminate the cooperative approach based on the idea of cooperation in market activities (Fayerweather, 2007).

Another important issue is the relationships of enterprises with the sphere of research and development, since the development is more and more dependent on the ability to acquire financial support for projects implemented commonly with entities present in the environment of the firm.

Against the background of economic tendencies and trends characterising modern carrying on of an enterprise, a question arises about the way of developing relationships with the environment and of creating conditions that enable making use of the environment for the operation and development of business entities.

2. Environment as a factor of the development of green economy – an empirical study results

The source literature provides numerous classifications of regional determinants. The regional environment comprises public administration units, funding institutions, scientific and educational institutions, and service infrastructure institutions supporting the development of entrepreneurship and conduct of business activities (Wach, 2008). Institutions of the public sphere are particularly responsible for creating local conditions for the development of entrepreneurship, including for the state of technical infrastructure (roads, sewerage, water supply), the level of safety, the situation in the labour market, activity of non-governmental organisations, and entrepreneurship of inhabitants. Another factor affecting the rate of changes in the economy is the local government units' activities oriented towards the activation of the local community through creating a friendly climate for the development of entrepreneurship initiatives, supporting the process of job creation but also maintaining new jobs, particularly in environmentally-friendly sectors, attracting new investors, strengthening local economy through the establishment of connection networks, raising the level of infrastructure in the area etc. (Filipiak, Ruzsala, 2009).

According to the adopted assumption, understanding the determinants of the development of green economy was based on measures that enable the identification of local problems for general groups and factors. The assessment of conditions provided to economic entities by the institutional environment can be assisted by the use of the following subjective component grades for such spheres of socio-economic life, as:

- the state of the natural environment,
- living and accommodation conditions,
- access to information and knowledge on local environment and its problems,
- the quality of technical infrastructure (e.g. roads, sewerage, water supply),
- the situation in local labour market,
- the efficiency and scale of activities of non-governmental organisations,
- the activity of local governments in stimulating the development of SME sector.

An analysis of the obtained opinions of entrepreneurs, concerning the assessment of the elements of local environment of green economy indicates that this is the state of the natural environment that has the strongest effect on the potential for the development of the "green sector" (47.4 pp). In turn, on the regional scale (NUTS 2), the major barrier to the development of green economy is the situation in the labour market (-1.9 pp). However, it is worth emphasising the role of local determinants in stimulating the development of green economy, which is already noticeable at the subregion level (NUTS 3), (Fig 1).

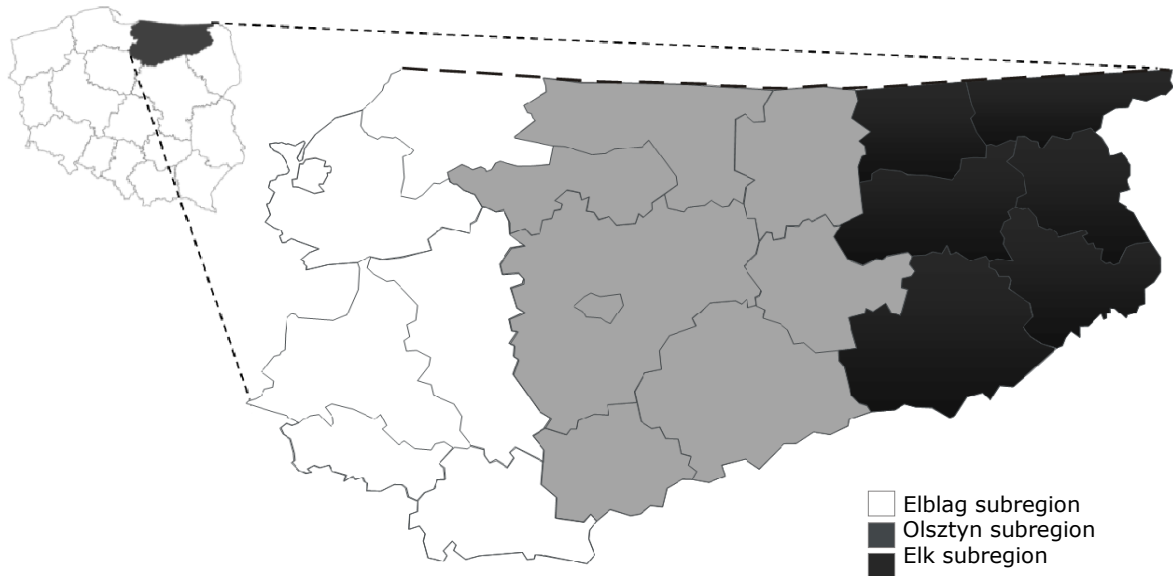


Fig. 1. Differentiation of local determinants in stimulating the development of green economy

In the subregion of the city of Olsztyn, the state of the natural environment was rated the highest by entrepreneurs, while in the subregion of the city of Elk, the highest rated ones were the environment factors associated with the activity of local governments and non-governmental organisations. Therefore, the conditions of the local environment of green economy are most favourable in the Elk subregion (Table 1), and not only do they result from environmental determinants but primarily from the skills of making use of the available tools and instruments in the process of the so-called "greening" of the economy.

Table 1

The balance of ratings of local factors forming the environment of green economy, broken down by subregions

Specification	Total	Subregion		
		Elblag	Olsztyn	Elk
	The balance of pp1			
The state of the natural environment	47.4	19.3	66.9	56.6
Living and accommodation conditions	33.2	19.4	37.4	49.6
Access to information	32.4	21.2	27.1	64.4
The quality of technical infrastructure	18.7	15.1	12.8	38.2
Situation in the labour market	-1.9	13.3	-30.7	33.0
The efficiency and scale of activities of non-governmental organisations	28.2	17.0	28.3	48.7
The activity of local governments in stimulating the development of SME sector	27.1	15.1	26.3	51.4

Source: authors' calculations based on own research.

An analysis of local elements of green economy environment in rural areas of Warmia and Mazury Voivodeship demonstrated that the major barrier which is virtually independent of the area of economic activity of the enterprises under study (production, tourism, agri-food processing) is the difficult situation in the labour market. Even though according to the assessment carried out by representatives of service-providing enterprises participating in the study, the balance of ratings

¹ The effects of particular factors were assessed as definitely unfavourable, unfavourable, neutral, favourable, and very favourable. The balance of pp is the difference between the sum of favourable and very favourable ratings and the sum of unfavourable and definitely unfavourable ones, expressed in % of responses. Negative values indicate that in the respondents' opinions the particular factor of the environment restricts the possibilities for the development of green economy, and a high value of the balance indicates that the particular factor is perceived as a development stimulator.

for this factor took a negative value, this index reached a very low value (1.8 pp), which means that the labour market is the area that does not create a strong potential for the development of green economy in Warmia and Mazury Voivodeship.

The causes of the occurrence of problems in the local environment of enterprises belonging to the green sector of economy in rural areas of Warmia and Mazury Voivodeship are not only related to the unfavourable situation in the labour market and unemployment (opinions of 50.8 % respondents) but also with the unfavourable situation in agriculture (25.4 %) and with the low level of entrepreneurship development (23.3 %); these problems are accompanied by the lack of possibilities for acquiring capital (22.8 %) as well as a low standard of living of rural inhabitants (14.6 %). What is more, in the opinions of entrepreneurs representing the agri-food processing sector, besides the situation in the labour market, the situation in agriculture and the potential possibilities for acquiring capital are of significance. On the other hand, in the opinions of representatives of firms operating in the tourism sector, the problems related to the standard of living of rural inhabitants and to the way the local government units are managed are more important (Table 2).

Table 2

The most important groups of problems restricting the development of green economy, broken down by the areas of economic activity of enterprises (% of respondents)

Specification	Total	Areas of economic activity of enterprises			
		Agri-food processing	Service-providing	Production	Tourism
Situation in the labour market and unemployment	50.8	61.5	52.1	50.4	42.1
The unfavourable situation in agriculture	25.4	61.5	29.1	19.5	2.6
The low level of entrepreneurship development	23.3	23.1	24.7	16.3	13.2
The lack of possibilities for acquiring capital	22.8	38.5	23.6	17.1	21.1
Low standard of living of rural inhabitants	14.6	0.0	14.7	15.4	15.8
Social pathologies	10.1	7.7	11.9	4.9	5.3
Bad condition of technical infrastructure	9.4	15.4	9.1	8.1	10.5
Peripheral location	1.6	0.0	1.9	1.6	0.0
The way the local government units	1.2	0.0	0.6	2.4	5.3

Source: authors' calculations based on own research

Conclusions, proposals, recommendations

The environment in which modern enterprises operate is becoming increasingly complex and variable while serving an important role in stimulating the socio-economic development of the region. The scope of connections between enterprises and the environment is constantly expanding, and not only relates to the technical or economic sphere but also extends to include the sphere of social, political, and cultural issues. Due to the high volatility of the environment in which enterprises operate, and to the complexity of relations, an enterprise which intends to survive in the market and to maintain the competitive advantage needs to adjust to changes in the environment. The need to take appropriate adaptation decisions changes the scope, methodology, and the logic of the operation of an enterprise.

The research indicates that the "greening" of the economy is, to a large extent, dependent on the local and regional determinants. The assumptions of the concept of development, including of green economy, are most frequently made, in terms of planning and the programme, at the level of international organisations (EU), and are implemented as part of national programmes. However, this is the activity of local government units, the efficiency of non-governmental organisations, the involvement of entrepreneurs, and the attitudes of local communities that determine the effects of these actions.

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SPATIAL CONCENTRATION OF BIOECONOMY SECTORS IN POLAND

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Abstract. The problem discussed in the study is regional distribution of main sectors of bioeconomy in Poland and assessment of the level of their spatial concentration. The regional structure was analysed according to province. The statistical measures used to determine the level of geographic concentration and location included the location quotient and Gini concentration coefficient. The study was conducted in years 2011-2016. It was found that in years 2001-2016, the pace of structural changes in regions was not high indicating a high level of concentration of food industry production and agricultural commodity production. Analysis of location quotients in food processing indicates that the highest share of production sold in total food production was recorded in Mazowieckie, Wielkopolskie and Podlaskie provinces (location quotients of 1.5 to 2.0). In terms of agricultural production, the highest levels of agricultural commodity production have been recorded in Wielkopolskie and Podlaskie provinces (location quotient values of 1.5-2.2). The study has shown that the level of concentration of production in forestry in Poland has been stable, and deconcentration of production of renewable energy is progressing.

Key words: bioeconomy, concentration, agriculture production.

JEL code: Q13, P18

Introduction

Bioeconomy encompasses production of renewable biological resources and transformation of these resources and waste streams into value-added products, such as food, fodder, biological products and bioenergy. This approach to bioeconomy was formulated in the strategy of the European Commission, adapted in 2012, entitled "Innovating for sustainable growth: a bioeconomy for Europe" (COM, 2012). According to this definition, bioeconomy combines various sectors of economy that produce, process and re-use renewable biological resources (Maciejczak M., Hofreiter, K., 2013). These include farming, forestry, fishing, food production, manufacturing of bioderivative chemical substances and materials and bioenergy production. Development of these sectors is of key importance for tackling societal challenges, such as growing demand for food, climate changes and reduction in availability of fossil resources (Adamowicz M., 2017).

The main problem discussed in the study is regional distribution of main sectors of bioeconomy in Poland and assessment of the level of their geographic concentration. Economic literature offers many studies, analysing the spatial location of various sectors of economy (Leslie D., Reimer S., 1999; Cohena J.P., Paul C.J.M., 2005; Antonowicz P., 2014). The issue is becoming increasingly important in Poland as well, since transformation to market economy in the 1990s and the processes of integration with the EU have changed the structure of industry, also influencing changes in production location. The same applies to activity in the field known as bioeconomy. Building of effective strategies for development of bioeconomy requires recognition and analysis of spatial issues.

The aim of the study is to determine the spatial distribution of main sectors of bioeconomy in Poland according to region (province) and to assess the level and direction of changes in their spatial concentration. Various statistical measures will be applied to assess the geographic concentration and location, such as the location quotient and Gini concentration coefficient.

The analysis encompassed four main sectors of economy: farming, forestry, food processing and bioenergy production. For these sectors, the data collected included commodity production in PLN million (farming), timber harvesting in thousand m³ (forestry), production sold in PLN million

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(food processing) and production of renewable energy in GWh¹. The reference variable for determination of location and concentration coefficient was the population number. Data were obtained from the Local Data Bank of the Central Statistical Office. The time span for the study included years 2011-2016.

The structure of the article is as follows. The first part presents a short literature review, focusing mainly on the key theoretical aspects of bioeconomy, followed by results of an empirical study of geographical concentration. The second part presents the research methodology applied. The third part contains results of empirical research on geographical concentration of bioeconomy in Poland. The last part of the study presents some final remarks.

Theory and empirical studies of spatial concentration

Theoretical models and empirical studies of regional concentration have been developed for a long time. At present, the theoretical and practical reasons for studying spatial concentration are rooted in three main fields of research in theory of economics, that is: the neoclassical theory, the new trade theory and the new economic geography (NEG) (Aiginger K., Rossi-Hansberg E., 2006). The neoclassical theory assumes that there are differences in productivity between regions, and liberalization of trade and increase in economic integration results in relocation of production and increased specialization to achieve a competitive advantage. The neoclassical models assume ideal competition, uniformity of products and lack of increase in the economies of scale. Location is determined exogenously, on the basis of inherited spatial distribution of natural resources, technologies and/or production factors. Economic activity disperses or concentrates in space, following the pattern of dispersion or concentration of these basic exogenous features. The dominant location pattern is inter-branch specialization: production takes place in those locations, which are characterized by a comparative advantage. Within such framework, assuming zero costs of trade, spatial distribution of demand influences the structure of trade, but not location of production. Assuming that there are trade costs, and in a situation, in which demand is distributed more evenly in space in comparison with production resources, higher trade costs lead to greater dispersion of activity. Limited trade costs result in an ideal dispersion of industry branches according to geographic distribution of demand. Thus, reduction of trade costs generates a trend of increasing of the degree of specialization (Jasinski L.J., 2008).

The new theory of international trade, developed mainly by Paul Krugman², is partially rooted and partially opposed to the theory of comparative advantage, developed by David Ricardo in the early 19th century and modified in the mid-20th century by Eli Heckshcher and Bertil Ohlin (Michalek J.J., 2013). Development of international trade in commodities in the late 20th century undermined the theories of both Swedish economists, enforcing a significant change in the interpretation. One of the key reasons for low predictive power of the H-O theory is the growing intra-industry trade, observed since the mid-1960s. This trade, which consists of simultaneous export and import in the same sectors or branches of production, increased mainly between highly developed countries, characterized by a similar relative level of productivity factors. This theory is based on assumptions very different from those forming the neoclassical theory. It assumes that products are horizontally diversified, which means that every product is available in many varieties. In accordance with the Dixit-Stiglitz demand function, it assumes that the growing number of

¹ Due to lack of regional data on bioenergy production, the study was based on renewable energy production data. In Poland, the share of bioenergy in the renewable energy structure in 2014 amounted to 88.9%.

² P. Krugman received a Nobel prize in 2008 for the new trade theory, presented in the article: Increasing Returns to Scale, Monopolistic Competition, and International Trade (1979), and for his contribution to theory of location of business activity, rooted in the new theory of trade.

varieties in specific goods results in growing consumer satisfaction. On the supply side, Krugman assumed the existence of the economies of scale, like in most modern branches of industry. Increasing of production scale reduces the average production cost, thus improving competitiveness of companies. Growing revenues of scale are usually associated with imperfect competition. Krugman's model provides for the so-called perfect monopolistic competition (Chamberlin's model), in which every company is a monopolist in production of a single variety of a given commodity, while the freedom of entering and leaving the market eliminates extraordinary profits and the prices are equal to average production costs. Each of identical companies produces a different variety of the same commodity. The only production factor is the labour force, which lacks international mobility, allowing for creation of a market balance in a given country. Thanks to these assumptions, Krugman proved the possibility of emergence of intra-industry trade, based on horizontally diversified products, between countries characterized by a very similar, high level of development (Krugman P., 1979). Such trade contributes to increasing of the number of varieties of individual goods and thus - to reduction of prices of goods available on the market. The result is growing wealth of the societies engaged in trade. This is possible thanks to increasing of the production scale and reduction of prices and a growth in the number of varieties of goods available on the common, liberalized market (Bartkowiak R., 2010).

The issue of spatial concentration also refers to the field of economic geography. In the new economic geography (NEG), the significance of geographic factors in management is assigned a key role, while regional specialization is a result of spatial agglomeration of economic activity.

Economic geography is a field of knowledge, searching for answers to questions concerning the causes of distribution of the available productivity factor resources (mainly capital and labour) between countries and regions. P. Krugman used it along with such terms as the economies of scale, consumer's preference for variety and transport cost. From his perspective, consumers (and employees at the same time) prefer to settle in locations, which are densely populated, where they can expect higher real wages thanks to the economies of scale (Krugman P., 1998). On the other hand, the factor, which is decisive for capital distribution, is comparison of economies of scale with costs of transport of goods. Correlations between the two shape the processes of concentration and deconcentration of business activity. Emergence of the big urban agglomerations is to be caused by advantage of the economies of scale over the costs of transport. An opposite situation contributes to more even distribution of labour and capital resources. Economic geography also uses the core and periphery model (Krugman P., 1991). More than one half of the global population lives in cities, which are often very big, constituting the core; the minority lives in the rural areas, or the periphery. The factor decisive for growth of the core are, once again, advantages of uniting production in a single location (Jasinski L.J., 2008).

The theoretical premises have served as a basis for numerous studies dedicated to the phenomena of regional concentration and specialization (Maslikhina V., 2017; Niepmann F., Felbermay G.J., 2010; Martin P. et al., 2011). These also have dealt with bioeconomy sectors. Most of these studies have compared countries in a given region, such as the European Union, or provinces (regions) within the borders of individual countries. An in-depth analysis of the state of bioeconomy in the EU has been provided in a report prepared in 2016 (Ronzon T., et al. 2017). The report also assesses the distribution of bioeconomy locations in the EU member states. The location quotient served as a basis for assessment of distribution of employment and revenues from sale in all sectors of bioeconomy. The report states that Romania seems to be the most specialized EU

member state with regard to bioeconomy, with the location quotient of 3.9. This means that the share of persons working in the Romanian biosector is almost four times higher than the average share of persons working in 28 member states of the EU. In reality, this "concentration" in bioeconomy is caused mainly by very high concentration of the Romanian labour market in agriculture. In 2014, 28 % people working in Romania were employed in the agricultural sector, and 83 % of people in Romanian bioeconomy worked in agriculture. High location quotients for bioeconomy were also recorded in Bulgaria, Croatia, Greece, Poland, Portugal, Latvia, Lithuania and Slovenia (1.5 to 2.1). In these countries, the high share of bioeconomy was also due to employment in agriculture. In the remaining part of the EU, bioeconomy location quotient values range from 0.4 to 1.3. The labour market in these Member States is not concentrated, in particular, on bioeconomy, although some specific sub-sectors of bioeconomy indicate high location quotients. For instance, Cyprus shows a very high location quotient in the sector of fishing and aquaculture. Estonia concentrates on forestry and production of timber components. Fishing and aquaculture are also a developed labour market in Estonia (Ronzon, T., et al., 2017).

A detailed analysis of the strategy of research and innovations in bioeconomy at the regional level can also be found in the report *Bioeconomy development in EU regions*. This regional study shows that research and innovation associated with bioeconomy (R&I) is a priority for most European countries and regions in the period of 2014-2020. Among 210 territorial units analysed (EU regions and countries), 207 (98.6 %) take the aspects associated with bioeconomy into account in their priorities and plans in the field of research and innovation. Nevertheless, bioeconomy at the regional level is very diversified. According to the authors of the report, implementation of bioeconomy at the regional level in the EU thus requires a more detailed analysis and in-depth understanding of various regional characteristics, needs and potential (Haarich S., 2017).

One of the basic sectors of bioeconomy in the EU and in Poland is the food industry. Innovation is a significant aspect of development of this sector. An in-depth analysis of concentration of expenditures for innovation in the food industry in Poland in years 2005-2011 at the regional level has been presented by Grzybowska. This author has found that the structure of expenditures from the interregional perspective is a dichotomous one: one half represents the expenditures of Mazowieckie and Wielkopolskie provinces, and the other half - those of the remaining regions. (Grzybowska B., 2013).

Statistical measures of spatial concentration

Analysis of spatial distribution is associated with the problem of equivalence of observations. Most often, the set of regions analysed is made up of administrative (geographic) areas, which differ in terms of their area or population. In order to mitigate the effect of diversified region size, and to conduct analysis under the conditions of comparability of observations, weight variables are used in spatial analyses. As a result of application of weight variables, spatial distribution of the variable is not analysed in isolation, but compared with distribution of the weight variable. It is assumed that a given phenomenon is strongly concentrated, if the examined and weight variable distributions differ significantly. In this study, the number of inhabitants was used as the weight variable. The key measure used in analysis of spatial distribution of economic phenomena is the location quotient. The location quotient is calculated separately for each of the regions examined

(Suchecky B., 2010). The following formula for determination of the location quotient has been applied in the study:

$$LQ_r^i = \frac{U_r^i}{w_r} \quad (1)$$

Where:

Q_r^i – location quotient

u_r^i – the share of r-th region in the set of all regions for the aggregate variable analysed

w_r – the share of r-th region in the set of all regions for the weight variable

The LQ is to be used to assess regional diversification of production size in four sectors of bioeconomy in relation to the number of inhabitants in a given region.

The synthetic measure of concentration, applied in this study, based on the Lorenz curve, is the Gini coefficient (Suchecky, 2010). The following formula was applied to determine its value in the study, taking into account the spatial weights:

$$G_i = 1 - \sum_{r=1}^R \sum_{k=0}^{k=r-1} [v_{r(k+1)} - v_{r(k)}] [\lambda_{r(k+1)}^i + \lambda_{r(k)}^i] \quad (2)$$

Where:

G_i - Gini index

$v_{r(k)}$ - accumulated share of weight variable

$\lambda_{r(k)}^i$ - accumulated values of examined variable

$r, k = 1, 2, \dots, r$

Gini coefficient was used to assess changes in the level of geographic concentration in four sectors of bioeconomy in years 2011-2016.

Research results and discussion

Test results

Analysis of distribution of production in the key sectors of bioeconomy was conducted on the basis of data of the Central Statistical Office, using various production measures. For agriculture, the commodity production measure in PLN million was used; distribution of production in forestry was measured on the basis of timber production in thousands of cubic meters, food processing production was assessed on the basis of production sold in PLN million, while production of renewable energy was measured in terms of energy production in GWh. The quantitative data collected for production sizes in basic sectors of bioeconomy according to region has been presented in Table 1.

Data presented in table 1 indicates that the regions examined differ in terms of population. The smallest provinces are: Opolskie, Lubuskie, Podlaskie and Swietokrzyskie. The biggest provinces in terms of population are: Malopolskie, Wielkopolskie, Slaskie and Mazowieckie. The share of the biggest four provinces amounted to 44 % of the country population.

The table also presents regional distribution of agricultural production, forestry, food industry and renewable energy. In agricultural production, the highest share was recorded in Podlaskie, Lubelskie, Kujawsko-pomorskie, Lodzkie, Mazowieckie and Wielkopolskie provinces. The share of these six provinces represented 66 % of agricultural commodity production in the country. Timber production in Poland is dominated by Lubelskie, Wielkopolskie i Warminsko-mazurskie and

Zachodniopomorskie provinces, with the share reaching almost 40 %. 54 % of total food production takes place in the following provinces: Slaskie, Lodzkie, Wielkopolskie and Mazowieckie. On the other hand, renewable energy production takes place mainly in Pomorskie, Swietokrzyskie, Kujawsko-pomorskie and Zachodniopomorskie provinces (representing 51 % of total timber production).

Table 1

The size and structure of production in bioeconomy and population according to province in 2016

Voivodeship	POP	%	PTR**	%	PD	%	PAS	%	PEO	%
Dolnoslaskie	2903710	8	3518	4	3364.8	8	6041	3	708	3
Kujawsko-pomorskie	2083927	5	6177	8	1922.4	5	12923	6	3091	14
Lubelskie	2133340	6	6163	8	1999.5	5	7316	4	445	2
Lubuskie	1017376	3	1843	2	3572.7	9	2925	1	632	3
Lodzkie	2485323	6	6427	8	1322.9	3	16512	8	1411	6
Malopolskie	3382260	9	2426	3	1364.4	3	13256	7	491	2
Mazowieckie	5365898	14	13603	17	2416.5	6	45931	23	1437	6
Opolskie	993036	3	2462	3	1426.5	3	4391	2	591	3
Podkarpackie	2127656	6	1521	2	2559.0	6	3152	2	653	3
Podlaskie	1186625	3	5229	7	2184.8	5	12103	6	815	4
Pomorskie	2315611	6	3607	5	3346.3	8	12146	6	2226	10
Slaskie	4559164	12	2264	3	1790.9	4	15272	8	1118	5
Swietokrzyskie	1252900	3	2558	3	1340.4	3	3357	2	2343	10
Warminsko-mazurskie	1436367	4	4233	5	3834.1	9	11243	6	976	4
Wielkopolskie	3481625	9	14873	19	3672.7	9	31028	15	1977	9
Zachodniopomorskie	1708174	4	2940	4	4783.0	12	5601	3	3912	17
Poland	38432992	100	79844	100	40900.7	100	203197	100	22825	100

* POP – Population, PTR – Agricultural commodity production (mln zł), PD- Obtaining wood (thou m³), PAS – Sold production of the food industry (mln zł), PEO – Renewable energy production (GWh).

** Agricultural commodity production – data in 2015

Source: author's calculation based on Local data bank

On the basis of production size in individual sectors, taking into account the population data, the location quotient values were determined. Detailed data can be found in Table 2. Agricultural production is the main sector of bioeconomy, responsible for supply of biomass in form of agricultural raw materials (Drejerska N., Golebiewski J., 2017). Products manufactured in agriculture are used for food production by the food industry, as well as for production of energy and various types of raw materials. Analysis of location quotients for agricultural commodity production in regions indicates that the lowest level of production has been recorded in Slaskie, Podkarpackie and Malopolskie provinces.

The location quotient values range from 0.2 to 0.49 in these regions. This means that agricultural production of this region represents a relatively low share in total agricultural production. The highest levels of agricultural commodity production have been recorded in Wielkopolskie and Podlaskie provinces (location quotient values of 1.5-2.2). These regions are characterized by modern, intensive farming, including, in particular, well developed animal production.

The second sector of bioeconomy analyzed is forestry. It is also one of the main producers of biomass, used by many other sectors of economy. Timber is the main product of forestry. It is used in construction, paper making, furniture production, and it is a significant raw material in energy production. The highest location quotients for timber production were recorded in Podlaskie and

Warmińsko-mazurskie provinces in the north-eastern part of the country and Zachodniopomorskie and Lubuskie provinces in the west. The lowest location quotients for timber production in 2016 were recorded in Śląskie, Małopolskie, Mazowieckie and Łódzkie provinces.

Table 2

Location quotients for agricultural commodity production, forestry, the food industry and renewable energy in 2016

Voivodeship	Agricultural commodity production	Obtaining wood	Sold production of the food industry	Renewable energy production
Dolnośląskie	0.583	1.089	0.394	0.411
Kujawsko-pomorskie	1.425	0.867	1.173	2.497
Lubelskie	1.387	0.881	0.649	0.351
Lubuskie	0.871	3.300	0.544	1.045
Łódzkie	1.241	0.500	1.257	0.956
Małopolskie	0.346	0.379	0.741	0.244
Mazowieckie	1.224	0.423	1.619	0.451
Opolskie	1.190	1.350	0.836	1.002
Podkarpackie	0.344	1.130	0.280	0.517
Podlaskie	2.117	1.730	1.929	1.157
Pomorskie	0.753	1.358	0.992	1.618
Śląskie	0.238	0.369	0.634	0.413
Świętokrzyskie	0.980	1.005	0.507	3.149
Warmińsko-mazurskie	1.415	2.508	1.481	1.144
Wielkopolskie	2.060	0.991	1.686	0.956
Zachodniopomorskie	0.827	2.631	0.620	3.856

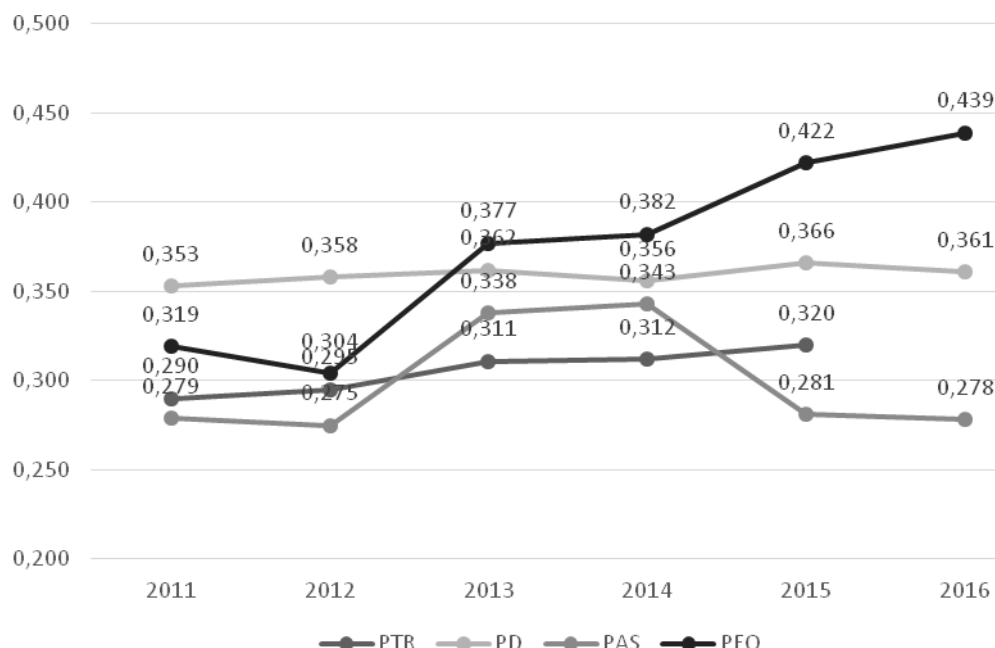
Source: author's calculation based on Local data bank

Food processing is one of the most dynamically developing sectors of economy in Poland. In terms of bioeconomy, food processing engages in production of food items on the basis of agricultural raw materials. The industry includes processing of plant and animal products. Analysis of location quotients in food processing indicates that the highest share of production sold in total food production was recorded in Mazowieckie, Wielkopolskie and Podlaskie provinces (location quotients of 1.5 to 2.0). The lowest share in food processing, on the other hand, was recorded in Podkarpackie and Dolnośląskie provinces.

Production of renewable energy is an important sector of bioeconomy. In some countries, production of electricity on the basis of renewable energy sources has exceeded 50 %. A good example here is Latvia, where the policy of support for development of power plants using biomass, the share of renewable energy sources in electricity production in 2014 exceeded 51 % (Rubins M., Pilvere I., 2017).

Similar trends can be observed in Poland, where in years 2005-2015, production of bioenergy from agricultural forces increased from 5 to 42 TJ (Wicki L., 2017). Production of renewable energy in Poland is also characterized by great regional diversity. In year 2016, the highest location quotients were recorded in Pomorskie, Kujawsko-pomorskie, Świętokrzyskie and Zachodniopomorskie provinces. Production of renewable energy is developing mainly on the coast and in the central part of the country; installations of this kind are rarely found in the southern and eastern parts of Poland. This indicates existence of some regional conditions that shape development of renewable energy.

The values of Gini coefficient, taking into account spatial weights for the analysed bioeconomy sectors, have been presented in Figure 1.



Source: author's calculation based on Local data bank

Fig. 1. Gini concentration coefficients for agricultural commodity production, timber production in forestry, food processing

In 2016, the highest levels of concentration were recorded for food processing (Gini coefficient of 0.278). Agricultural production was only slightly less concentrated (0.320 - data for year 2015). The lowest level of geographical concentration was recorded for production of renewable energy (0.439).

Summary

Bioeconomy constitutes a significant component of the Polish and European economy. It is subject to market rules and principles. The conditions of functioning of enterprises in the global economy force managers to tackle new challenges with regard to selection of enterprise location. Poland, as a part of the global system, shows similar trends, including the phenomenon of spatial concentration of production.

The study depicts the issue of regional concentration of bioeconomy sectors. The study was developed using the basic statistical measures of concentration, that is, the location quotient and the Gini concentration coefficient.

The main results of the study indicate that in years 2001-2016, the pace of structural changes in regions was not high. A high level of concentration of food industry production and agricultural commodity production. Analysis of location quotients in food processing indicates that the highest share of production sold in total food production was recorded in Mazowieckie, Wielkopolskie and Podlaskie provinces (location quotients of 1.5 to 2.0). In terms of agricultural production, the highest levels of agricultural commodity production have been recorded in Wielkopolskie and Podlaskie provinces (location quotient values of 1.5-2.2). The study has shown that the level of concentration of production in forestry in Poland has been stable, and deconcentration of production of renewable energy is progressing.

A significant and interesting issue in this context would be also to determine the driving forces behind regional concentration of bioeconomy in Poland. In-depth analyses, in terms of absolute and relative terms, should also be recommended, not only on the domestic scale, but also at the EU level.

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ECOSYSTEM SERVICES VALUE: CASE OF POLLINATION

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Abstract. Ecosystem services constitute inseparable component of human life. Their economic value is difficult to estimate. Estimating the economic value of the ecosystem services is important because it is necessary to make people realise the importance of the natural environment. The study attempts to present the pollination as an ecosystem service. The purpose of the study was to specify the market and non-market components of valuation of pollination as well as estimating the economic value of the service for the main crops in Poland.

Pollination of open-pollinated plants is necessary for their reproduction. In Poland, the plant species pollinated by insects account for approx. 78 % open-pollinated plant species. They include many arable crops. The most important Polish entomophilous arable crops include the fruit plants, rape, colza, shrubs and permanent pasture, buckwheat and vegetables: tomatoes and cucumbers. The value of pollination of the plants in Poland estimated by means of the method of the value of production generated thanks to pollination increased from EUR 625 million in 2005 to EUR 1195 million in 2016. The growth resulted both from the growth of the area of the crops and the growth in the prices of buying-in prices of most of the entomophilous plants. In the structure of the value of pollination, prevailed fruit plants, accounting for 55 % of the value of pollination on average of the total plants under review in 2005-2016. The value of pollination of rape and colza amounted to 21 % on average; of fruit shrubs and permanent crops: 14.5 %; tomatoes and ground cucumbers: 7.5 %, and buckwheat: over 2 %.

The method of estimating the pollination value of open-pollinated plants should be developed, in particular those related to the economic value of wild plants. In particular, the foregoing follows from the need of compensation for the ecosystem services performed, e.g. by honey bees of the apicultural farms, and also imposition and enforcement of fines if the natural environment is destroyed.

Key words: ecosystem services, pollination, economic value of pollination, Poland.

JEL code: E01, Q51, Q57.

Introduction

The nature (the ecosystem) and the goods and services generated by the nature are of fundamental importance for human life. The economic value of the nature lies in choices that humans make (Zylicz, 2017). The value of the nature is perceived by the value of the so-called ecosystem services. In order to continue its development, the world economy has to overcome the ecologic barrier, i.e. responsibly use the natural environment (Rutkowska-Podolowska, Poplawski, 2015). This, in turn, points to the need of valuation of the environmental goods and services. We should bear in mind the limitations applicable to monetary valuation of goods and services of this kind, in particular due to their complexity (Fiedor, 2017).

Ecosystem services may be defined as their contribution to human well-being (Braat, de Groot, 2012). On the other hand, Boyd and Banzhaf (2007, p. 619) provided the following definition of the ecosystem services: "Final ecosystem services are components of nature, directly enjoyed, consumed, or used to yield human well-being." We can distinguish between the market and non-market value of the ecosystem services (Boyd, Banzhaf, 2007), depending on whether the service can be evaluated on the market or not. The study of Constanza et al. (1997) was a ground-breaking work concerning the value of nature, specifying 17 key ecosystem services along with their economic value (USD 33 trillion ($33 \cdot 10^{12}$) annually on average) above the annual global GDP. This pointed to the importance of the ecosystem services as indispensable for human life.

Pollination is one of the ecosystem services. The study presents an attempt to characterize pollination performed by insects as an ecosystem service, specifying the market and non-market

components of the value of this ecosystem service, and the economic value of pollination of arable crops in Poland. The study employs the literature analysis method, as well as the dependence ratio method with regard to valuation of the economic value of pollination of the arable crops.

Research results and discussion

1. Pollination benefits

The natural environment provides many services, which can be divided into the following groups: provisioning, cultural, supporting and regulating ones (Schowalter et al., 2017). Insects, which are an important component of the natural environment, play the key role in the creating and regulating of many ecosystem services (Stein et al., 2017). Pollination is one of the most important ecosystem services performed by insects (Noriega et al., 2017).

Pollination is necessary to obtain fruit or seeds. Depending on the origin of the pollen serving for pollination, we can distinguish self-pollinating and open-pollinating plants. Self-pollinating plants use pollen from the same flower or another flower of the same plant for pollination, while open-pollinating plants need pollen from another plant of the same species for pollination. However, even in the case of autogamous species, cross-pollination allows obtaining finer fruit and seeds. Open-pollinating plants need an external factor for pollination, which, under the natural condition, can include wind, water, or animals (predominantly insects). According to estimations, the majority (approx. 78 %) of open-pollinating plants in Poland is pollinated by insects, while approx. 22 % of the plants are pollinated by wind (Koltowski and Jablonski, 2008).

Honey bee is one of the most important pollinating insects in the world. Its importance grows due to increasingly large arable areas which prevent wild pollinating insects access to the plants, pollution of the natural environment, inappropriate use of plant protection products and other chemicals in agriculture and reduction of non-productive areas. All those factors negatively contribute to the number of wild insects in the natural environment, and in addition to the honey bee, also solitary bees and bumble bees, in particular with regard to crops cultivated under shelter (Hanley et al., 2015). Also, other insects are important for pollination of plants, since many insect pollinated plants must be pollinated by specific insect species in order to yield seeds (Garratt et al., 2014), which follows from co-evolution of the organisms.

Insect pollination as an ecosystem service provides many benefits to mankind, whether directly or indirectly. The opportunity of obtaining crops should be considered as the primary benefit. Pollination allows obtaining crops of fruit or seeds of open-pollinating plants or at least is the factor increasing the number and quality of the crops (Kremen et al., 2007, Klatt et al., 2014, Melathopoulos et al., 2015, Stewart et al., 2017). In particular, the influence of the pollinating insects on the arable crops was discussed in particular by Morse and Calderone (2000) and Losey and Vaughan (2006). The immediate benefits also include the continuance of diversity, since absence of pollinators prevents open-pollinating plants from reproduction which results in changes in the natural environment in the form of extinction of the plant. As far as honey bee is concerned, the intermediate benefits include the possibility of obtaining bee products, such as honey, pollen, propolis, wax, apitoxin (bee venom) and royal jelly. The products may be included into human diet but they may also be used for medicinal or cosmetic purposes. In certain, usually less developed, countries insects may constitute food being a source of easily digestible protein. Pollinating insects also provide food for animals, in particular birds, thus contributing to their preservation. As far as the honey bee is concerning, it can be used as a bioindicator, due to their prevalence and

accumulation of pollution in their organisms, which may be an indicator of the quality of the natural environment.

2. Economic value of pollination

It is difficult to estimate the economic value of pollination of plants. The effects of pollination of plants may be attributed to any of the ecosystem services groups distinguished by Schowalter et al. (2017).

In the source literature, publications prevail in which the pollination value has been estimated from the point of view of arable crops. They found out that approx. 35 % of the global food production depends on insect pollination (Klein et al., 2007). The importance of pollinating insects for the global agriculture is growing. The surface area of arable crops has grown by more than 300 % between 1961 and the first decade of the 21st century (Aizen et al., 2008). The annual value of pollination of arable crops was estimated at USD 153 billion (Gallai et al., 2009). The value of pollination of arable crops in the European Union countries estimated by Gallai et al. (2009) and by Leonhardt et al. (2013) did not significantly differ (and amounted to EUR 14.2 and EUR 14.6 billion, respectively), which may mean that the method of estimation of the said value have been better developed. More results of works related to the estimation of the value of pollination of arable crops are presented in the study by Majewski (2017).

It is much more difficult to determine the value of pollination of wild plants. This is due to an absence of measurable effect and generation of so-called non-market goods. The goods are not present on the market, and, therefore, have no market price, which may raise controversies. For example, it is difficult to estimate the market value of a plant species, which will become extinct in the case of absence of its pollinating insects. In such a case, if the ecosystem service is public good, the services can be valued using direct or indirect techniques. In the event of indirect techniques, it applies to hypothetical markets on which specific good can be purchased or sold. The value of a service is determined by asking how much people would be willing to pay for specific good (willingness to pay – WTP), or how much they would ask to dispose of *(sell) the good (willingness to accept – WTA). On the other hand, as far as the indirect technique is concerned, the economic value is obtained by examining so-called substitute markets, on which goods that are complimentary to the good of interest are purchased and sold, provided that such markets exist.

In order to give picture of the economic value of pollination, estimation of the value for the main arable crops cultivated in Poland in 2005-2016 was performed. The study was based on the data collected by the Main Statistical Office (GUS) in Warsaw, the National Bank of Poland (NBP) and the source literature. The data provided by the Main Statistical Office were used to determine the production volume and the average buying-in prices of selected raw vegetable materials. The data obtained from the NBP concerned the average rates of foreign exchange and served the purpose of determining the pollination value in euro. The source literature provided the basis for determination of the participation of insect pollination in the yielded crops.

The most important insect pollinated arable crops cultivated in Poland were separated for the study: i.e. rape and colza, buckwheat, fruit plants (apple, pear, plum, cherry and sour cherry trees), shrubs and permanent crops (currants, gooseberry, strawberry and raspberry) and vegetables (tomatoes and cucumbers). The dependence ratio method was used to estimate the pollination value of the crops. Simplicity is an advantage of this method, since the value is calculated as a product of the value of production of specific plant and coefficient of the influence of

pollination on the crop volume (e.g. if the coefficient is 0.6 it means that 60 % of the value of production was obtained thanks to pollination). However, a problem related to this method is the determination of the effects of pollination and their valuation. The source literature often presents varying opinions concerning the extent of the influence of pollination on the yield of arable crops. This is attributable to multiplicity of factors affecting the crop volume, a part of which cannot be controlled by humans. It should also be noted that pollination is a specific procedure since it contributes to crop generating potential of plants. The potential may only be augmented but not created by other agro-technical procedures such as fertilisation, plant protection. On the other hand, natural factors, like frosts, hailstorms, absence or excessive precipitation may prevent or limit the yielding of crops. Selection of unit prices of seeds and fruit yielded thanks to pollination is also a certain problem. In the study, the buying-in prices of the agricultural crops were assumed.

Table 1

**Economic value of pollination of the main crops in Poland in 2005-2016
(EUR million)**

Description	2005	2010	2011	2012	2013	2014	2015	2016
Rape and colza	83.7	214.2	249.1	264.8	282.3	310.5	291.5	247.0
Buckwheat	9.6	27.0	32.2	19.9	19.3	19.0	32.1	49.9
Apples	266.6	300.6	512.0	502.2	657.5	403.7	584.9	484.5
Pears	15.0	16.7	19.6	22.1	22.7	20.9	22.1	25.5
Plums	16.2	17.5	21.4	28.6	21.3	14.0	22.7	20.5
Sour cherries	82.0	84.5	95.9	129.3	93.0	45.1	63.4	54.3
Cherries	19.8	54.0	43.6	53.5	47.7	59.8	54.0	48.4
Strawberry	10.3	17.8	31.0	31.4	23.3	24.1	24.6	27.3
Raspberry	29.7	70.3	60.4	71.0	118.0	115.0	118.6	126.1
Currants	24.2	64.0	112.0	58.2	50.1	23.1	20.9	33.6
Gooseberry	4.4	4.9	8.4	9.9	8.2	6.8	3.8	2.6
Cucumbers *	61.6	72.0	70.9	83.9	87.4	78.9	76.0	67.5
Tomatoes *	2.9	5.8	6.2	7.9	9.7	10.9	10.2	8.5
Total	625.9	949.3	1262.6	1282.9	1440.5	1131.6	1324.9	1195.8

* - field crops were included.

Source: author's calculations based on *Rolnictwo w 2016 r., 2017, Skup i ceny...*, 2017 and *Użytkowanie gruntów i...*, 2017 (*Agriculture in 2006, 2017, Buying-in and prices ..., 2017 and Land use and ..., 2017*)

The value of pollination of the main crops in Poland in 2005-2016 ranged from over EUR 625 million in 2005 to EUR 1440 million in 2013 (Table 1). In each of the years under review, apple trees were the most important arable plants from the point of view of pollination. Their pollination value ranged from nearly EUR 270 million in 2005 up to nearly EUR 660 million in 2013. The high value of pollination of the plant followed from adoption of high index of the influence of pollination on the crop volume (1.0). On the other hand, considerable variability of pollination of apple trees followed both from changes in the buying-in prices of apples in the years under review and from variability of the production volume.

The high value of pollination was also obtained in the case of rape and colza. The pollination value in 2011-2016 was approximately 3 - 4 times higher than in the initial year of the study. It was primarily the result of the growth of the surface area of cultivation of that plant, which was attributable to the growth in the demand for rape seeds from the industry, in particular the biofuel industry. Rape is important from the point of view of apiculture, since rape is a melliferous plant. The value of pollination of buckwheat was characterised by the highest dynamics. This was attributable to the considerable increase in the prices of buckwheat seeds in the period under

review. Also the value of pollination of raspberry increased over 4 times both in terms of the growth of the cultivation area by nearly 100 % and the buying-in prices which grew by over 130 %. However, in 2016, drops in the value of pollination of sour cherry and gooseberry were reported as compared to year 2005. In the case of the first plant, the latter was attributable to drop in the buying-in prices by over 50 %. On the other hand, drop in the pollination value of gooseberry was mainly attributable to decrease in the area of its cultivation.

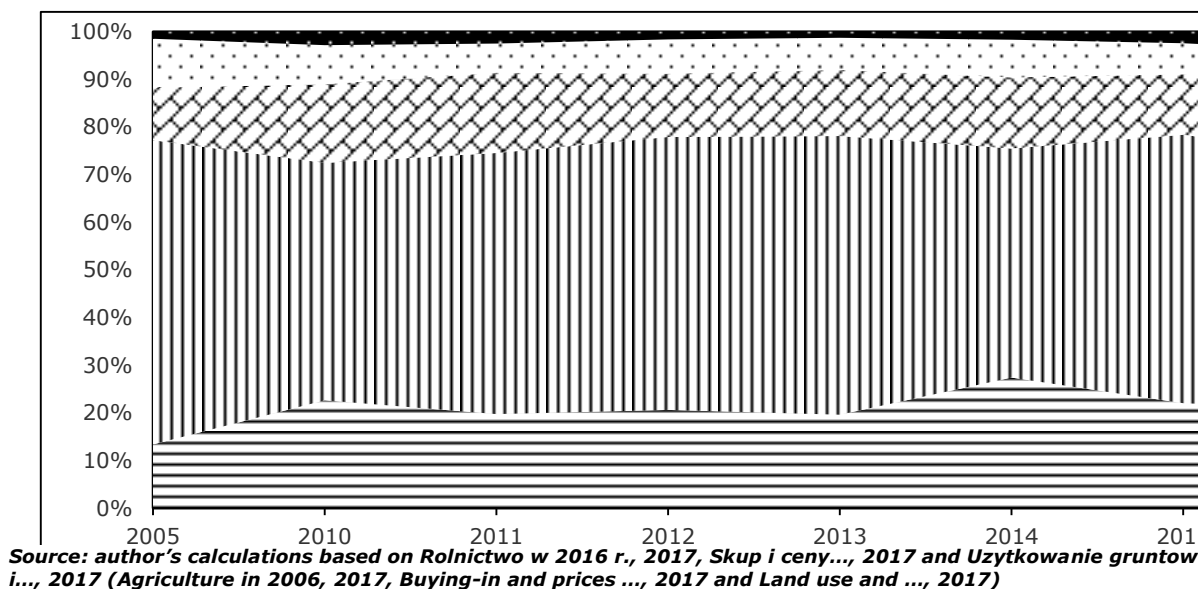


Fig. 1. The structure of the pollination needs of the most important arable crops in Poland in 2005-2016

In the economic structure of the value of pollination of arable crops in Poland in 2005-2016, the fruit plants were of the greatest importance (Fig. 1). Their pollination value ranged from nearly 400 to over EUR 840 million, and represented from 48 % in 2014 to nearly 64 % of the value of pollination of arable crops in 2005. Rape was an important plant from the point of view of the pollination value. Its share in the pollination value grew from 13.4 % in 2005 to nearly 21 % in 2016. This was attributable to a large extent from the growth in the area of cultivation of this plant in Poland. In the period under review, the value of pollination of fruit shrubs and permanent crops on average accounted for approx. 14 % of the value of pollination of all the plants under review, with deviation by +/- 3 percentage points. In the period under review, the share of the ground vegetables (tomatoes and cucumbers) dropped from over 10 % in 2005 to approx. 6 % in 2016, which was attributable to stagnation in the volume of the crops of the plants and negligible pace of growth in their prices.

Conclusions and recommendation

Pollination is the key ecosystem service due to its fundamental role in the reproduction of plants. The pollinating insects account for the key group of animals providing the service. In Poland, the pollinate approx. 78 % of open-pollinated plants; therefore, the realistic determination of the economic value of the services is so important. The following conclusions and recommendations may be drawn and formulated on the basis of the research.

- 1) Pollination as the key ecosystem service performs both the supply role (which is a component of the food production process) and a supporting and regulative (plant reproduction) role, and also a cultural role (e.g. restoration of wild-bee keeping).

- 2) Vast influence of the pollination on human life and the nature, including in particular production of public good makes it difficult to fully estimate the economic value of pollination.
- 3) In Poland, the economic value of pollination of the major arable crops grew from EUR 625.9 million in 2005 to EUR 1440.5 million in 2013. In the last year of the study (2016), the value amounted to EUR 1195.8 million
- 4) Changes in the pollination values were mainly attributable to changes in the cropped area and entomophilous plant crops, and also to variability in the prices of fruits and seeds obtained from the plants.
- 5) It seems reasonable that in the methods of pollination of the open-pollinated plants the aspect of change of prices as a result of growth/drop in the production of specific goods should be taken into account to a greater extent. Also, importance should be attached to improvement in the quality of agricultural products achieved thanks to pollination. However, from the point of view of determining the value of pollination of wild plants, research should be continued to improve the estimation methods.

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ECONOMIC AND ECOLOGICAL POTENTIAL OF THE PROTECTED AREAS IN THE PIENINY MOUNTAINS

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Abstract. The aim of this paper was a synthetic evaluation of selected aspects of the economic and ecological potential of the Pieniny, one of the most interesting medium-height mountain ranges in the Carpathians. The paper is an attempt to analyse the potential of protected areas of Pieniny Region, especially the Pieniny National Park. Economic interest and nature conservation as pursued by the national park and supported by the specific, individual farms, seem to be related to a significant extent. Except for the highly developed non-agricultural entrepreneurship in the Pieniny communes, including tourism and the related services, small-scale, dispersed agricultural production is important here. Sheep are kept in small herds and the majority of them are handed over for collective grazing during the season. They are grazed in 12 herds, one of which is involved in the environment-friendly cultural grazing in the Pieniny National Park. Sheep grazing in the pasture lands and abandoned arable land helps to maintain the biodiversity and the attractiveness of the cultural landscape, and tourists can buy sheep's cheese produced by the local people, who live in the Pieniny.

Key words: economic potential, natural values, the Pieniny Mountains.

JEL Classification: Q, Q5, Q57

Introduction

There are three main mountain ranges in Poland: the Carpathians, the Sudety and the Świętokrzyskie Mountains, of which the last one is in fact an upland, because of relatively small heights. The mountain range and geomorphological province, with the greatest area are the Carpathians, that are also among the largest and the most important European mountains. In the area of Poland, they are divided into several smaller mountain ranges, such as: Pieniny, Tatra Mountains, Beskidy and the Carpathian Foothills (Kondracki J., 2009; Zemanek B., 2009). In territory of the Carpathians, there are located as many as 141 rural and urban-rural communes, thus they are important from an economic point of view.

The paper is a dual analysis, combining the review part based on the analysis of the literature on the subject, including proprietary works, and the institutional analysis including the economic aspects of the area of Pieniny Mountains, with a special focus on agriculture, as well as some of their ecological potential. The economic part of the research is based on inductive-deductive method, related to institutional analyses. Moreover, the study is an original approach to illustrate interrelations between economics and ecology, including mountain landscape protection. An example has been presented, in the form of a case study, regarding economic activities undertaken, in order to maintain the biodiversity of the pasture lands situated in the Pieniny National Park, by cultural grazing of sheep. Some of the biotic resources of the Pieniny Mountains have been also presented, whose protection and maintenance is still an important challenge for the region. Source materials have been collected in January 2018 from the Directorate of the Pieniny National Park in Krościenko and from the Regional Union of Sheep and Goat Breeders in Nowy Targ. Source data regarding mass statistics came from the Statistical Office in Krakow and relate to 2016.

The aim of the paper was the synthetic evaluation of the economic potential and ecological resources of one of the most attractive mountain ranges of the Polish Carpathians, that are Pieniny. Special attention was paid to the economic and institutional aspects of maintaining the

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biodiversity in this mountain range, thanks to the support from the EU programs, that provide some financial assistance for cultural sheep grazing in the mountain pastures.

Research results and discussion

1. Polish Carpathians

The total mountain area in Poland is 878.4 thousand ha, of which the 77.2 % is the Carpathians, 18.8 % Sudety, and the Swietokrzyskie Mountains cover only 4 % of this area. Although part of the high-mountain range, the Tatra Mountains, is situated in our country (ca. two thirds of the range lies in neighbouring Slovakia), only 1.5 % of the area belonging to the farms, lies at higher altitudes than 500 m above the sea level. Mountain areas differ from lowlands or uplands because of a few specific features, such as: the climate, soil types, precipitation and flowing waters, but also flora and fauna. The climate in the mountains includes altitudinal arrangement of thermal and precipitation zones, as well as great diversity of the local climate types. A specific feature of this area is that the land is hardly useful for agricultural production, which includes a limited range of crop species and less opportunity for yields.

In the Carpathians, the temperature drops on average by 0.5 °C with each 100 metres above the sea level, and the precipitation increases by 30-50 mm per year. This favours farming on grasslands, at the same time reducing the chance for decent yield on arable land. The length of the vegetation period above the average altitude of 1 550 m above the sea level is reduced to 140 days, and the frost-free period is reduced to 110 days. Mountain areas also experience considerable precipitation, which may be quite diverse, spatially and seasonally. What is characteristic, is the increase of precipitation along with the increase of the altitude above the sea level. Maximum average annual precipitation is ca. 1800 mm for the average altitude of 1 850 m above the sea level and it drops by 15 mm with each 100 m upwards. The sloping of the land in the mountains is the main criterion for the way and intensity of land management, including its usefulness for plough tillage, assignment as permanent grasslands, or forest use, without alternatives (Kaim D., 2009).

When analysing the various aspects of the strengths and weaknesses of the Polish Carpathians, seen from the perspective of land factor, such as usefulness and attractiveness, we can see that the prominent problem is the agrarian structure. The land here is usually highly fragmented and dispersed, which accounts for its adverse layout. At the same time, the structure has been permanent for years, both as regards ownership and management. Trade in farmland is particularly low here, and in fact it's hardly noticeable, especially in the highlands of the Carpathians. Subregionally, it is more and more common for people to refrain from farming the agriculturally marginal land, which doesn't mean that the land is intended for sale or lease, though. A significant and progressive phenomenon in agricultural production is plant succession when it comes to the land use. Abandonment of arable land leads to its transformation firstly into grasslands, and then woodland. Apart from other production aspects, it is conducive to the reduction in the agricultural value of the land. Agricultural production, especially on arable land in the dominant part of the mountains, is rather traditional and extensive. The production most often takes place on small land plots (0.05-0.2 ha), where extensive farming of potatoes and cereal is maintained. However, this production is not only significant for the inhabitants of the rural areas in the mountains, but it is also a decisive factor for the people's lifestyle, by living close to the nature (Musiał W., 2017).

2. Economy of the communes situated in the Pieniny Mountains

Although the very range of Pieniny is relatively small, as it is ca. 30 km long, in fact it makes a geographical region of considerable economic, social and cultural potential. It is composed of three communes: part of an urban-rural commune of Szczawnica, a rural commune of Kroscienko and part of the Czorsztyn commune. The total area of these communes is 207 km² and their joint population is about 21.7 thousand. The communes are of similar size, however Kroscienko is the largest of these three (Tab. 1).

Table 1

Selected characteristics of the communes in the Pieniny Mountains

Specification	Communes			Total
	Czorsztyn	Kroscienko	Szczawnica	
Area (km ²)	62	88	57	207
Total population	7611	7322	6772	21705
Population per 1 km ²	104	83	119	99 ¹⁾
Business entities per 10 thousand inhabitants	1395	2025	1572	1664
Registered unemployment (%)	7.4	8.5	7.1	
Agricultural land (ha)	1552	2134	1306	4992
Agricultural land (%)	25.0	24.2	22.8	24.1
Afforestation (%)	44.6	68.1	49.1	
Percentage of farms up to 3.0 ha	94.2	85.2	80.4	86.6
Tourist accommodation establishments	22	74	15	111
Cattle - physical count of animals/100 ha of agricultural land	23.1	25.9	9.2	20.7
Sheep - physical count of animals /100 ha of agricultural land	77.1	68.3	18.8	54.7
Tourist accommodation establishments	22	74	15	111
Total income of the commune budget per 1 inhabitant (in PLN)	4085 (950 EUR)	4049 (941.6 EUR)	3929 (913.7 EUR)	4021 (935.1 EUR)
Proportion of people using the:				
- water supply network	75.9	69.6	79.3	75.7
- sewage system	92.5	60.7	81.9	79.6

¹⁾Converted with the rate: 1 EUR = 4.3 PLN

Source: Statistical Guidebook of the Local Authorities, Statistical Office in Krakow 2016

The population density of the communes is fairly high, when comparing to the other rural areas in Poland and it's close to the national average value, from 83 people/km² in Kroscienko to 119 people/km² in the urban-rural commune of Szczawnica. Local population is employed both in agriculture and in non-agricultural sectors of economy, especially in services. In the structure of land use, forests are dominant, including the protective forests in the Pieniny National Park. The forests cover a total of 55.8 % of the analysed area and their individual share is from 44.6 % (Czorsztyn) to 68.1 % (Kroscienko). Agricultural land in the whole analysed area covers 4992 ha, and the average share in individual communes is similar, from 22.8 % to 25 %. Farms in this area are fragmented and spatially dispersed, whereas an average of 86.6 % of farms occupy from 1 to 3 ha, and in the Czorsztyn commune this proportion is as high as 94.2 %. This agrarian structure is negative from the point of view of economy and production. For this reason, agricultural production is largely focused on providing supplies for households, and on farms where animals are also kept, the production may partially focus on the market. The number of cattle is relatively low and is on average 20.7 animals/100 ha and it is still on the decrease. It is the result of a sharp drop in the

profitability of the small-scale production (1-2 cows), and of the increasing requirements related to the animals' welfare.

The situation is far better with sheep breeding, as keeping these animals has been there a tradition for centuries and it is strongly rooted in the Pieniny culture (Drozd A., and Twardy S., 2004). In particular communes, the number of sheep may vary and it is respectively: 77.1 animals/100 ha in Czorsztyn, 68.3 in Kroscienko, and 18.8 in Szczawnica. The population of sheep is largely made up of small and very small herds of ewes (a herd may include from 10 to 50 animals). The sheep is kept all year long on a farm, when there is enough feed, or they may be handed over for grazing on pasture lands during the season. The dominant direction in sheep production is the production of light lambs (12-16 kg/animal), which are intended for export. After the lambs are weaned, the ewes are grazed on pastures and milked, and the sheep's milk, usually mixed with cow's milk, is used to make cheese. Breeding sheep is a significant value from the perspective of evaluating the economic potential of agriculture in the Pieniny. There are a total of twelve large herds of sheep, grazed and herded collectively, by *baca* who is a chief shepherd, on pastures and arable lands, which are sometimes transformed into grasslands, plus a few dozens of smaller herds (5-30 animals). The number of sheep grazed in the Pieniny is rather constant and for many years it has been on average 12-13 thousand ewes, which give ca. 16-18 thousand lambs intended for herd reproduction and for export, as mentioned above. Low milk yield of the dominant breed, i.e. the Polish Mountain Sheep, explains the fact that during a single grazing season, 1 ewe gives 55-65 l of milk, which is used to produce ca. 10-12 kg of sheep's cheese known as *bundz*. Therefore, the aggregate production of the valued sheep's cheese from the Pieniny region varies from 120 to 150 tons and this number is increased by 10-20 % due to mixing sheep's milk with cow's milk from the local breeds, which is a legally permitted procedure.

However, the most important business activity from the economic perspective is the diverse service sector focused on tourism and entertainment. Professional boarding houses as well as large scale hotel facilities are located there, a total of 111 of them. There are also numerous farms that provide services that may be classified as agrotourism or small boarding houses, if their activity is not related to agricultural production. A considerable proportion of the local population is seasonally involved in tourism by providing catering services, manufacturing and selling souvenirs, and offering water transport services as well as working as tourist guides in the Czorsztyn and Niedzica castles. A lot of seasonal jobs, for 300-500 people, are created by an organised business entity providing rafting services on the Dunajec river. An important source of income for the local population is providing various construction services, often performed away from their place of residence, usually quite far and often abroad. However, this does not result in the outflow of people from the region, and in fact the migration balance is even slightly on the positive side. The discussed region is inhabited by entrepreneurial and hard-working people, who usually organise their own non-agricultural business activities using the base of their own farm and land, if they cannot find employment away from the farm and their home. Such business activities may include harvesting and processing timber, construction services, trade in construction materials and catering services. A tourist attraction and an important workplace for the local population is also the water dam on the Czorsztyn water reservoir and the water plant in Niedzica. Furthermore, the local population finds employment in supervising forests, in the directorate of the Pieniny National Park, in educational and care facilities and particular communes' offices. The Pieniny region has an attractive location and its value lies in the originality and uniqueness of nature. That's why the

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communes located within this mountain range are widely recognised in the whole country, which considerably strengthens their image and constitutes an important asset in the field of territorial marketing (Dabrowski P., 2008; Gorecki A., Popiela R., and Drozd-Korbyla M., 2002; Wrobel I., 1997).

3. Cultural grazing of sheep in the Pieniny National Park - a case study

In the area of Pieniny National Park (PNP), only one herd of sheep is grazed, of twelve that are kept in the whole Pieniny Mountains. This herd and the grazing process itself are special, because as compared to others, this one is grazed within the perimeter of the PNP, and it is a so called cultural grazing, other than for different herds, where it is mostly commercial or mixed (commercial – cultural). At the moment, ca. 500 sheep are grazed on a pasture complex known as Majerz Pasture Land (*Hala Majerz*), located in Haluszowa village, and covering the area of 52,06 ha. One chief shepherd, who in the Carpathians is called *baca*, is responsible for the herd. Prior to that, there is signed a proper agreement between *baca* and the Directorate of the Pieniny National Park in Kroscienko. The shepherd is chosen following a tender procedure, and then a lease agreement is signed for five years. The current agreement is effective until 2019. The leased area includes non-forested and unfenced parts of 12 registered plots. In the agreement it is stipulated the main purpose of grazing, which is protecting the pasture ecosystem and maintaining the biological diversity. However, if there is not enough feed for the animals in pasture, the chief shepherd is allowed to graze the sheep in the special clearings. A pasture is leased along with farm buildings: the shepherd's hut, stables, and the drinking-troughs situated in the pasture, and fences for the meadows. According to the agreement, the annual lease fee is 25 300 PLN (i.e. 5 883.7 EUR), i.e. 485.9 PLN (113 EUR)/for 1 ha of the pasture land.

Furthermore, the tenant is obliged to observe following grazing rules: the grazing starts on 1 May of the specific year, and ends on 15 October, there must be no more than 10 sheep/ha, i.e. up to 500 sheep in the herd in the grazing season. The tenant has the right to graze individual cows, provided the number of sheep is reduced accordingly (1 cow = 10 sheep). What is more, soil fertilisation with the faeces of sheep is introduced in a continuous manner (the strip method), the density of sheep during the night must be no higher than 1 sheep/2-2.5 m². Other rules according to the agreement include: the distance between the place of fertilisation and the springs and banks of the streams, must be no less than 50m, the tenant does not have the right to lead the sheep to adjacent forests and is not allowed to use mineral land fertilisers without the lessor's consent.

What is more, the chief shepherd must conform to so called social and cultural requirements, e.g. related to the furnishing of the shepherd's hut. The mandatory equipment includes the traditional hearth, a kettle, equipment for processing meals etc. There must be also an access to electricity and water from a deep-drilled well. *Baca* undertakes production of the certified regional *oscypek* cheese and submits the production of the cheese to control, and his hut is located on the *oscypek* cheese trail. The chief shepherd must also display obtained certificates in a visible place in the shepherd's hut. As part of his activity, he may sell dairy products, provided they come from the dairy production conducted in the Majerz Pasture Land. The agreement also includes that on the specified days of the year, *baca* commits himself to appear in the full regional costume, and that also refers to all of his employees. However, according to some authors, there is not so much focus on other social and cultural elements, such as wearing traditional regional clothes and using the regional dialect, as in the neighbouring Tatra National Park (Kawecka A., Radkowska I., Szewczyk

M., and Radkowski A., 2017; Molik E., Dobosz J., Kordeczka K., and Peksa M., 2017). Moreover, the chief shepherd and the people employed by him are also obliged to graze the animals in neat clothes. The tenant is also obliged to carry out any necessary renovations and current repairs of the shepherd's hut and the equipment used to process the milk, whereas such repairs must be performed at his own expense, i.e. the maintenance of the facilities and equipment. He is also to inform the tourists about the grazing procedure, regional traditions, but also about rules that must be followed when visiting the park.

Having a legal agreement for grazing, the chief shepherd may receive payments under the Common Agricultural Policy. These are subsidies for organic farming and direct payments, as well as there is another instrument of income support for the farmers' production in the less favoured areas (LFA). These payments differ slightly from year to year and they total to ca. 1650 PLN (384 EUR) i.e. in aggregate ca. 102.3 thousand PLN (23.8 thousand EUR) (Rural Development Programme, 2014). Moreover, another source of basic income for the chief shepherd, comes from obtaining sheep's milk, which is mixed with a small amount of cow's milk (from 2-4 cows). The milk yield of mixed sheep breeds is low, though, and in a single grazing season it amounts to 60 l of milk, i.e. ca. 30-32 tons of milk from the whole herd and 2-4 thousand litres from the cows (the Polish Red breed). This will produce 4.8-5.5 tons of cottage cheese (*bundz*), which is processed into hard rennet cheese (*oscypek*). It seems, that is especially important to sustain the organic farming in the region, as it is not only about the production of superior quality food, but also a method of environmental protection (Glodowska M., and Galazka A., 2017).

Furthermore, the chief shepherd undertakes grazing of the animals in accordance with principles of the environment-friendly agriculture, where it is also accentuated special ecological potential of the Pieniny Mountains. According to this rule, the chief shepherd is obliged to remove undesirable plant species, manually or mechanically, at his own expense. This refers to such dicotyledonous plant species as e.g. *Cirsium arvense*, which may appear in large quantities in the mountain pasture sward (Musial K., and Kasperczyk M., 2013; Wrobel I., 2003). Besides, a large part of non-forest ecosystems in the PPN are of the anthropogenic origin, and their condition depends on human activity. Thus, grasslands must be mowed twice in each grazing season, in May or June and in August. The most important and valuable non-forest communities there, are e.g.: Pienin's thermophilic meadow (*Anthyllidi-Trifolietum montani*), xerothermic grasslands (*Origano-Brachypodietum*), or wet meadows (*Verleriano-Caricetum flavae*) (Matuszkiewicz W., 2002; Wrobel I., 2003). What is more, at the moment, PNP is not interested in expanding the grazing scope, because in order to sustain the biodiversity in this area, mowing seems to be a better alternative: 100 ha of area in the park is mowed. Grazing is therefore supplemented with mowing with the use of mechanical mountain mowers in places where it is possible, or manually using a scythe. Ca. 90-100 ha of meadows and highland pastures are mowed each year. However, this is even more important as Pieniny Mountains are one of the "hotspots" of biodiversity, with documented existence of over 1,100 species of vascular plants, in a narrow strip of land. This place, apart from the richness of plant species, stands out also because of the endemic and relic species, that have preserved in their isolated position (Witkowski Z.J., 2003; Zarzycki K., 1982).

Conclusions

Mountain areas, compared to other regions in Poland, as lowlands and uplands, have a harsher climate, bigger precipitation, shorter vegetation period, as well as sloping land that may cause

some technological limitations for agriculture. That is why, e.g. in the mountain range of Pieniny there are provided the best conditions for forest production. This, however, creates some significant limitations regarding the organisation of farms, which should focus on keeping ruminants, especially sheep and cattle. Further difficulties related to the production and farming, result of the location of the farms and settlements within protected areas. The Pieniny is a region of medium-height-mountains, characterized by a special beauty, thus it is especially attractive for tourists. The economic base of the local population is of dual nature and is based on the income from small farms breeding ruminants, as well as the well-developed non-agricultural business. Local breeds of sheep are intended for dairy and mixed production, i.e. the so called light lambs are bred, and once they gain the weight of 12-14 kg, they are exported, and the milk from the ewes is used to produce rennet cheese, i.e. *bundz* and *oscypek*, which are mainly sold to tourists. In the Pieniny National Park, cultural grazing is performed with one herd of sheep on the pasture land leased by a single chief shepherd. Organization of the cultural sheep grazing in this region, presented in the paper, may be a good example of searching for a balance between economics and ecology, which together make up for the sustainable development. The analysis confirms that under Polish conditions, in current economic relations of production costs, it is not possible, or it is just very difficult to run sheep grazing without external financial support. Therefore, for various areas, especially of special ecological value, various budget transfers are particularly important. That are subsidies for organic farming, direct payments and also for the less favoured areas.

In conclusion, cultural grazing in the Pieniny National Park (Majerz Pasture Land) has some ecological potential, but also some economic one. The first one is presented by grazing, that aim to maintain the non-forests ecosystems, thus preserve the biodiversity of this region. An alternative to it is mowing of sward every year or every other year, mechanically or manually. It is unproductive, yet effective and valued by scientists. Grazing and mowing are employed to sustain protected, endemic and relic species of the Pieniny, as well as the structure of its traditional landscape, composed of the fragmented arable land, grasslands and forests. Also economic potential appears, as there are tourists coming to that area and to adjacent communities. For them apart from the beautiful nature, crucial seems to be also a separate culture of this region, which includes cultivating the highland tradition, expressed by the cultural sheep grazing. Likewise, sustaining small farms, especially those related to animal production, especially breeding sheep in small herds, which are then handed over for collective grazing, is an important manifestation of the farmers' economic activity and an example of a good coexistence of agricultural business activity and nature conservation.

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CHARACTERISTICS OF THE FISHING INDUSTRY IN LATVIA

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Abstract. Fisheries and aquaculture remain important sources of food, nutrition, income and livelihoods for hundreds of millions of people around the world. In the EU, the development of fisheries is affected by the Common Fisheries Policy which aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for EU citizens. In Latvia, the fisheries industry is related to a rational and sustainable use of living natural resources in its economic zone, territorial waters and internal waters. Therefore, **research aim** is to examine the key characteristics of the fishing industry in Latvia. To achieve the aim, the following specific **research tasks** are defined: 1) to examine the characteristics of the fishing fleets of EU Member States; 2) to analyse total catch volumes and the performance of top 10 fishing enterprises in Latvia. The present research analysed the fishing fleets of EU Member States, which are affected by fleet capacity management measures, catch quotas for Latvia, catch volumes in the Baltic Sea and the Gulf of Riga in the period 2014-2017 as well as the key performance indicators of the top 10 fishing enterprises of Latvia. The research has discovered that the fishing enterprises of Latvia are affected by catch quotas for the key fish species that were reduced on average by 1-57 % during the period 2014-2017. The top 10 fishing enterprises turnover in 2016 increased by 60.7 % compared with 2014 and by 27.7 % compared with 2015, but in 2016 only four made profit.

Key words: fishing, fishing fleet, catch quotas, indicators

JEL code: Q22

Introduction

Fisheries and aquaculture remain important sources of food, nutrition, income and livelihoods for hundreds of millions of people around the world. International trade plays a major role in the fisheries and aquaculture sector as an employment creator, food supplier, income generator, and contributor to economic growth and development, as well as to food and nutrition security. Fish and fishery products represent one of the most-traded segments of the world food sector (FAO, 2016). However, fishing is one of the most risky occupations worldwide. Regarding the economic importance of the sector, it employs more than 37 million direct workers worldwide (not including aquaculture or processing industries). Fishing influence is especially relevant in the less developed countries, where primary sectors have a prevalent role. Globally, fish trade activities have grown in the last years, with exports rising from 72 billion dollars in 2004 to 148 billion dollars in 2014 and imports rising from 76 billion dollars in 2004 to 140 billion dollars in 2014 (Gonzalez M. M., Bulian G., 2018). It has to be stressed that people involved in decision-making processes should understand why fish and fisheries are important for society, that is, be aware of the socio-cultural values that people associate with fisheries (Ignatius S., Haapasaari P., 2018).

In several EU regions the fishing sector plays a crucial role for employment and economic activity – in some European coastal communities as many as half the local jobs are in the fishing sector. The Common Fisheries Policy (CFP) aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for EU citizens. Its goal is to foster a dynamic fishing industry and ensure a fair standard of living for fishing communities (European Commission, 2016).

In various countries, fishing plays an essential role, yet it faces serious challenges. For example, the fisheries industry has long been an important industry along the Norwegian coast. But...overcapacity was considered one of the main reasons behind the Norwegian fishing fleet's poor financial performance (Zhang D., Sikveland M., Hermansen Ø., 2018). The Icelandic fishing

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industry has had to deal with a reduced total catch for the past three decades. The industry has responded by reducing employment, closing factories and scrapping boats, thus significantly lowering the number of people working in the industry, especially in the processing component (Gunnlaugsson S.B., Saevaldsson H., 2016). The Belgian fishing sector is under pressure to demonstrate the sustainability of its fishing methods (Kindsa A., Sysa K. et al., 2016). Fisheries management in Northern Ireland uses a combination of catch restrictions (quota, minimum landing size), effort restrictions (days at sea, no weekend fishing), gear restrictions (minimum mesh size, square mesh panels), and spatial restrictions (the Cod Box). There are also voluntary stock management measures, such as v-notching berried lobsters (Yates K.L., 2014). In Sweden the importance of addressing forest owners' interests in development and management of fish and water resources is essential for successful policy programmes. Not only they own forests, they are a major group owning a water area with fishing rights (Laitila T., Paulrud A., Waldo S., 2018). Britain has a long history as a fishing nation and its waters are some of the most productive in Europe. But Brexit would involve compromise on many issues and the UK would be under pressure to be cooperative, especially in areas that more directly affect other EU Member States. Commercial fisheries are a typical example (Baldock D., Buckwell A. et al., 2016).

In Latvia the fisheries industry is related to a rational and sustainable use of living natural resources in its economic zone, territorial waters, and internal waters. The fisheries industry in Latvia represents three main fields of activity: fishing, fish processing, and aquaculture that to a great extent affects also the development of rural areas (Pilvere I., Upite I., 2011). In recent years, earnings in the fishing industry and aquaculture have increased, on average, by 3-6 % a year, except in 2013 when the earnings decreased by 2 % (Ministry of Agriculture, 2017a; b). Therefore, **research aim** is to examine the key characteristics of the fishing industry in Latvia. To achieve the aim, the following **specific research tasks** are defined: 1) to examine the characteristics of the fishing fleets of EU Member States; 2) to analyse total catch volumes and the performance of top 10 fishing enterprises in Latvia.

Methodology and data. Analysis, synthesis, the logical construction method, the induction and deduction methods were employed to execute the research tasks. Scientific literature review was used as well.

Research results and discussion

1. Fishing industry in the European Union

The total number of fishing vessels in the world in 2014 was estimated at about 4.6 million, very close to the figure for 2012 (FAO, 2016). EU fisheries management aims to achieve efficient fishing activities within an economically viable and competitive fisheries industry. Fleet capacity management is an essential tool for the CFP. The EU fishing fleet is very diverse, with vessels ranging from under six metres to over 75. The EU is the fifth largest producer worldwide, accounting for about 3.2 % of global fisheries and aquaculture production: 80 % of the production comes from fisheries and 20 % from aquaculture. (European Commission, 2016). The leading fishing countries in terms of volume are Spain, Denmark, the United Kingdom and France, which combined, account for more than half of EU catches (European Commission, 2016). Quota management in the EU began for the majority of commercial fish stocks with the first CFP implemented in 1983, a time when fish stocks were at low levels and fishing pressure was still high. The allocation of quotas among the EU Member States is largely determined by historic catch

shares - the "relative stability" - of the Member States over a reference period (1973-78) just before the CFP was brought into force. Under this method, countries fishing in each other's waters during the reference period continue to have the right to do so (Carpenter G., 2016). Gradually fishing pressure has decreased for quota species and some fish stocks are now growing.

The maximum capacity of the fishing fleet for every EU Member State is set in accordance with the fisheries management framework established under the CFP. Among the EU Member States, eight countries dominate: Greece, Italy, Spain, Portugal, Croatia, France and the United Kingdom; their number of fishing vessels accounts for 78 %, their gross tonnage comprises 68 % and their total vessel engine power represents 75 % of the EU total. It has to be mentioned that the Netherlands with only 1 % of the total fishing vessels in the EU accounts for 8 % of the total gross tonnage and almost 5 % of the total vessel engine power in the EU. The number of fishing vessels of Latvia represents 0.8 % of the EU total, while in terms of gross tonnage the fishing fleet of Latvia makes up 2.5 % of the EU total. This means that small-capacity vessels dominate in the fishing fleet (Table 1).

Table 1

Characteristics of EU Member State fishing fleets in 2015

Member State	Number of fishing vessels	Proportion, %	Gross tonnage, Gt	Proportion, %	Engine power, kW	Proportion, %
Greece	15638	18.4	76573	4.7	449534	6.9
Italy	12414	14.6	162749	9.9	1003301	15.5
Spain	9572	11.2	354186	21.6	815872	12.6
Portugal	8136	9.6	96596	5.9	359633	5.6
Croatia	7540	8.9	52341	3.2	414618	6.4
France	6964	8.2	171544	10.5	1001603	15.5
United Kingdom	6319	7.4	194683	11.9	787592	12.2
Finland	2839	3.3	15613	1.0	160475	2.5
Denmark	2396	2.8	69607	4.2	224769	3.5
Ireland	2156	2.5	62331	3.8	189442	2.9
Bulgaria	1989	2.3	6541	0.4	58043	0.9
Estonia	1534	1.8	13225	0.8	43714	0.7
Germany	1465	1.7	64221	3.9	141679	2.2
Sweden	1357	1.6	30398	1.9	167214	2.6
Malta	1005	1.2	7106	0.4	73106	1.1
Cyprus	893	1.0	3502	0.2	40209	0.6
Poland	874	1.0	26293	1.6	76256	1.2
Netherlands	832	1.0	133995	8.2	312548	4.8
Latvia	688	0.8	41403	2.5	46484	0.7
Slovenia	169	0.2	597	0.0	8540	0.1
Romania	152	0.2	870	0.1	6146	0.1
Lithuania	144	0.2	41403	2.5	46484	0.7
Belgium	78	0.1	14535	0.9	46289	0.7
Total	85154	100.0	1640312	100	6473551	100

Source: EUROSTAT, 2017.

It has to be noted that the length range of fishing vessels is very diverse – from less than 6 m to more than 75 m (Community Fishing..., 2017), and so is the range of gross tonnage (0.16–4407 Gt). For example, the number of fishing vessels in the neighbouring country – Lithuania – accounts for only 0.2 % of the EU total, while the gross tonnage represents 2.5 %, which indicates that the

fishing fleet of Lithuania exploits larger-capacity vessels. Among the Baltic States, the largest fishing fleet with 1534 vessels is reported in Estonia, yet its gross capacity is only 32 % and its total engine power is 94 % of the total fishing fleet of Latvia. The average age of vessels used in fishing beyond the coastal zone is 27.2 years, while the average age of those used in the coastal zone is 26.4 years. During the course of time, the vessels have become obsolete and therefore cause greater risks to the environment as well as increase the maintenance and operational costs of the vessels (Ministry of Agriculture, 2016b).

In 2016 in Latvia, 57 vessels did fishing in the Baltic Sea and the Gulf of Riga beyond the coastal zone, 610 fishing boats – in the coastal zone and 12 vessels – on the high seas.

In Latvia, the State Environmental Service (SES) controls fishing done by the fishing vessels of Latvia in the waters of EU Member States and non-EU countries and in international waters in accordance with the legal framework. The SES grants licences for industrial fishing in the internal waters, for fishing in the coastal waters as well as international and third-country waters and for special purpose fishing. In 2016, according to the SES, the list of fishing vessels of Latvia included 43 cod fishing vessels and 24 vessels for fishing in the Gulf of Riga (SES, 2017a; b).

On 2 December 2016, the Ministry of Agriculture made decision No. 4.1-12/87 "On Industrial Fishing Limits and Procedures for Use thereof in the Baltic Sea and the Gulf of Riga beyond Coastal Waters in 2017", which stipulated that industrial fishing agreements for a lease of fishing rights, based on the limits set in the decision, would be concluded with 37 fishing enterprises in 2017 (Ministry of Agriculture, 2016a). However, the 2017 list of vessels authorised to do fishing in the Baltic Sea and the Gulf of Riga broken down by fish species and fishing site contained 64 fishing vessels.

2. Key factors for the fishing industry in Latvia

The fishing industry in Latvia depends on opportunities to do fishing in the Baltic Sea. However, it has to be taken into account that since 2005 the key initiative in regulating fishing and setting catch quotas in the Baltic Sea has belonged to the European Commission, as the EU Member States accounted for 95 % of the total catch volume in the Baltic Sea. In 2013, the EU reformed its CFP, setting a target to increase fish reserves to a stable level until 2020. It is possible by means of very strict catch quotas. The amount of quotas to be allocated to the Member States is decided by the EU Council of Ministers of Agriculture and Fisheries (European Commission, 2016). The allocation of quotas to individual fishing companies is a Member State competence under the CFP (Pantzar M., 2016). The catch quotas in the Baltic Sea available to Latvia are distributed individually to every fishing entity, allowing the quotas to be exchanged and transferred, which contributes to efficiently exploiting the resources available to Latvia and achieving a catch volume as sustainable as possible (Ministry of Agriculture, 2017a; b).

The stocks of the most important fish species – cod, Baltic herring, sprat and salmon – in the Baltic Sea are estimated by the International Council for the Exploration of the Sea (ICES), which develops proposals for the sustainable exploitation of the fish stocks according to the Multiannual Baltic Sea Management Plan that was adopted by the Member States and the European Parliament (ICES, 2017).

In accordance with Paragraph 4 of Section 11 of the Fishery Law of the Republic of Latvia (1995), the total catch quota allocated to Latvia in its territorial waters and economic zone waters as well as in the waters of other EU Member States and in international waters or in the waters of

third countries, with which the EU has concluded agreements on fishing, is stipulated in the EU legal documents. The total catch quota in the territorial waters and economic zone waters of Latvia is divided into a quota for fishing in the Baltic Sea and the coastal waters of the Gulf of Riga and a quota for fishing in the waters beyond the coastal zone.

The division of waters into coastal waters and waters beyond the coastal zone is defined in accordance with the provisions stipulated in Cabinet Regulation of the Republic of Latvia No. 296 (2007) "Regulations regarding Commercial Fishing in the Territorial Waters and Economic Zone Waters". The total catch quota available to Latvia in 2017 was set by Council Regulation (EU) 2016/1903 of 28 October 2016 fixing for 2017 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in the Baltic Sea and amending Regulation (EU) 2016/72. The fishing enterprises of Latvia have to take into account a decrease in fishing opportunities, as the only quota that was increased for 2017, compared with the previous years, was for sprats (+20 % in comparison with 2014), while the quotas for cod, Baltic herring and salmon were decreased by 57 %, 1 % and 10 %, respectively, compared with 2014 (Table 2).

Table 2

Catch quotas for Latvia and catch volumes in the Baltic Sea and the Gulf of Riga in 2014-2017

Indicators	Cod	Baltic herring	Incl. in the Gulf of Riga	Sprats	Salmon*	Total
2014						
Catch quota, t	6642	22650	19335	32667	70	81364
Real catch volume, t	2037	23315	x	30758	4	56114
Volume as a % of quota	30.6	102.9	x	94.2	5.7	69.0
Catch volume composition, %	3.6	41.6	x	54.8	0.0	100.0
2015						
Catch quota, t	5408	25404	21201	31548	63	84121
Real catch volume, t	2593	25266	x	30501	4	58364
Volume as a % of quota	47.9	99.5	x	96.7	6.3	69.4
Catch volume composition, %	4.4	43.3	x	52.3	0.0	100.0
2016						
Catch quota, t	3954	26234	19055	28017	63	77323
Real catch volume, t	2700	26100	x	28100	4	56904
Volume as a % of quota	68.3	99.5	x	100.3	6.3	73.6
Catch volume composition, %	4.7	45.9	x	49.4	0.0	100.0
Catch volume index from base year, %	132.5	111.9	x	91.4	100.0	101.4
2017						
Catch quota, t	2838	22448	16724	39062	63	81135
Catch quota composition, %	3.5	27.7	x	48.1	0.1	100.0
Catch quota index from base year, %	42.7	99.1	86.5	119.6	90.0	99.7

* catch quota is measured in pieces, assuming that the average fish weight is 5 kg

Source: authors' calculations based on MoA Fisheries Department, Fisheries Yearbooks, 2014; 2015; 2016; 2017.

Sprats and Baltic herring played the most significant role in the total catch volume in the Baltic Sea and the Gulf of Riga, falling in the range from 95.3 % in 2016 to 96.4 % in 2014. In 2014 and 2015, the catch volume of sprats was larger, while in 2016 the difference in catch volume between sprats and Baltic herring decreased. The catch volumes of both fishes, expressed as a percentage of the quotas, were slightly volatile from year to year – in the range of 94.2-102.9 %.

The fishing enterprises of Latvia have problems to fulfil the cod quota in the Baltic Sea, as the catch volume as a percentage of the quota ranged from 30.6 % in 2014 to 68.3 % 2016. To improve the situation and raise the efficiency of fishing cod, an amendment was made to Cabinet Regulation of 2 May 2007 No. 296 (2007) "Regulations regarding Commercial Fishing in the Territorial Waters and Economic Zone Waters" (on 13 September 2016), which allows fishing enterprises to catch cod and flatfish by fishing nets not only in the coastal waters up to 20 meters deep but also in deeper waters where the population of cod is larger.

3. Performance of fishing enterprises in Latvia

In Latvia, fishing rights and fleet capacity management is an important instrument for achieving one of the key Common Fisheries Policy goals – the sustainable exploitation of fish resources. According to the Ministry of Agriculture data as of 20 October 2017 (Ministry of Agriculture, Fisheries 2107), there were registered 148 licensed lessees of commercial fishing rights in the Baltic Sea and the coastal waters of the Gulf of Riga, 35 licensed lessees in the Baltic Sea and beyond the coastal zone of the Gulf of Riga and five lessees of fishing rights in international waters and the waters of other countries outside the Baltic Sea.

In the period 2014-2016 in Latvia, the largest fishing enterprises in terms of turnover, according to the annual reports, were as follows: BALTREIDS Ltd, BAL TJURA SERVISS Ltd, VERGI Ltd, NORTH STAR LTD Ltd, BraDava Ltd (Table 3); in 2016, their net turnover totalled EUR 47.1 mln. or 81 % of the net turnover of top 10 fishing enterprises. In 2017, the total net turnover of the top 10 fishing enterprises increased by 60.7 % compared with 2014 and by 27.7 % compared with 2015. The largest net turnover increase from the base year was reported by BAL TJURA SERVISS Ltd – 215 %, BAL TREIDS Ltd – 184 % and A.I. un KO Ltd – 169 %.

Table 3

Top 10 fishing enterprises in Latvia by turnover in 2014-2016

No	Enterprise name	Net turnover, thou. EUR				2016		
		2014	2015	2016	Index from base year, %	Profit, thou. EUR	Profit margin, %	Number of employees
1.	BALTREIDS Ltd	10 236	8 318	18845	184	1 246	6.61	27
2.	BAL TJURA SERVISS Ltd	-	3 767	8083	215	26	0.32	4
3.	VERGI Ltd	7 612	8 155	7887	104	-152	-1.93	153
4.	NORTH STAR LTD*	-	6 135	6992	114	-1 171	-16.75	36
5.	BraDava Ltd	5 415	5 182	5204	96	603	11.60	110
6.	Fish farm IRBE Ltd	4 919	6 233	3879	79	-51	-1.33	85
7.	5 B Ltd	3 603	3 482	3159	88	-418	-13.24	12
8.	VARITA Ltd	1 794	1 991	1450	81	-75	-5.15	34
9.	A.I. un KO Ltd	855	932	1443	169	611	42.34	13
10.	JSC KURSA, Liepaja Special Economic Zone	1 811	1 427	1320	73	-325	-24.66	42

*basic economic activity – fish farming

Source: authors' calculations based on Latvijas biznesa gada..., 2017.

In 2016, among the top 10 enterprises in terms of net turnover, only four made profit, whereas six suffered losses. In 2016, the highest profit margin was reported by A.I. un Ko Ltd (42.34 %) and BraDava Ltd (11.6 %), while the largest enterprise in terms of net turnover reported only the third highest profit margin (6.61 %). It turns out that fishing enterprises in other EU Member States too are not always profitable – the fisheries in many European countries are unprofitable

and a poor investment for taxpayers. In fact, many European fleets only continue to operate with the support of government subsidies (Schroeer A., Sakai C. et al., 2011).

The number of employees at an enterprise is not a less important indicator. Totally, the top 10 enterprises employed 516 individuals in 2016; the largest employers were VERGI Ltd with 153 employees and BraDava Ltd with 110 employees, while BALTJURA SERVISS Ltd had only four employees. In 2016 in terms of labour productivity – net turnover per employee –, the highest levels were achieved by BALTJURA SERVISS Ltd at EUR 2 mln., BALTREIDS Ltd – EUR 698 thou. and 5 B Ltd – EUR 263 thou.

Conclusions, proposals, recommendations

- 1) In the EU, the development of fisheries is affected by the Common Fisheries Policy that involves fleet capacity management, as allowable fleet capacity is set for the Member States. The CFP has set a target to increase fish reserves to a stable level until 2020; for this reason, the catch volumes of the Member States are limited by fishing quotas.
- 2) Among the EU Member States, eight countries dominate: Greece, Italy, Spain, Portugal, Croatia, France and the United Kingdom; their number of fishing vessels accounts for 78 %, their gross tonnage comprise 68 % and their total vessel engine power represents 75 % of the EU total. The number of fishing vessels of Latvia represents 0.8 % of the EU total, while in terms of gross tonnage the fishing fleet of Latvia makes up 2.5 % of the EU total. This means that small-capacity vessels dominate in the fishing fleet of Latvia.
- 3) The fishing enterprises of Latvia have to take into account a decrease in fishing opportunities, as the catch quotas for the key fish species were reduced in the range of 1-57 % for the period 2014-2017. This poses a risk to the work of fishing enterprises as there is a threat to their future existence. And most likely the amount of the fishing fleet in Latvia will decrease in future. The only quota, which was increased, was for sprats (+20 % compared with 2014), but it does not compensate the decrease in other quotas.
- 4) Sprats and Baltic herring played the most significant role in the total catch volume in the Baltic Sea and the Gulf of Riga, accounting for 95.3 % of the total in 2016. The catch quota of cod in Baltic Sea waters was not fulfilled in the period of analysis (quota fulfilment ranged from 30.6 % in 2014 to 68.3 % in 2016).
- 5) In 2016 in Latvia, the top 10 fishing enterprises had a turnover of EUR 58.2 mln., which increased by 60.7 % compared with 2014 and by 27.7 % compared with 2015. In 2016, among the top 10 enterprises in terms of net turnover, only four made profit, whereas six suffered losses, and two had quite high profit margins. In 2016, the top 10 fishing enterprises employed 516 individuals and demonstrated different levels of labour productivity. This means that fishing enterprises are working in an intensive competitive environment and need to analyse the factors affecting financial performance in order to achieve better results.

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ENVIRONMENTAL AND SOCIAL RISKS RELATED TO SEAFARING EMISSIONS IN THE BALTIC SEA

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Abstract. Coastal countries must take measures to reduce harmful air emissions from ships and strengthen joint coordinated efforts to make the Baltic Sea a model for clean navigation in order to improve its endangered and sensitive environment. Coastal states and ports are directly responsible for monitoring and controlling the ships' compliance with national and international laws. Compliance monitoring and control is carried out by ship inspections and fuel sampling, especially for ships that do not use air emission abatement technologies. Although progress has been made towards reducing sulfur emissions in the Baltic Sea, a work has still to be done to achieve effective and consistent monitoring and enforcement. This issue will become even more important when further nitrogen oxide emission limit values in the region are introduced. Emissions of nitrogen oxides strongly affect air pollution, and together with carbon dioxide emissions they facilitate acidification of seawater. Nitrogen emissions from ships are the result of nitrogen deposition, which contributes to eutrophication - one of the major problems in the Baltic Sea. The aim of the study is to research the ship-generated air emissions and their impact on environment, to analyse the situation in the Baltic Sea region, and to develop proposals for reducing ship-generated emissions. The potential for reduction of ship-generated emissions in the Baltic Sea is based on compliance with international and regional requirements as well as integration of strategic solutions. Scientific literature, international conventions and European legislation, international studies and methodological materials as well as Internet resources will be used during development of this research.

Key words: environmental, ships emissions, seawater.

JEL code: Q53, Q56, Q57

Introduction

As a result of fuel combustion and energy transformation, maritime transport is a source of origin of various environmentally harmful substances. Airborne emissions from ships include emissions of carbon dioxide, nitrogen oxides, sulphur oxides, and particulates, affecting both water and land pollution. The emissions of nitrogen oxides strongly affect air pollution, and together with carbon dioxide emissions promote seawater acidification. Nitrogen emissions from ships are the result of nitrogen deposition, which contributes to eutrophication - one of the greatest problems in the Baltic Sea.

In recent decades, shipping intensity in the Baltic Sea, as well as the number and size of the ships, have increased. The sea traffic continues to increase by about 5 % per year. Maritime transport has a significant impact on air pollution, especially in the coastal areas of the Baltic Sea. Pollution in the Baltic Sea is an important and topical issue both at a European and international level.

The aim of the study is to research the ship-generated air emissions and their impact on environment, to analyse the situation in the Baltic Sea region, and to develop proposals for reducing ship-generated emissions. The potential for reduction of ship-generated emissions in the Baltic Sea is based on compliance with international and regional requirements as well as integration of strategic solutions.

Research results and discussion

To reduce the environmental and social risks associated with shipping-caused emissions, regulatory authorities have developed emission limitation requirements. There are different policy mechanisms to reduce emissions from ships and support their energy efficiency, such as emissions

trading, financial incentives or taxes, emissions reporting and monitoring obligations, and energy efficiency standards. Significant overall progress is reached to improve the protection of the marine environment in the Baltic Sea, especially in terms of reducing emissions from shipping but there is still room for improvement.

Although progress has been made towards reducing sulphur emissions in the Baltic Sea, work is still needed to achieve effective and consistent monitoring and enforcement. This issue will become even more important with the further introduction of nitrogen oxide emission limits in the region. Any effective and fair enforcement of the restrictions will require significant cooperation.

Taking into account the global scale of maritime transport, the International Maritime Organization (IMO) has developed international requirements for ship-generated emissions of sulphur oxides (SOx), nitrogen oxides (NOx), ozone-depleting substances (ODS) and volatile organic compounds (VOCs). The requirements are summarised in the International Maritime Pollution Convention (MARPOL, July 2005), in particular, its Annex VI "Prevention of air pollution from ships." The Convention applies to ships engaged in international navigation, while ships operating exclusively within the territory of one country are subject to national regulations or regional requirements.

MARPOL 73/78 Annex VI came into force in 2005. In turn, the Marine Environment Protection Committee (MEPC), at its 53rd session, has revised Annex VI with a view to setting strict emission limits taking note of technological developments. The amended version of MARPOL 73/78 Annex VI "Prevention of air pollution from ships" entered into force on 1 July 2010. Annex VI has established the Emission Control Area (ECA). ECA allocates a region for Annex VI within which it is necessary to comply with specific measures regarding emissions from ships to prevent, reduce and control air pollution with NOx or SOx and particulate matter (PM) or for all three emission types together. The ECA status to a sea or a part of it may only be determined by the IMO.

Table 1

MARPOL Annex VI requirements for sulphur content in fuels

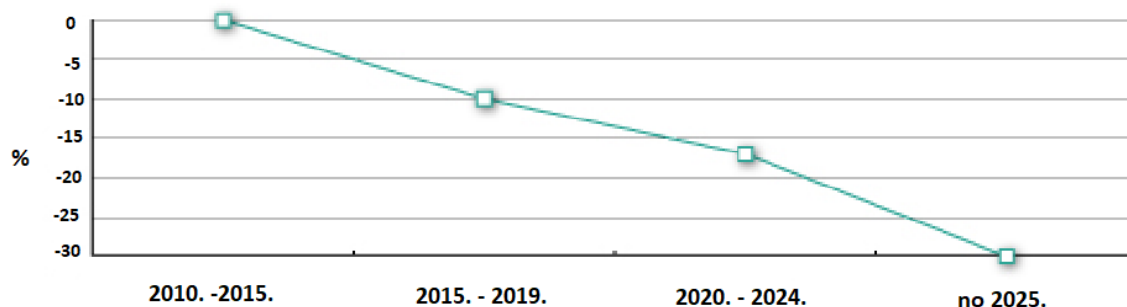
Maximum sulphur content in fuels (% m/m)		
	SOx ECA	Other region
2000	1.5 %	4.5 %
2010	1.0 %	
2012		0.1 %
2015	3.5 %	
2020		

Source: Prevention of..., 2010

In 2012, global greenhouse gas (CO₂) emissions from ships amounted to around 1.000 million tons, equivalent to 3 percent of human-caused emissions in the world. If climate change reduction policies are not reformed and implemented, ship emissions will double or even triple by 2050.

On 1 January 2013, new requirements for the energy efficiency of ships came into force (Chapter 4 of MARPOL Annex VI). Chapter 4 of MARPOL Annex VI introduces two mandatory mechanisms aimed at ensuring energy performance standards for ships: energy Efficiency Design Index (EEDI) suitable for new ships built after 2013. EEDI quantifies the CO₂ emission of ships in relation to the volume of cargo transported. Ship designers for a specific ship design are free to choose technologies that meet the requirements of the EED.

Based on the EED, the first period (from 2015 to 2019) will reduce CO₂ emissions by 10 % and a further reduction is expected in future periods (every 5 years) as well.



Source: Helfre J.F., Couto Boot P.A., 2013

Fig. 1. Reduction of CO₂ emissions (%), on the basis of the EED

Shipbuilding companies and shipowners need to monitor and improve their performance in relation to various factors that can contribute to CO₂ emissions. These include improved cruise planning, speed management, weather planning, engine power optimisation, shipbuilding maintenance and the use of alternative fuels. The IMO 2009 study (The IMO GHG Study, 2014) states that ship efficiency can be improved by up to 75 %, and one of the most effective measures is slow steaming. A 10 % reduction in driving speed reduces energy demand by about 27 % accordingly. Studies have shown that reducing fleet speeds can reduce ship emissions of CO₂ and other harmful air pollutants by 35 %. In addition, the use of alternative fuels (such as biofuels) and energy sources (such as wind and solar) could lead to significant greenhouse gas reductions. According to the mandatory requirements adopted by the IMO in 2016, ships of a gross tonnage ≥ 500 GT must record data for each type of heavy fuel used. These vessels account for about 85 % of CO₂ emissions from international shipping.

Reducing the pollution of the Baltic Sea is a major challenge for the countries of the region. In 2008, the European Commission adopted the Marine Strategy Framework Directive 2008/56/EC. The directive states that by 2020 the Member States take the necessary measures to maintain the good status of the marine environment, prevent its deterioration and, if possible, restore marine ecosystem in areas where it is adversely affected. The directive states that it is the responsibility of the Member States to cooperate in the region and sub-region to achieve the objectives of this Directive. One of the objectives of the strategy is to "save the sea." It can be achieved through the reduction of pollution of hazardous substances, as well as the promotion of clean and safe shipping (Directive 2008/56/EC, 2008).

According to the HELCOM BSRP, eutrophication is one of the most significant consequences of marine pollution. Eutrophication is defined as the process that occurs when an excessive amount of nutrients, primarily nitrogen and phosphorus, largely as a result of human activity are released in a waterbody. High levels of nutrients in water cause intense and potentially harmful blooming of algae. Eutrophication can significantly limit the use of the sea by reducing biodiversity, damaging coastal landscapes and reducing fish stocks. This problem has hit the Gulf of Finland, the Gulf of Riga and the central zone of the Baltic Sea known as the Baltic Sea Basin the most. It was estimated that in 2010 71 % of the territory was subject to eutrophication (Commision Staff..., 2013).

Eutrophication is caused by sources of nutrients from agriculture and municipal wastewater as well as shipping emissions. All countries of the Baltic Sea Region participate in maritime transport through the developing of seaports. In the period from 2005 to 2014, cargo turnover in the Baltic ports increased by 14.3 %. Container turnover in the ports of the Baltic states accounts for approximately 1.2 % of the world turnover and 9.9 % of the European container market turnover. In recent decades, shipping intensity in the Baltic Sea, as well as the number and size of the ships, has increased. The sea traffic continues to increase by about 5 % per year. There are about 2000 ships operating in the Baltic Sea region at any given moment, with about 3500 - 5000 ships every month, accounting for more than 15 % of the world's maritime traffic, carrying around 1 million tonnes of cargo per year (Review of Maritime Transport, 2017).

SO_x reduction can be achieved through the use of low sulphur fuel or the treatment of exhaust gases by treating them in devices known as scrubbers. These devices effectively remove sulphur oxides from the exhaust gases, but the problem is the neutralisation of residual waste. On the other hand, the transition to low-sulphur fuel is linked to an economic factor - fuel prices are related to the sulphur content. The reason is the expensive process of desulphurisation. The transition to low-sulphur fuels (Marine gasoil - MGO) is currently the most popular type of emission reduction. To comply with the EU Sulphur Content Directive and reduce SO_x emissions from ships, shipowners may also consider alternative fuels, such as liquefied natural gas and methanol, or continue to work with high sulphur fuel if the sulphur scrubbers are installed on board to remove sulphur from exhaust gases. In turn, the supply of Liquefied Natural Gas (LNG) and methane marine engines is an interesting solution because it reduces SO_x emissions, meets the high requirements in ECA areas and is 20-40 % less expensive than crude oil.

The introduction of sulphur limits for marine fuels has led to technology research in the area of emission reduction and alternative fuels. From 1 January 2015, the sulphur (S) content in fuel shall not exceed 0.1 % when operating in an ECA. The global agreement foresees that from 1 January 2020, the world will use marine fuel of S content that cannot exceed 0.5 % (IMO Global sulphur cap). In the case that the production and supply of such fuel is insufficient, these standards could come into force from 2024. Requirements to permit the use of liquid natural gas.

According to the information provided by the Transport Forum of the Organization for Economic Co-operation and Development (OECD), the total consumption of petroleum products in international shipping in 2020 (after the introduction of the new requirements) will amount to about 3.9 million barrels per day (30 % HFO and 70 % MGO). This means that the demand for MGO will decrease by 2 million barrels a day (Birol F., 2015).

The new requirements will increase the price of ship fuel, which means transportation costs are likely to raise, and as a result, the price of transported goods and products may increase.

In the search for alternatives, some shipowners have decided to invest in air emission reduction technologies, primarily in exhaust gas purification systems (EGCS) - popularly known as Sulphur Scrubbers. According to the DNV-GL data, only one scrubber-fitted vessel operated in 2000, and by 2014 the number had increased to 77 vessels. Considering the order trends, it is expected that by the end of 2018 the number of vessels with scrubbers will exceed 200 units.

Sea scrubber can remove up to 95 % of SO₂ and 99.9 % of suspended particles (with the exception of small, particularly hazardous solids). Seawater alkalis HCO₃ and SO₄ neutralise sulphur oxides while in the scrubber. Low-sulphur content fuel can be replaced by the installation of a marine scrubber. The cost of installing a scrubber varies from 1 to 5 million EUR, depending on

the size of the ship. Shipowners can choose an alternative fuel type to meet their emission requirements. Other types of fuel such as biodiesel, methanol, and ethanol, like LNG, have been extensively studied and tested. In particular, the use of LNG as a fuel for ships attracts the attention of the shipping industry. The transition to LNG ensures compliance not only with SO_x emissions but also with future requirements for NO_x emissions in the Baltic Sea Region. This allows a significant reduction in air pollution - from SO_x, NO_x, and PM to CO₂. SO_x emission is completely eliminated, NO_x and PM emissions are reduced to 85 %, and CO₂ emission up to 20 % (World LNG Report, 2016). LNG is liquefied natural gas with a density of 420 to 490 kg/m³. It is obtained by cooling the natural gas at a temperature of -160°C at normal atmospheric pressure. Natural gas in a liquefied state takes 600 times less space, making it easier to transport. Liquid natural gas has no odour, no colour, no toxic waste and exhaust after combustion, therefore it is environmentally friendly. LNG does not contain sulphur, therefore after combustion, no SO_x emission occurs and only a small amount of PM emission is generated. The shortage of LNG is the potential for methane (CH₄) emission. At present, LNG is mainly used as fuel for ships carrying LNG (LNG, 2015).

LNG requires about 1.8 times more storage volume than diesel, which in turn impedes the use of LNG. Other aspects that restrict the use are the availability of fuel in ports and the safety (LNG, 2015). At present, LNG is significantly less popular than MGO and scrubbers. The reason for this is that LNG fuels require special technology (such as marine engines, speciality tanks and pipelines), which are costly in the short term, therefore this solution is more suitable for newly built ships than for the modernisation of existing vessels. However, in the long run, the price differences between LNG and low sulphur fuel are significant in favour of LNG. This is considered to be the main advantage that can compensate for the major investment costs associated with modernising existing vessels or additional costs for newly constructed vessels. Judging by the market response and the benefits of LNG, the development of this industry is expected in the coming years. The number of ships using LNG as a fuel is rising relatively fast. Currently, one of the biggest restrictions on the use of LNG fuel is the lack of development of shipbuilding infrastructure in the ports of the Baltic Sea region. In order to allow shipowners to operate an ever-increasing number of LNG-powered ships, the Baltic ports should be involved in the installation of LNG bunkering equipment.

Conclusions, proposals, recommendations

The Baltic Sea is a region of intensive sea transport. Maritime emissions, in particular in major coastal cities, significantly increase air pollution with negative environmental impact at the local (coastal) or global level contributing to global warming. The coastal states and ports of the Baltic Sea are responsible for monitoring and controlling ship compliance in accordance with national and international law. Emission monitoring will become even more significant with the further introduction of nitrogen oxide emission limit values in the Baltic Sea Region. Effective and fair enforcement of any restrictions requires significant cooperation between all interested parties. Shipowners have a variety of alternative technologies for reducing air emissions, while cross-ship synergies between ports and shipowners are a boost to the use of these technologies. To achieve progress in reducing sulphur and nitrogen oxide emissions, the Baltic Sea Region countries are required to perform efficient emission monitoring and evaluate conformity with the requirements since despite the prohibitions it is possible that ships might be using high sulphur fuel in different regions of the Baltic Sea. Shipowners, in the context of future port infrastructure development

initiatives, consider the options available and choose the most appropriate technology to meet future global requirements for air emissions. They consider alternative fuels, such as LNG, or continue to work with high sulphur fuel by installing a scrubber. We must promote closer cooperation between ports, shipowners and other stakeholders in order to make LNG a competitive alternative to the fuel industry in the shipping industry. To allow shipowners to operate an ever-increasing number of LNG-powered vessels, the Baltic Sea ports must be involved in the installation of LNG bunkers by choosing a more suitable type of refuelling depending on the economic and technological factors.

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COST-EFFECTIVENESS OF POSTHARVEST DRIP IRRIGATION OF CHOSEN NORTH-AMERICAN CULTIVARS OF ASPARAGUS GROWN FOR GREEN SPEARS IN OPEN FIELD TECHNOLOGY IN THE CENTRAL POLAND

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Abstract. The aim of the present study was an attempt to calculate the cost-effectiveness of asparagus postharvest drip irrigation in the Central Poland. The results of field experiments on drip irrigation of 13 North-American asparagus cultivars, carried out at Kruszyn Krajenski in the vicinity of Bydgoszcz were investigated in the zone of the largest precipitation deficiency in Poland. The drip irrigation system's economic calculation was conducted following the methodology suggested by Grabarczyk (1987). The effectiveness of drip irrigation (ranging from 0 to 157 %) was the highest for cultivars Jersey Deluxe (157 %) and Jersey Giant (142 %). Lack of significant response to drip irrigation was found in case of cultivars Purple Passion, Jersey King and Atlas. Other cultivars (Jersey Supreme, Jersey Knight, Grande, Apollo, UC 157, NJ 953, UC 115, JWC 1) gave an increase in marketable yield of 35-79 % due to drip irrigation. Economic results of drip irrigation, depending on the increase in produce value and assumed drip irrigation costs were positive in case of 10 cultivars. The drip irrigation of Jersey Deluxe and Jersey Giant turned out most cost-effective. Irrigation was also very cost-effective in the case of cultivars UC115, NJ953, Jersey Knight, Jersey Supreme, UC157, Grande, Apollo and JWC 1. Drip irrigation was unprofitable in case of the following cultivars: Purple Passion, Jersey King and Atlas.

Key words: cost-effectiveness, asparagus, drip irrigation, cultivar, green spears.

JEL code: Q15

Introduction

The growing economic significance of asparagus in Poland is associated with the ability to export to European Union countries (mainly Germany), as well as increased demand for this valuable vegetable among consumers in Poland, where changes of eating habits are observed. Basic species - so-called "heavy" vegetables - are converted into low-calorie, high biological and flavoured value species. Intensive breeding works are underway, as a result of which, apart from old, known and already proven for many years, new cultivars appear, requiring verification in the climatic and soil conditions of Poland. In order to achieve the maximum production effects of a given cultivar, it is necessary to create optimal conditions for growth and development during the growing season - through appropriate fertilization and irrigation. Due to the specific cultivation method (spear harvest in early spring), the height and quality of the yield depends on the amount of ingredients stored in asparagus crown during the growing season of the previous year. Irrigation of asparagus in the current year after the harvest (postharvest irrigation/irrigation of summer stalks) causes the increase of the height, diameter of summer stalks and their number from one crown and positively affects the growth of the yield of spears in the following year (Rolbiecki, 2013).

The aim of the present study was an attempt to calculate the cost-effectiveness of asparagus postharvest drip irrigation in the Central Poland. This region of Poland is recognized as the area of the lowest precipitation and the highest water deficits during the vegetation period (Rolbiecki et al., 2000; Labedzki, 2009; Stachowski and Markiewicz, 2011; Rzekanowski et al., 2007; Zarski et al., 2013).

Material and methods

The results of field experiments on drip irrigation of 13 North-American asparagus cultivars, carried out at Kruszyn Krajenski in the vicinity of Bydgoszcz, were investigated in the zone of the largest precipitation deficiency in Poland (Rolbiecki, 2013). The drip irrigation system's economic

calculation was conducted following the methodology suggested by Grabarczyk (1987). For drip irrigation system, an increase in direct surplus was calculated:

$$\Delta D = \Delta P - (K_d + \Delta K_r)$$

where:

ΔD – increase in direct surplus (PLN ha⁻¹),

ΔP – additional production value received by introducing the drip irrigation (PLN ha⁻¹),

K_d – total drip irrigation costs (PLN ha⁻¹),

ΔK_r – direct costs related to receiving additional production (PLN ha⁻¹).

The basic index of economic efficiency of irrigation was the direct surplus obtained as a result of this treatment. It was calculated from the difference in the increase in the value of production and the cost of irrigation and the increase in general agricultural costs related to obtaining additional production. The increase in the value of production was determined by multiplying the average long-term production effects of irrigation obtained in the conducted field experiments by the unit price of green asparagus spear (PLN kg⁻¹). The prices were assumed based on average wholesale prices of asparagus (PLN 8.80 kg⁻¹) on WGRO SA in Poznań in 2017. Five variants of irrigated areas: 1, 2, 5, 10 and 20 ha, corresponding to potential areas of asparagus plantations in Poland, were adopted to analyse the profitability of asparagus irrigation. Calculation of irrigation and irrigation installation costs was based on the data of the 'Lukomet' irrigation company. The analysis of economic efficiency was carried out for the drip irrigation system. The calculation includes index-based depreciation of 6.65 % (Rolbiecki, 2013). The interest rate on the capital was set at 5 %, and the costs of repairs and materials at 2 % of the investment costs. Fuel costs were calculated based on the unit's consumption by a pump generator with a combustion drive (the number of litres of fuel per 1 mm of the seasonal dose of water in drip irrigation) and the average purchase price of diesel. The calculation includes water costs, taking PLN 0.20 m⁻³. The increase in general agricultural costs related to obtaining additional production was treated index-based, assuming that in conditions of correct economic relations it amounts to 30 % of the value of additional production obtained.

Results and discussion

Production effects of drip irrigated asparagus

Drip irrigation applied in the post-harvest period (from the third decade of June to the end of August) in the growing season of the year preceding the harvest, on average for the tested cultivars and years, significantly increased the yield of green asparagus spears from 4.21 t ha⁻¹ to 6.23 t ha⁻¹ (Table 1). The increase in the marketable spear yield achieved due to irrigation, on average for the tested cultivars and years of research, was therefore 2.01 t ha⁻¹ (48 %).

Table 1

Effectiveness of drip irrigation of asparagus cultivars in the vicinity of Bydgoszcz

Cultivar	Marketable yield of green spears (t ha ⁻¹)		Yield increase due to irrigation	
	Control (without irrigation)	Drip irrigation	(t ha ⁻¹)	%
Jersey Giant	2.75a	6.66b	3.91	+ 142
Jersey Knight	3.47a	5.72b	2.25	+65
Jersey Supreme	4.25a	6.43b	2.18	+51
Jersey Deluxe	2.78a	7.15b	4.37	+157
Jersey King	5.97a	6.27a	0.30	+5
Atlas	4.49a	4.79a	0.30	+7
Grande	5.11a	7.08b	1.97	+38
Apollo	5.58a	7.52b	1.94	+35
Purple Passion	5.38a	5.30a	-0.08	-1
UC 157	4.07a	6.15b	2.08	+51
NJ 953	4.67a	7.22b	2.55	+55
UC 115	3.53a	6.31b	2.78	+79
JWC 1	2.70a	4.41b	1.71	+63
Mean for all the cultivars	4.21a	6.23b	2.02	+48

Explanations: values in a row followed by the same letter do not differ significantly ($\alpha = 0.05$)

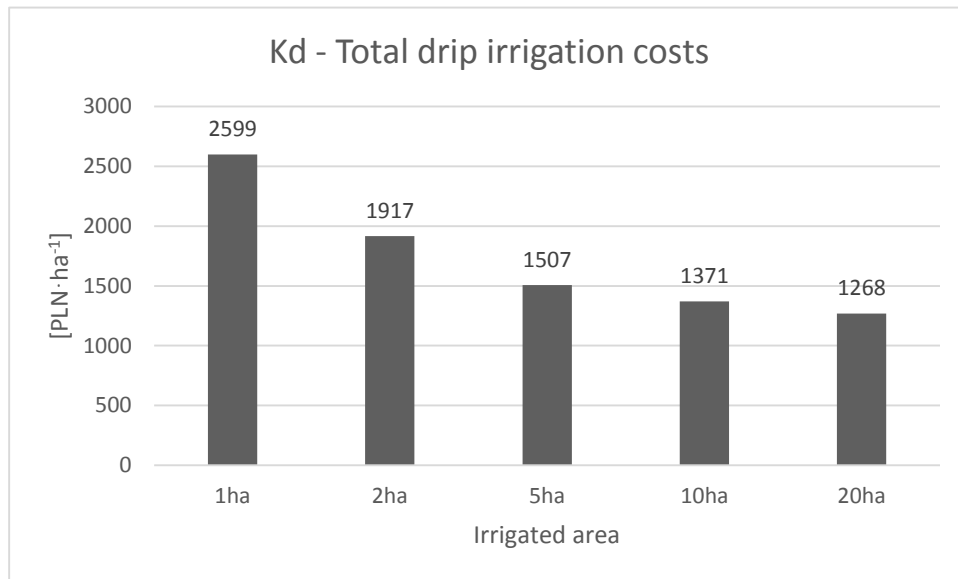
Source: author's calculations based on author's research data

The highest marketable yields in drip irrigation - over 7 t ha⁻¹ - were obtained in the following cultivars: Apollo, NJ 953, Jersey Deluxe and Grande. High yields under irrigation conditions - over 6 t ha⁻¹ - were obtained in the following cultivars: UC 157, Jersey King, UC 115, Jersey Supreme and Jersey Giant. Yields over 5 t ha⁻¹ - collected at Purple Passion and Jersey Knight. The lowest yields in irrigation conditions (over 4 t ha⁻¹) were collected in the JWC 1 and Atlas cultivars.

The best response to drip irrigation was found in Jersey Deluxe and Jersey Giant. Drip irrigation increased marketable yields in these cultivars respectively by 4.37 t ha⁻¹ (157 %) and 3.91 t ha⁻¹ (142 %). No significant response to drip irrigation was found in Purple Passion, Jersey King and Atlas. The response to drip irrigation in the other tested cultivars was positive, and the yield increases found were in the range 1.71-2.78 t ha⁻¹ (35-79 %). A varied reaction of other asparagus cultivars was found in previous experiments carried out in Central Poland (Rolbiecki et al., 2001; Rolbiecki and Rolbiecki, 2008; Rolbiecki, 2013). The results obtained were similar to those reported by Paschold et al. (1996, 1999, 2008) and other foreign authors (Roth and Gardner, 1989; Sterrett et al., 1990; Drost and Wilcox-Lee, 1997; Drost, 1999).

Economic results of drip irrigation of asparagus

According to the adopted assumptions, the minimal investment cost of the drip irrigation system - depending on the assumed area: 1 ha, 2 ha, 5 ha, 10 ha and 20 ha - amounted respectively 13000, 8000, 5000, 4000 and 3250 PLN ha⁻¹. Total annual cost of drip irrigation (Kd) - including depreciation, interest on capital, costs of repairs and materials, water costs, fuel costs - decreased with the increase of irrigated area ranging from 2599 PLN ha⁻¹ (1 ha) to 1268 PLN ha⁻¹ (20 ha) (Fig. 1). The calculation presented by Kledzik et al. (2015) showed that the cost irrigation per 1 ha decreases as the irrigated area increases.



Source: author's calculations based on author's research data

Fig. 1. Total drip irrigation costs (Kd)

Asparagus drip irrigation was profitable - the average direct surplus (ΔD) for 13 tested cultivars, depending on the size of the irrigated area, ranged from PLN 9844 ha⁻¹ (1 ha) to PLN 11.175 ha⁻¹ (20 ha) (Tab. 2). The most profitable was the irrigation of the Jersey Deluxe (ΔD in the range from 34703 to 36034 PLN ha⁻¹) and Jersey Giant (ΔD in the range from 21487 to 22818 PLN ha⁻¹). Irrigation was also highly profitable for the UC115, NJ953, Jersey Knight, Jersey Supreme, UC157, Grande, Apollo and JWC 1 cultivars (ΔD in the range from 15857 to 7935 PLN ha⁻¹). Drip irrigation was unprofitable for the Purple Passion, Jersey King and Atlas cultivars.

The economic analysis proved that the use of postharvest drip irrigation was cost-effective, which confirmed previous opinions and reports concerning also the sprinkler irrigation of other vegetable and field crops and cultivars (Rutkowski and Malecka, 1986; Rutkowski, 1987; Rolbiecki et al., 1999; Zarski et al., 1999; Zarski et al., 2001; Jankowiak and Rzekanowski, 2006; Rolbiecki, 2013; Kledzik et al., 2015). In the study of Kledzik et al. (2017), applying drip irrigation was economically unjustified in moist years and on average in the multi-year period. In the years with dry and average precipitation conditions, the direct surplus was positive (except for irrigation of 1 ha).

Table 2

Cost-effectiveness of drip irrigation of asparagus cultivars

Cultivar	Δ t ha ⁻¹	ΔP PLN ha ⁻¹	ΔKr PLN ha ⁻¹	ΔD PLN ha ⁻¹					R
				1ha	2ha	5ha	10ha	20ha	
Jersey Giant	3.91	34408	10322	21487	22169	22579	22715	22818	2
Jersey Knight	2.25	19800	5940	11261	11943	12353	12489	12592	5
Jersey Supreme	2.18	19184	5755	10830	11512	11922	12058	12161	6
Jersey Deluxe	4.37	38456	1154	34703	35385	35795	35931	36034	1
Jersey King	0.30	2640	792	-751	-69	341	477	580	11/12
Atlas	0.30	2640	792	-751	-69	341	477	580	11/12
Grande	1.97	17336	5208	9529	10211	10621	10757	10860	8
Apollo	1.94	17072	5122	9351	10033	10443	10579	10682	9
Purple Passion	-0.08	-	-	-	-	-	-	-	-
UC 157	2.08	18304	5491	10214	10896	11306	11442	11545	7
NJ 953	2.55	22440	6732	13109	13791	14201	14337	14440	4
UC 115	2.78	24464	7339	14526	15208	15618	15754	15857	3
JWC 1	1.71	15048	4514	7935	8617	9027	9163	9266	10
Average	2.02	17776	5333	9844	10526	10936	11072	11175	-

Δ – marketable yield increase influenced by irrigation [t ha⁻¹]

ΔD – increase of agricultural income [PLN ha⁻¹]

ΔP – value of additional produce, resulting by irrigation [PLN ha⁻¹]

ΔKr – an increase in agricultural costs resulting from additional produce [PLN ha⁻¹]

R – ranking

Source: author's calculations based on author's research data

Conclusions

- 1) The effectiveness of drip irrigation (ranging from 0 to 157 %) was the highest for cultivars Jersey Deluxe (157 %) and Jersey Giant (142 %). Lack of significant response to drip irrigation was found in case of cultivars Purple Passion, Jersey King and Atlas. Other cultivars (Jersey Supreme, Jersey Knight, Grande, Apollo, UC 157, NJ 953, UC 115, JWC 1) gave an increase in marketable yield of 35-79 % due to drip irrigation.
- 2) Economic results of drip irrigation, depending on the increase in produce value and assumed drip irrigation costs were positive in case of 10 cultivars. The drip irrigation of Jersey Deluxe and Jersey Giant turned out most cost-effective. Irrigation was also very cost-effective in the case of cultivars UC115, NJ953, Jersey Knight, Jersey Supreme, UC157, Grande, Apollo and JWC 1. Drip irrigation was unprofitable in case of the following cultivars: Purple Passion, Jersey King Atlas.

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INTEGRATED IMPACT ASSESSMENT OF AGRICULTURAL GHG ABATEMENT MEASURES

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Abstract. GHG emission reduction in the non-ETS (emission trading system) sector is a relevant component of environmental policies for the next programming period. Specific policy matters of the next programming period are unclear, yet in general, it is clear that the reduction of emissions or at least the introduction of emission abatement measures are binding on agriculture. A popular way how to analyse GHG emission abatement measures is to use a marginal abatement cost curve (MACC) that ranges the measures according to their costs and emission reduction potential. Such a research study has been done and the measures have been analysed in Latvia. A MACC, however, gives a relative notion of the effects of GHG emission abatement measures on sustainable development in Latvia. The research aim is to analyse the effects of GHG emission abatement measures on sustainable development in Latvia. The key instrument of the present research is Integrated Impact Assessment; according to it, experts from various fields identify the effects of GHG emission abatement measures on the economy, the environment and social development, determining its vector (positive/negative) as well as effect intensity (on a scale from 1 to 3). The results showed that some measures, e.g. promotion of biogas production, could have a negative effect in some sustainability sub-dimensions, yet overall the GHG emission abatement measures make positive and significant effects not only on the environment but also on sustainability at large. At the same time, it has to be taken into consideration that the effects identified by the experts are indicative and more research has to be done to make a more accurate assessment.

Key words: marginal abatement cost curve, integrated impact assessment, greenhouse gases, agriculture.

JEL code: F64; G28; O44; P28

Introduction

Environmental preservation is one of the EU multifaceted policy priorities that influences all the other policies, among them agricultural (European Commission, 2011). Agriculture plays an essential role in environmental preservation and in shaping climate policies. The agriculture of Latvia is the second largest source of greenhouse gas (GHG) emissions, accounting for 24.2 % of the total emissions produced in the country (Latvia's National Inventory Report, 2017). All the sectors of the economy have to contribute to the reduction of GHG emissions. Research studies (Cilinskis et al., 2017) have analysed various instruments that reduce emissions from the non-ETS sector. It has been found that there are great opportunities for GHG emission reduction (80 %) in Latvia by means of carbon tax, subsidies for solar technologies and funding for energy efficient renovation. However, reducing agricultural GHG emissions is a complicated problem. It is determined by the source of GHG emissions, which is mainly the feed fermentation process in the intestines of animals (CH₄); in 2015, it accounted for 31.3 % of the total agricultural emissions. Fertiliser application (N₂O) and organic soil use (N₂O, CO₂) made up 60.5 %, while manure management (CH₄; N₂O) comprised 7.2 % of the total (Latvia's National Inventory Report, 2017). The simplest way is to diminish the so-called activity data or to reduce the number of agricultural animals and fertiliser application and to limit activity in organic soils. However, such an approach is in contradiction to the agricultural development goals of Latvia (Latvijas Bioekonomikas stratēģija 2030, 2017; Pilvere et al., 2017) and current trends (Pilvere I. et al., 2016; Nipers, A., et al., 2017), as it envisages a considerable increase in agricultural output. Another alternative is the change of farming practices, which could raise the efficiency of the factors of production and/or

reduce the release of emissions; the goal of such measures is to reduce relative GHG emissions per unit of agricultural output. This approach is generally accepted in the EU (Frelih-Larsen A. et al., 2014). The most frequently used kind of analysis to examine GHG emission abatement measures is the so-called marginal abatement cost curve, which is a histogram that compares the measures according to GHG emission reduction potential and measure introduction and maintenance costs. The research aim is to analyse the effects of GHG emission abatement measures on sustainable development in Latvia. The object of the research is GHG emission abatement measures.

MACC. MAC curves are used in France (Pellerin S. et al., 2013), Ireland (Schulte R. et al., 2012), Great Britain (Spadavecchia L., 2014) as well as in other countries. Overall, one can find that the approaches and solutions are diverse (Eory V. et al., 2018). Latvia also constructs MAC curves for its agriculture (Popluga, D., et.al, 2017). In general, a MACC is a very useful instrument for an analysis of GHG emission abatement measures, yet it has limited opportunities to give a comprehensive insight into the effects on economic activity as a whole, as it does not have parameters of the social, economic as well as natural environments. A solution could be a combination of a MACC with Integrated Impact Assessment (IIA).

Integrated Impact Assessment. IIA is a policy analysis instrument that allows identifying the multifaceted effect of policy measures. The instrument is not new and, of course, has several sub-kinds.

Integrated impact assessment is a popular instrument in strategic and policy decision-making, which allows identifying the effect of a planned or unplanned strategic measure or a policy. The general form of IIA encompasses dimensions being typical of a sustainable development process: social, environmental and economic (Santoyo-Castelazo, Azapagic, 2014), yet it is possible to view any process through the prism of the fourth dimension: a) equality and diversity; b) health and prosperity; c) the environment; d) the economy (Fife Council, 2015). Impact assessment is a set of logical steps to be followed when you prepare policy proposals. It is a process that prepares evidence for political decision-makers on the advantages and disadvantages of possible policy options by assessing their potential impacts. It is also stressed that impact assessment is an aid to political decision-making, not a substitute for it, and although many actors may be involved in an impact assessment, the lead service remains fully responsible for its quality (European Commission, 2009). IIA represents a diversity of methodological approaches. There is the ex-ante and the ex-post approach with regard to the occurrence of an event researched. The first approach identifies the effect of a potential event on the subject researched, whereas the second one analyses the effect of an implemented policy or measure. The ex-ante approach is the most popular, as it is important for the introduction of a measure to identify a broader range of the consequences of it, while being aware and reducing any potential negative effect in advance, as well as the positive effect is increased by the opportunities for financing the measure and by the link with other policies. The EC vice-President, Frans Timmermans, points out that IIA may play an enhanced role within the Juncker Commission, as well as adds that it is necessary to enhance the IIA system, focusing on ex-ante assessment as well (European Parliament, 2015). Different policies could require a specific perspective on policy effects, therefore the following kinds of assessment have been developed: social impact assessment, health impact assessment (Milner S.J. et al., 2005), environmental impact assessment (Dendena B., 2015), sustainable assessment (Sala S., 2015) and others. Aledo-Tur with his colleagues has analysed social impact assessment (SIA)

from the multidimensional paradigm perspective and can creatively, by means of six questions, characterise the SIA from the methodological, theoretical, government involvement, epistemological, ontological and axiological perspectives. He has concluded that the SIA has to encompass as much precise potential effects of a measure as possible, which could specify the potential unjust social reality, supplementing the SIA with cross-cutting elements, contributions from regional science and spatial analysis (Aledo-Tur J., 2017). The methodological approach represents the so-called expert evaluation method, where the experts are measurers of integral effects (Sala et al., 2015), some mathematical model is employed, agricultural IIA models and climate change models are analysed (Britz W. et al., 2012), or it is a combination of both approaches (Brouwer R., van Ek R., 2004).

In summary, IAA is a popular and widely used instrument for assessing the effects of policy measures based on a variety of approaches, depending on the purpose of the assessment.

The research aim is to analyse the effects of GHG emission abatement measures on sustainable development in Latvia.

Method.

Regardless of the variations of a method, three tasks have to be performed:

- identification of economic, social and environmental effects of a policy; why and who are involved;
- identification of the most essential effects (often qualitative methods are employed);
- a detailed analysis of the most essential effects (quantitative/expected gain and loss monetary assessment).

A gain-loss analysis has been already performed for the GHG abatement measures within the present research, as well as GHG emission reduction potential was estimated, which is represented by a MACC for the GHG abatement measures for the agriculture of Latvia. Accordingly, an IIA might be considered an extension or a further derivative of the MACC. The IIA process involves five steps: a) identification of the need for an assessment of an effect; b) identification of the interests of social groups involved and the selection of experts; c) creation of a table for the assessment of the effect to be filled in by the experts; d) development of recommendations; e) familiarisation of policy makers with the results. The specifics of this research methodology are presented below.

Identification of the need for an assessment of an effect. As mentioned above, GHG emission abatement measures could cause multifaceted externalities, e.g. increase animal welfare, increase the population of pests, contribute to higher agricultural land market prices etc. As regards the practical introduction of measures, it is required to identify and take into account the measures for the purpose of setting conditions for the measure introduction. *Identification of the interests of social groups involved and the selection of experts.* The quality of expert selection directly affects the quality of research; therefore, the experts involved have to represent national institutions: the Ministry of Environmental Protection and Regional Development and the State Plant Protection Service, farmers: the Farmers Parliament (large farms) and the Latvian Farmers Union (small and organic farms) and agricultural experts in agronomy and livestock husbandry. The experts were familiarised with the purpose and construction specifics of a MAC curve and the measures analysed in the curve. *Creation of a table for the assessment of the effect to be filled in by the experts.* The groups of influencing factors are traditional and encompass the usual sustainability dimensions: the environment, the economy and the society. Some sub-dimensions were selected using the

available methodological guidelines (Fife Council, 2015; European Commission, 2009), as well as the externalities of measures identified in the above-mentioned seminars on MACC construction. The assessment involves three levels: a) identification of whether a measure makes an effect on a particular sub-dimension of sustainability; b) identification of whether the effect is positive or negative; c) identification of the intensity of the effect (on a scale from 1 – weak to 3 – strong). Such an approach is employed in urban analysis (Andersson-Skold Y., 2015). The table was filled in during an in-person meeting of the experts who discussed every measure individually, yet the IIA table was filled in by every expert individually, which enabled the experts to consider every measure from different perspectives, while having the right to express their own opinions.

Development of recommendations. The recommendations were drawn up based on the summary table with the experts' ratings as well as the discussion. It has to be noted that in some cases the experts' ratings differed, which is understandable, as they represented diverse social groups; for this reason, the research employed the multi-step aggregation approach. Both the mode, the average and the median (useless due to a small sample) were calculated for every effect of every measure on every sustainability sub-dimension; a simultaneous comparison allowed relatively objectively aggregating the experts' ratings.

Familiarisation of policy makers with the results. The research results were presented as the MACC extension for GHG emissions from the agriculture of Latvia for national agricultural policy makers: the Ministry of Agriculture, the Latvian Rural Support Service, those working on the Rural Development Programme as well as the Consultant Organisation, the Latvian Rural Advisory and Training Centre (LLKC), the Union of Farmer Organisations and the Latvian Agricultural Organisation Cooperation Council (LOSP).

Research results and discussion

The research results are summarised in Table 1, in which the potential sustainability sub-dimensions are arranged horizontally and the GHG emission abatement measures are arranged vertically. The experts' ratings are shown by means of colours and signs: grey means a positive effect, darker grey means a negative effect, white – no effect; the signs show the intensity of the effect, see below.

Table 1

Summary of integral effects of GHG emission abatement measures

Measure/ Impact criteria	Economic aspects										Social aspects							Environmental aspects					
	Competitiveness of agriculture	UAA value	Production quality	Employment	Export	Import	Pesticide consumption	Fertilizer consumption	Regional development	Development of outourcing	Equality of business	Public health	Farmers health	Research development	Knowledge transfer	Landscape preservation	Public infrastructure	Soil quality and natural fertility	Soil sealing	Water quality	Biodiversity	Animal welfare	Fossil energy usage
Introduction of perennial grasses in organic arable soils	✓	✓✓✓	✓✓✓	○	○	○	○	○	○	○	○	○	○	○	○	○	○	✓✓✓	○	✓✓	✓✓✓	○	○
Nitrogen fixation (legume plants in crop rotation)	✓	✓✓	✓	○	○	○	✓	✓✓✓	○	○	○	○	○	✓	✓	○	○	✓✓✓	✓✓	✓✓	✓	○	○
Fertilisation planning	✓✓	✓✓	✓✓	✓	○	○	○	✓✓✓	○	✓	○	✓	○	✓✓	✓	○	○	✓✓	✓	✓	○	○	✓
Promotion of biogas production	○	○	○	✓	○	○	○	○	✓	✓	✓	○	✓	✓	✓✓	✓	○	○	✓	○	○	○	○
Planning feed rations	✓✓	○	✓✓	○	○	○	○	○	○	✓	✓	○	○	✓	✓	○	○	○	○	○	○	✓✓✓	○
Solid-liquid separation of livestock manure	○	○	○	✓	○	○	○	○	○	○	○	○	○	✓	✓	○	○	○	○	✓	○	○	○
Enrichment of feed with fats	○	○	✓	○	○	○	○	○	○	○	○	○	○	✓	○	○	○	○	○	○	○	✓	○
Growing green manure crops	○	✓✓	○	○	○	○	✓	✓	○	○	✓	○	○	✓	✓	○	○	✓✓✓	○	✓	✓	○	○
Minimum tillage	✓	✓	○	✓	○	○	○	○	○	○	○	○	○	✓	✓✓	○	○	✓	✓	✓	✓	○	○
Direct incorporation of organic fertilisers in soil	✓	○	✓	○	○	○	○	✓	○	✓	○	○	✓	✓	✓✓	○	✓	✓✓	○	✓	○	○	○
Maintenance of amelioration systems	✓✓	✓✓✓	○	✓	○	○	○	○	✓✓	✓✓✓	✓	○	○	✓	○	✓	✓✓✓	✓✓✓	○	✓	✓	○	○
Precision fertiliser application	✓✓	✓	✓✓	✓✓	○	○	○	✓✓✓	✓✓	✓	○	✓	✓	✓✓✓	✓✓	○	○	○	○	✓✓	○	○	✓
Application of nitrification inhibitors	○	○	✓	○	○	○	○	✓	○	○	○	✓✓	○	✓	✓	○	○	○	○	✓✓✓	○	○	○
Intensive grazing (frequent livestock rotation in pastures)	○	○	✓	✓✓	○	○	○	✓	○	○	○	○	○	✓✓	✓	✓	○	○	✓	○	✓	✓✓✓	✓
Enhancement of the quality of feed	✓✓	○	✓✓	○	○	○	○	○	✓	○	○	✓	○	✓✓	✓	○	○	○	○	○	○	✓✓	○
Liming acidic soils	✓✓	✓✓✓	✓✓✓	○	○	○	○	✓	✓	✓✓	○	✓	○	✓	✓✓	✓	○	✓✓✓	✓	✓	○	✓	✓
Extending the grazing season	✓✓	○	✓✓	✓	○	○	○	○	○	○	○	○	○	✓	✓	○	○	✓	○	○	○	✓✓✓	○

Denotations: - positive impact; - negative impact; ○ - measure don't effect analysed criteria; ✓ - impact intensity (✓ - weak, ✓✓ - medium, ✓✓✓ - strong)

Source: authors' calculations

Overall, most of the measures cause positive externalities on sustainable development. An exception is the promotion of biogas production, which was negatively rated according to some sub-dimensions of all the three dimensions. Such a critical attitude could be largely due to the mechanism of unsuccessful promotion of biogas production under the energy policy of Latvia. Economic development is negatively affected by permanent grasses grown in organic soils, while at the same time making a positive effect on the quality of soil and water, as well as biodiversity. The introduction of this measure could be linked with not only the climate change policy but also the environment preservation policy, while being aware of a decrease in the total output of agricultural products. The environmental dimension could be negatively affected by the measure "intensive grazing", which results in higher fuel consumption, soil compaction and lower biodiversity; however, since the intensity of the effect is weak, it is possible to mitigate the effect by means of enhancement of practices of the measure. Almost all the measures make positive effects on research development and knowledge transfer, which makes us consider that the experts saw a lot of opportunities for enhancing the practices of the measures and the need for informative and training measures for farmers. It could be actually considered to be a strong demand for closer interaction between science and agricultural practices. It is surprising that the summary of the research results does not encompass the effects on imports and exports, although some experts noted such an effect for some measures. An explanation might be the relatively dual effect of a measure, i.e. the measure, on the one hand, reduces fertiliser imports, while on the other hand, increases imports owing to machinery and equipment imports. This means that if interpreting the

results acquired, one has to take into consideration a possibility that a neutral sign in the table might be interpreted as an unclear effect as well. Overall, the IAA approach employed by the research gives insight into the effects of the measures in the form of "underwater stones" (negative effects) and "tailwind" (positive effects) that could be measured more accurately by employing quantitative methods or by enhancing the existing agricultural models or creating new ones through employing the IAA or the SIA approach.

Conclusions, proposals, recommendations

- 1) Integrated impact assessment is a popular instrument for assessing policy measures, which is characterised by a methodological, epistemological, ontological and axiological diversity and which continue developing as an important instrument in policy effect analysis for the European Commission, EU Member States and other world countries.
- 2) The GHG abatement measures analysed by means of a MACC for Latvia are diverse and, overall, make positive effects on sustainable development. Policy makers have to focus particularly on the measures that, along with positive effects, make also negative effects: permanent grasses grown in organic soils; promotion of biogas production; as well as intensive grazing. Solutions to the measures causing negative effects could be diverse. The measure "permanent grasses grown in organic soils" may be introduced in a broader context of policies: land use, land-use change, and forestry (LULUCF) management, biodiversity, water quality and for other climate and environmental policy purposes. The introduction of the measure "promotion of biogas production" has to be linked with the energy policy. However, the insignificant negative effects caused by the measure "intensive grazing" could be reduced by practical enhancements of the measure, e.g. by making the watering system more effective. It has to be mentioned that the above are only conceptual solutions that need to be examined and analysed.
- 3) IIA can effectively supplement a MACC, giving a multifaceted insight into the effects of GHG abatement measures. A more accurate assessment of an effect requires employing quantitative models, while considering whether the efforts to create a specific simulation tool are worth making or considering performing, if necessary, an additional analysis of the specific aspects of introduction of GHG abatement measures.

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FINANCE AND TAXES

EFFECT OF AN UNDERDEVELOPED HIGH VALUE-ADDED SECTOR ON THE LOW VALUE-ADDED SECTOR IN LESS DEVELOPED COUNTRIES

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Abstract. Average nominal earnings among world countries are very diverse, even within the EU. The disparity between Luxembourg and Bulgaria is almost ten times, as the East European EU Member States considerably lag behind in terms of production of high value-added products. It is important for the East European EU Member States to reduce the disparities, which could be achieved through raising labour productivity, mainly in the tradable sector. The research aim is to identify the effect of an underdeveloped high value-added sector on the low value-added sector in less developed countries. An analysis of empirical data supported the hypothesis that an underdeveloped high value-added tradable subsector in less developed countries does not allow reaching the labour productivity level of developed economies in the low value-added tradable subsector because of the availability of a relatively cheaper labour force that does not force businesses to raise their labour productivity levels.

Key words: labour productivity, earnings level, tradable sector, high value-added sector, low value-added sector.

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Introduction

The nominal earnings disparities among the EU Member States were significant, reaching almost ten times: in 2014, the highest mean earnings in industry, construction and services (in companies with 10 employees or more) were reported in Luxembourg with EUR 4026, while in Bulgaria the earnings were the lowest at EUR 431, which should be a concern for policy makers as well. The nominal earnings were lower in almost all the East European EU Member States (former communist countries) than in the West European EU Member States. The only exception was Slovenia with EUR 1582, surpassing only one West European EU Member State – Portugal. The minimum wage is also a relatively good indicator that shows the disparities in the standard of living within the EU, where the highest minimum wage was set in Luxembourg with EUR 1921, whereas the lowest was in Bulgaria with EUR 174. In terms of minimum wages, Slovenia surpassed three West European EU Member States: Portugal, Spain and Malta (Eurostat). Therefore, the purpose of the present research is to contribute to the understanding of factors that hinder the reduction of nominal income disparities within the EU, mainly between the West European and East European EU Member States.

The large nominal earnings disparities among the EU Member States make it necessary for the East European EU Member States to increase labour productivity in their tradable sectors, which allows raising labour force earnings both in the tradable sector and in the entire economy, thereby contributing to income convergence among the EU Member States or at least a decrease in the significant income disparities.

The research aim is to identify the effect of an underdeveloped high value-added sector on the low value-added sector in less developed countries.

The specific research tasks were set as follows: 1) to characterise the roles of high and low value-added sectors and of the tradable sector in a modern economy; 2) to identify the effect of a high value-added tradable subsector on labour productivity in the low value-added tradable subsector.

The research employed Eurostat data and other sources of information. The research used the following methods: correlation analysis, single-factor analysis of variance (ANOVA), analysis and synthesis, logical construction.

The research put forward the following hypothesis: an underdeveloped high value-added tradable subsector in less developed countries does not allow reaching the labour productivity level of developed countries in the low value-added tradable subsector because of the availability of a relatively cheaper labour force in the less developed countries.

Research results and discussion

1. Roles of high and low value-added sectors and of the tradable sector

Nowadays scientists discuss such issues as high and low value added, high and low value-added goods and services, as well labour productivity and an income level determined by it. There are distinguished high and low value-added industries and even sectors. From the perspective of foreign trade, there are also distinguished the tradable sector and the nontradable sector. It has to be noted that according to the Balassa-Samuelson theory, the nontradable sector is more labour intensive and, consequently, no considerable labour productivity differences exist among nontradable sector industries and across countries, and these differences do not determine the nominal earnings level in the entire economy (Krugman P.R., Obstfeld, M, 1994); therefore, the mentioned differences were not analysed in the present research. All the above-mentioned factors determine the nominal as well as the real income level in any open economy. Since nominal income levels are very diverse not only among world countries but also among EU Member States, it is necessary to perform an in-depth examination of the roles of the above-mentioned sectors and their interaction.

The nominal income level in any open economy is determined by labour productivity in the tradable (export) sector, as stated by the Balassa-Samuelson theory. Yet it is very important what value added the exports have – whether the exports are of high or low value-added. Less developed countries export mostly low value-added goods and services, whereas developed countries export both low and high value-added products.

For simplicity, let us assume that there are only two subsectors in the tradable sector: a high value-added subsector and a low value-added subsector. In reality, the division is broader and more gradual. Within the present paper, industries or kinds of economic activity requiring a highly-qualified labour force and high technologies to produce high value-added goods or services are attributed to the high value-added tradable subsector. In contrast, the low value-added tradable subsector is comprised of the industries or kinds of economic activity requiring a less-qualified labour force and different-level technologies to produce low value-added goods or services. For example, to produce complicated manufacturing goods, modern electronics, equipment etc. that have high value-added, it is necessary to have and employ a highly-qualified labour force and high technologies and to cooperate with institutions dealing with science and technology, research and development and innovation. Conversely, producing agricultural and other low value-added goods requires a less-qualified labour force, while technologies (agricultural machines and equipment) could be complicated and expensive. In the last half a century, for example, very rapid changes occurred in the electronics industry and completely new goods emerged, which is incomparable with the agricultural industry where changes occurred at a much slower pace – agricultural commodities have little changed during the centuries (only new crop varieties were

developed), while technologies used in agriculture (e.g. precision farming) developed as fast as technologies in general.

In the world, there are quite many high-income countries, both large and small in terms of population. In these countries, the high income levels are determined by the factors related to exports (tradable sector).

In world countries, high incomes are generated in three main ways. Two of them are specific to small countries in terms of population: 1) exports of low value-added commodities; 2) exports of low value-added services. As regards the first way, there is a number of Arab and other countries endowed with relatively large oil or other resources. The second way is attributed to small the so-called offshore countries that sell (and export) a lot of financial services, given the small populations of these countries, ranging from tens of thousands to a few millions. The third way involves the production and, of course, export of high value-added goods and services, which is characteristic of the developed countries with large populations.

2. Effect of the high value-added tradable subsector on labour productivity in the low value-added tradable subsector

The Eurostat database provides data on earnings in the business economy that encompasses the following sectors according to the NACE Rev.2 classification: industry (sections B to E), construction (section F) and services (sections G to N, excluding activities of holding companies – K64.2). The sections included in the business economy mainly correspond to tradable sector industries. Industry produces mostly tradable goods, construction services may be considered to be internationally tradable services within the EU, as there is free movement of services in this free trade bloc. Other service sections (G-N) include wholesale and retail trade (G), accommodation (I), transportation and storage (H), information and communication (J), financial and insurance activities (K), real estate activities (L), professional, scientific and technical activities (M) and administrative and support service activities (N), which also involve mainly internationally tradable activities. The remaining service sections (O-U), which are not included in the business economy, relate to the nontradable sector, with a few exceptions. In view of the fact that Eurostat does not provide data broken down by the tradable and nontradable sectors, the data on the business economy best reflect the tradable sector.

Beside the business economy (tradable sector) as a whole, the author selected the following industries of this sector: manufacturing as a whole, which is usually the key contributor to exports, high technology manufacturing, low technology manufacturing, manufacture of food products as well as two service industries: accommodation and information and communication technology (ICT), which are strongly associated with exports or the tradable sector. Accommodation is directly related to tourism, which is an export service. Since no complete data on the tourism industry are available in the Eurostat database, the author chose the accommodation industry for analysis. High value-added could be attributed to high technology manufacturing as well as ICT services. The other three industries, except manufacturing as a whole, are considered to represent low value-added industries.

The countries available in the Eurostat database, which were mostly EU Member States, as well as Switzerland and Norway, were selected for analysis. Since the available data were collected according to the same methodology, the data were comparable and allowed drawing relevant conclusions. Table 1 shows countries ranked by mean earnings in companies with 10 or more

employees, as the data on the mean earnings in all companies are not available for all the selected countries. In addition, a correlation between mean earnings and labour productivity in the tradable sector (business economy) and individual industries of this sector was calculated as well.

As shown in Table 1, the correlation calculation results indicate a strong empirical relationship (correlation coefficients are high, in the range of 0.72-0.97) between the average earnings and the labour productivity both in the business economy, i.e. the tradable sector and in the individual tradable sector industries.

Table 1

Correlation between average earnings (EUR) and apparent labour productivity (thou. EUR) in selected tradable sector industries in selected European countries in 2014

Country	Average earnings	Productivity in:						
		business economy	Manufacturing	high-tech	low-tech	food	ICT services	Accommodation
Switzerland	6 011	113.0	131.4	216.2	93.8	n.d.	171.6	55.4
Norway	5 031	131.3	103.6	155.8*	83.5	88.9	141.0	43.8
Luxembourg	4 206	86.8	75.8	n.d.	63.7	44.2	213.5	48.3
Denmark	4 194	77.8	82.5	145.9	72.5*	66.3	91.0	48.1
Ireland	3 778	94.8	194.1	442.7*	n.d.	184.1	206.3*	26.7
Sweden	3 578	70.3	83.2	162.0	74.7	60.5	98.8	38.2
Finland	3 232	59.2	70.8	85.6	71.3	59.7	96.0	34.4
Belgium	3 216	71.0	98.9	204.8	73.9	73.5	115.0	48.6
UK	3 151	65.6	76.1	90.5	65.1	67.3	126.0*	38.9
Germany	3 045	55.1	71.5	97.3	48.0	39.9	102.0	24.0
Netherlands	2 988	59.1	87.1	123.8	76.4	80.2	101.6*	33.4
Austria	2 806	62.4	79.3	111.2	62.4	52.6	90.0	38.0
France	2 775	57.1	66.7	97.9	55.1	53.0	88.8	44.6
Italy	2 458	45.4	55.8	90.3	46.6	50.8	82.7	36.9
Spain	1 985	40.4	56.6	97.1	46.6	50.8	75.9	37.2
Cyprus	1 840	33.4	29.8	46.0*	25.9	27.4	88.2	29.8
Malta	1 720	33.1	n.d.	30.2*	30.6	n.d.	n.d.	25.9
Slovenia	1 582	32.1	36.5	77.9	27.0	27.5	52.1	23.2
Greece	1 562	22.8	35.2	54.9	29.7	34.6	49.4	29.5
Portugal	1 249	23.9	26.8	45.0	22.2	22.5	58.0	22.6
Estonia	1 066	25.7	24.7	27.5	21.9	23.2	41.7	15.2
Croatia	1 057	20.4	18.2	43.4	15.1*	16.2	43.2	27.1
Poland	980	21.5	23.8	30.4	19.4	21.0	37.2	15.6
Slovakia	930	21.5	25.0	35.6*	16.4*	17.7	46.3	10.4
Czechia	925	23.9	27.3	32.9	19.2	18.7	46.0	16.0
Hungary	811	20.7	29.3	48.3*	16.2	17.8	33.5	14.1
Latvia	806	16.3	16.1	37.0	14.3	13.8	28.8	11.7
Lithuania	706	16.0	15.8	32.7	13.8	14.7	30.0	9.0
Romania	521	14.6	13.4	19.9	9.4	9.8	28.0	10.0
Bulgaria	431	10.5	9.9	18.2	7.6	8.7	25.3	7.7
Coefficient of correlation between average earnings and productivity		0.97	0.85	0.72	0.95	0.75	0.87	0.88

* data refer to the closest year to 2014; n.d. – no data

Source: author's calculations based on Eurostat

An analysis of variance showed that the p-value was smaller than the significance level of 0.01 (author's calculations). This is not a startling fact because according to the Balassa-Samuelson theory (Krugman P.R., Obstfeld, M, 1994), labour productivity in the tradable sector determines the overall earnings level in the whole economy, especially in today's globalised world and particularly among the EU Member States with free movement of goods and services, including Switzerland and Norway that have almost free trade with the EU. The highest correlation (0.97) existed between the average earnings and the labour productivity in the business economy (tradable sector as a whole). A slightly lower correlation was identified in the individual tradable sector industries. In the author's opinion, it would be a very positive phenomenon if no strong correlation existed between average earnings and labour productivity in low value-added tradable subsector industries.

If there were no strong correlation between average earnings and labour productivity in any low value-added tradable subsector industry in lower income (economic development level) countries, i.e. if the availability of a relatively cheaper labour force made no effect on the labour productivity in the entire tradable sector and, first of all, in this sector's low value-added industries, this would allow raising the labour productivity in the low value-added tradable subsector industries of these countries, i.e. in the industries which exist in these countries and the proportion of which in their economies is significant. Consequently, earnings would rise in the whole economy, including in nontradable sector industries, even though no high value-added tradable sector industries exist in these countries or their proportion in the economy is insignificant. For example, even though East European countries actually have no high-technology manufacturing or its proportion in their economies is very low, these countries could achieve the labour productivity level of developed countries in such industries as low-technology manufacturing, manufacture of food products, accommodation and other low value-added tradable sector industries. Nominal incomes would converge, to some extent, between the developed West European and the less developed East European countries. However, the empirical data do not indicate such a phenomenon; there are only a few exceptions.

This is most apparent in the accommodation industry if comparing Croatia with such countries as Germany and Ireland. In 2014, average earnings in Croatia were only just above EUR 1000, while in Germany they were more than EUR 3000 (about three times higher) and in Ireland they were EUR 3800 (almost four times higher). Labour productivity in this industry in Croatia was EUR 27.1 thou., while in Germany and Ireland it was EUR 24.0 and 26.7 thou., respectively, i.e. slightly lower. This phenomenon could be explained by economies of scale, including labour economies of scale, as the travel and tourism industry, which is closely associated with accommodation, in Croatia was relatively larger (total contribution of travel & tourism to GDP was 25 %) than that in Germany (11 %) and Ireland (6 %). A similar situation was in Slovenia where labour productivity in its accommodation industry was only slightly lower than that in Germany and Ireland. In Slovenia, too, the travel and tourism industry made a relatively large total contribution to its GDP (13 % of GDP). In Greece, where average earnings were approximately two times lower than those in Germany and Ireland, labour productivity was higher at EUR 29.5 thou. In Greece, too, travel and tourism (20 % of GDP) and related accommodation was a very significant export industry. In terms of labour productivity in the accommodation industry, Germany and Ireland considerably differed from most of the developed West European countries where it was significantly higher. This could be explained by the use of a relatively cheap foreign labour force,

mainly from Eastern Europe, in these high-income countries, which did not motivate businesses in these countries to raise their labour productivity through optimising the number of their employees.

The analysis of labour productivity in manufacturing shows that there was only one country – Cyprus – where this indicator was lower than it was supposed to be. In the period 2008-2014, the labour productivity decreased by approximately 12 % (author's calculations based on Eurostat), which was affected by the global financial and economic crisis.

In high technology manufacturing, there was only one exception – Hungary – in which labour productivity in this industry was higher than in three countries with higher average earnings – Malta, Portugal and Cyprus. Slovenia, too, outperformed such countries as Cyprus and Malta. As regards low technology manufacturing, it is worth mentioning Cyprus where labour productivity in this industry was relatively low.

Labour productivity in the food industry of Slovenia and Malta was lower than that in Greece, while Portugal outperformed Greece and Slovenia in the industry of ICT services.

As regards the business economy as a whole, labour productivity only in Estonia was slightly higher than in Greece where average earnings were approximately 1.5 times higher. A quite strong trend was observed – labour productivity in the business economy in all the analysed countries rose from year to year. An exception was Greece, which was a heavily indebted country and in which its GDP significantly contracted (by about 25 %), as well as Cyprus that underwent a banking crisis in 2013 and in which its GDP also considerably decreased (by approximately 15 %), which obviously negatively affected the labour productivity in these countries in their entire business economies (tradable sectors).

Labour productivity in several analysed industries in Ireland was untypically high, compared with even the other developed countries, yet the purpose of this research was not to identify the causes of it.

The above-mentioned data indicate that the high value-added tradable subsector (the existence or lack of it) significantly affects the low value-added tradable subsector through such a factor of production as labour and remuneration paid to it. There is a marked economic phenomenon that can be observed in lower income countries – the availability of a relatively cheap labour force, which is one of the four factors of production and one of the most important factors of production, does not motivate, encourage and force businesses operating in the tradable sector's low value-added subsector raise labour productivity and approach the level reported in developed countries. Conversely, in high income countries, the labour force is expensive, which motivates, encourages and forces the businesses of these countries that are engaged in the tradable sector's low value-added subsector to raise their labour productivity in order to remain competitive in terms of pay with the high value-added subsector. In high-income countries, average earnings in low value-added industries are not as high as in high value-added industries, yet the earnings are adequate to the income level in these countries or are significantly higher than in corresponding industries in lower income countries.

Figure 1 shows a scatterplot for the empirical linear relationship – average earnings (independent variable) are strongly positively related to labour productivity (dependent variable) in the business economy (tradable sector) – for all the countries presented in Table 1.

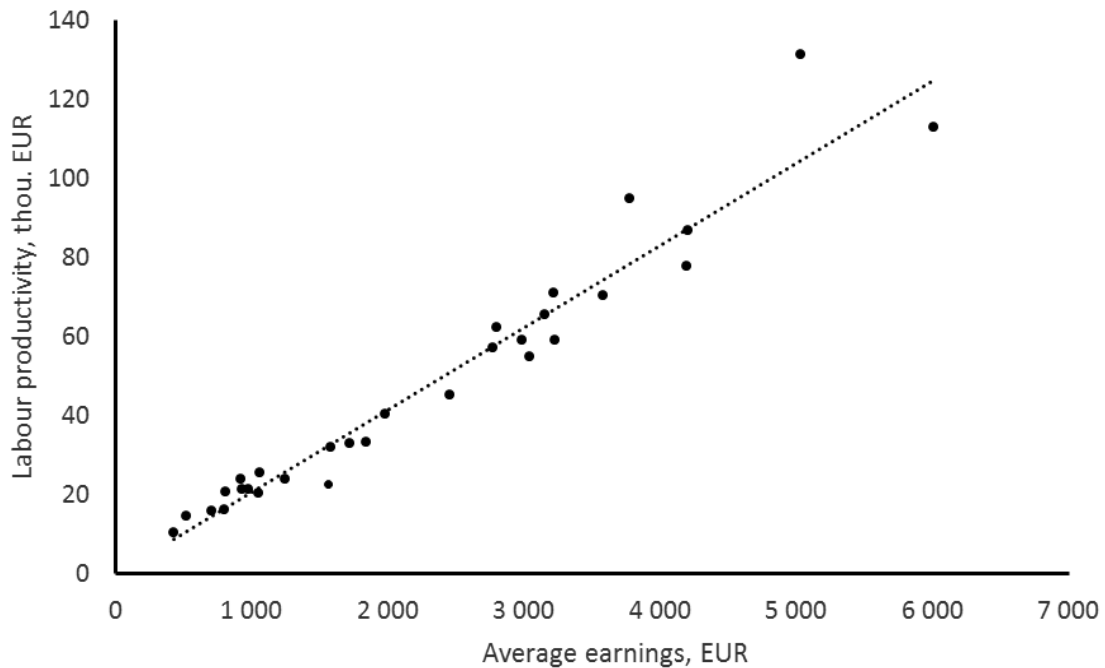


Fig. 1. **Empirical relationship between average earnings and labour productivity in the business economy (tradable sector)**

This indicates a serious problem in lower income countries – the proportion of the high value-added tradable subsector is low, which cannot raise the overall earnings level in the entire economy. For this reason, the labour force in such economies is relatively inexpensive, which, on the one hand, is an advantage for businesses that need to hire employees at a lower cost. On the other hand, the availability of a relatively inexpensive labour force is a serious disadvantage, as it allows businesses to hire and employ a larger number of employees and not to tackle problems related to technological advancement and, consequently, the release of redundant employees or an increase in output, while employing the same number of employees. The freed up labour force could be engaged in other industries, which would contribute to economic growth at the current number of the labour force or even at a declining population as well as a decreasing number of the labour force, which is a typical trend observed in Latvia and other East European EU Member States for a long period.

As regards labour productivity in high value-added industries in less developed countries, it is relatively low and, as mentioned above, also strongly correlated with average earnings in the entire economy. In less developed countries, the availability of a relatively cheap labour force does not allow achieving a high labour productivity level in neither the low value-added tradable subsector that is significantly represented nor the high value-added tradable subsector that is insignificantly represented in their economies.

The availability of a relatively inexpensive labour force, in the opinion of the author, relates to the so-called middle-income trap problem, i.e. the countries, upon reaching a middle income level, cannot transit to a new, higher income level that approaches the income level of developed countries or shift to the innovation-based stage (World Bank, s.a.). The cause is the fact that there is no driver – a high value-added tradable subsector and its integral component – a highly qualified labour force and innovation that lead to higher labour productivity, higher labour incomes and more tax revenue paid to the government. As regards innovation and creativity, problems with so necessary prerequisites are particularly characteristic of post-communist countries where the

creativity and the initiative were suppressed for half of a century. Even though almost three decades passed after communism disappeared in Eastern Europe, the consequences of it still remain in the way of thinking of the entire society, which affects and will affect entrepreneurship for some time.

Conclusions, proposals, recommendations

- 1) Nominal income (earnings) disparities among the EU member States are very significant, reaching almost ten times, which makes it necessary for policy makers to focus on this problem not only at the EU but also at the national level.
- 2) There is a quite strong empirical relationship in the analysed EU countries between average earnings and labour productivity in the entire tradable sector (business economy) as well as in individual industries of the sector, besides, in both high and low value-added industries, which indicates a theoretical possibility for lower income countries to reach the labour productivity level of developed countries in their low value-added industries.
- 3) The hypothesis mainly proved to be true – the high value-added tradable subsector considerably affects the low value-added tradable subsector. The insignificant high value-added tradable subsectors of post-communist EU Member States are not able to raise the earnings level in their entire economies; for this reason, a relatively inexpensive labour force is available in the mentioned countries, which does not motivate, encourage and force businesses engaged in low value-added tradable subsector to raise their labour productivity.
- 4) In high-income countries with large populations, the proportion of the high value-added tradable subsector is significant, which raises the overall earnings level in the entire economy. The labour force is expensive, which, in its turn, forces businesses to increase their labour productivity also in the low value-added tradable subsector in order not to lose their competitiveness in terms of pay. Conversely, in low income countries the proportion of the high value-added tradable subsector in the economy is low, which does not raise the earnings level in the entire economy. The labour force is inexpensive, and this factor does not force businesses engaged in the low value-added tradable subsector to raise their labour productivity. The businesses would be forced to do it if the high value-added tradable subsector considerably expanded in a low-income country.
- 5) If the East European EU Member States do not develop their high value-added tradable subsectors, a considerable increase in the nominal earnings level in the entire economy is not possible.

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FINANCIAL EFFICIENCY OF THE INDUSTRY PRODUCING FODDER IN COMPARISON WITH OTHER FOOD INDUSTRY SECTORS

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Abstract. Efficiency, as a universal and comprehensive measure of management efficiency, may be referred both to a single enterprise, branch of industry, and the entire economy. The feed industry is a branch of the food industry, which differs greatly from its other sectors. Its specific character results from the generation of products, which are not directly consumed by humans, but are used to feed animals - both pets and farm animals, as a result satisfying human needs. Additionally, enterprises in the feed industry are to a greater extent exposed to the risk of the effects of natural factors than it is the case in other branches of the economy. The multitude of specific conditions influencing the feed industry sectors is reflected in its financial situation, first of all efficiency. The aim of the study was to assess financial efficiency in feed industry enterprises in Poland in the years 2011-2015 and showing its position in relation to the entire food industry sector. The study was conducted based on unpublished data of the Main Statistical Office (GUS). Variation in financial efficiency in individual branches of the food industry sector was assessed using a synthetic measure constructed using the classic TOPSIS method. These analyses indicate relatively good financial efficiency in a group of enterprises producing animal feed and fodder, although it varied in the class system. Generally higher efficiency was recorded for enterprises producing pet food.

Key words: financial efficiency, synthetic measure, feed industry, food industry.

JEL code: G32

Introduction

Functioning of each entity, irrespective of the type of its operations and market situation, is determined by the management efficiency of available material and capital resources (Polaczek, 2008). In the literature on the subject the concept of efficiency is used in a broad and highly diverse sense, both within various fields of science and in the common language; for this reason it is difficult to provide their clear definition (Jaki, 2011). In the general sense, efficiency refers to the effectiveness of operations assessed on the basis of relationships between obtained effects and outlays. The effect is understood by a specific type of the result provided by the economic activity of the enterprises. Until recently, it was assumed that profit is such an effect, thus efficiency is measured based on this parameter (Dudycz, 2001). In recent years interest of researchers has been focused on actual cash flows, thus efficiency started to be measured considering operating cash flow. In terms of outlays, efficiency may be measured depending on the used material resource (e.g. equity capital, assets) or intellectual capital (Sierpinska, Jachna, 2007). An interesting approach to financial efficiency may be provided by the proposal by E. A. Helfert. He stated that it is "managing selected resources at the strategic level so that with time an economic value may be generated, ensuring not only the coverage, but also decent return on the incurred outlays, at the same time not exceeding the level of risk acceptable to the owners" (Kulawik, 2008; Helfert, 2004). A commonly applied method to measure efficiency is connected with the indicator approach. The selection of indicators is determined by the objective of the analysis (Capiga, 2011). In the theory of finances indicators are not clearly specified, which would objectively present financial efficiency of enterprises. It may be assessed using indicators from various areas of financial analysis, i.e. profitability, liquidity, effectiveness of activity.

The multidimensional character of the problem makes unequivocal assessment of financial efficiency difficult. Some ratios may point to a very good financial situation, whereas others may signal problems at the same time. In consequence of the diversified rules of assessment there is

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excessive subjectivity of interpretation. Grzesiak (1997) was of an opinion that the analysis of efficiency conducted based on financial indicators should be supported by decision-making or taxonomic methods. A useful tool in the evaluation of financial efficiency may be provided by a synthetic measure (a synthetic measure of development). The synthetic trait is constructed as a real function of directly observable simple traits, representing significant elements and relations of a complex phenomenon (Zielinska-Sitkiewicz, 2017).

Efficiency, as a universal and comprehensive measure of management efficiency, may be referred both to a single enterprise, branch of industry, and the entire economy. The feed industry is a branch of the food industry, which differs greatly from its other sectors. Its specific character results from the generation of products, which are not directly consumed by humans, but are used to feed animals - both pets and farm animals, as a result satisfying human needs. The agricultural sector is the recipient of the feed industry outputs, the demand for which resulting first of all from the direction, scale and intensity of animal production (Drozd et al., 2014). Additionally, feed enterprises are mutually dependent on economic entities from one sphere of production. On the one hand, they purchase the raw material required for production from farms (cereals, lupine, pea etc.), while, on the other hand, these entities produce feeds and concentrates for farms, which are used in animal production. For this reason, the turnover in feeds is limited, which may result in a greater risk of destabilisation in the economic activity of participants in this market. Additionally, enterprises in the feed industry are more exposed to the risk of the effects of natural factors than it is the case in other branches of the economy. The multitude of specific conditions influencing the feed industry sectors is reflected in its financial situation, first of all efficiency.

For this reason, the aim of the study was to assess financial efficiency in feed industry enterprises in Poland in the years 2011-2015 and showing its position in relation to the entire food industry sector. The article describes the following research tasks: - the economic characteristics of feed production enterprises were made, analyse of the financial situation of feed enterprises in comparison to the food industry, indicate the position of the feed enterprises in the food industry.

Materials and research methods

Source materials for this analysis included unpublished financial data for the years 2011-2015, in terms of the food industry branches according to the Polish Classification of Economic Activity, originating from the Main Statistical Office (Unpublished data..., 2012-2016). This system made it possible to evaluate a total of 26 branches of the food industry sector. Variation in financial efficiency in individual branches of the food industry sector was assessed using a synthetic measure constructed using the Technique for Order Preference by Similarity to an Ideal Solution - TOPSIS (Hwang, Yoon 1981). The value of the synthetic measure of financial efficiency for branches of the food industry sector was established in five stages (Stanislawski, Wysocki, 2008). In stage 1, simple characteristics were selected, describing financial efficiency based on factual and statistical principles. In order to construct the synthetic measure of financial efficiency in the branches of the food industry sector, 20 potential financial indicators were proposed, describing broadly understood efficiency. Based on statistical analyses strongly correlated variables were eliminated. Finally, 7 simple characteristics were selected for analyses: return on equity, return on operating assets, profitability of sales, operating cash flow/sales ratio, the indicator of global assets turnover, the indicator of current liquidity, the indicator of dynamics of sales revenue. In the next stage the character of the parameters was unified and their value was converted to a comparable

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form applying the unitarisation procedure. Based on unified (standardised) values of simple characteristics, Euclidean distances were calculated for individual branches from the benchmark and the anti-benchmark of development. Finally, the value of the synthetic measure of financial efficiency for branches in the food industry sector was obtained to be within the (0, 1) range. A greater value of the measure indicates a more advantageous financial efficiency of a given branch, while a value close to 0 is typical of a branch of an inferior financial efficiency.

Economic characteristics of enterprises in branches of the feed industry

As it was already mentioned, the feed market is a closed market, for this reason within this market a limited number of entities operates (tab. 1).

Table 1

The number of enterprises producing feeds in the years 2011-2015 in terms of entity size

Feed enterprises	2011	2012	2013	2014	2015
Small (up to 9 persons employed)	73	75	80	79	79
Medium (from 10 to 249 persons employed)	28	29	34	34	35
Large (over 250 persons employed)	6	5	4	5	4
Total	107	109	118	118	118

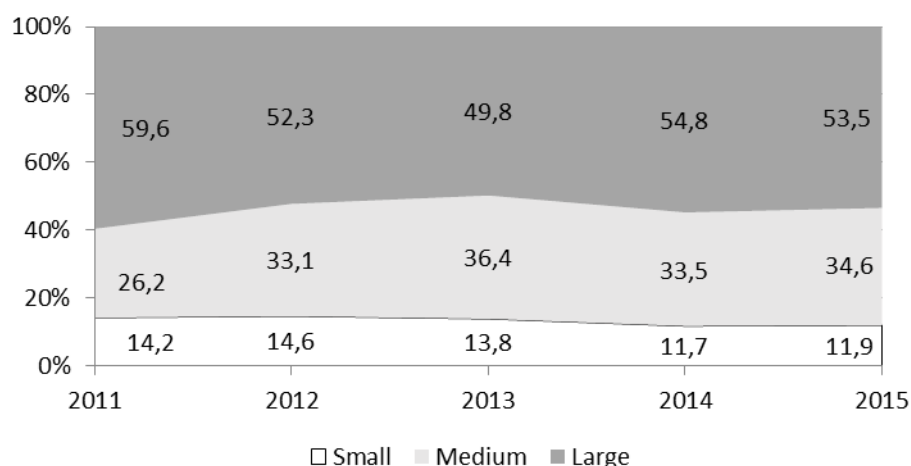
Source: author's calculations based on GUS data

It can be concluded from the data presented in Table 1 that since 2011 the number of enterprises producing animal feeds has been increasing, at present involving 118 economic entities. When analysing the number of feed enterprises in terms of their size, the greatest dynamics of changes was observed in the group of small and medium-sized enterprises (Florek, Czerwinska-Kayzer, 2012). In 2011, a total of 101 small and medium-sized feed enterprises were involved in feed production, while in 2015 their number increased to 114 enterprises. In the group of large economic entities employing 250 workers or more, the situation was relatively stable - in the analysed period there were from four to six.

The presented number and its distribution in terms of the size groups of feed enterprises indicates strong competitiveness on the market, which is a positive phenomenon, as many small and medium-sized enterprises stimulate economic development and reflect the entrepreneurship spirit in the society (Skowronek-Mielczarek, 2003). On the domestic market of the feed industry the dominance of the largest entities is evident in terms of the number of employed workers (Fig. 1).

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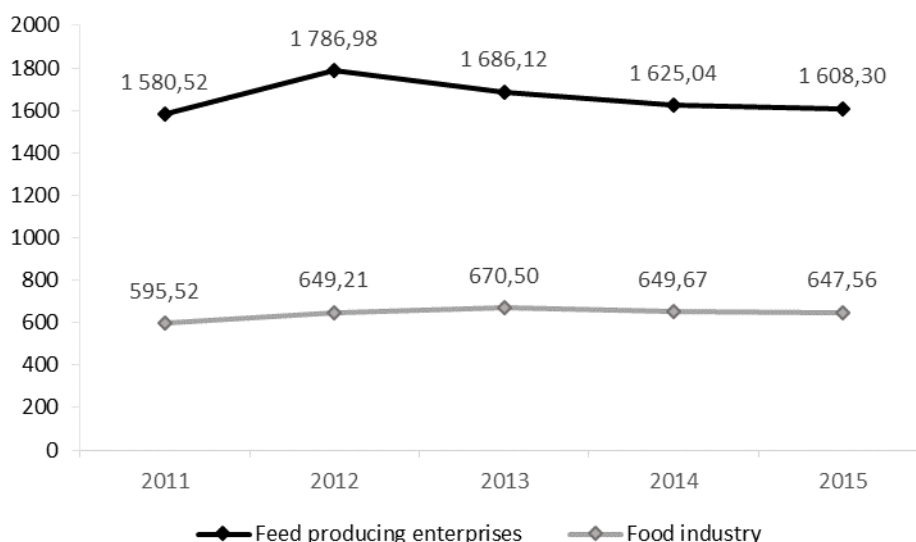


Source: author's calculations based on GUS data

Fig. 1. The share of individual groups of enterprises producing animal feeds in revenue from sales (%)

Studies showed that 4 large entities generated over 50 % total revenue from feed sales in Poland. In turn, medium-sized producers have an approx. 35 % share in the total revenue from feed sales, while a large number of small entities generated only 12 % revenue from sales.

Generation of such a high revenue is connected with the specific character of employment. In enterprises producing feeds, in the investigated period employment increased from year to year and in 2015 it was over 11 thousand workers (Unpublished data..., 2012-2016). Labour efficiency measured by the value of revenue per one employee in feed producing enterprises was rather high in that period (Fig. 2).



Source: author's calculations based on GUS data.

Fig. 2 Revenue from sales per one employee in feed producing enterprises and in the food industry in the years 2011-2015 (thousands PLN)

In comparison, the efficiency in enterprises of the entire food industry was by almost 60 % higher. One employee in a feed producing plant generated in 2011 approx. 1581 thousand PLN revenue from sales, while in 2015 - it was 1608 thousand PLN, whereas in the food industry these figures were 596 thousand PLN and 648 thousand PLN, respectively.

Assessment of financial condition of feed industry enterprises

The basic criterion in the assessment of financial efficiency is provided by financial indexes, which in this study were divided into four groups, i.e. profitability, return of cash flow and effectiveness of activity. Their values are presented in Table 2.

Table 2

Values of financial indicators characterising financial efficiency in the group of feeds enterprises in Poland in the years 2011-2015

Indicators	2011	2012	2013	2014	2015
ROE (%)	17.3	21.2	19.3	15.5	12.8
ROAO (%)	12.7	13.5	13.3	11.0	9.1
OS (%)	105.1	105.2	105.7	105.0	104.0
RA	2.6	2.8	2.5	2.4	2.3
WGS (%)	4.8	5.2	5.5	5.1	4.9
QR	1.5	1.5	1.6	1.6	1.7
DPS (%)	19.0	16.0	-0.1	2.0	4.7

Source: author's calculations based on GUS data

In the group of profitability indicators this study was conducted based on: return on equity (ROE), expressed as a ratio of net profit to equity capital and return on assets (ROAO), established as a ratio of profit from operating activity to the involved total property. The characteristic showing financial efficiency in the analysis was return on equity (ROE), which in enterprises producing feeds ranged from 12.8 % (in 2015) to 21.2 % (in 2012). It needs to be stressed that the rate of return on equity has been systematically decreasing since 2012. In the analysed period it decreased by 8.4 p.p. In turn, for the entire food industry the value of this index ranged from -18.7 % to 40.7 % (tab. 3). One of the factors affecting the level of the rate of return is connected with return on involved equity. In this study, in order to eliminate the effects of the policy of selecting financing sources the indicator of return on operating assets was applied (Czerwinska-Kayzer, 2014). These data show that this return in feed producing enterprises ranged from 9.1 % to 13.5 %. The direction of changes in this indicator is comparable to that indicated by the rate of return on equity. However, the change is by 50 % lower and it amounts to 4.4 p.p. Economic activity is based first of all on the coverage of incurred operating costs. For this reason, in this study we analysed another parameter characterising financial efficiency, i.e. cost-effectiveness of sales. In feed producing enterprises, similarly as in the entire food industry, this indicator was stable – on average 105 %. It results from the presented data that feed production is a profitable economic activity. This conclusion is confirmed by other studies of the authors (Czerwinska-Kayzer, Bieniasz 2017). Indicators of return are particularly interesting for owners, as profit leads to cash flows, which are the primary sources of value for any company (Boratynska, Wlozczewska 2014). For this reason, another area of financial efficiency analysis included cash flow efficiency, supplementing accrual analysis of returns (Stanislawski, Florek 2013). The measure value indicates that enterprises in the feed industry maintain adequate cash levels, making it possible to maintain the self-financing principle and potential for unhindered continuation of their operations (Table 2). This is additionally confirmed by the low variation in the analysed index. For an enterprise to be able to continue efficient operations over a long period it needs to have an adequate level of security for liabilities using current assets of high liquidity. Thus, a synthetic measure was constructed based on the quick ratio (QR). It results from data presented in Table 2 that in the investigated period it assumed values from 1.5 to 1.7, i.e. it fell within the closed interval (1.5-2.0) (Sierpiska, Jachna,

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2007). This means that on average in feed enterprises a loss of financial liquidity, measured by the quick ratio, was not too high, which may not be generalised in relation to all branches of the food industry. In 2015, in 25 % branches of the food industry the quick ratio was below 1.3, i.e. below the assumed norm, and in 25 % branches this index was greater than 2.0, which also is not advantageous, as this may indicate excessive liquidity. An important element of financial efficiency is also connected with operating efficiency, i.e. the ability to effectively utilise owned equity. The primary measure of this ability is provided by the asset turnover index. The presented data show that the economic activity of enterprises producing animal feeds is a branch of low capital intensity. The turnover index in this branch in the years 2011-2015 ranged from 2.3 to 2.8 and it was greater than the mean for the food industry, which in 2011 amounted to 1.6. and in 2015 - to 1.5.

Table 3

Descriptive statistics characterising financial efficiency of branches in the food industry in Poland in 2011 and 2015

Financial indexes	Min		Max		Lower quartile		Median		Upper quartile		Coefficient of variation (%)	
	2011	2015	2011	2015	2011	2015	2011	2015	2011	2015	2011	2015
ROE (%)	-4.7	-18.7	40.7	28.6	7.8	9.4	10.7	11.8	20.6	17.3	70.8	74.7
ROAO (%)	2.1	-9.5	27.1	18.6	6.5	6.6	7.2	8.4	14.6	11.6	60.3	63.6
RA	0.9	0.7	3.8	3.3	1.4	1.1	1.6	1.5	1.8	1.6	39.1	42.3
OS (%)	101.7	95.4	136.2	111.4	103.6	103.9	104.4	106.5	107.8	109.9	6.8	3.5
WGS (%)	1.4	-4.4	23.0	13.2	4.0	5.5	6.2	7.5	9.4	12.0	67.1	51.6
QR	1.0	0.7	3.3	3.4	1.1	1.3	1.3	1.4	1.5	2.0	36.1	35.5
DPS (%)	-50.4	-43.7	55.8	33.3	7.2	-6.1	17.2	3.4	30.3	12.5	122.4	1170.3

Source: author's calculations based on GUS data

The evaluation of financial efficiency was supplemented with the dynamics of increase in sales, which reflects the position and potential for enterprise development. This analysis shows that in the first two years revenue from sales increased by 19 % in 2011 and 16 % in 2012. In 2013, a rapid decrease was observed in revenue from sales, which may have been a consequence of greater competitiveness on the market (Table 1). In the following years, the situation became stable, which caused slow increases in revenue from sales. It needs to be stressed that the index of increase in sales was the most diverse measure in all the branches of the food industry, as indicated by the very high level of the coefficient of variation, which in turn had a considerable effect on the ordering of branches in the food industry.

The position of the feed industry in the food industry

In order to determine the position of the branch producing prepared feeds for farm animals and manufacture of prepared pet foods in the food industry sector, the conventional TOPSIS method was applied. Values of the indicators established using this method provided linear ordering of individual branches of the food industry in terms of the investigated characteristics. Based on the obtained results considerable variation was stated between the branches in terms of their financial efficiency (Table 4).

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Table 4

The position of the feed industry in the food industry according to financial efficiency

Branches of food industry	Value of the measure	Rank in the year	Value of the measure	Rank in the year
	2011		2015	
Sugar	0.645	1	0.606	12
Manufacture of starches and starch products	0.600	2	0.635	10
Manufacture of prepared pet foods	0.554	3	0.602	13
Cocoa, chocolate and sugar confectionery	0.424	4	0.544	21
Margarine and similar edible fats	0.416	5	0.205	26
Ice cream	0.415	6	0.779	1
Processed and preserved poultry meat	0.415	7	0.597	14
Prepared feeds for farm animals	0.407	8	0.638	8
Condiments and seasonings	0.402	9	0.651	5
Manufacture of bread; manufacture of fresh pastry goods and cakes	0.400	10	0.648	6
Processed and preserved potatoes	0.395	11	0.607	11
Homogenised food preparations and dietetic food	0.369	12	0.703	2
Meat and poultry meat products	0.368	13	0.637	9
Grain mill products	0.338	14	0.507	23
Processed and preserved meat	0.334	15	0.584	17
Processed tea and coffee	0.330	16	0.679	4
Other food products n.e.c.	0.319	17	0.580	19
Other processing and preserving of fruit and vegetable	0.317	18	0.590	15
Dairy and cheese products	0.313	19	0.462	24
Processed and preserved fish, crustaceans and molluscs	0.312	20	0.585	16
Macaroni, noodles, couscous and similar farinaceous products	0.307	21	0.681	3
Fruit and vegetable juices	0.298	22	0.531	22
Rusks and biscuits; preserved pastry goods and cakes	0.270	23	0.566	20
Production of beverages	0.254	24	0.582	18
Prepared meals and dishes	0.179	25	0.381	25
Oils and fats	0.170	26	0.640	7

Source: author's calculations based on GUS data

The greatest values of the synthetic measure in 2011 were recorded for the following branches: production of sugar (0.640), manufacture of starches and starch products (0.600) and manufacture of prepared pet foods (0.554). In turn, in 2015 the best financial efficiency was recorded for the following branches: production of ice cream (0.779), production of homogenised food preparations and dietetic foods (0.703) and production macaroni, noodles, couscous and similar farinaceous products (0.681). They exhibited the highest level of returns, low capital intensity and maintenance of financial liquidity. The lowest financial efficiency in 2011 was observed for the production of oils and fats (0.170). production of prepared meals and dishes (0.179) and production of beverages (0.254). In turn, in 2015 branches of the lowest financial efficiency included production of margarine and similar edible fats (0.204), production of prepared meals and dishes (0.381) and processing of dairy and cheese products (0.462).

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The presented data show that the analysed branch producing prepared pet foods in 2011 ranked 3rd, while in 2015 it ranked 13th. In turn, production of prepared feeds for farm animals in both analysed years ranked 8th. On this basis it may be concluded that enterprises producing prepared feeds for farm animals recorded relatively high returns, adequate financial liquidity and efficient management of involved equity. Moreover, this situation is relatively stable in comparison to the other branches.

Conclusions

- 1) The feed industry is a closed market. On the domestic market of the feed industry the dominance of the largest entities is evident in terms of the number of employed workers. Studies showed that 4 large entities generated over 50 % total revenue from feed sales in Poland.
- 2) The research indicate, that financial efficiency in of the food industry in terms of the branches was varied. The conducted analyses indicate a relatively good financial efficiency in the group of enterprises producing prepared feeds for farm animals and pet food. This is manifested in the satisfactory level of profitability and effectiveness of activity.
- 3) Financial efficiency in the branches of the feed industry in terms of classes was varied. Generally, lower efficiency was observed for enterprises producing prepared feeds for farm animals. However, the situation of this class over a longer period is relatively more stable in comparison to the class of enterprises producing pet foods. Manufacture of prepared pet foods was ranked 3 in 2011 (value of the measure TOPSIS 0.554) and 13 in 2015 (0.602). In turn, prepared feeds for farm animals in the analyzed years were in the 8th position.
- 4) As it is indicated by the generalised form of the results. the financial situation of all the branches in the feed industry facilitates survival and development of enterprises operating in this sector and as such makes it possible to maximise profits for their owners.

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FINANCIALIZATION OF AGRICULTURE THROUGH PURCHASE OF FARMING LAND

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Abstract. The objective of the study is to determine whether financialization of economy through purchase of farming land is taking place - and thus, whether investors purchase farming land to secure their cash surplus. No studies have been conducted in this regard, leaving a gap that needs to be filled. The study, presented below, is the first attempt to determine whether it is possible to speak of farming land as a resource subject to the phenomenon of financialization. It was found that the phenomenon of financialization in agriculture through purchase of farming land does exist. It is not possible to determine the exact scale of this phenomenon; however, it is noticeable that purchase of farming land was observed in the recent years. One of the factors that encourage investment in farming land over the long-term perspective is undoubtedly the constant - so far - tendency of increase in land prices. If the investor decided to purchase farming land several years earlier, they may consider this investment satisfactory, when a need arises to release the funds. Land is a good factor, securing the funds invested against the effects of inflation. In addition, due to its rarity, the value of this resource increases over time. An additional factor that encourages investment in farming land is the scale of aid from the European Union, connected with ownership (or at least lease) of land. This is probably an argument, which increases the real value of profit (return) on investment in farming land. In this situation, it seems that the phenomenon of financialization of economy is also taking place in agribusiness due to purchase of farming land for investment purposes.

Key words: financialization, agriculture, farmland.

JEL code: Q12, Q14, G00

Introduction

The pace of information flow, and thus - the pace of financial transactions in the modern world have become extraordinarily high. The human brain often finds it difficult to absorb and process all information received. It is particularly difficult, when it comes to finances, due to the on-going process of financialization. This phenomenon has gone beyond the financial markets and is no longer limited to the sphere of capital markets or banking transactions. Therefore, it cannot be associated exclusively with financial transactions. The on-going process of financialization of economy undoubtedly includes investing in land, or purchase of land in order to maintain the value of money over time, or even to increase this value. Land is a resource, which clearly resists the inflation phenomena and, so far, has constituted a very good method for securing unallocated cash over the long-term perspective. This seems to be rooted in the characteristics of land, which is perceived as a non-reproducible and non-movable, as well as non-destructible commodity. The last feature is disputable, as the progressing degradation of the natural environment and overexploitation of some farming land result in destruction and even permanent damaging of land features. In general, however, it is a rare resource, which, in the era of loss of trust in bank and banking transactions, as well as speculations on capital markets, has attracted the attention of investors to land, including farming land. According to Wicki and Wicka, in Poland, agriculture still plays an important role in the national economy, although year after year its importance decreases (Wicki, Wicka, 2016).

The objective of the study is to determine whether financialization of economy through purchase of farming land is taking place - and thus, whether investors purchase farming land to secure their cash surplus. No studies have been conducted in this regard, leaving a gap that needs to be filled. The study, presented below, is the first attempt to determine whether it is possible to speak of farming land as a resource subject to the phenomenon of financialization.

According to Burch and Lawrence, financialization has also encompassed the agricultural sector, and even, more broadly, the entire chain of delivery of agricultural and food and catering products (and the sector of trade and services) (Burch, Lawrence, 2013). Similarly, Clapp points to the increase in importance of financial markets in the global food markets, observable since the 19th century, and dates the beginning of increased importance of financialization in the agri-food processing sector to the early 21st century (Clapp, 2015).

Studies conducted on the land factor indicate that capitalization of subsidies is a process, in which they are deposited in the ground rent rates, as well as in the value and prices of fixed assets. This is particularly true for farming land (Goral, Kulawik, 2015). According to B. Czyzewski, Przekota and Poczta-Wajda: "The subsidies paid under the EU's Common Agricultural Policy (CAP) are capitalized in the value of agricultural land, and in effect landowners obtain higher land rents". As the authors have also noticed, a farmer, who owns land, is a beneficiary of aid; on the other hand, if land is used by a lessee, the financial effects of securing of financial resources in land, instead of reaching the owner, often get transferred beyond the agricultural sector (Czyzewski, Przekota, Poczta-Wajda, 2017), particularly to owners, who are not professionally active as farmers (Goral, Kulawik, 2015).

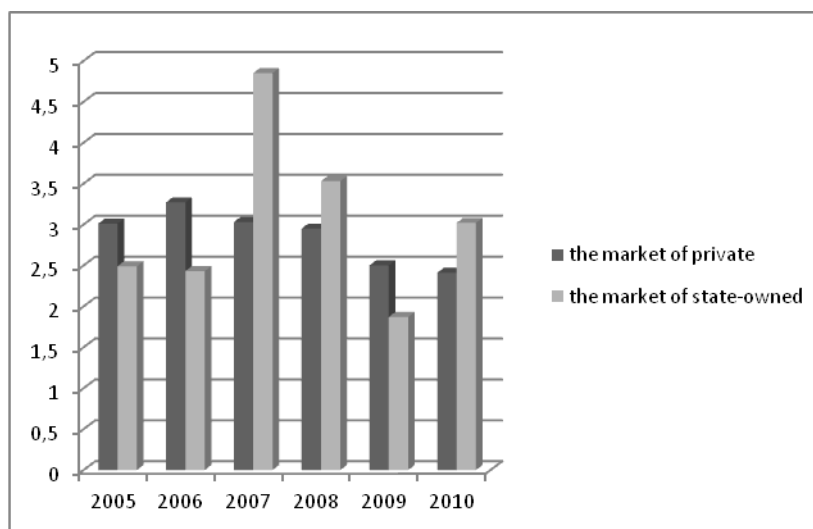
Additionally, research conducted by Czubak indicates that investment expenditures in Polish agriculture in years 2007-2011 amounted to PLN 26.7 billion - thus, a net effect of implementation of the Common Agricultural Policy took place (Czubak, 2013). One of the key factors of investing in agricultural land seems to be appreciation of value of farming land over the long-term perspective, which has also been pointed out by Goral and Kulawik (2015), as well as Laskowska (2011), and the same thesis has been presented in this study.

An analysis of financialization of farming land should take into account the problem of competition of use of land for agricultural purposes and for residential purposes, as well as industrial use. According to Golebiewska, in years 2005-2014, the area of arable land decreased substantially, and some of this land was designated for residential and industrial developments. Land of low quality, on the other hand, was afforested (Golebiewska, 2016). Changes in Brazilian agricultural economy after the inflow of foreign capital are discussed, among others, by Sondergaard (2016).

Research results and discussion

In the debate on financialization of agriculture through purchase of agricultural land, an important factor is the average capitalization rate on the market of farming land. Similar observations have been made by Marks-Bielska: "the price of land is also the primary and most stable component of a farming family's assets (i.e., property, capital)" (Marks-Bielska, 2013). As it can be concluded on the basis of Figure 1, the average capitalization rate in years 2005-2010 was relatively high, and taking into account the private market - it was stable, with a slight decrease tendency since 2007. The average capitalization rate on the market of state-owned land was somewhat different, as it fluctuated visibly, reaching its maximum value in 2007 and decreasing by approximately a half in 2009. On the average, the capitalization rate on the market of state-owned land, however, was slightly higher in comparison with the market of private land. Regardless of this difference, however, we can confirm the observations known from literature of the subject - land is a good resource for long-term investment of funds. The same has been stated by Lizinska, Marks-Bielska and Kisiel. In their opinion, land is a very attractive resource. One of the factors, which

attract investors to communes, is the area of land designated for investment purposes, as well as the number of separated land plots, characterized by attractive location, as the share of total area for investment purposes (Lizinska, Marks-Bielska, Kisiel, 2011). Therefore, investing in farming land, observed on a systematic basis (as it has been discussed in the further part of the article) is not surprising.

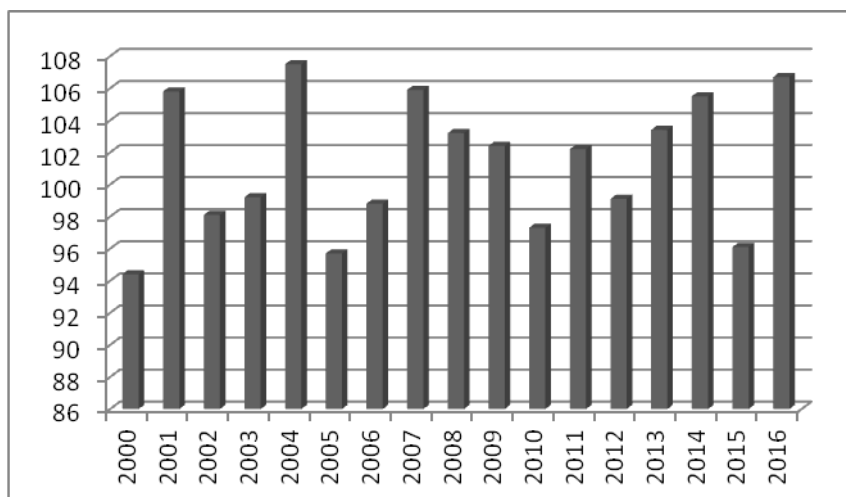


Source: author's study on the basis of Laskowska, 2011

Fig. 1. Average capitalization rate on the market of private and state-owned farming land (%)

According to Laskowska, in years 2005-2010, the average capitalization rate on the market of private farming land ranged between 3.27 and 2.41 (a down-trend), and on the market of state-owned land - between 4.85-1.87 (it changed over time without a specific direction of change – Fig. 1) (Laskowska, 2011).

Farming land is the basic resource, having its specific features, being non-movable and non-reproducible (as for being non-destructible, in my opinion, it is a debatable feature). On the one hand, it is the basic workplace of the farmer and their family; on the other hand, large land resources are not always necessary for continuous existence and development of a given farming enterprise. According to data presented in Fig. 2, global agricultural production (expressed in fixed prices as a chain-reaction change in relation to the previous year), indicates a rather high level of fluctuation, not related directly to the financial crisis of 2007-2008/2009. It can even be stated that taking into account the global agricultural production (GAP) and its dynamics, in the years of the most severe global financial crisis, it was resistant to these phenomena. A certain decrease in the GAP level was observed in years 2010, 2012 and 2015. Such situations are observed on a cyclical basis, and they were also recorded in years 2000, 2002 and 2005. Therefore, a decrease in the global agricultural production level should not be associated with a financial crisis. On the other hand, it could be considered to be a situation typical for the farming sector, associated - among other things - with the cyclical nature of some phenomena (such as the pork cycle) or changes in the agrarian structure, as well as the impact of the Common Agricultural Policy on choices made by agricultural producers.

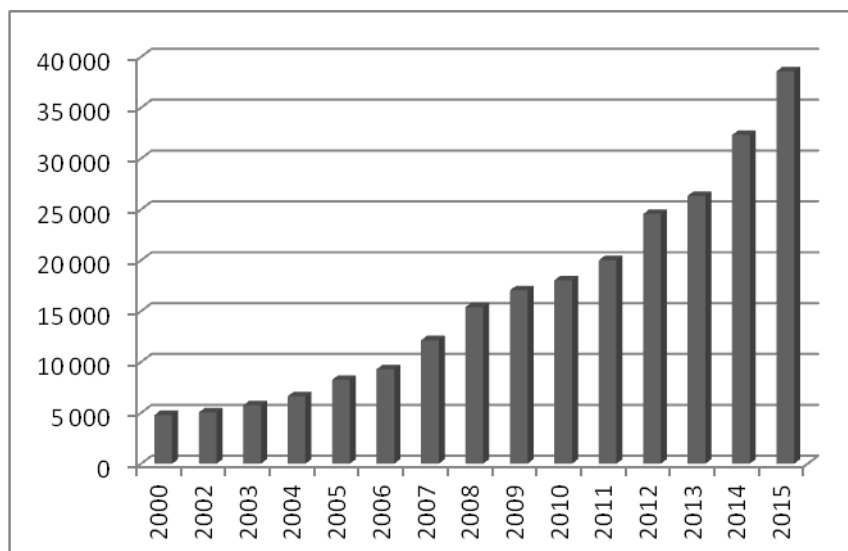


Source: author's study on the basis of data from the Agricultural Macroeconomic Data Bank, Central Statistical Office

Fig. 2. Global agricultural production according to fixed prices (%)

Analysis conducted by Sikorska's team indicate that in 2016, the number of land purchase/ sale transactions decreased visibly. In relation to legal entities, the direct reason for this change was entry into force of the act on trade in farming land¹, which suspended sale of real estate property owned by the State Treasury. The decrease in the scale of purchase/ sale of land amounted to 73 % less in comparison with year 2015 (which, on the other hand, was a year of particularly many transactions of this kind) (Sikorska et al., 2017). One of the ways of engaging surplus cash in order to secure its value over the long-term perspective (and to generate capital gain) is to purchase land. Figure 3 presents prices of arable land in Poland in years 2000-2015. There is a visible tendency of increase in the prices of arable land, which was eightfold in the period of fifteen years (from about EUR 1200 to approximately EUR 9500). This is a substantial increase, which lasted continuously over the examined period and cannot be explained only by Poland's accession to the European Union. It seems that, on the one hand, it is the effect of a natural price increase due to reduction of the area of land available for sale. On the other hand, arable land was not always purchased for agricultural purposes. In addition, there is also the issue of leased land, which is made available for use not by its owners, but persons, who make gains from business activity and consume the profits due to aid programmes, dedicated to farmers in the European Union. In particular, the part of purchases of farming land, which is not associated with agricultural use, but serves as a capital investment, should be considered to be a sign of financialization in agriculture through purchase of farming land. It should be kept in mind that, according to studies conducted by Franc-Dabrowska, Porada-Rochon and Suwala, insolvency of one enterprise may influence the local market. A snowball phenomenon may occur, which is equivalent to transfer of insolvency to subsequent entities. This may be a significant factor, exerting negative influence on the society from a regional perspective (Franc-Dabrowska, Porada-Rochon, Suwala, 2016). Therefore, it is extraordinarily important to secure the unallocated funds in the manner that prevents their loss of value, and over the long term perspective, turns them into a good source of funds for an agricultural entrepreneur (Madra-Sawicka, 2017). Land - including farming land - may serve as such resource over the long-term perspective.

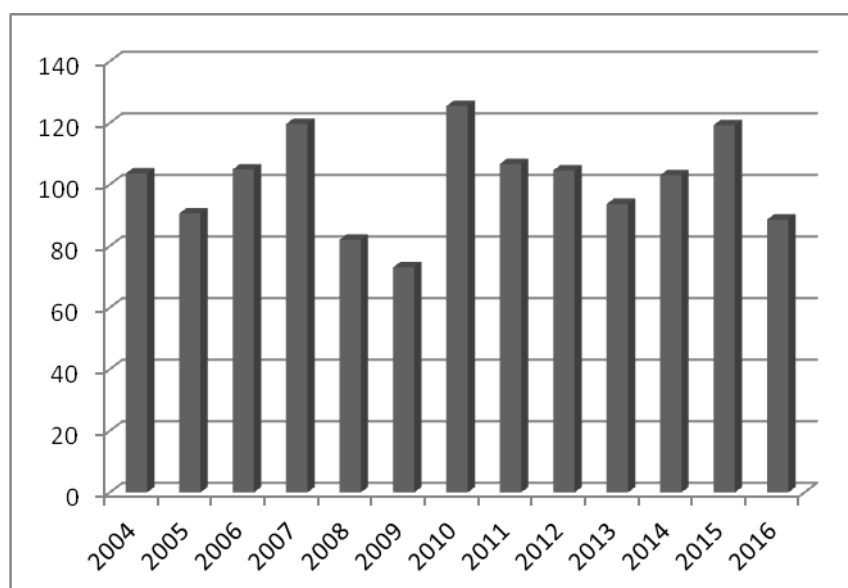
¹ The act of April 14th, 2016 on suspension of sale of real estate property of the Agricultural Property Stock of the State Treasury and on amendment of some legal acts, Journal of Laws of 2016 item 585 (note by JFD).



Source: author's study on the basis of Statistical Yearbooks of the Central Statistical Office

Fig. 3. Prices of arable land in Poland in years 2000-2015 (PLN)

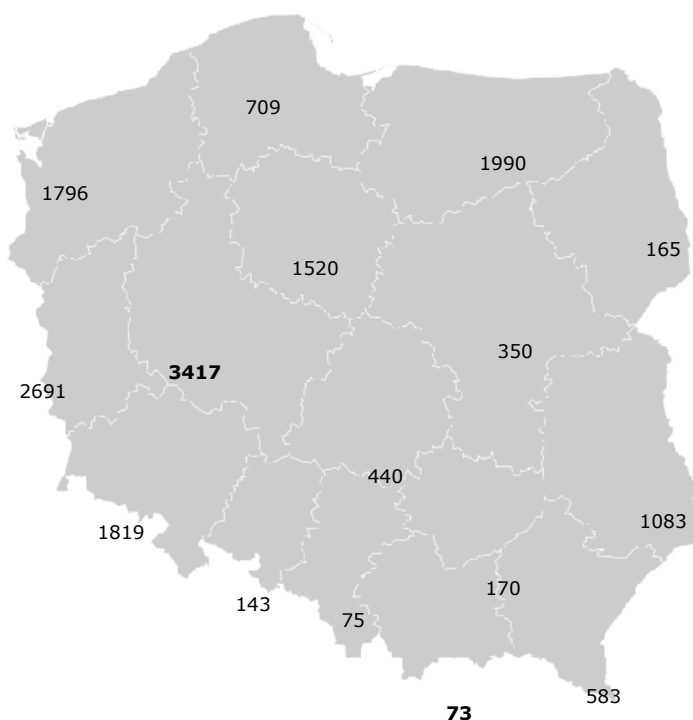
Figure 4 presents the number of land property purchase/ sale transactions in Poland in years 2004-2016. Changes in the dynamics of land purchase have been pointed out. The first period of intense land purchase was in years 2004-2007, then in years 2010 and 2015. It would also be impossible to state that years 2011-2012 and 2013 were characterized by small numbers of land purchase transactions. The land purchase level was the same as in the previous year or even higher. The highest level of growth dynamics was observed in the periods indicated above. On the one hand, the reason for land purchase was the intent to increase the scale of agricultural activity, and it was designated for agricultural production. Some of the land, however, was purchased for various investment purposes of different types. Some land was purchased as a long-term capital investment, some - in order to make smaller but quick gain in form of subsidies, and some was designated for residential and industrial developments.



Source: author's study on the basis of *Obrot nieruchomości w 2016 r. (Trade in real estate in 2016)* and *Obrot nieruchomości w 2010 r. (Trade in real estate in 2010)*, stat.gov.pl.

Fig. 4. The number of land property sale/purchase transactions in Poland in years 2004-2016 (previous year = 100)

The scale of purchase of arable land in 2016 has been presented in Figure 5. It is clearly visible that the largest area was sold in wielkopolskie province (3417 hectares), and the smallest - in malopolskie (73 hectares) and slaskie (75 hectares) provinces. The scale of sale of arable land was dependent on the needs of farmers (or investors), but also on availability of land in the Agricultural Property Stock of the State Treasury, which had been partially sold out in the previous decade. Perhaps it is not easy to find land of appropriate quality close to a farmer's place of activity. However, this does not prevent purchase of arable land for investment purposes. Of course, the act of April 14th, 2016 on suspension of sale of real estate property of the Agricultural Property Stock of the State Treasury and on amendment of some legal acts, Journal of Laws of 2016 item 585, has imposed substantial limitations on trade in arable land; however, prior to its entry into force, there was much greater freedom of investing in land. In this place, worth quoting are interesting results of research conducted by A. Czyzewski and Matuszewska, indicating the level of expenditures for agriculture, rural development and agricultural markets and the Agricultural Social Insurance Fund in the state budget in years 2000-2014 (Czyzewski, Matuszewska, 2014). The results are presented in Figure 6. It is clearly visible that the subsidies provided for agriculture were of substantial value.

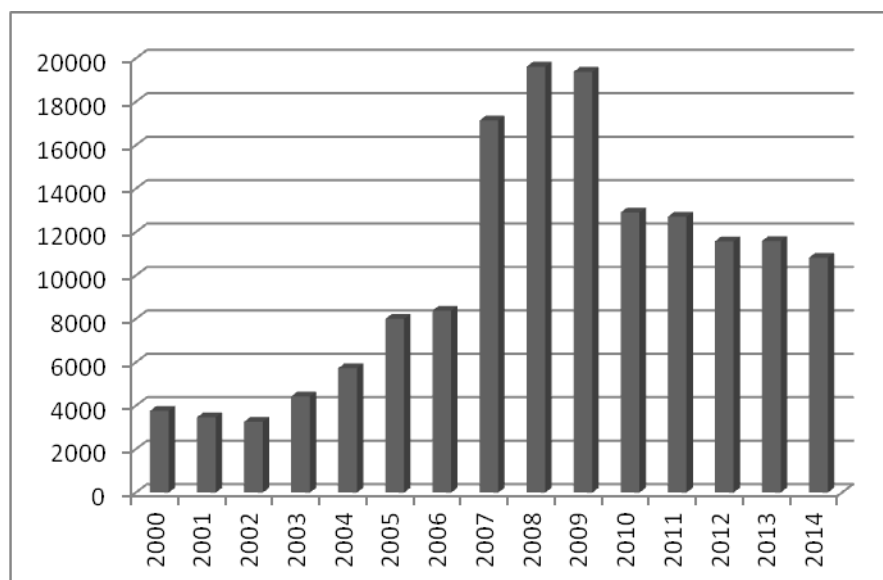


Source: author's study on the basis of Sikorska A. (ed.), 2017; *Rynek ziemi rolniczej stan i perspektywy, Analizy rynkowe, Rolnictwo polskie i UE 2020+ wyzwania, szanse, zagrożenia, propozycje (Farming land market: condition and perspectives, Market analyses, Polish and EU farming 2020+ challenges, opportunities, threats, proposals) IERiGZ-PIB, Warsaw, p. 27*

Fig. 5. Area of arable land in the stock sold in 2016 (hectares)

While in years 2000-2006 it can be considered that these expenditures were relatively low, although growing systematically, in years 2007-2009, inflow of subsidies into Polish agriculture was substantial. Although since 2010, we have been observing a tendency of decrease in the domestic and EU budget expenditures aimed at agriculture, these still amount to approximately PLN 11.5 billion (that is, almost EUR 3 billion). It can be assumed that some of these funds were used to purchase farming land. Undoubtedly, these purchases were partially made to secure funds in land, as a resource resistant to inflation changes, allowing for long-term maintenance of real

value of money and even achieve a positive return rate. Worth quoting here are the views of Bernard, Greiner and Semmler, who stated that financialization led to a decrease in the area of farming land - however, not due to investments in agriculture, or, more broadly, agribusiness, but due to global warming (some of the farming land turning into deserts, being of no use for agriculture), in some countries (such as the USA and Brazil) - reduction of the area of arable land associated with investing in bio-fuels, residential settlements or tourist resorts. At the same time, energy consumption by agricultural production is growing, reducing its profitability. The authors have also pointed out that the prices of agricultural commodities are less stable (sensitive to many exogenous factors) in comparison, for instance, with investment in corporate bonds or real estate property (Bernard, Greiner, Semmler, 2012). This, undoubtedly, is a significant issue, which must be taken into account when examining the process of financialization in agriculture. Financialization may be a positive phenomenon, offering additional benefits in agriculture; however, it may also lead to hardly reversible changes, thus reducing the potential of the sector to generate additional value. According to Akram-Lodhi, financialization is rather one of the factors that fuel the global agrarian crisis, which is due to financial speculations using derivative instruments on the global markets of agricultural raw materials (Akram-Lodhi, 2012).



Source: author's study on the basis of Czyżewski A., Matuszczak A., 2014; *Krajowe i unijne wydatki budżetowe na sektor rolny w Polsce (Domestic and EU budget expenditures for the agricultural sector in Poland)* *Roczniki Naukowe Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich*, Vol. 101, booklet 2: 40

Fig. 6. Expenditures for agriculture, rural development and agricultural markets and the Agricultural Social Insurance Fund in the state budget in years 2000-2014 (PLN million)

Conclusions, proposals, recommendations

Taking into account the results of literature-based studies and author's own research conducted, it can be stated that the phenomenon of financialization in agriculture through purchase of farming land does exist. It is not possible to determine the exact scale of this phenomenon; however, it is noticeable that purchase of farming land was observed in the recent years. One of the factors that encourage investment in farming land over the long-term perspective is undoubtedly the constant - so far - tendency of increase in land prices. If the investor decided to purchase farming land several years earlier, they may consider this investment satisfactory, when a need arises to release the funds. Land is a good factor, securing the funds invested against the effects of inflation. In addition, due to its rarity, the value of this resource increases over time. An additional factor that

encourages investment in farming land is the scale of aid from the European Union, connected with ownership (or at least lease) of land. This is probably an argument, which increases the real value of profit (return) on investment in farming land. In this situation, it seems that the phenomenon of financialization of economy is also taking place in agribusiness due to purchase of farming land for investment purposes.

It should be noted that the act of April 14th, 2016 on suspension of sale of real estate property of the Agricultural Property Stock of the State Treasury and on amendment of some legal acts, Journal of Laws of 2016 item 585, has reduced the scale of financialization of agriculture through purchase of farming land. On the other hand, it has made it possible to increase security of unallocated funds of farmers through purchase of land, thus allowing them to participate more actively in the financialization phenomenon. Apart from the strengths and weaknesses of this legal act, it can be assumed that farmers - even if they are not ready to increase the production scale (or perceive no need for such increase) may secure their unallocated funds by purchasing land as a long-term investment, securing their funds against inflation. They are thus able - if they are willing to and have the sufficient funds at their disposal - to participate in financialization of economy and to make profits on this phenomenon.

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THE EUROPEAN UNION'S COMMON AGRICULTURAL POLICY AS AN INSTRUMENT OF EQUALIZING FARMS' INCOME

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Abstract. The main objective of this article is to find out the level of farming income differences and the influence of particular CAP instruments on these income differences. The first part of the thesis presents theoretical aspects of the redistribution function performed by the state and the most important elements of this function under the Common Agricultural Policy. The second part reveals the level of farmers' income in 2014 and its differences, which were found out based on a survey done in a group of 573 Polish farmers. The income was computed in accordance with the profit and loss account used in the FADN system. The Gini coefficient was applied to find out the level of income inequality. It was concluded that the CAP instruments play an active role in supporting the level of income and eliminating income differences among farmers, which was proved by calculating the Gini coefficient. Without the CAP support instruments, it amounted to 0.745, and after applying them – 0.689. The share of support in the income accounted for 41.6 %. Without the CAP instruments, only 40 % of the surveyed households gained income from their activity.

Key words: income differences, Gini coefficient.

JEL code: E62

Introduction

After Poland entered the European Union (EU), the domestic agriculture underwent deep changes concerning economic and legal conditions, which resulted from the fact that the country was also included in the Common Agricultural Policy (CAP). On the one hand, it brought many various EU's funds (area payments, investment support, environmental payments etc.), on the other, farmers had to fulfil various requirements and administrative obligations. A serious social-economic problem arose. Not all the farmers equally benefited from the opportunities that appeared after Poland's accession to the EU. This caused a long-lasting material disparity of this social group. Additionally, it was indicated more and more often that because of the system of area payments, which was separated from output, the CAP advantaged large farms, gaining high profits anyway. The situation of investment programmes looks similarly. They are mainly addressed to efficiently managed, developing farms, which are required to have an appropriate level of income if they are to vote funds for investment on its first stage (a part of the funds is reimbursed later). Thus, some theoretical problems appear here: should a state (or the EU as a whole) influence income differences among farmers, are the CAP instruments successful in their redistribution role?

The state's redistribution function is one of the three classic functions (together with stabilization and allocation) mentioned in the economic theory. P. A. Samuelson and W. D. Nordhaus define it as supporting justice by means of taxes and programmes of expenses to redistribute incomes to selected groups of people (Samuelson P.A., Nordhaus W.D. 2004). This function arouses the most controversy among economists because it consists in such an adjustment of income distribution which matches what the society considers to be the appropriate or fair distribution (Musgrave R.A., Musgrave P.B., 1989). Thus, this function means one social group's benefits at the cost of other groups. That is why numerous doubts emerge here. They concern such issues as a state's function scope, redistribution influence on an economy efficiency, or the criteria of social justice assessment. These discussions are covered by the theory of welfare economics. It focuses on defining the criteria of social choice, the ways of taking decisions in a society, and the assessment of the work of such institutions as state or market. Theoretical discussions on this matter concern performing state functions, the redistribution function and its

specific kind related to state interventionism in agriculture. Studies in this respect have received great recognition: in 2015 Angus Deaton was awarded the Noble Prize in economics for his analyses of consumption, poverty, and welfare. This economist had a great influence on the research on social and income disparities. He created one of the formal presentations of the Gini coefficient (Deaton A., 1997).

That is why the main objective of this article is to find out the influence of the CAP subsidies for production and investments on the level of farms' income and its diversity.

To achieve this goal, the following research tasks were set:

- characterizing the CAP production and investment subsidies based on the *Rural Development Programme for 2007-2013*,
- finding the level of the examined farms' income,
- finding out how much the examined farms' income is diversified.

In this study, a hypothesis was assumed that the current CAP support system deepens farmers' income differences.

The object of the study covered 573 farmers of Masovian, Lublin, Podlaskie and Lodz Voivodeship, who ran farms on their own. In the study, the author used data gathered in his own survey. The survey was run during trainings for farmers which concerned a farm's accounting. The data gathered are related to farmers' income in 2014. The income was computed in accordance with the profit and loss account used in the FADN system. The calculations covered:

- I. Output value:
 1. (-) Intermediate consumption,
 2. (+) Balance of subsidies and taxes,
 - a. (+) Operational activity subsidies,
 - b. (-) Taxes,
 - c. (+) Operational activity VAT balance;
- II. Gross value added:
 1. (-) Costs of external factors,
 2. (+) Balance of investment subsidies and taxes,
 - a. (+) Investment subsidies,
 - b. (+) Investment activity VAT balance;
- III. Family farm income (FADN, 2016).

In this study, operational activity subsidies included direct, LFA and agri-environmental payments. The Lorenz curve and the Gini coefficient, related with it, were applied to find out the level of income inequality. This method is widely used in case of investigating income disparities all over the world (Thewissen et al., 2015). The curve presents cumulated percentage of income which falls for subsequent farms, ordered from the richest to the poorest ones. When the incomes of all the farms are equal, the Lorenz curve is a straight line inclined at an angle of 45 degrees against X-axis (perfect equality line). While inequality grows, the Lorenz curve deviates more from the perfect equality line. The Gini coefficient is the quantity metric of this inequality, and it amounts to the doubled area between the real curve and the perfect equality line (Samuelson P.A., Nordhaus W.D., 2004). The following formula presents one of the formal approaches:

$$G = \frac{1}{2\mu n^2} \sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|$$

where:

μ – average income

n – sample population (Kot S.M., 2002).

The Gini coefficient takes the values from 0 (in case of the perfect equality of incomes) to 1 (when one farm has all the income). This coefficient fulfils the postulate of Pigou-Dalton transfer (which in case of farms means that with income transfer from farms with a higher income to those with a lower income, it changes), symmetry, homogeneity, and replica. Yet it does not fulfil the decomposition postulate (Lissowski, et al. 2008).

Research results and discussion

Instruments of support for farms' income

In 2014, although theoretically there was a new financial framework of the EU for 2014-2020, the system of support for agriculture had not been significantly changed as compared to the previous years. As part of direct payments, farmers received:

- single area payment (910.87 PLN/ha),
- separate payments for: tomatoes, soft fruit, sugar,
- specific support: for cows, for sheep, specific area payments for legumes and leguminous fodder crops, for high quality raw tobacco,
- transitional state measures: decoupled payment for hop, decoupled payment for potato starch, decoupled payment for tobacco (Ministry of Agriculture and Rural Development, 2014).

Apart from that, payments were given to farmers from less favoured areas (LFA). The rates amounted to:

- mountain areas (mountain LFA) – 450 PLN/ha;
- lowland areas (lowland LFA):
 - : lowland LFA I – 179 PLN/ha;
 - : lowland LFA II – 264 PLN/ha;
- specific areas (specific LFA) – 264 PLN/ha.

Degressivity was set for LFA because a farmer can receive:

- from 1 to 50 ha – 100 % of payments;
- from 50.01 to 100 ha – 50 % of payments;
- from 100.01 to 300 ha – 25 % of payments;
- over 300 ha – payment is not granted.

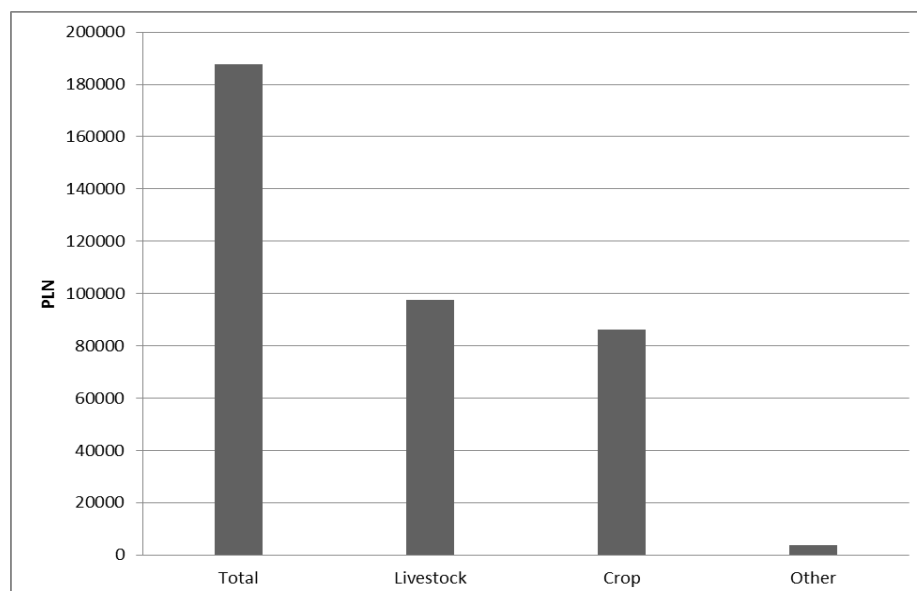
Farmers who decided to take additional obligations could enter an agri-environmental programme. It consisted in undertaking to fulfil a 5-year obligation as regards one of several actions. They included: sustainable agriculture, organic farming, extensive grassland, protection of endangered bird species and natural habitats, conservation of endangered genetic resources, soil and water protection, buffer zones. The level of payment was computed as the product of: a rate per hectare and the area of farming plots, or a rate per animal and the number of cows, mares, sows, and ewes, or a rate per metre of balk and the length of this balk.

As part of the Rural Development Programme for 2007-2013, which was still binding in 2014, one could receive support for investments in a farm. The action "Farms' Modernization" played the main role here. The aid consisted in reimbursing 40-60 % of the eligible costs of the investment whose objective was to improve a farm's overall results, increase gross value added or improve a

farm's situation as regards environmental protection (Ministry of Agriculture and Rural Development, 2013).

Research results

The average area of the surveyed farms amounted to 25 ha, out of which the vast majority was farmland (22.1 ha). Most surveyed farms dealt with both crop and livestock production. More than a half of a farm's output fell for crop production (52 %), livestock production accounted for 46 % (Figure 1).



Source: the author's own work

Fig. 1. Output value in the surveyed farms

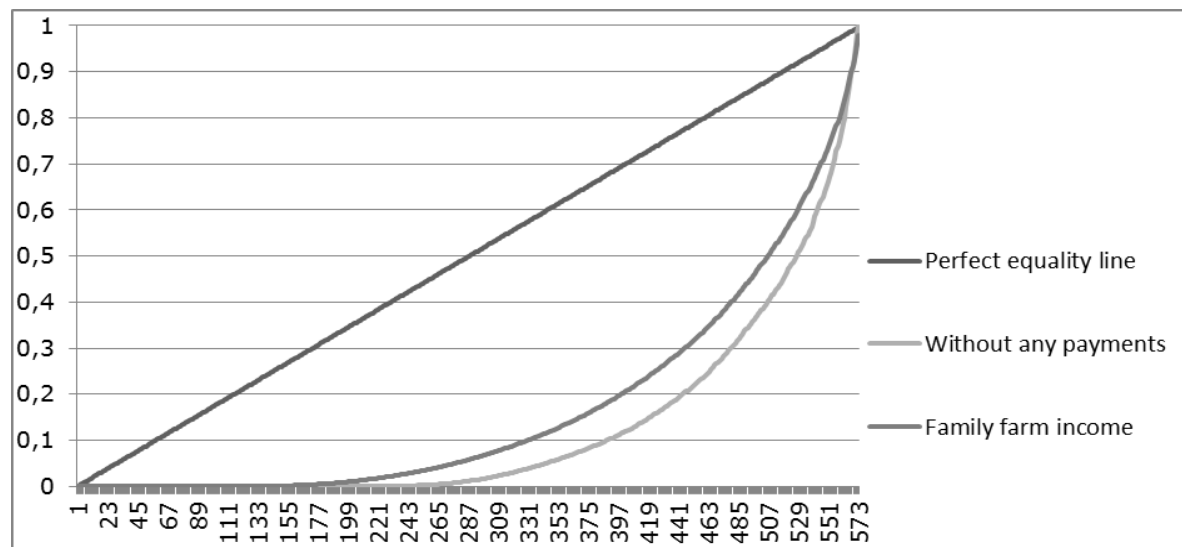
A small part of farms dealt with another kind of production, but its value was marginal. The average output value in a farm amounted to PLN 187.622, which was PLN 7.505 per hectare.

In 2014, the average level of farming income amounted to PLN 64.791, which translated into 2.544 PLN/ha of a farm's area. It should be underlined that area and environmental payments had a considerable influence on incomes. Almost all farms received this kind of support (95 %), which is strictly connected to the easy access and application process (Pietrzykowski R., Wicki L., 2011), and it accounted for 1/3 of incomes. It amounted on average to PLN 21.123 per farm. On average, PLN 1.074 of payment fell for each hectare of a farm's area. The situation is totally different as regards investment subsidies.

The special character of investment subsidies is related to the fact that a farmer needs to be highly active in the process of applying for it and fulfil a series of formal and administrative requirements. A large part of the interested people, gave up participating in this action after they gained all the information on formal requirements (Borawski P., Brodzinski Z., 2014). In the surveyed group, fewer than 6 % of farmers went through the whole process to finally get this kind of support. That is why in spite of a great significance of these funds to farming and rural development (Bienkowska-Golasa W., 2015), they are not commonly used. On the other hand, benefits gained by the applying farms were very high, on average – PLN 50.536, which accounted for nearly 2/3 of these farms' income.

Area, environmental and investment payments had a huge influence on the level of income. Without these support instruments, 40 % of the surveyed farms do not have any income (with

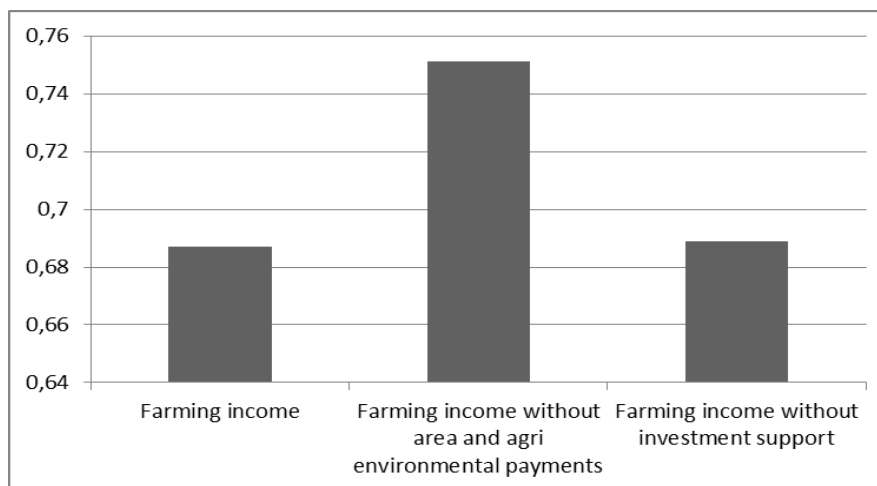
payments – 23 %), and this aid is responsible for 42 % of the income gained. It was also recorded that these instruments had a visible impact on income differences. The Lorenz curve showing this phenomenon is as follows.



Source: the author's own work

Fig. 2. The Lorenz curve for farms' incomes with area and environmental payments, and investment subsidies, as well as without this aid

The Lorenz curve for farming incomes is closer to the perfect equality line than the curve for incomes without area, environmental and investment payments. This means that these instruments have the redistribution function and they reduce income differences among the surveyed farms. It is confirmed by the Gini coefficient values (Figure 3).



Source: the author's own work

Fig. 3. Gini coefficient values for farming incomes

The Gini coefficient value at the level of more than 0.5 reveals great differences in a given characteristic. It amounts to 0.687 for farming incomes. In case of farming income without area, agri-environmental and investment payments, it has a higher value than farming income calculated with this support. Hence, thanks to these instruments, farmers' incomes are being levelled. However, the aid influence has a different power. While area and environmental payments have a significant influence (the Gini coefficient changes from 0.751 to 0.687), investment subsidies are of marginal importance (change from 0.689 to 0.687). It depends on how commonly particular support instruments are used.

Conclusions, proposals, recommendations

The research makes it possible to draw the following conclusions.

- 1) The research hypothesis was rejected. Investment subsidies, and area and environmental payments result in lowering income differences. Area and environmental payments are of the greatest importance here. The influence of investment subsidies on levelling incomes is practically non-visible, but they definitely do not cause the increase of income differences.
- 2) Area and environmental payments have a huge influence on farms' income. Over 95 % of farms benefit from this kind of support and in 2014, it accounted for 1/3 of income.
- 3) Investment aid is not so significant and widespread as area and environmental payments. Only 6 % of farmers benefited from this kind of support. However, for those who did, these funds were important because they accounted for 64.24 % of the income.

The discussion on what the CAP should be like after 2020 is slowly starting. It should cover not only the issues concerning income aid for farmers but also equalizing the income among farmers. There are huge disparities in farmers' incomes, which is typical for this kind of activity. There are small family farms and large professional farming companies. Income support instruments have an influence on all of them. That is why it is essential that these CAP instruments be developed appropriately so that they will not deepen the current income differences. It seems that a good system of area payments with degressivity after exceeding a defined threshold of payments is the best instrument which performs this task. This can prevent payment concentration in the largest farms, because the largest and richest farmers could receive only a fixed maximum amount of payment.

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FINANCIAL HEALTH OF LITHUANIAN STATE UNIVERSITIES

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Abstract. The problem of assessment of university's financial health is investigated in the publication. This subject is relevant from both theoretical and practical approach. According to authors' knowledge, it is one of the first works of Lithuanian authors that analyses the financial health of Lithuanian state universities. The aim of performed research is to assess the financial health of Lithuanian state universities. The research is carried out according to publicly announced financial reports of 2011-2016 of fourteen Lithuanian universities. The financial health of universities is assessed calculating Financial health index (FHI), which consists of four indices: primary reserve ratio, viability ratio, return on net assets ratio and net operating revenues ratio. These indices allow evaluating different aspects of financial health of universities. The four ratios are weighted and combined to determine FHI. FHI statistic indices (mean, minimum, maximum) are calculated applying SPSS software. With reference to FHI of each university, universities are divided to four groups that reflect different level of financial health. The level of FHI of different years and average FHI meanings showed that financial health of most universities was satisfactory in analysed period.

Key words: university, financial ratios, university financial health, financial health index.

JEL code: I22, I23, H83

Introduction

Universities undoubtedly are high in the social scale in the life of each state. Not only they provide education and fulfil scientific research but also influence economic, social and cultural development of the country. As the reform of higher education is being proceeded, optimization of higher school net is widely discussed in Lithuania. Present universities are assessed according their capability to present qualitative studies and ability to fulfil scientific research of high level, as well as present possibilities of efficient financial support. On purpose to use the finances for higher education effectively, the necessity to investigate financial health of universities appears. It is important to consider not only qualitative characteristics of universities (academic reputation, quotation indices etc.) but also assess the ability of universities to manage resources, fulfil financial obligations, generate surplus etc.

Foreign scientific references show much consideration to issues of financial health of universities. Certain aspects of financial health analysis and aspects of assessment are investigated in scientific publications prepared by Gallifa, Gassiot (2011), Tahey, Saluzo, Prager, (2010) Fischer, Gordon, Greenlee, Keating (2004), Gordon, Greenlee (2008), Tugas (2012). Most research on financial health of universities can be found in the works of the scientists from the USA. Fischer, Gordon, Greenlee, Keating (2004) investigated financial state of those private universities of the USA that had higher level of autonomy and lesser of governmental support than in other countries. Greenlee, Keating (2004) fulfilled the research of structure and changes in financial statements of universities. Peruso (2010) investigated methodical issues of financial health assessment in private universities. Greenlee, Keating (2004), applying on financial reports of USA universities, prepared Composite financial index calculating methods and fulfilled empiric investigation according to the practice of USA universities.

Lithuanian authors pay insufficient attention to the issue of financial health of universities. Although, after the implementation of the accounting reform of public sector, which allows to analyse and compare the financial state of universities and other public sector subjects (arranged since 2010), there is a research on aspects of sufficiency and efficiency of own and borrowed resources (tangible, intangible, financial) missing. There is a lack of works dealing with the

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methods of calculating and comparing financial health in Lithuanian universities with the best indices of other universities. Thus, the differences of accountability (structure of financial statements, titles of items) limit the direct application of evaluation indices of the financial health of foreign universities (especially of the ones from the USA).

The main problem of the article can be reflected in the question: how to assess the financial health of Lithuanian universities paying attention to the peculiarities of financial accountability of Lithuanian public sector? The purpose of the article is to assess financial health of Lithuanian universities. The following tasks are set: 1) to investigate theoretic issues of the assessment of financial health of universities; 2) to calculate the Financial health index of Lithuanian universities on the grounds of assessment methods of financial health; 3) to divide Lithuanian universities into groups according to their level of financial health.

The research methods are as follows: analysis of scientific literature, grouping, comparing, specifying and generalizing of information, analysis of statistical data.

Research results and discussion

1. Theoretic issues of the analysis of financial health of universities

Scientific works deal with the appearance of the necessity of financial health analysis of universities and other subjects of a public sector and possibility to fulfil it is interrelated with the reform of accounting and financial accountability of a public sector. The states, which started public sector accounting reform, had to graduate from the cash basis to the accrual-based accounting (Tikk, Almann, 2011). The authors, who investigate the issues of the accountability of a public sector (Steiss, Nwagwu, 2001; McKinney, 2004; Finkler, 2005 et al.), emphasize that information in financial statements becomes more comprehensive and easier understandable when it is formed applying accrual-based accounting. With reference to this information it is possible not only analyse and assess financial health of a public sector subject but also compare it with the results of financial health of other subjects. The analysis of financial health can reveal fiscal problems and provide with information that is necessary in fulfilling corrections. It can help to reveal weak and strong sides of financial management of a subject of a public sector. It is useful in assessing the efficiency of financial resource usage.

The analysis of the works of foreign authors (Tahey, Saluzo, Prager, Mezzina, Cowen, 2010; Fischer, Gordon, Greenlee, Keating, 2004; Gordon, Greenlee, 2008; Tugus, 2012; Fichtenbaum, 2016) show that there is no unanimous attitude towards the analysis of financial health of universities. Different indices and their combination of financial health analysis as well as different methods containing information particularities are presented in the article.

The authors, who investigate the issues of the analysis of university's financial health, refer to the groups of indices that are calculated while assessing financial status of private universities: Liquidity ratios, Operating performance ratios, Debt and Leverage ratios.

Scientists from the USA (Tahey, Salluzo, Prager, Mezzina, Cowen 2010) propose to apply the Composite Financial Index (CFI) method for calculating university's financial health. The CFI has been useful in helping boards and senior management understand the financial position their institutions enjoy in the marketplace and has proved valuable in assessing future prospects, functioning as an "affordability index" of a strategic plan (Tahey, Salluzo, Prager, Mezzina, Cowen 2010). The main questions that CFI helps to answer to: are resources sufficient and flexible enough to support the mission?; are debt resources managed strategically to advance the mission?; does

asset performance and management support the strategic direction?; do operating results indicate the institution is living within available resources? While analysing scientific works it is noticeable that there are no unanimous opinion due to the number of indices that CFI consists of and the level of assessment. Tahey, Saluzo, Prager, Mezzina, Cowen (2010) calculate CFI applying four indices. Moody's rating agency apply the method of three CFI indices for private university assessment. The analysis of scientific works allows to state that the choice of the indices of university's financial health is determined by the peculiarities of accounting and financial accountability of a public sector of a certain state. That is why the presented indices have to be calculated according to the structure of financial statements.

2. Research methodology

The purpose of the research is to assess the financial health of Lithuanian state universities. Financial health of Lithuanian state universities is assessed calculating Financial Health Index (FHI). The calculations are fulfilled according to financial statements of Lithuanian state universities: statement of financial position and statement of activities. The stages of a research: 1. FHI indices are calculated; 2. the indices are converted to strength factors along a common scale; 3. The strength factors are then multiplied by specific weighting factors; 4. FHI is calculated; 5. According to the level of FHI assessment, Lithuanian universities are divided into four groups; 6. Statistical indicators of FHI are calculated (mean, maximum, minimum).

FHI consists of four indices: Primary reserve ratio (PRR), Viability Ratio (VR), Return on Net Assets Ratio (RNAR), Net Operating Revenues Ratio (NORR) (Table 1).

Table 1

FHI ratios

Ratio	Formula
PRR	Expendable Assets/ Expenditure
VR	Expendable Assets/Debt
RNAR	Change in Net Assets/Net Assets
NORR	Net Surplus (Deficit)/Revenue

Source: author's calculations based on Fischer, Gordon, Greenlee, Keating (2004); Tahey, Saluzo, Prager Mezzina, Cowen (2010); Tugas (2012)

These ratios compare the university's operating commitments (Primary Reserve Ratio) and its obligations (Viability Ratio) against its expendable wealth. They measure the ability of the university on a short-term basis to live within its means (Net Operating Revenues Ratio) and the ability of the university to generate overall return against all net resources (Return on Net Assets Ratio).

The works of foreign authors (Tahey, Salluzo, Prager, Mezzina, Cowen 2010) present a formula of Expendable Net Assets calculation:

$$\text{Expendable Net Assets} = \text{Total Net Assets} - \text{Permanently Restricted Net Assets} - (\text{Property, Plant, and Equipment} - \text{Long} - \text{Term Debt}) \quad (1)$$

Since net assets is not divided into unrestricted net assets in the statement of financial position of Lithuanian public sector, restricted net assets formula is modified. Expendable net assets are calculated according to the formula:

$$\text{Expendable Net Assets} = \text{Net Assets} - \text{Strategical Inventories} - \text{Long Term Assets} + \text{Long Term Debt} + \text{Financing} \quad (2)$$

According to Tahey, Salluzo, Prager, Mezzina, Cowen (2010) the calculated indices are converted to strength factors. The strength factors with related ratios were as follows: PRR (0.133), VR (0.417), RNAR (0.02), and NORR (0.013). According to Tahey, Salluzo, Prager, Mezzina, Cowen (2010) the floor for negatives values is -4 and the highest meaning is 10. FHI is calculated according to a formula:

$$FHI = PRR * 0.35 + VR * 0.35 + RNAR * 0.2 + NORR * 0.1 \quad (3)$$

The weight of indices has been chosen according to the research of foreign authors (Tahey, Salluzo, Prager, Mezzina, Cowen, 2010; Salluzo, Tahey, Prager, 2002). The level of FHI is assessed according to this scale of assessment (Table 2).

Table 2

FHI scale of assessment

FHI meaning	Level of assessment	University status
-4 – 0.99	Unsatisfactory level	Unstable
1 – 2.99	Satisfactory level	Low stability
3 – 9.99	Good level	Stable condition
10	Very good level	High stability

Source: author's calculations based on Tahey, Salluzo, Prager, Mezzina, Cowen (2010)

According to Salluzo, Tahey, Prager (2002) the FHI meaning larger than 3 reflects a stable condition of university's financial health.

Limitations of the research. Although, Lithuanian universities, as other subjects of a public sector, have an obligation to declare financial statements publicly, not all universities declare them. Eight from fourteen state universities declared financial statements for the years 2010-2016. One university presents statements for the period of 2011-2016, two universities for 2012-2016 and two universities for 2014-2016. Such limitation of data accessibility does not allow fulfilling thorough analysis of all universities' financial health for the years 2010-2016.

3. Research results and discussion

With reference to universities FHI calculating results FHI assessment scale, Lithuanian state universities are classified into four groups (Table 3).

Table 3

Classification of Lithuanian universities according to FHI meanings

Year	Universities/FHI			
	-4 – 0.99	1 – 2.99	3 – 9.99	10
2011 (N 8)	ASU	KTU, VU, VGTU	VDU, LEU, LSU, LKA	-
2012 (N 9)	VDU, ASU	LSU, LKA, KU	KTU, VU, VGTU, LEU	-
2013 (N 11)	VDU, ASU, LSU, ŠU	VU, VGTU, LKA, KU	KTU, LEU, VDA	-
2014 (N 13)	KTU, LKA, ŠU	LSU, KU, VDA, LMTA	VDU, VU, VGTU, ASU, LEU, LSMU	-
2015 (N 14)	ŠU, MRU	VDU, KTU, VU, LEU, LKA, VDA, LMTA, LSMU	VGTU, ASU, KU, LSU	-
2016 (N 14)	MRU	VDU, KTU, VU, VGTU, LEU, LSU, ŠU, VDA, KU, LSMU	ASU, LKA, LMTA	-

Source: author's calculations

Where:

VDU - Vytautas Magnus University; KTU - Kaunas University of Technology; VU - Vilnius University; VGTU - Vilnius Gediminas Technical University; ASU - Aleksandras Stulginskis University; LEU - Lithuanian University of Educational Sciences; LSU - Lithuanian Sports University;

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MRU - Mykolas Romeris University; LKA - General Jonas Žemaitis Military Academy of Lithuania; ŠU - Šiauliai University; VDA - Vilnius Academy of Arts; KU - Klaipėda University; LMTA - Lithuanian Academy of Music and Theatre; LSMU - Lithuanian University of Health Sciences.

As it can be seen from the data presented in Table 3, FHI has ranged from an unsatisfactory level to a good one in an analysed period of time. Most universities a good level of FHI achieved in 2011 when financial health was stable of 50 per cent of all universities. A good level of FHI was achieved by the smallest number of universities (27.27 %) in 2013. While analysing the changing results of FHI, it can be seen that financial health of seven universities (VU, VGTU, LEU, KU, VDA, LSMU, LMTA) was of a low stability and stable condition. Especially bad financial health was detected in Mykolas Romeris University. Negative meaning of FHI of this university means that the status of the university is unstable. During the analysed period, the highest average level was in Lithuanian University of Educational Sciences. The average meaning of FHI (3.31) of this university shows its stable financial health. Average meanings of FHI of other universities do not reach 3 and ranged from an unsatisfactory to satisfactory level. In order to show the changes of FHI of all universities during the analysed period, statistical FHI indices are presented in Table 4.

Table 4

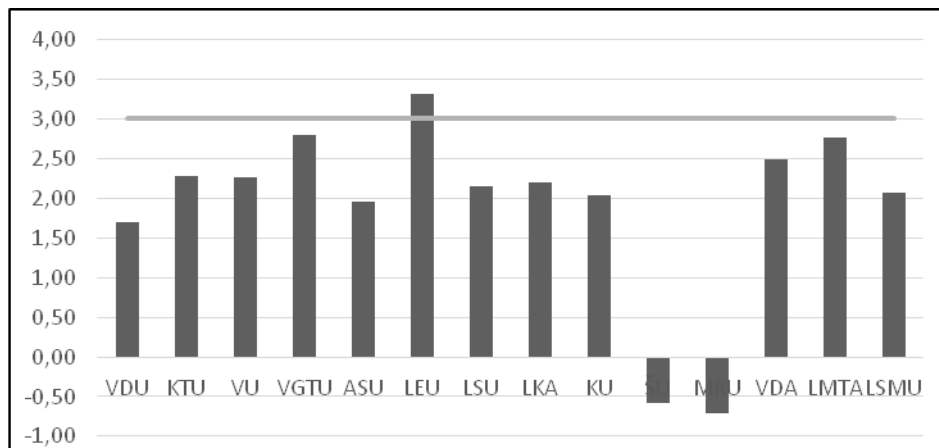
Statistical FHI indices

Year	Mean	Min	Max
2011 (N 8)	2.45	0.05	5.27
2012 (N9)	2.34	0.24	3.98
2013 (N 11)	1.31	-1.22	3.83
2014 (N 13)	2.27	-1.31	4.45
2015 (N 14)	1.99	-1.56	4.09
2016 (N 14)	1.94	-0.80	4.77

Source: author's calculations based on Lithuanian state universities annual financial statements

Calculated means of FHI show that average level of university's financial health was low during the analysed period; what is more, it changed within 1.31-2.45 limits. The worst result was in 2013 when FHI mean dropped to 1.31. Such level of the index was determined by unstable university's financial health, when 3 universities from 11 had negative FHI meanings. The best result was in 2011. Even though FHI average meaning was the highest, it did not exceed desirable level, i.e. 3, and university status was assessed satisfactory. Table 3 presents minimal FHI means. These means show that FHI means of all universities having publicly announced financial statements were positive only in 2011 and 2012. General Jonas Žemaitis Military Academy of Lithuania had the highest FHI meaning in analysed period of time. In 2016 FHI increased more than twice and reached 4.77. On purpose to present FHI of every university and compare it to other universities, Fig.1 reflects average FHI meanings of Lithuanian universities.

As it can be observed from the presented figure, only Lithuanian University of Educational Sciences had an average FHI meaning that was higher than 3 during the analysed period. Presented results show that two universities had negative FHI meanings. During the analysed period average FHI of most universities reflects low level of stability. FHI means of each university reflect only an average level. FHI of each university changed differently during the analyzed period.



Source: author's calculations based on Lithuanian state universities annual financial statements

Fig. 1. Average FHI meanings of Lithuanian universities

FHI changes were insignificant in several universities (for example, MRU, LMTA); however, some universities (for example, VDU, ASU, LEU and others) had a wide range of FHI. For instance, FHI of Šiauliai University was negative in 2015 and reached 1.55, and increased to 1.73 in 2016. Such fluctuation had impact on average FHI meaning. In carrying out further and more detailed analysis, FHI of each year, its changes and reasons have to be assessed.

Conclusions, proposals, recommendations

- 1) In the article, the financial health of Lithuanian universities is assessed calculating FHI, which gives an opportunity not only to assess the most prominent financial results of each university but also to fulfil the comparative analysis of universities, rate them according FHI level and identify stable and unstable financial health of each university.
- 2) According to university's FHI calculating in the period of 2011-2016 years, the universities are divided into four groups; it can be noticed that the financial health of more than 45 per cent of all universities was stable only in years 2011 and 2014. The results of FHI calculating showed sufficiently complicated financial situation of universities in 2016 when the stability of university's financial health was low in more than 70 per cent of universities.
- 3) Analysis of FHI statistic indices showed that financial health of Lithuanian universities was satisfactory in a period of 2011-2016 years though it was getting worse during the analysed period (with an insignificant exception in 2014). The worst status was in 2013 when the average level of FHI reached only 1.31. The best results of financial health were in 2011, when the average meaning of FHI was equal to 2.45. Although average FHI meaning of all universities did not reach desirable level (3), the average FHI levels were higher than desirable level in several universities. It proves the stable financial health of these universities.
- 4) Calculations showed general tendencies of university's financial health changes. It is purposive to carry out more intensive analysis in the next stage of research, where changes of FHI indices and reasons of the phenomena would be investigated. It would allow to reveal the main reasons of low university's financial health and make a decision on financial health improvement.
- 5) The assessment of university's FHI reveals only the financial status of an institution. The received results should be analysed together with the results of other spheres of university's activities. The assessment of financial health should become concurrent part of university's annual assessment. Universities should present not only general comments on financial

statements but also calculate relative indices that show their ability to use resources efficiently, implement obligations, generate surplus etc.

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THE DILEMMA OF CHOOSING THE FORM OF VAT TAXATION IN AGRICULTURE IN POLAND

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Abstract: The aim of the paper is to present the most important problem of VAT in Polish agriculture. The key issue concerns the assessment of the attempt to optimize the economic and financial performance of the VAT settlement. The farmer chooses and settles VAT in a flat-rate system or according to the general rules. The question is which form is more favourable. On the basis of mathematical formulas, an appropriate criterion has been selected for the choice of the form of VAT settlements in agriculture.

Even though VAT has been functioning in Polish agriculture for many years, its rules are misinterpreted. From the point of view of the ordinary farmer, it means many cases of erroneous choices which, consequently, reduce his efficiency. This paper systemises knowledge in this regard. It also shows possible changes in the law and their potential impact on farmers' choices of a VAT taxation form.

Key words: value added tax (VAT), agriculture, a flat-rate VAT farmer, management, finance.

JEL code: H21, Q14, G32

Introduction

The value added tax (VAT) has been in force in Poland since 1993. It was regulated by the Act of 8 January 1993 on tax on goods and services and on excise duty (Journal of Laws of 1993 No. 11, item 50). The application of VAT is not only an organizational and financial problem, but also a mental one, in particular for farmers. VAT was associated with taxes, and therefore additional charges. Misunderstanding the essence of VAT caused the subjective exemptions from VAT to be selected. It meant that the farmers purchasing the means of production were treated as final consumers. VAT in agriculture was introduced seven years later. On 20 July 2000, the Parliament, accepting the Senate's amendment to the amendments to the above mentioned Act, decided to introduce a 3 % VAT rate in agriculture. At the same time, two possibilities of its settlement were introduced, a flat-rate form (specific for farmers) and under general rules similar to other taxpayers.

The subject of the VAT in agriculture has been undertaken by many Polish authors. In relation to agriculture, this topic was taken up by Szelagowska, Goraj (2000), Dziemianowicz (2006), Wegrzyn (2007), Filipiak (2007), Gruzziel (2009), Turowska (2010), Zabielska (2011), Sadowski and Baer-Nawrocka (2011), Brodzinska (2015), Kondraszuk (2016). Attempts have also been made to build online calculators to calculate the effects of choosing the form of VAT taxation (ksiegowosc.infor.pl, podatki.egospodarka.pl). The publications mentioned also focus on the problem of choosing a form of VAT taxation along with the economic assessment of its effects. The previous analysis of these publications (Kondraszuk, Jaworski 2017) proves that this problem poses great difficulties even for experienced authors and has not been definitively resolved to date.

The aim of the paper is an attempt to answer the question how to determine the criterion of choosing a form of VAT taxation in agriculture in Poland. Mathematical formulas have been used to determine the final criterion, which allowed the authors to derive the objective function determining the threshold point for the farmer to decide whether to stay on a flat-rate form or switch to the general taxation rules. The paper also indicates the perspectives for changes in the VAT taxation in Poland and their possible impact on the farmers' situation.

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The specifics of VAT taxation in Polish agriculture

Currently, the VAT rules are regulated by the Act of 11 March 2004 on tax on goods and services (UoVAT) in Poland. This Act, like the previous one, provides the farmers with two forms of taxation. The first one is the general rules which apply to all other taxpayers. The tax liability is calculated by the farmer as the surplus VAT due from sales of agricultural products (5 or 8 %) over VAT charged from general purchasing transaction (5, 8 and 23 %). For this purpose, the farmer is obliged to keep appropriate records and prepare tax statements. The second option is to choose the flat-rate form of taxation. In this case, the farmer is exempt from tax registration and its settlement. It is done by the recipient of agricultural products by issuing the so-called RR invoice with calculated flat tax of 7 %. The purchase price together with this tax is transferred to the farmer. After making the payment, the buyer acquires the right to reduce the tax due by the mentioned tax charged. It is worth pointing out that this form of taxation is only granted to farmers who do not keep accounting books.

Two forms of VAT taxation, in the flat-rate form and according to the general rules, gave the farmer the opportunity to choose a more favourable solution. The assessment criterion, which solution is better, includes both economic and financial as well as organizational and mental aspects. For a flat-rate taxpaying farmer, VAT due received from the buyer of agricultural products is a type of income. On the other hand, the farmer bears the VAT tax burden if he purchases means of production (current and fixed assets). It is a type of cost for the farmer. In this situation, the fundamental VAT principle, the economic neutrality, does not apply. Additional income or loss is generated for farmer taxed under flat-rate rules.

Farmers, who resign from the proposed simplification and switch to general rules, can reduce VAT due by VAT charged. In this way, they can fully implement the principle of VAT economic neutrality.

Economic and financial consequences of VAT taxation

The fundamental VAT principle for a taxpayer is economic neutrality. It means that the VAT burden is borne solely by the final consumer of goods or services as the final link in the economic turnover¹.

At the level of a single economic entity, a proper understanding of the impact of VAT settlement on its financial situation is very important. The authors mentioned in the introduction as well as managers of informational websites have tried to solve this problem. The analyses conducted by Kondraszuk (2016) and Kondraszuk and Jaworski (2017) have demonstrated that these calculations contain numerous errors, e.g.:

- incorrect categories used to calculate VAT: Filipiak (2007), Brodzinska (2015);
- incorrect criterion for assessing the benefits of shifting to general rules of taxation: Wegrzyn (2007), Filipiak (2007), Gruziel (2009), Zabielska (2011), Brodzinska (2015), eGospodarka.pl, Infor.pl;
- incorrect assessment of economic effects of the flat-rate settlement of VAT: Gruziel (2009), Turowska (2010), Brodzinska (2015), eGospodarka.pl, Infor.pl;
- incorrect calculations in profit and loss statements: Turowska (2010), eGospodarka.pl.

Therefore, the problem of choosing the form of VAT taxation remains open and at the same time very important from the point of view of the farmer who is obliged to make a choice.

¹ This situation concerned the farmers until 2000. They were treated like consumers.

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For a flat-rate taxpaying farmer, the key question is: who is the buyer of his agricultural products? If it is a VAT payer taxed under the general rules then a sale transaction takes place at net prices with maintaining a 7 % flat-rate VAT refund. However, if the buyer is a flat-rate taxpaying farmer as well as a final consumer, then obtaining a net price plus a 7 % flat rate rebate does not necessarily occur. The gross price can be negotiated. When a flat-rate taxpaying farmer wants to get the equivalent of a flat-rate VAT, the price should be similar to prices offered by other suppliers, for example farmers who are taxed under general rules. They will sell their products at net prices plus VAT due (5 % or 8 %). The gross sale price obtained is revenue for a flat-rate taxpaying farmer.

It is also important, from whom farmers will buy current and fixed assets for their farms. They can buy them from flat-rate taxpaying farmers and then they will negotiate the gross price as described previously. They can also buy from farmers taxed under general rules or, what happens most often, from specialized commercial companies also paying VAT under general rules. Then the gross price will include the net price plus VAT (5 %, 8 %, 23 %), which will be a cost for the flat-rate taxpaying farmer.

In the case of a purchase, there is also a difference in benefits between a flat-rate taxpaying farmer and a VAT payer under general rules. In this case, the second one is in better situation. A farmer taxed on general rules can reduce a tax due by tax charged (5 %, 8 %, 23 %). The flat-rate taxpaying farmer has to include tax charged to the costs.

Flat-rate or general rules of taxation?

In an attempt to recognise the economic consequences of VAT settlements, all possible combinations of sales and purchases by flat-rate taxpaying farmers and farmers taxed under general rules should be distinguished. Here (GR) means the farmer taxed under general rules and (FR) means the flat-rate taxpaying farmer. There are four possibilities of transactions between them:

- a. (GR) sells to (GR),
- b. (GR) sells to (FR),
- c. (FR) sells to (FR),
- d. (FR) sells to (GR).

These transactions for one entity may occur jointly. Both: the VAT payer taxed under general rules and the flat-rate taxpaying farmer can sell simultaneously to (GR) and (FR). Let the total sales be equal to:

$$S = SGR + SFR \quad (1)$$

where:

SGR – means the sale to a VAT payer taxed under general rules,

SFR – means the sale to flat-rate taxpaying farmer.

For cases (a) and (b), net amounts will go to the profit and loss account on the seller's side. However, VAT due on sales (VS) will be settled from the tax office after its reduction by the tax charged. In this way, the principle of VAT economic neutrality will be implemented.

For cases (c) and (d), gross amounts are transferred to the income statement of the seller and these amounts will not be settled with the tax office. At the moment, the profitability of the flat-rate form in relation to the general rules of taxation is determined.

For case (c) the calculation of return from SFR (VSFR) will occur (calculated at the VAT rate of - 5 %, 8 %). For case (d) the VAT amount (VSGR) will be refund from the payer taxed under general rules to flat-rate taxpaying farmer (calculated at the flat rate - 7 %). When the flat-rate taxpaying farmer carries out both types of sale, the total VAT refund is:

$$\mathbf{VSF = VSFR + VSGR} \quad (2)$$

The purchase transactions may also be presented in four variants:

- e. (GR) buys from (GR),
- f. (GR) buys from (FR),
- g. (FR) buys from (FR),
- h. (FR) buys from (GR).

Similarly to sales, the purchase transactions for a single farmer may occur together. Both a VAT payer taxed under general rules and the flat-rate taxpaying farmer can buy simultaneously from (GR) and (FR):

$$\mathbf{P = PGR + PFR} \quad (3)$$

where:

PGR – means purchase from VAT payer taxed on general rules,

PFR – means purchase from flat-rate farmer.

For cases (e) and (f) net amounts will go to the income statement of the buyer of agricultural products. VAT due from sales in the case of (e) will be calculated based on rates of 5 % and 8 %, and in the case of (f) based on the flat rate of 7 %. In both cases, these amounts will be settled with the tax office and the principle of VAT economic neutrality will be implemented.

For cases (g) and (h) gross amounts are transferred to the income statement of the buyer and they will not be settled with the tax office. At this point an additional cost arises for the flat-rate taxpaying farmer. So, for case (g) we will have the same situation as in (c) – (VPFR) calculation refund payable by the buyer to the seller (negotiable at the VAT rate of -5 %, 8 %). For case (h) the situation will be the same as in (b) – (VPGR) VAT charged on purchases from VAT payer taxed under the general rules (at the rate: 5 %, 8 %, 23 %) will not be settled with the tax office.

When the flat-rate taxpaying farmer carries out both types of purchase, total VAT charged included in the costs is equal to:

$$\mathbf{VPF = VPFR + VPGR} \quad (4)$$

In order to finally answer the question, what is more profitable for a farmer, a flat-rate form or the general rules of VAT taxation, the economic result should be calculated for both cases and compared.

The economic result (ERGR) of a farmer taxed under general rules is equal to:

$$\mathbf{ERGR = S - P = (SGR + SFR) - (PGR + PFR)} \quad (5)$$

Whereas for the flat-rate taxpaying farmer:

$$\mathbf{EFR = S - P = (SGR + VSF) - (PGR + VPF) = (SGR + SFR + VSGR + VSFR) - (PGR + PFR + VPGR + VPFR)} \quad (6)$$

In order to assess whether the switching from flat-rate form to the general rules of taxation is beneficial (BoV), the difference between the economic results of VAT payer taxed under the general rules and the flat-rate taxpaying farmer must be calculated:

$$\mathbf{BoV = ERGR - EFR = (SGR + SFR) - (PGR + PFR) -}$$

$$[(SGR + SFR + VSGR + VSFR) - (PGR + PFR + VPGR + VPFR)] = VPGR + VPFR - VSGR - VSFR \quad (7)$$

and finally:

$$BoV = VPF - VSF \quad (8)$$

As a result, a very simple criterion is created allowing farmers to assess the benefits of switching from the flat-rate form to general rules of VAT taxation. If BoV is positive, then it is worth considering the choice of the general rules of taxation. However, it should be remembered that the general rules also include more obligations related to registration which causes transaction costs (TC). Therefore, if a farmer considers giving up flat-rate form of taxation and switching to general rules, then the criterion of profitability of this decision takes the form of the following formula:

$$BoV = VPF - VSF - T > 0 \quad (9)$$

It means that a flat-rate taxpaying farmer should continue operating on a flat-rate form of taxation even if it results in a loss but this loss does not exceed the transaction costs related to VAT settlement under the general rules.

Prospects for changes in the VAT taxation in Polish agriculture

Recently, a significant problem in the discussion on the functioning of VAT in Poland has been the tax gap growing at a significant rate. This tax gap results from the difference between VAT, which according to the calculations based on the structure and size of GDP, should go to the budget and the amount actually charged. It has more than doubled in Poland in the past few years (Tratkiewicz 2016). In the light of such a dynamically growing gap, the solutions limiting it are sought.

The first solution, already implemented in Poland is the Unified Control File. VAT payers under general rules of taxation are obliged to send this file to the tax administration electronically. It contains a list of purchase and sale invoices for a particular period and enables the tax administration to quickly verify the transactions conducted on the market. This obligation from 2018 also applies to farmers taxed under VAT general rules.

Another solution (currently piloted) which is implemented in Poland is the split payment. It is based on separating every payment between VAT payers into two parts: the net amount and VAT tax. Each of them should be regulated, but also accepted on separate bank accounts. Funds accumulated on the account intended for VAT cannot be used for any other purpose (Pastuszka 2016). It is envisaged that in the next two years this obligation will also apply to farmers taxed under VAT general rules.

On the other hand, the European Commission has announced a proposal to amend the VAT rules, inter alia, by increasing the freedom for Member States to set the rates of this tax. The list defining what may be covered by reduced tax rates will also disappear. Therefore, changes in the tax rates of VAT for farmers should also be expected. It will probably concern both flat-rate taxpaying farmers and those taxed under the general rules.

Conclusions and recommendations

Understanding the essence of VAT taxation is a prerequisite for a proper approach to estimating costs and benefits resulting from the choice between the flat-rate form and the general rules of VAT taxation for agricultural activity.

Based on the conducted research it can be concluded that:

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- 1) The mathematical dependence developed in this paper allows farmers to determine additional costs incurred by the flat-rate taxpaying farmer. These costs result from the surplus of VAT paid at the purchase (which is the cost) over the flat-rate VAT obtained at the sale transaction (which is the income). The general rules of taxation is a better solution than flat-rate if this surplus occurs.
- 2) When making such a choice, one should consider additional costs related to taxation under general rules, i.e. keeping additional records, submitting relevant tax statements and collecting accounting documents. Within these costs, it would also be necessary to take into account solutions implemented in Poland to counter the tax gap and mainly related to VAT payers taxed under general taxation rules.
- 3) The topic that requires more detailed research is the practical application of legal solutions by farmers. It is worth noting that taxation under general rules is more favourable when a farmer purchases means of production. When agricultural products are sold, the flat-rate form of taxation is more profitable. This situation creates room for informal tax optimization by farmers operating together but under different forms of taxation.

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RURAL DEVELOPMENT PROGRAMME AS AN INSTRUMENT OF FINANCIAL SUPPORT FOR AGRICULTURAL PRODUCER GROUPS IN POLAND

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Abstract. In the article, principles of granting financial aid within the Rural Development Programme aimed at agricultural producer groups are discussed. Producer groups and organizations play an important role in Polish agriculture. Through group activity Polish farmers obtain numerous benefits, achievement of which would be impossible if they acted on their own. Since Poland joined the European Union, entities could receive financial aid within the Rural Development Programme. In the 2014-2020 programming period, conditions to receive financial aid have significantly changed in comparison to previous periods. Most of all, financial support was aimed only at new groups which were approved before 1 January 2014 at the latest. Moreover, groups gathering producers of poultry, poultry meat (fresh and chilled), and fruit and vegetables groups were excluded from receiving financial aid within RDP 2014-2020. By 30 September 2017, Agricultural producer groups were paid nearly 240 million EUR. Introducing new restrictive regulations concerning support for producer groups and organizations may contribute to a breakdown of the process of creating these entities. Data indicate that the number of agricultural producer groups decreased significantly in comparison to e.g. 2013 when new legal regulations had not been applied yet. The aim of the paper is to discuss the mechanism of providing financial aid to agricultural producer groups within the Rural Development Programme. Analyses have been performed for three programming periods: 2004-2006, 2007-2013 and 2014-2020 (as of 30.09.2017).

Key words: agricultural producer groups, producer organisations, Rural Development Programme, cooperation, integration.

JEL code: D23, Q13, Q14

Introduction

The integration of farmers has a very long tradition in Poland. In times of the centrally planned economy, agricultural cooperatives had a very strong position. The economic system at the time ensured cooperatives with sources and conditions to purchase goods, guaranteed cheap loans, set the costs of basic items and determined the level of sales prices and margin amounts. The scope of activities of agricultural cooperatives was very broad. However, the entities were not enterprises with an entrepreneurial spirit, with a skill to take risks or use marketing activities. Therefore, as a result of social and economic changes, a significant decrease in the scope of activities and the role of cooperatives in Polish agriculture was observed. The crisis in cooperatives caused that Polish agricultural producers – deprived of care from cooperatives – were not able to function on the market. Gradually, attempts to undertake common actions in the form of agricultural producer groups were made. Initially, the process was very slow, as after the collapse of cooperatives farmers lost trust in the common form of management. However, on the other hand the market required large batches of agricultural products which would be prepared for sale, sorted, properly marked etc. The requirements could not be met by individual farmers. Therefore, despite the collapse of agricultural cooperatives, farmers started to think about undertaking group actions. The legal act regulating establishment of agricultural producer groups was adopted in 2000; however joining the European Union increased the pace of farmers organizing themselves. An important element related to joining the EU, which undoubtedly contributed to the establishment of producer groups, was the creation of a mechanism to provide financial aid to such entities. Achieving other benefits would not be such a strong stimulus to intensify actions in this aspect. In terms of financial aid for agricultural producer groups, the main role in this aspect was played by the Rural Development Programme, within which since 2004 financial funds to support operations of such entities have been provided for.

The objective of the article is to discuss the mechanism of providing financial aid to agricultural producer groups within the Rural Development Programme. Analyses have been performed for three programming periods: 2004-2006, 2007-2013 and 2014-2020 (as of 30.09.2017). One of the research tasks is to present the amount of financial aid granted due to the product category for which the group was created and as well as overview of the changes in the rules for granting financial aid to agricultural producer groups, according to the rules of the RPD 2014-2020. Secondary data obtained from the Agency for Restructuring and Modernization of Agriculture and the Ministry of Agriculture and Rural Development as well as literature on the subject was used in the analyses.

Status of farmers being organized into agricultural producer groups

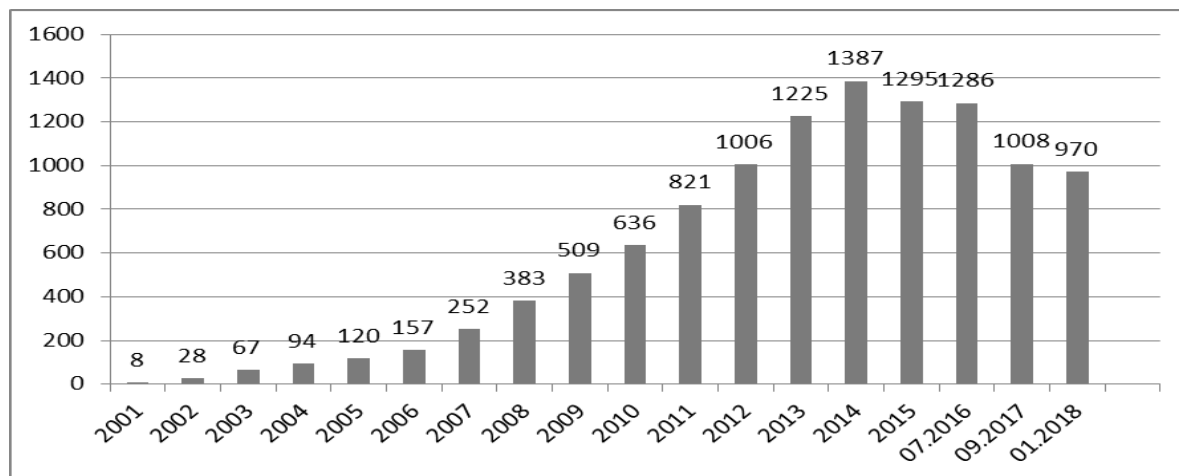
Adoption of the act on agricultural producer groups of 15 September 2000 (Journal of Laws No. 88, item 983, as amended) constituted a chance to commence a systemic organization process for farmers. The act entering into force ensured groups being created use of national public aid measures. However, only Poland's entry into the European Union and providing support to the groups according to the Community principles definitely increased interest of producers in creating groups. Conditions of financial aid for agricultural producer groups being created significantly improved.

When it comes to the notion of an "agricultural producer group" it is worth mentioning that it does not mean any specific legal form. This term refers to an organization of the main goal, which is to launch products produced by farms of the members. Farmers can choose a legal form to be a cooperative, a limited liability company, an association or a society. As of 30 December 2017, in terms of selecting the legal form, limited liability companies and then cooperatives were the most popular.

Producer groups or organizations operate on the market among other economic entities. Therefore, they are subject to the same economic principles, competing for markets with national and foreign entities. Their operations are also justified in numerous economic theories, among others in neoclassical economics, new institutional economics or social economy. In neoclassical economics, a significant condition to undertake integration activities of agricultural producers is an imperfect market structure. It can be observed in the form of market asymmetry and large differences in the market strength of the participants in the food chain. In accordance with neoclassical economics, a method to reduce the lack of market balance between agricultural producers and other market participants is horizontal integration which involves common activities in the form of agricultural producer groups (Lemanowicz M., 2017). Establishing producer groups is also justified in new institutional economics, in particular in terms of transaction cost optimization. In the theory of transaction costs, the fundamental research unit is a contract, and contracts concluded by groups are always accompanied by various costs, which can be included among transaction costs (Coase R.H., 1993; Williamson O.E, 1998). They are costs incurred at the stage of seeking an opportunity to conclude a contract, seeking partners, entering into a contract, its execution and potential costs of problem solving after entering into a contract (Hardt L., 2009; Gorynia M., Mroczek K., 2013).

As mentioned before, despite the fact that the act on agricultural producer groups was adopted in 2000, a clear increase in the interest in creating agricultural producer groups could be observed from the moment Poland joined the European Union (2004), and even more so from the moment

financial aid for such entities was commenced. In 2001, eight agricultural producer groups were registered in Poland; while in 2004, there were 94, and in January 2018 – 970 entities. Development of agricultural producer groups between 2001 and 2018 is presented in Figure 1.



Source: the author's own study based on data from the Agency for Restructuring and Modernisation of Agriculture. Register of agricultural producer groups, www.arimr.gov.pl

Fig. 1. The number of agricultural producer groups in Poland in the years 2001–2018

Most agricultural producer groups function in product categories, such as: live pigs and pork, cereal grains and live poultry. The number of agricultural producer groups has been decreasing since 2015, which is caused by an amendment of the *act on agricultural producer groups* (...) of 11 September 2015 (Journal of Laws 2015, item 1888) entering into force. Not all groups functioning on the market filed applications for recognition and approval of a business plan within the required timeframe, and therefore were removed from the register of agricultural producer groups.

Thanks to acting as a group, farmers can win a lot of benefits, which would be either very difficult or even impossible in case of dispersed individual actions. Among basic benefits that farmers can obtain from horizontal integration, we can list a stronger competitive position of farmers in the market, improvement of economic efficiency of agri-production, better opportunities to create a base for storage, trade and processing, all due to joining capital, conclusion of favourable contracts and distribution of risk to all group members. It can also help to implement and develop marketing orientation of producers in the market (Adamowicz M., Lemanowicz M., 2004; Krzyzanowska K., 2016). Malchar-Michalska also underlines the significant role of producer groups in the vertical coordination of transactions in agriculture (Malchar-Michalska, 2018).

Principles for granting financial aid to groups within the Rural Development Programme

A significant factor for the development of group activity in Polish agriculture is financial support for such entities, which is granted within the Rural Development Programme. The Rural Development Programme is an instrument to execute the European Union policy in terms of development of rural areas in Poland. The document specifies objectives, priorities and principles concerning activities with an expected budget for their implementation. Based on this, specific activities related to social and economic development of rural areas are supported financially. Currently, Poland is within the 2014–2020 programming period, and before financial aid was granted - within the RDP 2004–2006 and RDP 2007–2013. While the principles to provide financial support to agricultural producer groups between 2006 and 2006 and between 2007 and 2013 were similar, then since 2014 significant changes were introduced in the conditions in providing financial

aid. Between 2004 and 2006, 25.4 million EUR was provided for financial aid to agricultural producer groups; the budget for 2007-2013 was 554 million EUR (Krzyzanowska K., Trajer M., 2011). Within the RDP 2014-2020 financial plan, an amount of nearly 403 million EUR (including approx. 110 million EUR for commitments related to payments under measure 142 "Agricultural producer groups" RDP 2007-2013) was provided for support of agricultural producer groups (www.armir.gov.pl).

As mentioned before, principles to grant financial aid to groups within the Rural Development Programme in 2004-2006 and 2007-2013 were similar. Financial aid was granted as lump sum aid in the form of annual instalments over the first five years counted from the date of entering an agricultural producer group into the register. Financial aid was calculated based on the annual net value of income from the sale of products produced by farms being members of the group and it was in subsequent years respectively:

- 5 %, 5 %, 4 %, 3 % and 2 % of the sold production value, if it did not exceed 1 million EUR, or
- 2.5 %, 2.5 %, 2 %, 1.5 % and 1.5 % of the sold production value which exceeded 1 million EUR.

The amount of financial aid in a given year could not exceed: in the first and second year – 100.000 EUR, in the third year – 80.000 EUR, in the fourth year – 60.000 EUR and in the fifth year – 50.000 EUR. When it comes to the principles to grant financial aid to agricultural producer groups within the RDP 2014-2020, it should be underlined that financial aid was aimed only at new agricultural producer groups, consisting of natural persons only, and which were approved not earlier than on 1 January 2014. Moreover, the following producer groups were excluded from receiving financial aid: live poultry, poultry meat (fresh and chilled) and fruits and vegetables.

Financial aid is executed in the form of annual payments in the 5-year period and it is: in the first year – 10 %, in the second year – 8 %, in the third year – 6 %, in the fourth year – 5 %, in the fifth year – 4 % of net income of the group from the sale of products produced by agricultural farms being its members. The aid limit is 100.000 EUR for each year of the 5-year support period. Table 1 presents the amount of financial aid paid to agricultural producer groups within the Rural Development Programme 2004-2006, 2007-2013, 2014-2020.

Table 1

**Financial aid paid to agricultural producer groups within RDP 2004-2006,
 RDP 2007-2013, RDP 2014-2020 (payments as of 30.09.2017)**

Specification	RDP 2004-2006	RDP 2007-2013	RDP 2014-2020
Amount of paid financial aid in PLN	74.154.436.18	914.726.584.07	4.511.960.83
Amount of paid financial aid in EUR*	17.868.538.83	220.416.044.30	1.087.219.47

* according to approximate exchange rate 1 EUR=4.15 PLN

Source: data obtained from the Agency for Restructuring and Modernization of Agriculture on the basis of the author's application

When it comes to financial aid granted to agricultural producer groups because of the product, for which they were established, the highest financial aid was received by groups created in the following categories: live poultry, meat or edible poultry offal – approx. 76.289.943 EUR; live pigs, piglets, weaners, pork – approx. 52.047.488 EUR; cereal grains and oilseeds – approx. 40.817.914 EUR. Table 2 presents the amount of financial aid paid to groups divided into product categories for which groups were created. The amounts provided concern support given within the RDP 2004-2006 and RDP 2007-2013.

Table 2

**Financial aid paid to agricultural producer groups within RDP 2004-2006,
 RDP 2007-2013, divided into product categories (as of 30.09.2017)**

Product category	Financial aid amount RDP 2007-2013		Financial aid amount RDP 2004-2006	
	PLN	EUR*	PLN	EUR*
Live poultry, meat, poultry offal	309.714.114.50	74.629.907.10	6.889.148.35	1.660.035.75
Pigs, piglets, pork	194.795.444.18	46.938.661.22	23.512.917.28	5.665.763.20
Cereal grains and oilseeds	155.905.153.12	37.567.506.77	13.489.90.43	3.250.407.33
Cow milk	80.036.366.46	19.285.871.43	8.998.663.70	2.168.352.70
Cereal grains	63.680.047.47	15.344.589.75	6.117.950.81	1.474.205.01
Oilseeds	43.897.817.01	10.577.787.23	4.689.211.09	1.129.930.38
Birds' eggs	17.270.489.88	4.161.563.83	3.218.422.12	775.523.40
Potatoes	13.108.385.69	3.158.647.15	1.472.259.21	354.761.26
Sugar beets	11.045.974.46	2.661.680.59	851.377.80	205.151.28
Cattle, beef	10.659.887.10	2.568.647.49	663.478.87	159.874.43
Other	14.612.904.17	3.521.181.73	4.251.816.52	1.024.534.10
Total	914.726.584.07	220.416.044.30	74.154.436.18	17.868.538.83

* according to approximate exchange rate 1 EUR=4.15 PLN

Source: data obtained from the Agency for Restructuring and Modernization of Agriculture on the basis of the author's application

Financial aid received by agricultural producer groups within the RDP 2014-2020 up until 30 September 2017 is not significant; however, it should be mentioned that in Q3 of 2017 only the second call for funding applications was made and the data presented in table 1 includes only the first tranche of payments. The sum of the points obtained for the group based on various criteria decides about the order of granting aid within action 9 "Creating producer groups and producer organizations" (RDP 2014-2020). It should be mentioned that the preferred legal form is a cooperative for which the largest number of points can be obtained as well as organizing a group in terms of selected products, such as e.g. organic farming products, live pigs, piglets, weaners, pork or live cattle, beef, sheep, live goats, slaughter animals or farmed animals, sheep wool, sheep or goat meat, sheep or goat skins, natural honey or other bee products, plants cultivated for energy purposes as well as hop cones. Furthermore, a factor affecting the ranking position is the number of group members. If a group consists of at least 10 members – a larger number of points is given, and for each subsequent group member – additional points are given. It is an important criterion which may encourage the creation of larger entities than the required minimum five members. The evaluation criteria also include investments planned by a given group in their business plan. If investments contributing to implementation of cross-cutting purposes of RDP 2014-2020, i.e. 1) increasing innovation - by introducing new production, process or technology rules, different from those currently in use and 2) counteracting climate change or environmental protection - by using machines, devices, equipment or technology, limiting adverse impact on the natural environment, or solutions limiting the use of resources, in particular water or energy, are planned, then such investments also receive a higher number of points. However, it should be remembered that financial aid within the RDP 2014-2020 is aimed only at new producer groups or organizations, i.e. groups or organizations which were approved not earlier than on 1 January 2014. Introduction of such a requirement significantly limited access to financial aid for groups which are already functioning on the market. To sum up, it should be underlined that having the status of an approved agricultural producer group and an approved business plan constitutes a necessary

condition to be able to apply for financial aid within action 9 "Creating producer groups and producer organizations". Approval of an agricultural producer group and a business plan takes place by means of an administrative decision upon request of the concerned group.

Referring to the presented amounts of financial aid granted to agricultural producer groups, it should be clearly underlined that thanks to such aid agricultural producer groups received nearly 240 million EUR up until 30.09.2017 to support the process of their creation and development. It should be mentioned that execution of action 9 within RDP 2014-2020 is going to take several more years; therefore, the amount of financial aid granted to agricultural producer groups will be even higher.

Conclusions

- 1) Agricultural producer groups and producer organizations play a very important role in development of Polish agriculture.
- 2) Group activity in agriculture has a very long tradition, previously known as cooperatives. However, development of Polish cooperatives was hampered by political changes started in 1989.
- 3) Currently we can observe the rebirth of group farmers' activities according to new principles based on new legal acts. A significant element which accelerated the process of farmers organizing themselves into groups was financial support for agricultural producer groups.
- 4) The Rural Development Programme is an important financial instrument supporting the development of group activities in agriculture.
- 5) Thanks to the programme, agricultural producer groups received approx. 240 million EUR of financial support (payments up until 30.09.2017 were taken into account).
- 6) Principles to grant financial aid within the Rural Development Programme 2014-2020 have been changed significantly, limiting access to financial aid only to new groups (approved not earlier than 1 January 2014).
- 7) It was decided that the legal form which received the largest number of points when applying for financial aid is a cooperative. At the same time, it is underlined that larger entities, consisting of more than 10 members, should be established, which will ensure a higher ranking position.
- 8) Limiting access to funding and introduction of new legal regulations related to the approval of groups caused a decrease in the number of registered groups.

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THE KEY ROLE OF INTERNAL FINANCING AMONG ENTERPRISES FROM FOOD INDUSTRY – CASE OF POLAND, LATVIA AND LITHUANIA

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Abstract. The aim of the paper was to identify the internal financing role in case of investment expenditures coverage role. The research sample is constituted from the food industry listed Polish, Latvian and Lithuanian companies. The investigated sample has 348 observations. The research horizon covers the period 2004 to 2016. Food industry due to the high operational risk connected with product price volatility often maintain the conservative strategy of financing. The role of internal capital was varied across studied countries sample. The highest importance in case of financing the investment by internal capital was recorded in Lithuania where the half of those funds were intended for investment in fixed assets issue. In case of economic downturn, the higher share of internal financing was left for the liquidity hedge and the lower investment expenditures were carried. The carried study confirmed the strong manager's preference in term of internal financing sources in case of growth strategy.

Key words: internal financing, food industry, Poland, Latvia, Lithuania, stock exchange.

JEL code: Q13, Q14

Introduction

The optimal structure of capital is a compromise between profit and risk acceptance level, which influence the level of debt or demand for external financing. The financing strategy, which aims to minimize the involvement of foreign capital and thus reduce the financial risk, is demonstrating a conservative approach of managers to capital structure decisions. It is reflected by limiting the share of foreign capital share in the capital structure and expansion of the demand for internal financing. A high level of internal financing in a company may lead to a conservative financing strategy and determine the growth rate based mostly on operational efficiency.

Internal financing is one of the results of efficient operating activities of a firm, not its activity on the financial market. The internal sources of financing are defined as the resources of the owner or shareholders of enterprises invested at the time of setting up the business and later reinvested. Thus, the internally generated funds become the primary source of funds that support the increase of the scale and scope of operating activities. Internal financing could be also identified as available cash balance, which may be related to the accumulated savings in the enterprise. Another approach divides internal funding into funds acquired through asset conversion or through capital formation and indicated their impact on working capital (Madra-Sawicka, 2016). Internal financing is often synonymous with the concept of self-financing and means the process of financing from retained earnings, long-term provision, depreciation and from the transformation of possessed assets. The most often used definition of internal financing (also called cash flow) consists of retained earnings and amortization. Therefore, the decision of managers depending on the adopted depreciation methods will condition the internal sources availability in a given period (Circiumaru, Dracea and Stanciu, 2011). As a rule, the amortization capital should be accumulated for the future reconstruction of the fixed assets. However, actual and economic consumption often does not coincide with the period of redemption of the asset book value (Kamoto, 2014). This decision could be diversified across investigated financial markets due to different accounting and tax rules.

The components of internal financing have an impact on the level of the financial result. In profitable enterprises, managers prefer financing through retained earnings, that is why it is expected that relationship between profitability and debt engagement is negative, as evidenced in many studies (Myers and Majluf, 1984; Shun-Yu Chen, 2011). Highly profitable companies will

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reduce external financing due to the ability to cover internal capital needs (Barton, Hill and Sundaram, 1989; Abor, 2007; Bannier and Zahn, 2012). Internal financing among such companies may be used to finance investments and support faster growth (Bottazzi, Secchi and Tamagni, 2014). It confirmed the discussion of Carpenter and Petersen that the external capital is typically more expensive than internal financing (Carpenter and Petersen, 2002). On the other hand, the increased involvement of internal financing contributes to the higher cost of capital, due to the lower efficiency of equity capital engagement.

The excessive preference for internal financing sources may lead to a reduction of the company's growth potential when company noticed a low level of profitability. Lack of diversification of financing sources contributes to the relaxation of investment discipline and strengthens preference to self-sufficiency among managers. Therefore, a high share of internal capital may indicate a greater importance of the company's financial security than the level of profitability. Nevertheless, the inefficient use of internal financing may necessitate the need to increase the involvement of foreign capital (Frielinghaus, Mostert and Firer, 2005).

During the investments process, one of the most important problems is the selection of the capital sources. Determinants that influence the level of internal financing are related to the company's investment cycle, the adopted financing strategy, the level of operating profitability, legal form, financial situation and access to alternative external financing. According to the hierarchy theory when achieved profits are greater than investment needs, managers will pay off liabilities first, and the remaining surpluses invested in liquid, short-term securities (Franc-Dabrowska, 2006; Bhama, Jain and Yadav, 2015). As a result, internal financing allows to reduce the financial risk, but the available funds may be sufficient for only replacement investments in fixed assets with limited possibility to access the path faster growth. Managers that undertake new investments prefer to finance or co-finance them with funds from retained profits mostly due to the lack of information asymmetry problems (Frank and Goyal, 2003). Accumulated financial capital in the company, in order to fund the resources for development, could reduce this problem temporarily. The asymmetric information problems are the main reasons that explain companies' reliance on internal funds, but they are less severe in case of listed firms (Requejo, 2016). However, the internal and external funds are not perfect substitutes because of transaction costs, tax advantages, agency problems or costs of financial distress (Rahaman, 2011) and internal financing could be unavailable for those firm that characterized with low profitability.

The strong preference of internal capital usage for investments financing do not support striving for an optimal capital structure (Lopez-Gutierrez, Sanfilippo-Azofra and Torre-Olmo, 2015). However, the capital investments of firms' largely depend on internal sources of financing and the ability of companies to internally generate funds for investments (Pavlovic, Bukvic and Gajic, 2016). The determinant of high importance for managers in case of increasing capital expenditures is to preserve the financial flexibility that influences the structure of capital relation in the enterprise. However, the strong preference to maintain the financial surplus result in the reduction of high-value investment expenditures (Bhama, Jain and Yadav, 2015).

The study uses a firm-level panel data set of all publicly traded firms from the food industry on emerging market. The data were collected from consolidated and individual financial statements expressed in mln of U.S. dollars. Data were retrieved from two sources. The primary source was the Emis Intelligence database. Additional items have been collected from Datastream. The investigated period covers 2004-2016. The database has 348 observations of companies from 3

countries such as Poland (16 companies), Latvia (5 companies) and Lithuania (6 companies). The lowest number of units in the sample represent period 2004-2006 – 26 companies, the remaining period of research is represented by 27 companies.

The research aim is to examine the determinants and level of accessible internal financing for investment among enterprises in Poland, Latvia, and Lithuania.

The research hypothesis is as follows:

H1: The level of internal financing determines the investment expenditures among food industry companies listed on the stock exchange.

H2: Companies from Poland, Latvia, and Lithuania varied with the internal financing agreement in investments expenditures.

Specific research tasks in the study covers:

- Identification of companies' financial situation in aspect of capital demand,
- Investigation of the internal financing role in the investment process.

In the research different methods were applied. In the theoretical part of the paper, the descriptive method was applied for the introduction. The research part covers the descriptive statistics for investigated variables which play the crucial role in internal financing assessment. The nonparametric Spearman correlation was used to assess the strength and significance of the relation between investigated ratios. The last part of the study covers variation analyses carried out by using the ANOVA Kruskal-Wallis test and the multiple comparisons test. The rank Kruskal-Wallis test ranked together all observations, and the sum of the ranks obtained for each sample separately (Kruskal and Wallis, 1952).

The novelty of the study is a contribution to the existing literature by identifying key determinants of internal financing level used for fixed assets investment coverage in emerging Europe listed companies from the food sector.

Research results and discussion

1. Food industry characteristics

The food sector is one of the most significant sectors of the European economy (Dimara et al., 2008). The role of the food industry is decreasing while the economy develops, but in case of emerging economies, the role of the food industry is much more expressed (Lakner and Popp, 2014). The food sector indirectly affects other domestic sectors included in the value-added chain of the food industry (Buturac, Lovrinevic and Mikulic, 2017).

The food sector companies can apply for dedicated subsidies from EU funds that require own contribution (Ratajczak, 2008) that could consist of internal sources of financing, previously accumulated. A higher level of uncertainty regarding the company's environment determines the shift from the operational investment towards financial investments (Sauner-Leroy, 2004). The level and structure of the capital sources are highly differentiated depending on specific characteristics of activity conducted by the food industry companies listed on the stock exchange (Wasilewski and Zabolotnyy, 2012). Thus, the internal accumulated sources will play a key role in the food industry, especially in case of investments decision and downturn situation on the market.

2. Financial situation of research firms

Table 1 presents the financial values and ratios of firms in panel sample and in-country division. The relevant figures clearly indicate that the usage of debt is quite diverse among investigated sector across countries. The average amount of debt ratio in full panel amounts 25.8 %, while the

median level of this ratio was 22.5 %. The highest level of the debt was noticed in Lithuanian companies (30.1 %), while the lowest in Latvian (17.5 %). The external financing was a more crucial source of financing for Lithuanian companies, especially that they noticed the highest share of long-term debt in total debt ratio (LTD %), that amounts 65.8 %. The profitability ratios in research period were quite varied when it comes to average values comparison (minus values for Polish companies – net loss), thus the median level was further discussed. The highest median level of ROA (return on assets) was noticed in Latvian companies (5.7 %), while the lowest in Polish firms (3.9 %). The median level of ROE ratio (return on equity) was the highest in case of Lithuanian companies (9.8 %), while the lowest level ratio was noticed among Polish companies (7.5 %). In case of ROS ratio (return on sale), the highest level of this ratio noticed in Latvian sample of firms, which amounts on average 5.4 %, while the median value was twice higher (10.0 %). It supports the conclusion that the highest possibility of generating the internal financing in the research period was achieved by Latvian food industry companies.

The current liquidity ratio in full panel amounts 3.9 %, with the median level of 1.5 %. The highest current ratio level was the characteristic feature of companies from Latvia, where average amounts 4.9 %, and median 2.4 %. When it comes to the assessment of this level the value that is over 1.5 could be asses as excess liquidity, but it explains the hedge form operating liabilities. The presented total assets value (TA) and working capital (WC) was used for comparison reason to express the scale of conducted firms' activity. The total average assets value of Polish companies amounts 144.7 mln USD, while the median was twice lower (77.5 mln USD). The lowest level of this value noticed Latvian companies, that averaged was 33.8 mln USD and the median level of 6.4 mln USD. However, the lowest value of working capital was among Polish companies (5.0 mln USD in average), while the highest in case of Latvian companies. It expresses the conservative manager's attitude to the risk, with the lowest level of all assets was related to the highest level of working capital in Latvian companies.

Table 2 contains descriptive statistics for the full panel and for the subsamples of firms divided into the country stock exchange. The average amount of internal financing to total assets (SF/TA self-financing measure) for the full panel recorded average level of -0.5 %, and the median was 8.1 %. The Lithuanian companies noticed the highest average and median value of this ratio (amounts respectively 9.9 % and 11.8 %), while the lowest was among Polish firms (-6.5 %, 7.2 %). The Polish companies recorded greater diversity in the distribution of this variable.

In case of Lithuanian companies, the highest share of internal financing to total assets was translated into a higher value of investments expenditure on fixed assets that companies invest during the research period. The relation of this investment to total assets (INV/TA) for these companies recorded average level of 7.1 % and for the median 6.5 %. The interesting in the Polish case was that companies noticed a deficit of internal financing in research period. However, they managed to introduce investments on the average level of 6.4 % compared to total assets value (4.4 % for median). It supports the conclusion that investments were more often co-financing with external debt or with capital gained from the market. The comparison of the share of investments to self-financing level with the internal financing ratio to total assets it could be concluded that companies from Latvia and Lithuania noticed higher levels of self-financing ratio. It evidenced that the most of the investments in fixed assets in these two countries were supported by a large amount of internal financing. This situation did not appear in case of Polish companies where lack of the most accessible internal financing did not influence on resisting from investment

expenditures. However, among Polish companies, this situation was quite diverse, thus the median level of internal financing to total assets was higher than an investment to total assets ratio.

Table 1

Descriptive statistics of the total assets, working capital values and financial ratios for listed firms in 2004-2016, according to country division

	N – valid observations	Mean	Standard deviation	Perc. 10	Median	Perc. 90
Latvia						
Debt ratio (%)	65	17.5	17.0	0.0	16.2	40.4
LTD (%)	41	65.8	25.3	30.1	72.9	95.3
ROA (%)	65	3.1	12.6	-8.6	5.7	12.3
ROE (%)	65	36.6	301.7	-14.7	8.7	17.0
ROS (%)	65	5.4	18.9	-10.4	10.0	19.4
Liquidity	65	4.9	4.4	1.2	2.4	11.3
TA (mln USD)	65	33.8	57.5	1.7	6.4	152.7
WC (mln USD)	65	6.9	12.8	0.6	1.3	35.6
Lithuania						
Debt ratio (%)	78	30.6	15.2	11.0	33.0	51.2
LTD (%)	77	46.6	31.9	0.0	53.3	83.6
ROA (%)	78	3.4	6.1	-5.3	4.9	9.7
ROE (%)	78	4.6	18.5	-18.4	9.8	19.7
ROS (%)	78	3.0	4.6	-3.8	4.2	7.5
Liquidity	78	1.5	0.8	0.6	1.3	2.7
TA (mln USD)	78	73.7	51.3	15.4	67.3	149.7
WC (mln USD)	78	12.5	19.6	-4.6	4.2	40.1
Poland						
Debt ratio (%)	205	26.5	81.0	0.3	21.4	38.4
LTD (%)	189	37.2	30.3	0.0	37.2	77.8
ROA (%)	205	-10.8	104.2	-16.7	3.9	14.0
ROE (%)	205	-25.5	265.6	-29.8	7.5	29.0
ROS (%)	197	-39.9	253.7	-7.0	4.5	13.3
Liquidity	205	4.5	22.5	0.9	1.4	3.1
TA (mln USD)	205	144.7	194.4	7.3	77.5	374.5
WC (mln USD)	205	5.0	46.0	-6.5	6.0	34.1
Total sample						
Debt ratio (%)	348	25.8	63.1	0.0	22.5	41.6
LTD (%)	307	43.4	31.5	0.0	44.0	83.8
ROA (%)	348	-5.0	80.4	-10.5	4.4	13.1
ROE (%)	348	-7.2	242.7	-22.7	8.3	23.9
ROS (%)	340	-21.4	194.3	-5.8	4.8	13.9
Liquidity	348	3.9	17.4	0.8	1.5	5.0
TA (mln USD)	348	108.1	159.7	2.3	53.3	253.9
WC (mln USD)	348	7.0	37.0	-4.2	3.5	35.2

Source: author's calculations based on Emis Intelligence and Datastream

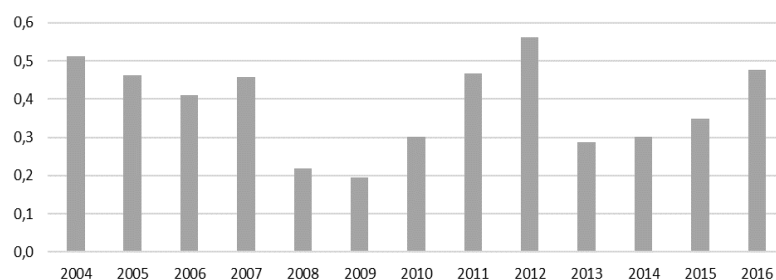
Table 2

Descriptive statistics of the internal financing and investments expenditures ratios for listed firms in 2004-2016, according to country division

	N – valid observations	Mean	Standard deviation	Perc. 10	Median	Perc. 90
Latvia						
SF/TA (%)	65	6.0	12.9	-7.2	8.1	16.2
INV/TA (%)	65	4.4	6.6	0.3	1.8	10.2
INV/SF	65	0.4	1.2	0.0	0.2	0.8
Lithuania						
SF/TA (%)	78	9.9	7.9	-3.8	11.8	18.3
INV/TA (%)	78	7.1	5.6	0.9	6.5	12.3
INV/SF	78	0.8	1.6	0.0	0.5	1.4
Poland						
SF/TA (%)	204	-6.5	104.6	-11.5	7.2	19.7
INV/TA (%)	191	6.4	6.7	1.1	4.4	12.6
INV/SF	204	0.6	2.2	0.0	0.4	1.5
Total sample						
SF/TA (%)	347	-0.5	80.7	-5.6	8.1	18.3
INV/TA (%)	334	6.2	6.5	0.6	4.3	12.4
INV/SF	347	0.6	1.9	0.0	0.4	1.4

Source: author's calculations based on Emis Intelligence and Datastream

The ratios from table 2 for Latvia sample shows that median value of the investment to total assets was relatively low and amount 1.8 % while the self-financing sources noticed the level of 8.1 %. This could be concluded by the last ratio that presents the investment value to internal financing level (INV/SF). The lower ratio value than 1.0 than it could be stated the higher usage of internal financing is covering the investment expenses. In case of median values, this ratio was the lowest in Latvian companies (0.2) which could be explained by prudent approach for external capital usage. The Lithuanian companies recorded the highest debt ratio and the ratio of internal financing to assets. The surplus of internal capital is not distributed for investment purposed but it is used for building the financial security of the company. This strategy did not really strictly affect the profitability level of this companies, thus the median-value of ROA, ROE, and ROS was the highest among Lithuanian research countries.



Source: author's calculations based on Emis Intelligence and Datastream

Fig. 1. **Relation of investment expenditures on fixed assets to self-financing value in 2004-2016**

The Fig. 1 shows the importance of internal financing change in research period. The lowest level of investments to self-financing was noticed in 2008-2009 when the consequences of global financial crisis influence the emerging economies financial markets. During this period the investment expenditures on fixed assets amounts near 20-22 % of all accessible in current year internal financing sources (0.20-0.22). It supports the statement that in case of economic

downturn, the higher share of internal financing was left for the liquidity hedge and the smaller investment expenditures were incurred. The highest level of internal financing to investment expenditures value was noticed in 2012 (0.56).

Table 3

Correlation matrix

SF/TA	1.0000							
INV/TA	0.3146*	1.0000						
INV/SF	0.2086*	0.6630*	1.0000					
TA	0.2217*	0.0981	0.1986*	1.0000				
LTD	0.0058	0.1845*	0.2444*	0.4339*	1.0000			
DEBT	0.0174	0.0613	0.1863*	0.7866*	0.7197*	1.0000		
WC	0.1880*	-0.0655	0.0811	0.3517*	-0.0805	0.0613	1.0000	
ROS	0.6730*	0.1996*	0.1742*	0.0821	-0.0538	-0.0766	0.1279*	1.0000
	SF/TA	INV/TA	INV/SF	TA	LTD	DEBT	WC	ROS

*p-value<0,05

Source: author's calculations based on Emis Intelligence and Datastream

The summary statistics of internal financing and investment ratio variable as well as the basics values and ratios for firms' financial conditions was present in a correlation matrix for the 2004-2016 period (table 3). It can be seen that most cross-correlation are fairly small. The highest and significant correlation index was noticed between internal financing to total assets ratio and return on sale (ROS) (0.6730). The lower ROS level due to rising raw materials and labour costs or due to increasing competition, effects on the firms' ability to generate internal funds. It also confirmed that operational activity of food industry companies generates the highest amount of internal sources. It is a consequence of a relatively low debt level in case of listed companies in the research industry. The correction index of long-term debt share and debt ratio amounts (0.7197). The significance of these capital structure factors can provide useful hints to the drivers of the observed relation between the debt relation, thus if the debt growth it was a result of higher long-term debt engagement. The cross-correlation between internal financing ratio and investments ratio express that the decision to carry out the investment depends on the internal sources of financing obtained from each assets unit (0.3146). Also, the growth of working capital presents the scale of support the availability of internal financing in firms but is mostly connected with a higher scale of companies' activity.

The Kruskal-Wallis test was conducted on the country differences. It was found to be significant at greater than the 0.01 level in case of three tested variables: SF/TA, INV/TA, and INV/SF. Thus, there appears to be a very definite relationship between country food sector analyses in case of internal financing source and investment expenditures level. The obtained difference in that range could be a result of a different size of this company listed on the capital market in case of investigated sample. Table 4 shows the results of this analysis. The significant differences among all countries were noticed in case of INV/TA ratio, while the SF/TA was significantly differing between Polish and Latvian companies.

Table 4

ANOVA Kruskal-Wallis test and the multiple comparisons test results, differences between countries

	Kruskala-Wallis test	p-value for H test	Median test Chi ²	The result of the multiple comparisons (based on "z" test and p-value)
SF/TA (%)	H(2, N = 347) = 9.4418	0.0089	10.7109, df = 2 p = 0.0047	Statistical important difference between Latvia and Poland
INV/TA (%)	H (2, N = 334) = 20.8773	00000	13.3138, df = 2 p = 0.0013	Significant differences among all countries
INV/SF	H (2, N = 347) = 10.1344	0,0063	12.1646, df = 2 p = 0.0023	Only insignificant differences between LT and PL, the remaining countries were characterized by significant diversification

Source: author's calculations based on Emis Intelligence and Datastream

Conclusions, proposals, recommendations

- 1) The analysis' results confirmed the importance of internal financing, as it is the most accessible source for firms' investments expenditures. The high preference of internal financing was also confirmed by the low-level of external debt engagement. It supports the theory of managers' capital preferences defined by pecking order theory.
- 2) The internal sources measures were diverse between countries group. The lowest level of internal financing was in case of Polish companies while the highest in case of Lithuanian firms. The difference in that field was shaped by the level of firms' profitability and conservative approach to keep the reserve of internal financing sources that could reduce the level of risk. The Lithuanian firms could follow the pattern of a support of faster growth financed mainly by internal capital. It was possible in case of the high profitability, which supports research results of Bottazai, Secchi, and Tamagni (2014). However, these firms noticed also the highest level of long-term debt, which co-financed the investments in fixed assets compared to other countries groups. Research result support Pavlovic, Bukvic, and Gajic statement that capital investments of firms largely depend on internal sources of financing (2016); however; they need especially in case of listed firms other supplement external sources of capital. The study results confirm the first and second hypothesis.
- 3) Study contribution builds on a set of contributions to international study for emerging markets, which have tried to evaluate the actual nature of the internal financing determinants among food sector companies. The internal financing measures were proposed by the Author.
- 4) The empirical examination in this study is limited to few independent variables. The next step of study should base on econometric panel model which will include the main determinants of the internal financing. The further study could include a separate period of global economic crisis when companies decrease sharply the investment expenditures and accumulate the internal capital without investing it. The limitation of a study is not discussed dividend policy of research companies. Thus, companies in emerging market pay dividend rarely, but if the company pay it's often irregularly.

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YIELD RISK AND THE POTENTIAL FOR INSURANCE IN AGRICULTURE

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Abstract. The introduction of yield insurance schemes for the farmers that would contribute to the diversification of risk transfer opportunities in the agricultural sector is under the consideration in Estonia. The paper focuses on agricultural insurance practices that could lead to the solutions for farmers. The aim is to study possible volume of yield insurance in Estonia. The development of agricultural insurance schemes is heterogeneous in different EU Member States and the characteristics of specific agricultural insurances for the crop sector vary from market-based single and combined risk insurances to the policy-type insurances. The analysis of Estonian data indicate that cereal yields and yield volatility differ across the Estonia regions, and the potential market volume for crop insurance is low.

Key words: yield insurance, field crops, cereal yield, agro-food sector.

JEL code: Q10, Q18, M48

Introduction

The agro-food sector is subject to many uncertainties. Risk taking is inevitable and thus income stability and risk balancing are the crucial questions in agriculture. Risk sources influence directly the income of the agro-food enterprises and have an impact on their long-term economic performance. The production in agro-food sector is dependent of factors that are uncontrollable by the farmer, including the agro-climatic conditions, and diseases. Climate change, greater price volatility for inputs and outputs, international trade restrictions, new food safety standards, and EU agricultural policy changes have influence on the income of the farms.

Risk management policies in the EU deal with farm income variability. Research by Cordier (2014) indicates that the respective weight of instruments in the EU policies are 1 % insurance, 39 % safety nets, 60 % income support with direct payments. The proportions of the three types of instruments contribute to farmers' risk management strategies. The support to enhance crop insurance according to Article 37 of the Regulation (EU) n°1305/2013 (rural development policy) has been implemented by few European countries. The problem is that effective EU spending for supporting crop insurance is very limited. High systemic risks, high loss expertise costs and demand of public or subsidized reinsurance limit the development of such instruments (Cordier, 2014). If the CAP budget for the next financial period will be decreased and the available financial resources are scarce, the involvement of the private sector can ensure the development of agro-food sector risk management. There is a discussion in the EU on the role of policy measures and the development of the corresponding market.

The motivation to estimate the possible volume of yield insurance coverage in Estonia comes from the fact that the agricultural insurance availability in Estonia is poor. This issue became especially relevant due to the difficult situation with field crops in 2017, when only approximately 70 % of crops were harvested (SOE, 2018). The introduction of yield and income insurance schemes for the farmers would contribute to the diversification of risk transfer opportunities in the agricultural sector.

The present paper focuses on the research question of what is the potential for implementation of agricultural insurance protection for Estonian farmers. **The aim** of the present paper is to study the agricultural insurance practices and to estimate the possible volume of yield insurance in Estonia. This will contribute to the discussion on the possible solutions for farmers in a small country where the development of agricultural insurance system is still in progress.

Agricultural insurance, used by the farmers is a transfer strategy of risk management. Risk transfer strategy means that the consequences of risk incidences will be transferred to other institutions. Typical instruments are fire insurance, crop insurance, weather derivatives, and the use of commodity futures exchanges (Schaper et al., 2009). In the present research, yield insurance is defined as the type of policy that covers yield losses for a given crop due to any meteorological event (Bielza Diaz-Caneja et al., 2009).

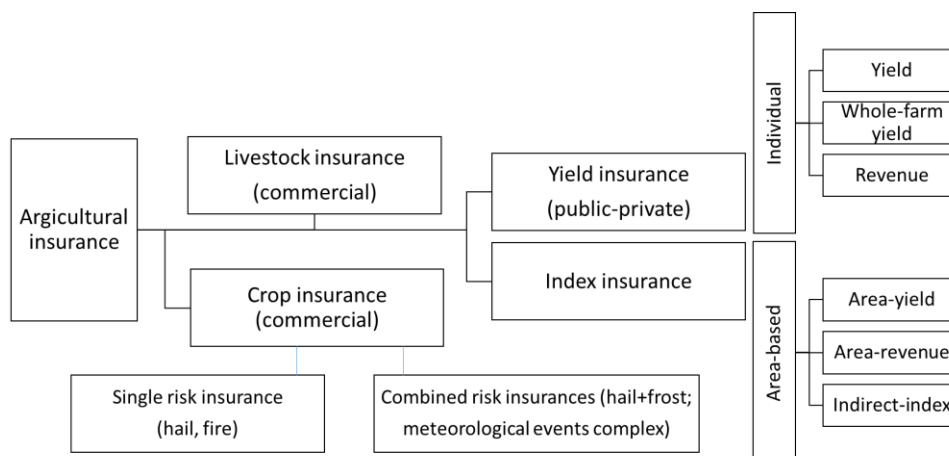
The data are collected from the Estonian Statistical Office's database of agricultural production (SOE, 2018). The research uses yield indicators of field crops from 2006- 2016 and includes average yields of cereals by county and year. For the study of the volume of the insurance coverage, cereals yield and yield volatility by county are analysed. The literature review, descriptive analysis method, analysis and synthesis, and graphical analysis are used in order to perform the study.

In order to perform the analysis, the following research tasks have been set: first, analyse the peculiarities of risk transfer strategies via insurance in agriculture. Second, describe the cereal crop yields from 2004 to 2016 by counties total, using statistics on crop yields, and then to compare the differences in average yields by counties and to calculate the potential size of the insurance coverage on the cereals crop yield. Finally, conclusions are given.

Agricultural insurance for agricultural risk management

The risk management tools in agriculture can be divided into two main groups: strategies concerning on-farm measures and risk sharing strategies. Risk sharing strategies include production contracts, marketing contracts, hedging on future markets, which are tools mainly for price risks mitigation; or participation in mutual funds and insurances, which mitigate mainly production risks. Insurance is an option for risk-transfer among other strategies like marketing contracts, production contracts, hedging on future markets, participation in mutual funds (Meuwissen et al., 1999; Bielza Diaz-Caneja et al., 2009). Figure 1 illustrates different insurance schemes used to hedge production risks (Figure 1). The characteristics of specific agricultural insurances are different in the crop sector and in the livestock sector. Livestock insurance covers mainly non-epidemic diseases and accidents. In crop sector, one of the main strategies for transferring risk is crop insurance (Valverde Arias et al., 2018). European Commission (2006) overview on the insurance schemes describes the hail insurance that can include other scattered risks as fire as most widely extended crop insurance in EU. Some insurance policies address also the risk of frost or a limited number of meteorological events. These are combined risk insurances.

Yield insurance is the type of policy that covers yield losses for a given crop due to any meteorological event. The meteorological origin of the damage has to be identifiable. Yield insurance triggers payoffs when yield falls short of a predetermined level, which is usually based on a historical yield average. In general, all the fields of a farm with the same crop are insured. A yield reduction of one crop will not be compensated if the total production reduction of the farm does not reach the trigger (Bielza Diaz-Caneja, et al., 2009; Du, et al., 2017). Revenue insurance is the combination of yield and price insurance; it takes into account the total value of the production, and the costs of production and it is paid out when revenue falls short of a predetermined level. Predetermined revenue is the product of average yield and a price established in an insurance plan in a given year (Bielza Diaz-Caneja et al., 2009; Du et al., 2017).



Source: authors' construction based on Bielza Diaz-Caneja, et al., 2009

Fig. 1. Agricultural insurance typology

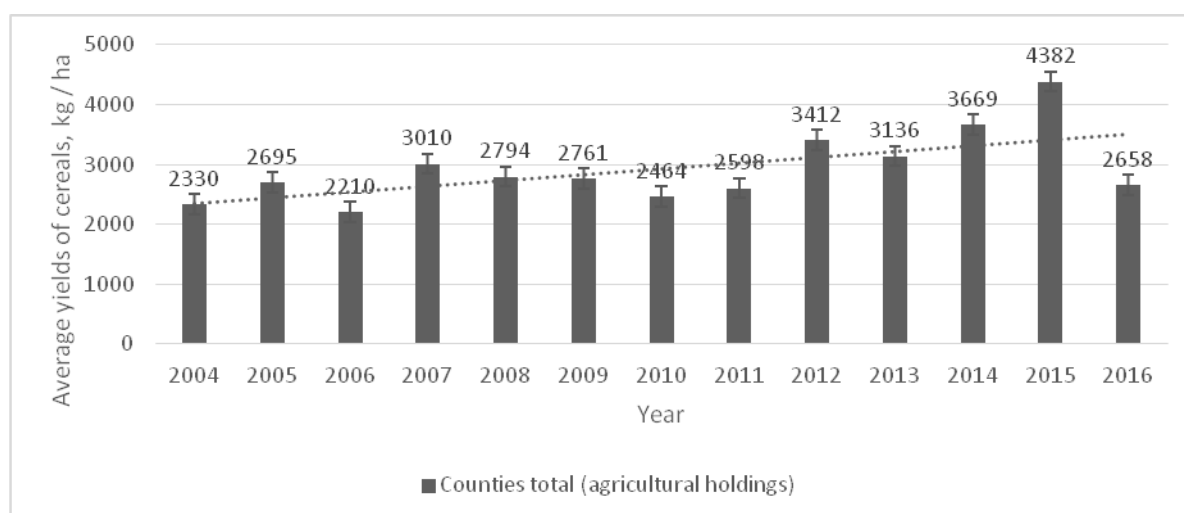
Bielza Diaz-Caneja et al. (2009) explain that index insurances are based on a common index for an area. In area-yield insurance, the compensation paid to the farmer depends on the statistical yield for the year in a predefined area that is usually an administrative unit. The elements of area-revenue insurance include the area yield multiplied by the area price. All of the farmers in the area who have insured for that crop, get compensation if the average yield/revenue in that area is below a certain threshold. Indirect-index insurance does not refer to the average yield in an area but to a meteorological indicator (Bielza Diaz-Caneja et al., 2009). All of these field-crop insurances rely on information about crop yield, crop production of a certain area, and cover potential loss on these crops in a particular year. The volatility of yields in a particular year compared to years' average serves as the basis for calculations.

The agricultural insurance schemes are very different in the EU Member States. Combined risk insurance is public and compulsory in Greece and Cyprus; private and partially subsidised in Portugal, the Czech Republic, Slovakia, and Romania; and completely private in the Baltic States, Hungary and Bulgaria. Yield insurances guarantee the main risks affecting production, include systemic risks such as drought, and are available in a private partially subsidised system in Spain, Italy, Austria and France (Enjolras et al., 2012). Austria, France, Greece, Italy, the Netherlands and Spain provide crop insurances as safety nets for farmers. These countries have developed crop insurance schemes, which is mostly a combination of public and private partnership. Crop insurances are non-existent in Finland, and despite the growing interest towards agricultural risk management schemes in the EU, the success of existing programs has remained limited (Liesivaara and Muura, 2017). In practice, agricultural insurance has been a costly way of transferring the risk from farmers to governments and other insurers (Nelson and Loehman, 1987). The role of policy measures and the development of the corresponding market is an ongoing discussion in the EU. The farmers' preferences, the perception of risks, farm and farmer characteristics influence the demand for agricultural insurance (Van Asseldonk, et al., 2016). Agricultural insurance captures many different options for the insurable object and it can include both private and public partnership, but, as farm level studies show, the popularity of crop insurance varies considerably across EU Member States.

Research results

Insurance products' availability regarding crop losses is very limited in Estonia. The competition between insurance providers is low because the potential market for crop insurance is small and is not economically feasible (IESS, 2016). Crop insurance is suitable for insuring the yield of cereals (barley, oats and wheat) and industrial crops (oilseed rape) and its purpose is to cover losses from adverse weather conditions. Elements for cereal yield insurance administration come from classification of areas under cereals according to their productivity, flow data of cereal productivity in years by economic entities, by regions or the whole country. In context of insurance, the yield in cereal production is determined according to the data on yield loss. Yield loss cost for insurer is equal to indemnity divided by liability, and actuarially fair premium rate is the expected loss cost. The loss cost can be determined by using yield data as a measure of productivity, which is dependent of crop, region, agro-tech production practices, varieties. There are differences in yield risk for different crops, and regions.

The data of SOE (2018) show that the cereals' yield, measured by counties total, has increased during the period from 2004 to 2016 (Fig. 1). In 2017, the average cereal yield per hectare was 3967 kg. The yields of wheat, barley, and oats were accordingly 4202; 4154; and 3932 kg per hectare in 2017. The sown area of potatoes were 5400 hectares, and average yield was 16925 kg per hectare.



Source: authors' calculations based on SOE 2018

Fig. 2. Average yields of cereals 2004-2016

The European Union CAP Implementation Act sets out the ground and procedure for implementation of the measures of the common agricultural policy of the European Union, but it does not regulate directly compensation mechanisms regarding crop losses arising from natural disasters. Rural Development and Agricultural Market Regulation Act regulates that the state may grant agricultural insurance support via the Ministry of Rural Affairs or the Estonian Agricultural Registers and Information Board, ARIB (IESS, 2017). The farmers have the right for government subsidies on agricultural insurance in Estonia. According to the terms of agricultural insurance subsidies, the costs for insurance policy are compensated partly for insurance that covers the risk of unfavourable meteorological events as frost, storm, hail, ice etc. The amount of the damage is in extent that destroys more than 30 % of average annual production, calculated as the average of three previous years' annual production.

The average cereal yield varies across the counties in Estonia. Calculations of cereal yield on the data regarding the average cereal productivity in counties and counties total between 2004 and 2016 were combined. Cereal yield ratio, expressing counties' average differences from the counties total average of last three years is calculated:

$$\text{cereal yield ratio} = \frac{y_{ij}}{\frac{y_{t_i} + y_{t_{i-1}} + \dots + y_{t_{i-n}}}{n}}$$

Where y_{ij} is the cereal yield in year i in county j ; y_{t_i} , $y_{t_{i-1}}$, and $y_{t_{i-n}}$ are counties' total average yields in years i , $i-1$, and $i-n$, respectively; and n is the number of observable years. The results of calculations are in Table 1.

Table 1

Cereal yields ratio by county to average total yields of cereals 2004-2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Harju county	-20 %	10 %	15 %	7 %	-11 %	-2 %	8 %	6 %	8 %	21 %	-24 %
Hiiu county	-52 %	8 %	-27 %	-32 %	-28 %	-63 %	-31 %	-36 %	-44 %	-10 %	-68 %
Ida-Viru county	-6 %	-6 %	-8 %	-3 %	-12 %	-3 %	16 %	4 %	7 %	6 %	-27 %
Jogeva county	-4 %	17 %	5 %	11 %	6 %	8 %	42 %	14 %	16 %	31 %	-14 %
Jarva county	-17 %	-6 %	1 %	-10 %	-7 %	-1 %	20 %	8 %	6 %	23 %	-23 %
Laane county	-21 %	-8 %	-13 %	-12 %	-29 %	-25 %	1 %	-22 %	-18 %	9 %	-26 %
Laane-Viru county	-16 %	21 %	10 %	0 %	-1 %	1 %	29 %	15 %	19 %	25 %	-25 %
Polva county	-10 %	22 %	11 %	0 %	-16 %	-3 %	17 %	-2 %	12 %	20 %	-21 %
Parnu county	-12 %	-6 %	-12 %	-23 %	-23 %	-19 %	-5 %	-17 %	-6 %	-2 %	-30 %
Rapla county	-11 %	2 %	-4 %	-7 %	-13 %	-7 %	0 %	-10 %	8 %	13 %	-20 %
Saare county	-40 %	-13 %	-20 %	-22 %	-28 %	-25 %	-7 %	-14 %	-11 %	3 %	-15 %
Tartu county	17 %	41 %	25 %	7 %	7 %	13 %	41 %	10 %	19 %	22 %	-30 %
Valga county	10 %	27 %	1 %	-3 %	-12 %	9 %	15 %	2 %	-6 %	9 %	-29 %
Viljandi county	-8 %	19 %	6 %	-5 %	-8 %	7 %	22 %	6 %	7 %	18 %	-27 %
Voru county	-14 %	12 %	-3 %	-12 %	-18 %	-2 %	16 %	-8 %	-6 %	6 %	-43 %

Source: author's calculations based on SOE 2018

According to the statistical data about the cereal yields, the lowest average yields in period 2004 - 2016 were in Saare, Hiiu, Parnu and Laane counties. The highest average yields were in Tartu, Valga, Jogeva, Laane-Viru, and Rapla counties. The most volatile cereal yields were in Hiiu, Saare, Valga and Tartu counties, and the most stabile cereal yields were in Viljandi, Parnu, Laane-Viru and Polva counties. The counties classified into categories according to cereal yields and yield volatility (Table 2).

Table 2

Classification of counties according to cereal productivity and yield volatility

Category	Cereal productivity (yield)	Cereal yield volatility
Low	Saare, Hiiu, Parnu, Laane	Viljandi, Parnu, Laane-Viru, Polva
Average	Harju, Ida-Viru, Jarva, Polva, Viljandi, Voru	Harju, Ida-Viru, Jogeva, Jarva, Laane, Rapla, Vou
High	Tartu, Valga, Jogeva, Laane-Viru, Rapla	Hiiu, Saare, Valga, Tartu

Source: author's calculations based on SOE 2018

The potential for yield insurance market is measured according to the volume of the mainly grown cultures, cereals. The size of insurance coverage in cereal yield insurance is calculated on the indicators of the average cereal production and average cereal price. According to the data of SOE (2018) the production of cereals in 2017 was more than 1.3 millions of tons, of which 713 300

tons of wheat, 425 700 tons of barley and 52 400 of rye. The estimated production volume was more than 167 million euros. If insurance coverage is 70 %, the potential market volume is estimably 117 million euros. If premium rate is 7 %, the maximum potential market volume is 8,9 million euros. The prerequisite of this volume would be compulsory yield insurance to all cereal producers for all cereal crops, which is not achievable in reality. Previous practice from years 2003-2008 shows that the cereal crop insurance covered approximately 5 % sown area. In case if the participation will stay in a voluntary basis, the potential market volume would stay remarkably lower.

Conclusions

The agricultural insurance practices study and estimation of possible volume of yield insurance coverage in Estonia results as follows.

- 1) The characteristics of specific agricultural insurances for the crop sector vary from market-based single and combined risk insurances to the policy-type insurances as yield insurance, whole-farm yield insurance, revenue insurance. Experiences of EU Member States that have implemented the agricultural insurance show that it is successful only if through precise ex-ante evaluation is made, and if the target group is identified and policy developments are well designed.
- 2) The crop insurance covers the losses of cereals' and industrial crops' yield from adverse weather conditions. The elements for cereal yield insurance administration, includes classification of areas under cereals according to their productivity by regions. Taking into account the differences in yields in cereal production, the counties classified into categories according to cereal yields and yield volatility.
- 3) The potential crop insurance market volume is relatively low in Estonia.
- 4) The limitation of the present analysis was the availability of the specific data. The future research would continue with the study on enterprise-level, it would be important to analyse if this indicator shows signs of decrease or increase.

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MILK PRODUCTION COSTS IN POLISH AND OTHER EU COUNTRIES' DAIRY FARMS - ASSESSMENT IN 2009-2015

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Abstract. The main purpose of the study was to assess the cost competitiveness of milk production in dairy farms from selected EU countries in the years 2009-2015. In addition, differences in the volume of milk production in individual EU countries were presented and the problem of the scale of milk production in agricultural farms was outlined. According to the study, average dairy farms from selected 10 EU countries significantly differed in the production potential and scale of milk production. The average arable land area of a dairy farm in Poland was only approximately 20 ha of arable land area, while at the same time in the Czech Republic it was at the level of approximately 300 ha of arable land area. The lowest production costs of 100 kg of produced milk were recorded in Poland, Lithuania and Latvia, while the highest were in Denmark and the Czech Republic. It can be observed that in the years 2009-2015 in nine out of ten analysed countries, the total costs of production of 100 kg of milk increased (by 2.4 euro on average).

Keywords: dairy farms, production scale, cost competitiveness.

JEL code: O140

Introduction

Competition is ubiquitous in economic and social life. It also affects agricultural farms, both when two entities face one another and fight for the best possible position or when individual entities (agricultural farms) are not a party in the real market, but their production costs have a major impact on the ability to compete of final products. In the second situation mentioned, the ability to compete of national agriculture as a whole or of a relevant segment of this sector in meant (Wos A., 2001). Then, the agriculture is an element which has a significant impact on the competitiveness of finished products manufactured by food processing units. A considerable part of the costs incurred by the food processing industry are the costs of the raw material. Analysing the costs of production of agricultural raw materials (consumption and prices of production factors) intended for further processing, a potential competitiveness of this element in the distribution channel in relation to the situation in other countries is assessed (Parzonko A., Hornowski A., 2017). Reasons for differentiation of production costs can be compared and the directions of their changes can be considered. The expenditure of the performed production can be affected by factors present inside the farm, or endogenous factors (resources of production factors, organization, people's skills etc.) and external or exogenous factors. The Common Agricultural Policy implemented in the EU is among external factors, which significantly affect the competitiveness of agricultural farms in the EU (Czyzewski A., Guth M., 2016). It involves major changes, including those concerning the milk market. In 2015, the resignation of the EU from the "milk quotas" mechanism became a reality. It worked from 1984 and contributed to the stabilization of the milk market in the EU countries. Each EU Member State had its national milk quota and the production of milk above its level resulted in a fine being paid. It discouraged farmers from producing over the established limit (Malak-Rawlikowska A., 2005). The EU agricultural policy began to change from 2003 towards a greater transformation into market oriented economy of agricultural production (Parzonko A., 2013). Among other things, decisions were made to slowly withdraw the milk production quoting mechanism in the EU. In addition, in 2008 the European Commission proposed to limit the scope of intervention in the milk market. It mainly consisted in: 1) abandoning obligatory subsidies for private storage of butter and fixed intervention prices for butter and skimmed milk powder purchase; 2) elimination of subsidies for

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private storage of cheeses, subsidies for butter processing, its sale to non-profit organizations and the army etc.; 3) elimination of subsidies for exporting dairy products outside the EU (Guba, Dbrowski 2012). The adopted course of actions of the European Union after 2003 contributes to a deeper liberalization of the milk market and dependence on the global situation. This leads to greater instability in the European milk market. The prices of milk and dairy products depend to a greater extent on the situation on world markets (Parzonko A., 2014). According to the presented proposals of changes in the EU agricultural policy in the milk market, strong, economic farms, where milk production costs are relatively low, are preferred. In relation to the emerging situation, the following question arises: Which is the cost competitiveness of dairy farms from individual EU countries?

The main purpose of the study was to assess the cost competitiveness of milk production in dairy farms from selected EU countries in the years 2009-2015. In addition, differences in the volume of milk production in individual EU countries were presented and the problem of the scale of milk production in agricultural farms was outlined. In order to achieve the planned objective, statistical data from the milk production quoting system applied until 2015 were reviewed, a literature review on this subject was performed, and based on the accounting data of the FADN system, an analysis of milk production costs in farms from selected EU countries was carried out. When determining the cost competitiveness of dairy farms, at first a group of countries to analyse their dairy farms was selected. These were countries important for milk production divided into "old" and "new" EU countries. The material for analysis was data from the FADN system from the years 2009-2015 including the group of farms specialized in milk production. In the paper, costs of milk production in an average dairy farm from a selected country were presented.

Research results and discussion

Changes in milk production and the number of dairy farms in the EU countries in the years 2004-2015

Various historical and macroeconomic conditions, the culture of a specific country, traditions in the consumption and production of milk determine organization of entities involved in the production and processing of milk. The countries of the European Union significantly contribute to the global milk production. In 2015, in 28 EU countries, it accounted for approximately 20 % of the global production and remained on a fairly stable level, with a slight upward trend. However, there were big differences in the level of development of the dairy sector in individual EU countries (Zietara W. et al., 2013). This differentiation resulted primarily from the level of economic development of EU countries depending, among others, on historical events (Parzonko A., 2014). According to the data presented in Table 1, farms involved in milk production in the EU countries are much diversified in terms of the size of their operations. On average, most milk in the quota year 2014/2015 was sold in Slovakia (1659.2 tons), the Czech Republic (1487.7 tons), Denmark (1432.9 tons), Estonia (1087.7 tons), and the United Kingdom (1093.2 tons). At the other extreme, there were farms from Romania (13.6 tons), Lithuania (43.6 tons), Slovenia (47.3 tons), Latvia (80 tons), Poland (80.6 tons).

Very clear differences between individual EU countries are also visible in the total milk production and the number of farms (farming families) involved in the dairy cattle husbandry. According to the data presented in Table 1, the largest milk producers in the EU include such countries as Germany (31.34 million tons), France (24.84 million tons), the United Kingdom (14.79 million tons), the Netherlands (12.46 million tons), Italy (11.0 million tons), Poland

(10.51 million tons). In the quota year 2014/15, the milk production in the EU was located in 579.981 farms selling milk to dairies. The largest percentage of farms was present in Poland 22.5 %, Germany 12.5 %, Romania 12.1 %, and France 11.5 %.

Table 1.

Changes in production and number of farms selling milk to dairies in individual EU countries in the quota years 2004/2005 to 2014/2015

Details	Quota year 2014/2015			Increase in the production of milk delivered to dairies in the quota years 2004/2005 – 2014/2015		Decrease in the number of farms selling milk to dairies in the quota years 2004/2005 – 2014/2015	
	Delivery of milk to dairies (million tons)	Number of wholesale suppliers	Average supplies from the farm in a year (t)	million tons	%	number	%
Germany	31.34	72.647	431.3	3.16	11.21	39.623	35.29
France	24.84	66.662	372.7	1.201	5.08	41.522	38.38
the United Kingdom	14.79	13.531	1.093.2	0.525	3.68	7.293	35.02
the Netherlands	12.46	17.641	706.3	1.389	12.54	5.517	23.82
Italy	11.00	30.528	360.4	0.336	3.15	18.928	38.27
Poland	10.51	130.263	80.6	2.159	25.87	180.197	58.04
Spain	6.55	17.678	370.5	0.43	7.02	17.861	50.26
Ireland	6.04	18.430	327.7	0.602	11.07	5.766	23.83
Denmark	4.93	3.444	1.432.9	0.478	10.73	3.091	47.3
Belgium	3.65	8.411	433.6	0.352	10.7	6.007	41.66
Austria	3.07	33.322	92.2	0.393	14.69	17.716	34.71
Sweden	2.87	4.931	581.7	-0.336	-10.49	4.485	47.63
the Czech Republic	2.69	1.811	1.487.7	0.304	12.72	1.139	38.61
Finland	2.34	8.985	260.8	-0.008	-0.35	8.773	49.40
Portugal	1.87	6.093	306.7	-0.05	-2.59	9.627	61.24
Hungary	1.59	2.641	601.1	0.131	8.98	2.553	49.15
Lithuania	1.46	33.472	43.6	0.35	31.62	74.691	69.05
Slovakia	0.86	519	1.659.2	-0.015	-1.75	281	35.13
Latvia	0.76	9.551	80	0.304	66.23	14.858	60.87
Estonia	0.70	640	1.087.7	0.181	35.03	945	59.62
Greece	0.62	3.351	185.2	-0.102	-14.09	4.384	56.68
Bulgaria	0.46	6.855	66.5	0.031	23.85	32	13.56
Luxemburg	0.31	716	434.8	0.04	14.9	275	27.75
Malta	0.04	117	364.8	0.001	1.92	33	22

Source: author's elaboration based on the press release of the European Commission "Twelve Member States exceeded their 2014/15 milk quota", Brussels 21.10.2015, http://ec.europa.eu/agriculture/newsroom/232_en.htm, retrieved: 9.01.2018

Considering the directions of changes in milk production in individual EU countries over subsequent years, it is worth investigating the changes which took place in the previous decade. Despite the compulsory system limiting the increase in milk production in all EU countries – the "milk quota mechanism" – changes occurred. They took place with varying intensity in different EU countries (Table 1). The largest increase in milk produced, which reached dairies, occurred in Germany (3.16 million tons), Poland (2.16 million tons), the Netherlands (1.39 million tons),

France (1.20 million tons), Ireland (0.60 million tons). In five EU countries, milk production in the quota year 2014/2015 was lower than in 2004/2005. In general, in the analysed period milk production in the EU increased by 11.86 million tons, which accounted for 8.9 % of production from the quota year 2004/2005. A very important issue, worthy of clear emphasizing, is the process of decrease in the number of farms involved in dairy cattle husbandry and production of milk for sale. In the analysed decade (quota years 2004/2005 – 2014/2015), the number of so-called wholesale suppliers decreased in the analysed 24 EU countries by 456.597, which constituted almost a half of all suppliers from the year 2004/2005. In particular, the process of decreasing the number of farms involved in dairy cattle husbandry and milk production took place in countries characterized by a significant number of farms with a relatively small scale of production. The highest percentage reduction of farms took place in Lithuania (69 %), Latvia (61 %), Portugal (61 %), Poland (58 %), and Spain (50 %). The decrease in the number of farms involved in cattle husbandry and milk production was apparently accompanied by the process of increase in the scale of production in the entities, in which a decision to continue this activity was made. The largest increases in annual production of milk sold to dairies from an average farm took place in such countries as Estonia (762 tons), Denmark (750.9 tons), the Czech Republic (677.4 tons), Slovakia (563.6 tons), the United Kingdom (408.1 tons).

Costs of milk production in dairy farms from selected EU countries

The measure of the cost competitiveness of milk production in agricultural farms in Poland and other countries is the expenditure for production, or the cost of production of a production unit (in the case of the analysed issue – the cost of production of 100 kg of milk). When determining the expenditure for milk production, various methodological doubts appear. The most important of them include: 1) the way of recognizing different costs (mainly indirect) and assigning them to the activity, which is milk production; 2) milk produced in different farms may differ in the content of individual components (e.g. protein, fat etc.). Among agricultural economists, there are different approaches in the methodology of determining production costs. So-called analytical and synthetic approaches were developed. Supporters of the first approach treat an agricultural farm as a set of mutually independent production activities, for which revenues and costs, and resulting profit (income) can be calculated. Economists opting for the synthetic approach treat an agricultural farm as an organic unit, where it is not possible to correctly divide all and especially indirect costs between individual activities because of numerous and close relationships between production sectors, branches and activities (Zietara, 2009). Despite actual methodical difficulties with accurate attribution of appropriate costs (especially indirect ones) to the manufactured product (which is milk in the analysed case), there are information needs, in particular of financial analysts and policy makers, of delivery of synthetic and precise information about the cost of unit production of a given product. Therefore, many organizations, including the European Dairy Farmers Association (EDF) and the International Farm Comparison Network (IFCN) provide information on the production cost of 100 kg of milk, trying to logically divide and assign direct and indirect costs incurred in an agricultural farm (Hemme T., 2013). In this paper, the author, based on data from the European FADN, considered the average direct costs of cattle husbandry in the group of farms specialized in milk production, while indirect costs (divided into the costs of general economy and external factors) were divided and assigned to the activity, which is milk production, in a part

corresponding to the percentage share of revenues from cattle husbandry and milk production, within the total revenue of an agricultural farm.

According to the data presented in Table 2, average dairy farms from selected 10 EU countries significantly differed in the production potential and scale of milk production. The average arable land area of a dairy farm in Poland was only approximately 20 ha of arable land area, while at the same time in the Czech Republic it was at the level of approximately 300 ha of arable land area. The average number of dairy cows in a Polish farm was also very small and in the years 2009-2015 varied in the range of 13.9 and 16.7 animals. A similar level of the average number of kept cows was in Lithuania and Latvia. In other compared EU countries, the average number of cows and milk production were at a significantly higher level. When analysing the costs of milk production, relatively large differences between the analysed average dairy farms from selected 10 countries can be observed (Table 2). The lowest production costs of 100 kg of milk were recorded in Poland, Lithuania and Latvia, while the highest were in Denmark and the Czech Republic. In general, it should be stated that in smaller dairy farms, in which the cattle husbandry was performed by a farmer and his family, the actual production costs of 100 kg of milk were lower. It resulted, among other, from the fact, that the presented calculation did not include the costs of own work of the farmer and his family. In dairy farms in Western Europe, the highest costs of milk production were recorded in Denmark. It resulted from relatively high direct costs and high costs of external factors, especially bank interest rates. An important element in the assessment of production costs is their structure. In the years 2009-2015, the average share of costs of external factors (lease fee, remuneration, and interest rates) in the structure of total costs of produced milk ranged from 7 % in Polish farms to 30 % in Danish farms. A big difference in this area resulted in particular from high costs of interest on capital and remuneration in Danish farms. When assessing changes in milk production costs in the years 2009-2015, it can be observed that in nine out of ten analysed countries, the total costs of production of 100 kg of milk increased (by 2.4 euro on average). Only in Denmark the average unit cost in 2015 was lower by 1.6 euro/100 kg of produced milk in comparison with 2009.

When assessing the competitiveness of dairy farms from the analysed countries, it is worth paying attention to the total income generated on a farm, which includes a payment for the farmer's work and the assets involved. In 2015, on average, the highest income from a dairy farm was generated in the Netherlands (60.506 euro), while Czech (56.286 euro) and Hungarian farms (2.747 euro) incurred losses.

Table 2.

**Average production potential and costs of milk production in dairy farms from
 selected EU countries in the years 2009-2015**

Details	Selected EU countries									
	DE	FR	GB	NL	DK	PL	CZ	HU	LT	LV
Year 2009										
Total Utilised Agricultural Area (ha)	70.6	83.5	106.6	49.4	143.5	19.7	282.7	93.5	34.0	51.8
Number of cows	53.3	50.3	118.7	80.7	144.1	13.9	101.3	41.2	11.7	14.6
Milk yield (kg/year)	7268	6371	7036	7837	8385	4997	6188	6479	5106	5275
Total specific costs (euro/100 kg of milk)	11.5	10.3	16.6	10.8	21.8	9.4	18.8	19.8	13.4	15.9
Total farming overheads (euro/ 100 kg of milk)	10.7	13.0	6.0	8.9	7.5	5.3	10.3	7.6	4.8	6.7
Of which: Machinery & building current costs	2.8	2.7	1.7	2.5	2.4	1.7	2.4	1.2	1.3	1.7
Energy	3.0	1.8	1.4	1.5	1.1	2.2	3.9	3.2	2.1	3.3
Depreciation	5.7	8.7	3.0	5.4	4.3	4.9	3.9	2.2	4.3	4.3
Costs of external factors (euro/kg of milk)	5.5	4.9	3.6	6.9	12.6	1.0	10.0	6.9	2.1	3.0
Of which: Wages paid	2.3	0.8	2.2	0.7	3.1	0.3	8.7	5.1	0.9	2.1
Rent paid	2.0	2.6	0.8	1.6	1.4	0.3	0.7	1.0	0.4	0.2
Interest paid	1.2	1.5	0.6	4.6	8.1	0.4	0.6	0.8	0.7	0.7
Total costs (euro/100 kg of milk)	25.6	26.6	23.6	25.4	36.0	14.1	31.9	27.4	15.1	19.9
Year 2011										
Total Utilised Agricultural Area (ha)	69.6	87.1	106.1	49.8	141.0	21.3	281.2	93.4	31.1	49.7
Number of cows	54.1	52.5	120.8	81.7	143.9	15.0	98.2	41.2	10.7	14.4
Milk yield (kg/year)	7532	6936	7429	7984	8417	5069	6448	6627	5322	5423
Total specific costs (euro/100 kg of milk)	14.4	11.0	18.3	13.2	25.0	11.0	20.9	23.5	15.2	18.3
Total farming overheads (euro/ 100 kg of milk)	12.1	13.3	5.9	9.8	8.1	6.3	13.7	9.4	6.5	9.3
Of which: Machinery & building current costs	3.3	2.7	1.1	2.7	2.6	1.8	3.5	1.8	1.7	2.8
Energy	3.5	2.2	1.7	1.8	1.4	2.8	4.9	4.4	3.0	4.3
Depreciation	6.1	7.8	3.3	5.9	4.2	5.0	4.5	2.8	6.0	4.2
Costs of external factors (euro/kg of milk)	5.4	4.4	3.8	7.2	10.8	1.1	11.8	8.4	1.7	3.3
Of which: Wages paid	2.4	0.7	2.3	0.7	3.0	0.4	10.1	5.7	1.0	2.6
Rent paid	1.9	2.4	0.8	1.9	1.5	0.4	1.0	1.7	0.4	0.2
Interest paid	1.1	1.4	0.6	4.6	6.3	0.4	0.8	1.0	0.4	0.5
Total costs (euro/100 kg of milk)	29.0	27.0	25.6	29.0	36.7	15.7	38.3	32.9	18.7	25.5
Year 2015										
Total Utilised Agricultural Area (ha)	72.1	91.1	111.8	51.0	156.8	21.9	327.1	81.8	27.8	50.9
Number of cows	62.5	58.8	136.4	91.2	165.2	16.7	116.7	43.7	9.8	16.3
Milk yield (kg/year)	7589	6947	7311	8169	9585	5417	7157	6819	5342	5913
Total specific costs (euro/100 kg of milk)	13.9	11.4	20.5	16.9	23.6	10.5	19.8	21.5	15.6	16.9
Total farming overheads (euro/ 100 kg of milk)	10.2	14.0	7.1	8.8	7.6	6.4	10.8	7.6	6.1	7.1
Of which: Machinery & building current costs	3.4	3.8	2.2	2.4	2.7	2.1	4.3	1.8	1.9	2.3
Energy	2.8	2.2	1.5	1.7	1.1	2.7	3.7	3.2	2.4	3.3
Depreciation	5.2	7.8	3.6	5.1	3.8	6.2	5.0	2.7	6.6	3.7
Costs of external factors (euro/kg of milk)	5.4	4.5	4.7	5.6	8.9	1.2	11.3	7.9	1.9	3.6
Of which: Wages paid	2.3	0.9	2.8	0.9	3.4	0.3	9.3	6.2	1.0	3.0
Rent paid	2.1	2.5	1.1	1.3	1.4	0.5	1.3	1.4	0.6	0.3
Interest paid	1.0	1.2	0.7	3.3	4.1	0.4	0.7	0.3	0.2	0.3
Total costs (euro/100 kg of milk)	26.7	28.3	29.1	29.1	34.4	16.9	33.2	28.9	17.9	21.2

Source: author's elaboration based on: [http:// http://ec.europa.eu/agriculture/rca/database/database_de.cfm](http://ec.europa.eu/agriculture/rca/database/database_de.cfm)

Summary and conclusions

The direction of the agricultural policy of the European Union adopted after 2008 contributes to a deeper liberalization of the milk market and dependence on the global situation. The prices of milk and dairy products in the EU depend to a greater extent on the situation on the world markets. According to the adopted direction of changes in agricultural policy in the milk market, strong, economic farms, where milk production costs are relatively low, are preferred.

Based on the conducted research it can be concluded that:

- 1) there were big differences in the level of development of the dairy sector in individual EU countries and the largest milk producers in the EU include such countries as Germany (31.34 million tons), France (24.84 million tons), the United Kingdom (14.79 million tons), the Netherlands (12.46 million tons), Italy (11.0 million tons), Poland (10.51 million tons);
- 2) farms involved in milk production in the EU countries are much diversified in terms of the size of their operations. On average, most milk in the quota year 2014/2015 was sold in Slovakia (1659.2 tons), the Czech Republic (1487.7 tons), Denmark (1432.9 tons), Estonia (1087.7 tons), and the United Kingdom (1093.2 tons). At the other extreme there were farms from Romania (13.6 tons), Lithuania (43.6 tons), Slovenia (47.3 tons), Latvia (80 tons), Poland (80.6 tons);
- 3) There were relatively large differences in the costs of milk production between average milk farms in individual EU countries. The lowest production costs of 100 kg of milk were recorded in Poland, Lithuania and Latvia, while the highest were in Denmark and the Czech Republic.

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PROFITABILITY OF OWN LABOUR VS. ECONOMIC AND FINANCIAL STANDING OF FARMS IN CENTRAL AND EASTERN EUROPEAN MEMBERS OF THE EUROPEAN UNION

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Abstract. Farming profitability is of special importance both for the national economy and for the farmers and their families. Despite the implementation of Common Agricultural Policy instruments, income disparity between the EU agriculture sector and other branches of the national economy continues to be a problem. The main purpose of this paper is to depict the economic and financial standing of farms in CEE countries demonstrating various levels of profitability of own labour. The author used macro-regional FADN data from 2013-2015. The population studied was split into quartiles, as justified by the variance analysis. In the groups identified, selected indices were calculated to reflect the farms' economic and financial standing. As shown by this study, the profitability of unpaid labour in CEE farms is largely affected by subsidies. Farms with high levels of own labour profitability are more willing to borrow funds and demonstrate greater investment capacities.

Key words: labour profitability, farms, Central and Eastern Europe, ANOVA, FADN.

JEL code: O52, Q14, Q18

Introduction

In addition to the socio-economic system and economic policy, the level, quality, structure and effective use of the available production capacity are the key co-determinants of competitiveness of the economy as a whole and of its specific sectors. In the agriculture, rational use of productive inputs is the decisive factor of competitiveness at national and international level (Mrowczynska-Kaminska A., 2013, p. 285; Misala J. and Slusarczyk B., 1999). While affecting the agricultural sector's contribution to the gross domestic product, the effective use of labour in the agriculture has consequences for the levels of income earned by rural households. Thus, it co-determines the structure and development pace of rural areas. Having in mind the European Union's (EU's) commitment to equalize the regional development levels, this issue seems even more important (Kolodziejczak M. and Mrowczynska-Kaminska A., 2008, p. 145). Farming profitability is of special importance not only for the national economy but also for the farmers and their families. This is because family farming incomes should compensate for the family's labour, capital employed and farming risks (Goraj L. and Manko S., 2009, p. 220). Meanwhile, according to studies, agriculture continues to be outperformed by other sectors of national economy in terms of labour productivity (cf. e.g. the research by A. Baer-Nawrocka (2016, p. 506) on EU countries in the 2005-2015 period).

Despite economic reforms and progressing macroeconomic stabilization, most of the new EU member countries demonstrate significantly lower development levels than highly developed EU-15 countries. That problem is also noticeable in the agriculture sector, as regards both the availability and effective use of production capacity (Baer-Nawrocka A. and Markiewicz N., 2012, p. 14). In Western European countries, changes which involved land consolidation, agricultural reforms and shifting to a chemicals-based approach to agriculture contributed to reducing employment in agriculture and to increasing the agricultural production volume. In turn, in Central and Eastern European (CEE) countries, collective farming failed to provide higher levels of efficiency. Furthermore, the territories where private agricultural property was maintained faced the problem of surplus labour (Janiszewska D. A. and Ossowska L., 2014, p. 44; Czerny M., 2008, p. 98-99). A. Zadura (2009), A. Lerman et al. (2002), S. Rozelle and J. F. M. Swinnen (2004) write more about the economic transformation of the agriculture sector in CEE countries. Mentioned changes

contributed to the reduction of agricultural income per full-time employee (FTE) in those countries. For instance, in Poland in 2003, that income was around 40 % of the national economy incomes, close to their level recorded in 1989, at the time of socio-economic shift. Initially, the accession to the EU did not result in any radical changes to the situation of a large number of small farms in Poland (Jozwiak W., 2008, p. 7).

The main purpose of this paper is to depict the economic and financial standing of farms in Central and Eastern European countries demonstrating various levels of profitability of own (unpaid) labour. The author has adopted the hypothesis that farms with higher profitability of own labour are generally characterized by a better economic and financial standing. The main tasks include: 1) determining the level and diversification of profitability of own labour in the CEE countries; 2) determining the economic and financial standing of farms depending on the profitability of own labour. To achieve the aim, the FADN (Farm Accountancy Data Network) database was used. The research used macro-regional data from 2013 to 2015 of eleven countries that accessed the EU in 2004, 2007 and 2013 (except for Malta and Cyprus, as only CEE countries are covered by this analysis). Based on the values of family farming incomes per full-time family employee (FWU – Family Work Unit – equivalent to 2,120 hours of work within a year (2015 Standard Results ..., 2016, p. 4, 7)), the population studied (85 farms) was split into quartiles:

- 1st quartile (group 1): farms with *low* levels of own labour profitability (21 farms);
- 2nd quartile (group 2): farms with *medium low* levels of own labour profitability (22 farms);
- 3rd quartile (group 3): farms with *medium high* levels of own labour profitability (21 farms);
- 4th quartile (group 4): farms with *high* levels of own labour profitability (21 farms).

To validate the division of this population into quartiles, the one-way analysis of variance (ANOVA) was used. In accordance with one of the basic assumptions for variance analysis, the dependent variable should follow a normal distribution within all groups compared (Stanisz A., 2007, p. 337). This was verified using the variable's histograms and the Shapiro-Wilk test. Because the above assumption was not met, the Kruskal-Wallis ANOVA on ranks (a nonparametric equivalent of the one-way analysis of variance) was performed. While this test is interpreted just as the one-way analysis of variance, it is based on ranks rather than mean values (Stanisz A., 2006, p. 386). Based on that test, it was concluded that differences exist between at least two of the groups identified. To provide more details, a post-hoc analysis of p values was performed for multiple comparisons to verify which pairs differ from one another.

Later in this paper, an analysis was performed of family farming incomes per full-time family employee by quartile groups. The basic descriptive statistics were used. Afterwards, for the groups identified, mean values of selected characteristics of the farms' economic and financial standing were calculated.

Research results and discussion

The initial step of this study was to split the population into quartiles by levels of profitability of own labour and to validate it with the analysis of variance. The assumption of normal distribution of the variable considered was verified using the histograms and the Shapiro-Wilk test. In that test, the null hypothesis (H_0) is that the variable follows a normal distribution. In three of the groups studied, the null hypothesis was rejected at $p = 0.05$ (the results of the Shapiro-Wilk test were as follows: group 1: SW-W = 0.7622, $p = 0.0002$; group 2: SW-W = 0.9538, $p = 0.3748$; group 3:

SW-W = 0.8770, $p = 0.0129$; group 4: SW-W = 0.8585, $p = 0.0060$). Therefore, instead of the classic one-way analysis of variance, the Kruskal-ANOVA on ranks was used. As the null hypothesis (H_0), it assumes the absence of a statistically significant impact of the grouping factor on the characteristic considered. According to the alternative hypothesis (H_1), the grouping factor impacts at least some pairs of groups in the general population. Based on the Kruskal-Wallis ANOVA on ranks, the null hypothesis was rejected and the alternative hypothesis was accepted at $p = 0.05$ (Table 1). To determine which pairs of groups differ from one another, a post-hoc analysis of p values was performed for multiple comparisons (Table 2). On that basis, it was concluded that statistically significant differences in the levels of profitability of unpaid labour exist between all quartile groups identified. Therefore, it seems justified to group the CEE farms into quartiles by level of family farming income per full-time family employee.

Table 1

Results of the Kruskal-Wallis ANOVA on ranks for the variable grouping the family farming income per full-time family employee in farms from CEE members of the EU (based on 2013-2015 data)

Specification	Test statistic value	p
Kruskal-Wallis ANOVA on ranks	$H(3, N = 85) = 78.75431$	0.0000

Source: author's calculations based on http://ec.europa.eu/agriculture/rca/database/database_en.cfm

Table 2

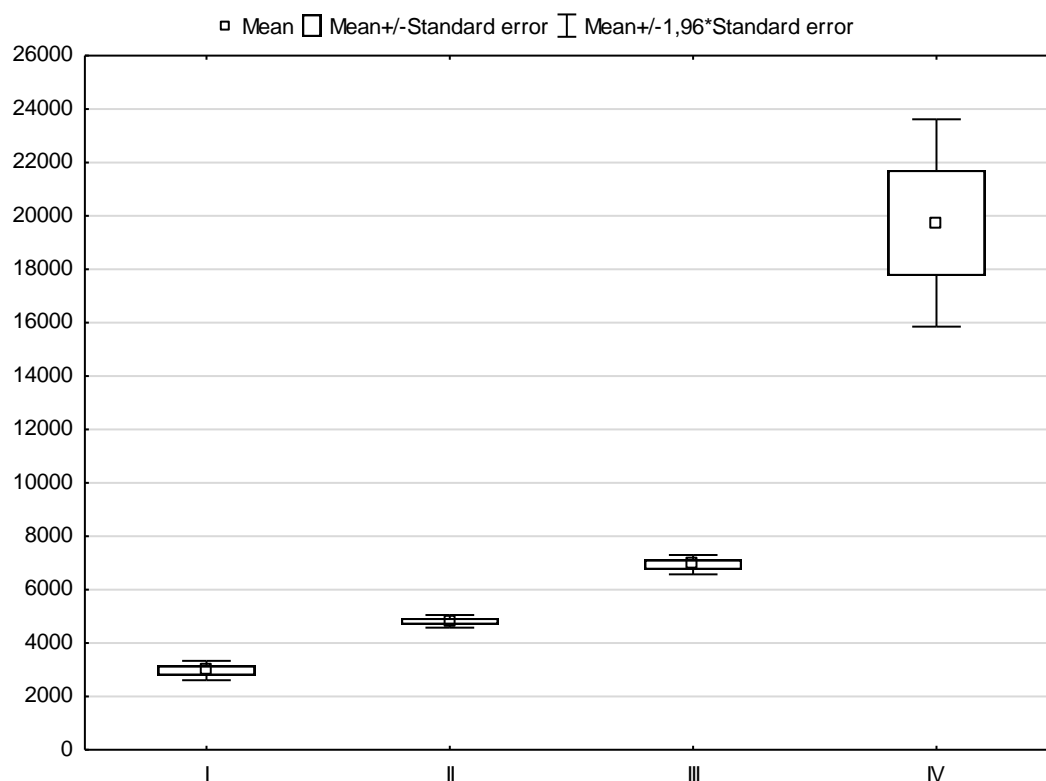
Results of the post-hoc analysis of p values for multiple comparisons between groups of farms from CEE members of the EU with various levels of family farming income per full-time family employee

Specification	Group 1 R = 11.000	Group 2 R = 32.500	Group 3 R = 54.000	Group 4 R = 75.000
Group 1		0.025795*	0.000000**	0.000000**
Group 2	0.025795*		0.025795*	0.000000**
Group 3	0.000000**	0.025795*		0.034994*
Group 4	0.000000**	0.000000**	0.034994*	

* significant at $p < 0.05$, ** significant at $p < 0.01$

Source: author's calculations based on http://ec.europa.eu/agriculture/rca/database/database_en.cfm

Figure 1 and Table 3 show the family farming income per full-time family employee in CEE farms by quartile groups. In 2013-2015, in the entire population studied, the level of that income spanned from slightly above EUR 153 to more than EUR 48,100 per full-time family employee. This is an extensive range. Also, a coefficient of variation reaching nearly 93 % reflects quite a high dispersion of the characteristic considered. Group 1 consisted of farms with low levels of own labour profitability, not in excess of EUR 3,708 per full-time family employee. The coefficient of variation of 28.5 % suggests a relatively low dispersion of profitability of unpaid labour in that group; however, the minimum and maximum values show that the income of the "wealthiest" farmers was more than 24 times higher than that of the "poorest" ones. In groups 2 and 3 (with a medium profitability of own labour), the average share of a full-time family employee in the family farming income was approximately EUR 4,800 and EUR 6,900, respectively. With a coefficient of variation of around 12 %, these groups were characterized by a significant equalization of income levels. The highest dispersion of the characteristic considered was recorded in group 4, composed of farms with high levels of unpaid labour profitability. Although the coefficient of variation was 46 %, the minimum of EUR 8,800 and the range of just under EUR 40,000 show that the income of the "wealthiest" farmers was barely 5.5 times higher than that of the "poorest" ones.



Source: author's calculations based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm

Fig. 1. Box plot for the variable grouping the family farming income per full-time family employee in farms from CEE members of the EU (based on 2013-2015 data, EUR/FWU)

Table 3

Basic descriptive statistics for the variable grouping the family farming income per full-time family employee in farms from CEE members of the EU, split into quartiles (2013-2015 data, EUR/FWU)

Specification	Group 1	Group 2	Group 3	Group 4	Total
Minimum	153.6	3770.1	5860.3	8830.9	153.6
Mean	2970.1	4813.0	6936.3	19734.5	8568.8
Maximum	3707.9	5735.5	8771.6	48106.0	48106.0
Coefficient of variation (%)	28.5	11.8	12.3	46.0	92.9

Source: author's calculations based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm

Table 4 shows the selected characteristics of the farms' economic and financial standing in CEE countries, grouped into quartiles. The data clearly indicate that, in the period covered by this study, high levels of own labour productivity were recorded by large-area, economically strong farms with a large production scale. Their average area of agricultural land was over 125 ha; their economic size reached EUR 122; and their production value went beyond EUR 154,000. This was, respectively, around nine, twelve and eleven times more than the corresponding figures reported by the group of farms with low profitability levels of unpaid labour. It is worth noting that as regards other variables, the differences between the extreme quartile groups were not that significant. The higher the farm's income per full-time family employee, the higher were the total labour inputs and the larger was the share of paid labour.

Table 4

Selected characteristics of the farms' economic and financial standing in CEE members of the EU in 2013-2015, grouped into quartiles

Specification	Group 1	Group 2	Group 3	Group 4	Total
Economic size (EUR)	13.2	26.8	35.1	122.0	49.0
Utilized agricultural area (ha)	10.5	28.5	42.8	126.1	51.7
Total labour inputs (AWU*)	1.4	1.9	1.9	3.3	2.1
Share of paid labour (%)	14.7	28.7	31.4	57.4	33.0
Technical equipment of labour (EUR thousand/AWU)	82.4	50.4	71.0	113.8	79.1
Utilized agricultural area per FTE (ha/AWU)	7.3	12.7	21.1	36.8	19.4
Total production (EUR thousand)	14.5	32.3	43.2	154.3	60.7
Net value added per FTE (EUR thousand/AWU)	3.8	7.2	9.1	18.0	9.5
Cost-effectiveness of output (%)	118.6	116.3	114.0	100.9	112.5
Debt ratio (%)	4.8	11.7	14.6	20.5	12.9
Gross investments per FTE (EUR/AWU)	1339.2	2776.2	4048.6	7223.7	3834.3
Net investments per FTE (EUR/AWU)	-847.3	561.2	930.4	2177.0	703.6
Share of operating subsidies in incomes (%)	75.1	80.8	93.4	160.8	102.3

* AWU (Annual Work Unit) – 2,120 hours of work within a year (2015 Standard Results ..., 2016, p. 4, 7)

Source: author's calculations based on http://ec.europa.eu/agriculture/rca/database/database_en.cfm

Favourable levels of own labour profitability were driven by higher ratios of land and capital to labour inputs. In group 4, utilized agricultural area and fixed assets per FTE were significantly above the average figures for CEE countries. The more advantageous were the relationships between productive inputs, the highest was the farms' labour efficiency measured as net value added per FTE. Therefore, it seems that the profitability of unpaid labour was co-determined by the efficiency of total labour inputs. However, account needs to be taken of cost-effectiveness of output (measured as the ratio of production value to total costs), which was progressively lower in each subsequent group. This demonstrates the significant role of operating and investment subsidies. The share of the latter in the income of the groups 1, 2, 3 and 4 was, respectively: 75 %; nearly 81 %; over 93 % and as much as 160 %. This means that farms with high profitability levels of own labour would generate losses if deprived of operating subsidies. The important role of subsidies as a determinant of labour profitability is also demonstrated in studies by Z. Golas (2010), Z. Koloszko-Chomentowska (2016) and T. Sobczynski (2010) who also emphasize the relationship between labour efficiency and profitability. However, T. Sobczynski (2010, p. 247) notes that this relationship does not apply to adjusted profitability of labour which is calculated by deducting the balance of operating and investment subsidies and taxes from the profits. The conclusions of T. Sobczynski (2010) indirectly confirm A. Baer-Nawrocka and N. Markiewicz (2012, p. 22) who indicate Common Agriculture Policy instruments as a catalyst in the equalization of differences in labour productivity in spatial terms. Interesting conclusions also result from research by Kollar and Sojkova (2016), who proved that non-investment subsidies have positive effect on the average efficiency of Slovak farms.

It should be noted that the higher the profitability of unpaid labour in the farms, the more willing were their owners to borrow funds. This was also a driver of investments: in the 4th quartile group, gross investments per FTE were over EUR 7,200, approximately five times more than the corresponding ratio in group 1. In the quartile with the lowest income per full-time family

employee, the value of net investments (i.e. investments less depreciation) was negative. This means these farms did not even manage to attain the simple reproduction level.

Conclusions, proposals, recommendations

- 1) As shown by this study, in Central and Eastern European countries, higher levels of family farming incomes per full-time family employee were reported by farms with a larger utilized agricultural area, larger economic size and higher production value. The significant fragmentation of farmland continues to be a problem for many CEE countries. This suggests the need to implement further changes to the area structure and production concentration patterns in the agriculture.
- 2) A relationship was discovered between labour efficiency (measured as net value added per FTE) and own labour profitability. However, as demonstrated by a more in-depth analysis, this may be an illusive discovery because operating and investment subsidies are actually the key growth driver for the profitability of unpaid labour.
- 3) Agricultural producers are considerably less willing to borrow funds than entities active in non-agricultural sectors of the national economy. However, it was noted that a significantly higher debt-to-capital ratio was reported by larger farms that are supported with higher amounts of subsidies while attaining higher levels of own labour profitability. That pattern was also related to a larger scale of investments.

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ACCESS TO EU FUNDS VS. FINANCIAL RISKS FACED BY RURAL MUNICIPALITIES OF THE WIELKOPOLSKIE VOIVODESHIP

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Abstract. The purpose of this study was to present the rural municipalities' access to EU funds and their impact on the occurrence of financial risks. One of the Poland's largest voivodeships, Wielkopolskie, was used as the example. A group of 116 rural local government units were assumed to be the subject matter of this study. The timeframes for this study are the period from 2006 to 2015. Because of the complex nature of the municipalities' financial operations, they were expressed with a selected group of indices divided into four groups in line with an approach adopted by the author. A variance analysis was performed to check whether the level of EU funds accessed had a statistically significant impact on the results regarding specific risk characteristics of the municipalities' financial operations. The author also used the descriptive and comparative methods as well as selected descriptive statistics methods and the Pearson correlation coefficient. In this study, the municipalities demonstrated different levels of access to EU funds. Generally, smaller, peripheral units proved to be more effective in accessing EU aid than larger ones located next to big urban centres. As shown by the variance analysis, the level of aid accessed has a statistically significant impact on the local government units' financial operations, in addition to financial liquidity. Note that higher absorption levels were correlated with smaller financial autonomy and greater indebtedness.

Key words: EU funds, financial risks, local government, variance analysis.

JEL code: H70, H71, H72

Introduction

For more than ten years now, Polish local government have been eligible for aid measures from the European Union. The allocation structure, available levels and shares of financing have evolved in line with the frameworks of EU's subsequent financial perspectives. While supporting the very necessary infrastructural transformations in numerous municipalities, the funds also contributed to human capital improvement. Generally, they were supposed to stimulate development as provided for in the Treaty on European Union, primarily by driving growth of less developed areas.

The amount of funds accessed by municipalities is affected by many factors, mainly including the beneficiary's financial situation (Standar A. and Puslecki Z., 2011). When it comes to absorbing this kind of aid, the financial situation is all the more important since the beneficiaries must implement the investment by themselves first. Afterwards, they are provided with a partial refund (at a level ranging from 75 % to 85 % of expenses) while the remaining part is their own contribution. Therefore, this system of EU aid absorption may contribute to emergence of various threats to the municipality's financial operations, e.g. indebtedness (Poniatowicz M., 2005), restriction of financial autonomy (Kozera A. et al., 2016) or insolvency (Kosak-Wojnar M. and Wojnar J., 2005). The beneficiary is required to secure financial resources for the implementation of the entire investment. This is why less wealthy municipalities make broad use of repayable funds. In the future, this could result in restricting their income potential as they will be required to repay the debt with interest. Also, waiting for a refund of amounts disbursed in advance could adversely affect their liquidity. While that problem is addressed only to a limited extent in the literature, it is noteworthy because equally important investment funds are secured for the Polish local government units in the next financial perspective 2014-2020.

The purpose of this study was to present the rural municipalities' access to EU funds and their impact on the occurrence of financial risks. According to the research hypothesis advanced in this paper, the operations of municipalities involve financial risks caused by the absorption of EU funds.

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Therefore, studies need to be conducted on this issue to identify the scale and measurement methods of these developments. Thus, the following research tasks are set out: to present the level of EU funds available in Poland; to identify the scale and diversification of aid accessed by local government units under consideration; and to assess the impact of EU subsidies accessed on financial risk areas in local government operations. One of the Poland's largest voivodeships, Wielkopolskie, was used as the example. With an area of 29.826.50 sq. km and a population of 3.47 million, Wielkopolskie is the country's second and third largest voivodeship, respectively. It comprises of 226 municipalities, including 4 urban districts, 19 urban municipalities, 91 urban-rural municipalities and 116 rural municipalities. A group of 116 rural local government units were assumed to be the subject matter of this study. This voivodeship represents the wealthiest local government units in Poland, rich in natural resources (e.g. lignite, gas). Good soils are conducive to agricultural development. In turn, highly developed infrastructure and their location near the Berlin-Warsaw transit road are the reasons for a dynamic growth of entrepreneurship (Central Statistical Office). The timeframes for this study are the period from 2006 to 2015. Because of the complex nature of the municipalities' financial operations, they were expressed with a selected group of indices. To do so, a desk review of the relevant literature was performed, and the recommendations of the Ministry of Finance (Indexes for the assessment...) were complied with. Also, a dedicated database (www.mf.gov.pl) was used. The source materials also originate from the Local Data Bank of the Central Statistical Office. On that basis, a group of indices were identified and were subsequently divided into four groups in line with an approach adopted by the author: risks involved in financial autonomy (share of own incomes in total incomes [%], current transfers per capita [PLN]); risks related to the investment capacity and financial liquidity (share of the operating surplus in total incomes [%], share of the operating surplus and property incomes in property expenses [%]); expenditure-related risks (share of remunerations and similar expenses in current expenditure [%]); risks involved in liabilities (total liabilities per capita [PLN], share of total liabilities in total incomes [%], share of debt-servicing costs in total incomes [%]).

Indices reflecting the amount of EU funds accessed were assumed to be the level of subsidies absorbed per capita (cumulative amount in the 2006-2015 period) and the share of EU funds in total income (median from the period concerned). Based on the arithmetic mean \bar{q} and standard deviation s_q of the two indices referred to above, the municipalities were divided into four classes: class 1 (high level) $q_i \geq \bar{q} + s_q$, class 2 (medium-high level) $\bar{q} + s_q > q_i \geq \bar{q}$, class 3 (medium-low level) $\bar{q} > q_i \geq \bar{q} - s_q$, class 4 (low level): $q_i < \bar{q} - s_q$.

A variance analysis was performed to check whether the level of EU funds accessed had a statistically significant impact on the results regarding specific risk characteristics of the municipalities' financial operations. The variance analysis used for that purpose specifies how likely it is for the identified factors to cause the differences between the group mean values observed (Stanisz A., 2016, p. 337, 386). Checking the normality of the distribution is a prerequisite for variance methods. To do so, the Shapiro-Wilk test (SW-W) was used. For the variables labelled "share of the operating surplus and property incomes in property expenses" (SW-W=0.93 for p=0.00) and "share of debt-servicing costs in total incomes," (SW-W=0.91 for p=0,00) the Shapiro-Wilk test resulted in rejecting the null hypothesis of normality at p = 0.05. Therefore, later in this study, the Kruskal-Wallis ANOVA (KW) nonparametric test and the p value were used for

multiple comparisons. The distribution of other variables was normal within the groups (SW-W ranged from 0.96 to 0.99 for p significance levels from 0.06 to 0.18), enabling the use of ANOVA variance analysis; the Fisher-Snedecor test was calculated (F). The author also used the descriptive and comparative methods as well as selected descriptive statistics methods and the Pearson correlation coefficient. The data were arranged in tables and figures and were mapped.

Research results and discussion

Poland is the largest beneficiary of European funds (Fig. 1). Even though the European Union budget decreased in the 2014-2020 financial perspective compared to the 2007-2013 period from EUR 1.035 billion to EUR 997 billion, the guaranteed support for Poland increased from EUR 102 billion to EUR 106 billion (www.msz.gov.pl). The largest part of aid was allocated to measures under regional programs dedicated to 16 Polish voivodeships and infrastructure (www.funduszeuropejskie.gov.pl). The main beneficiaries were local government units, including (in Poland) the municipalities as the basic territorial division units.

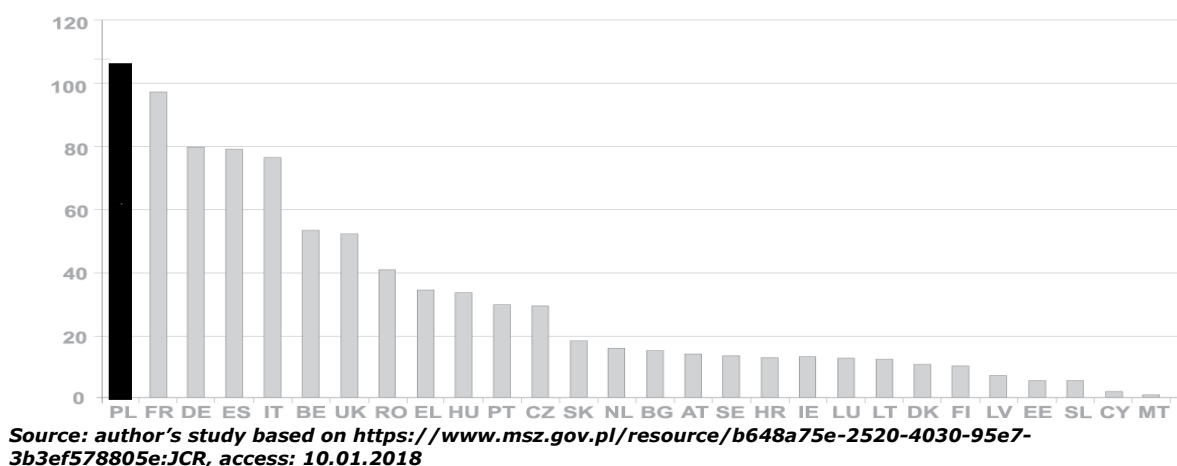


Fig. 1. Allocation of European Union funds between member countries (euro billion)

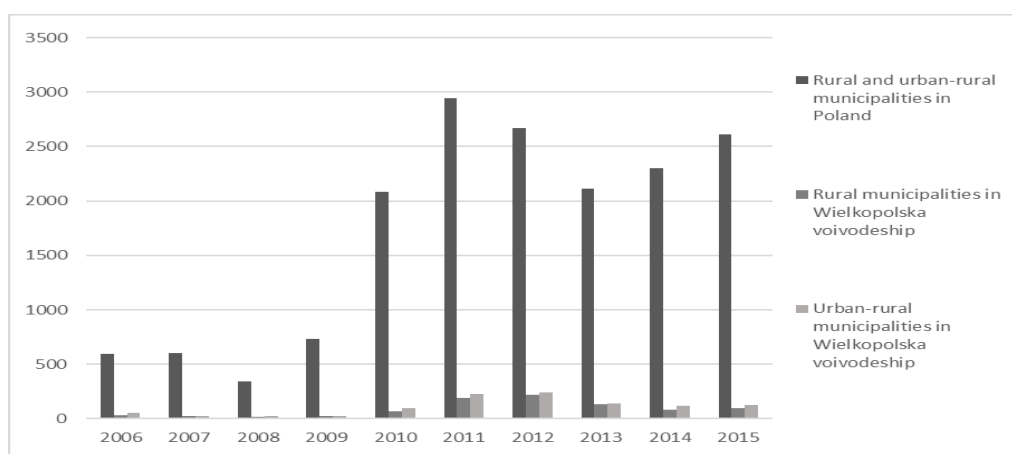
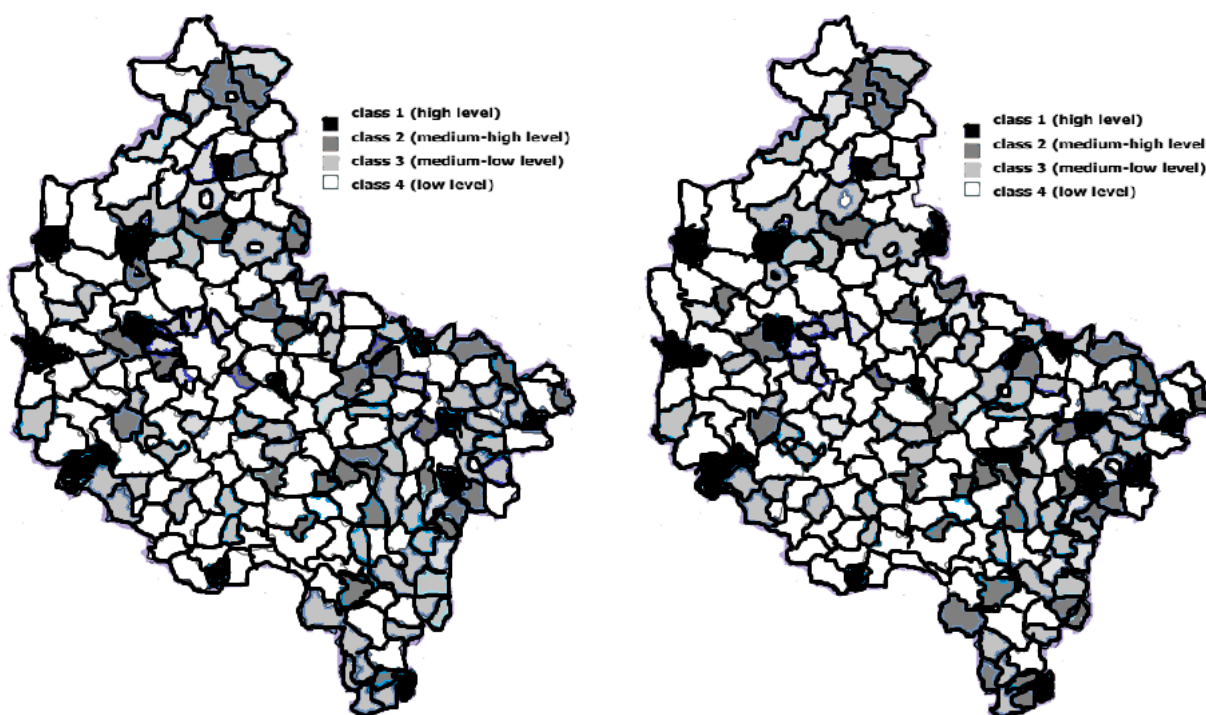


Fig. 2. Amounts of EU funds accessed by rural municipalities and urban-rural municipalities in Poland and in the Wielkopolskie voivodeship (PLN million)

In Poland, in the period under analysis, rural municipalities and urban-rural municipalities accessed a total pool of PLN 16.998 million. The amount of funds absorbed has become increasingly important since 2010 because of European Union aid implementation as a part of the 2007-2013 perspective. A similar trend may be observed when analysing the level of support accessed by selected groups of municipalities in the Wielkopolskie voivodeship: the urban-rural and

urban municipalities accessed a total pool of PLN 1.951 million, which is 11.5 % of total funds accessed by these types of municipalities in Poland. Approximately 55 % and 45 % of the funds were allocated to urban-rural municipalities and rural municipalities, respectively. When it comes to the amount of funds accessed per municipality, urban-rural units proved to be more effective beneficiaries than their rural counterparts, reaching the levels of PLN 9 million and PLN 7.5 million respectively, in the decade under consideration (Fig. 2).

Figure 3 shows the spatial differentiation of cumulated levels of EU funds accessed per capita and of the mean (median) share of EU funds accessed in the total incomes of rural municipalities of the Wielkopolskie voivodeship. Because of the similarities between the two maps, it was justified to verify the dependencies. As a consequence, a very strong relationship was discovered between these characteristics (a Pearson correlation coefficient of 0.96). This means that in the municipalities that absorbed important amounts of funds per capita the aid represented an equally significant part for the total budget (and vice versa). Therefore, later in this study, the indices reflecting the municipalities' financial risks were selected based on only one of the indices covered by this analysis: the amount of EU funds accessed per capita.



Source: author's study based on the Local Data Bank of the Central Statistical Office

Fig. 3. Delimitation of rural municipalities of the Wielkopolskie voivodeship by cumulated level of EU funds accessed per capita (left) and mean (median) share of EU funds accessed in the total incomes (right)

When analysing Figure 3 in more details, note that the amount of implemented EU aid varied across the municipalities. In smaller, peripheral municipalities (for large cities), such as Miasteczko Krajenkie, Malanow and Kazmierz, significant amounts of aid (even in excess of PLN 2.500 per capita) were accessed, whereas in larger ones (in terms of the number of inhabitants), located near big urban centres, e.g. Tarnowo Podgorne, Komorniki and Czerwonak, the aid accounted for barely several dozen PLN over the 10-year period. As regards the population of classes, the extreme classes No. 1 (high level) and 4 (low level) were less numerous, and represented 19 and 14 units, respectively. In most of municipalities, the amount of aid accessed

fluctuated around the mean value, and thus groups 2 and 3 were composed of several dozen local government units.

Risk type identification by the Local Government Units (JST) is not an easy task, which is caused by the diversity of conducted activity and the points of view (the authorities, the citizen, the investor) (Dylewski M., Filipiak B and Gorzalczyńska-Koczkodaj M., 2010). Financial risk results from the way of covering the cost of the Local Government Units tasks. It is connected with the flow of capital accumulated and spent from the Local Government Units' budget in the form of income and revenue and outgoings and expenses (Koreník D. and Koreník S., 2007). The fact that it is characterized by complexity is evident in the above mentioned research areas. Another aspect of risk in the Local Government Units focuses on the levels of risk. Kosak-Wojnar M. and Wojnar J. (2005) distinguish its three types: the risk of losing current liquidity, the risk of losing reliability and the risk of the Local Government Units insolvency. Generally, the risk analysis in the functioning of local government is an issue more extensively explored in international literature (e.g. Patrick P.A. and Trussel J.M., 2012; Kloha P. et al., 2005; Jones S. and Walker R., 2007; Hendrick R., 2004; Rivenbark W.C. and Roenigk D.J., 2011) than by Polish authors (Kata R., 2012; Standar A., 2017). The authors usually focus on a theoretical approach and on selecting the indicators. In his pioneering article, Kata (2012) stated that using only one indicator is inadequate considering some municipal characteristics. Note that these risks were not previously addressed in the context of the absorption of EU funds. Table 1 shows the results of variance analysis for the indices specific to the financial risks of rural municipalities in the Wielkopolskie voivodeship, ordered by amount of EU funds accessed per capita. A group of indices were identified and were subsequently divided into four groups in line with an approach adopted by the author. Afterwards, the analysis of variance was employed to measure the developments under consideration. That method was not used previously in this type of research. In the group of indices covered by this analysis, only two demonstrated statistically insignificant differences. This means the amounts of EU aid disbursed have a statistically significant impact on the municipalities' financial operations expressed with the use of other characteristics.

The first group of risks refers to financial autonomy. These risks are reflected by the share of own incomes in total incomes and by current transfers per capita. In Poland, own incomes are related to the municipality's own activity and are mainly represented by local taxes and fees, shares in personal and corporate income taxes, and other capital and property incomes (Act on the incomes...). A directly proportional relationship exists between the amount of own incomes and financial autonomy (Wisniewski M., 2011, p. 126). The important role of own income as a determinant of financial situation is also demonstrated in studies by A.Kozera et al. (2010). As found in the group covered by this analysis, the higher is the amount of EU funds accessed, the smaller is the beneficiaries' independence. This means the implementation of EU aid in Poland effectively supports less wealthy local government units. Otherwise, wealthier local government units (those with greater own incomes) would prove to be more efficient in accessing the funds because, unlike their less wealthy peers, they would not have any problems in securing funds for investments and delivering their own contribution. The above conclusion is corroborated by the results of variance analysis for the next characteristic: current transfers per capita. It turns out that the increase in the levels of EU aid accessed was accompanied by an increase in the support from state budget disbursed as subsidies and grants. Note, however, that the above system, which supports weaker units, may pose a risk to their functioning because if state support is limited, their

capacity to implement projects co-financed by the EU will also be limited. This system makes the local government's functioning dependent upon state support.

Table 1

**Results of variance analysis for the indices specific to the financial risks
of rural municipalities of the Wielkopolskie voivodeship, ordered by amount
of EU funds accessed per capita**

Index	Class 1	Class 2	Class 3	Class 4	Total	F/KW*	p
Financial autonomy risks							
Share of own incomes in total incomes (%)	36.47	38.66	40.12	49.35	40.50	3.08	0.0302
Current transfers per capita (PLN)	1.868.20	1.799.42	1.725.78	1.516.81	1.737.00	2.79	0.0439
Risks related to the investment capacity and financial liquidity							
Share of operating surplus in total incomes (%)	8.76	10.43	9.50	11.70	10.00	1.37	0.2547
Share of operating surplus and property incomes in property expenditure (%)	118.49	120.03	124.18	127.14	122.62	0.69*	0.8765
Expenditure-related risk							
Share of remunerations and similar expenses in current expenditure (%)	49.55	48.20	49.20	45.63	48.44	3.67	0.0144
Risks involved in liabilities							
Total liabilities per capita (PLN)	1.173.50	880.16	680.83	1.046.61	852.60	4.29	0.0067
Share of total liabilities in total incomes (%)	35.06	26.69	21.63	28.62	25.79	4.02	0.0093
Share of debt-servicing costs in total incomes (%)	9.44	8.66	6.01	6.91	7.37	9.90*	0.0194

Note: F means the Fisher-Snedecor (F) test; KW means the Kruskal-Wallis test; p means the significance level.

Source: author's calculations based on the Ministry of Finance Database and the Local Data Bank of the Central Statistical Office. Access: 09.01.2018

According to M. Dylewski (2014, p. 133-134), relatively low capacity to generate an operating surplus may be a financial risk factor causing excessive indebtedness not only in rural communes but also in other entities of the local government sector. Interestingly, the amount of EU aid accessed does not affect the risk of insolvency. This may be regarded as a surprising result, having in mind that the EU aid implementation system is based on the refunding principle. It requires the beneficiary to freeze the funds during the investment and to wait for a refund only upon partially or entirely completing the project. The Ministry of Finance considers the ratio of operating surplus (the difference between current incomes and current expenditure) to total incomes as an indicator of investment capacities and creditworthiness of a local government unit. A negative result suggests the emergence of threats to the municipalities' financial management (Indexes for the assessment..., 2014, p. 6). Additionally, from January 1, 2014, the level of operating surplus is important for specifying the limits of use of repayable sources (Article 243 of the Public Finance Act of 2009). For all municipality classes, positive results mean positive financial standing. The share of operating surplus index and property incomes in property expenditure is also at a satisfactory level. Referred to as the self-financing index by the Ministry, it specifies the financial liquidity level.

Another risk area for the municipalities is related to expenditure and is represented by a single feature: share of remunerations and similar expenses in current expenditure. If municipalities which access larger amounts of EU aid allocate statistically significantly more funds to remunerations and similar expenses, this reflects an unfavourable structure of funds disbursed.

According to M. Dylewski, B. Filipiak and M. Gorzalczyńska-Koczkodaj (2010, p. 88) in the future, this may create an imbalance in the allocation of funds between property and human resources, which could contribute to the risk of restricting the investment capacity.

The last area covered by this analysis is the over-indebtedness risk. The very important role of the over-indebtedness as a determinant of financial risks of municipalities is demonstrated in studies by A. Standar (2017). The amount of EU funds accessed turns out to be a statistically significant differentiator of the indebtedness level and of debt-servicing costs. Municipalities which accessed larger amounts of European Union aid made a statistically greater use of repayable funds when it comes to both per capita ratio and their share in total incomes. A greater debt means the need to secure funds not only for the future repayment but also for debt-servicing purposes. Over-indebtedness may result in the need to borrow more funds (debt rollover); as a consequence, the borrowing municipality may fall into a debt trap. Also, in the future, the growing debt and debt-servicing costs may result in the loss of investment capacity and financial liquidity because of the need to allocate increasingly more funds to repay the capital borrowed. Interesting conclusions also result from research by R. Kata (2012, p. 142-143), who proved that indebtedness and own income are the most important determinants of financial risk.

Conclusions, proposals, recommendations

- 1) Because Poland is an EU member, local government units may access significant subsidies, especially in the area of investments. In Poland, in the period under analysis, rural municipalities and urban-rural municipalities accessed a total pool of PLN 16,998 million. The amount of funds absorbed has become increasingly important since 2010 because of European Union aid implementation as part of the 2007-2013 perspective. A similar trend may be observed when analysing the level of support accessed by selected groups of municipalities in the Wielkopolskie voivodeship. In this study, the municipalities demonstrated different levels of access to EU funds. However, most of them reported a medium absorption level of EU aid. Generally, smaller, peripheral units proved to be more effective in accessing EU aid than larger ones located next to big urban centres. This means the principle of promoting less wealthy units is effectively implemented in Poland.
- 2) Local government units may use the EU funds to implement their investments despite a lower investment potential. However, they may face a problem related to the emergence of various financial risks in local government operations because the absorption of Union subsidies is a refund-based system. This paper attempts to estimate the impact of EU funds on financial risks grouped by the author. The analysis of variance proved to be useful for this type of studies, and was therefore employed for that purpose. As shown by the analysis, the level of aid accessed has a statistically significant impact on the local government units' financial operations, in addition to financial liquidity. Therefore, the hypothesis advanced in this paper is accepted. Note that higher absorption levels were correlated with smaller financial autonomy and greater indebtedness. In the future, both of these aspects may pose the risk of reducing the investment capacity which, in turn, may result in the risk of marginalization. Breaking this impasse may be even more difficult for less wealthier municipalities.
- 3) The results of this study only extend to rural municipalities of the Wielkopolskie voivodeship. Thus, they could be the starting point for further research on this topic, which

becomes particularly important as the Polish local government units may access considerable support from the EU under the 2014-2020 financial perspective.

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CROP INSURANCE WITH SUBSIDIES IN POLAND – DO IT WORKS?

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Abstract: Farming is a risky business. Every farmer has to cope with various kinds of natural, technological, personnel- and market-related risks. The most important strategies in risk management in farming include diversification of production and income, entering into contracts, vertical integration and insurance. Production insurance allows for transfer of risk outside individual farms, allowing them to stabilize their income. Since 2006, insurance is obligatory in Poland for crops and is partially subsidized by the state. Popularization of insurance is still lower than assumed in the programmes devised to provide support for agriculture. **The aim of this study is** to assess the functioning of compulsory crop insurance subsidized by the state budget in Poland and the reasons limiting its development. The analysed period included years 2006-2016, and for quantitative data – years 2009-2015. The author used statistical data from Central Statistical Office and governmental institutions. It was found that compulsory crop insurance developed dynamically in the early years after introduction of the concept. Each year, about PLN 200 million was paid by the state budget to subsidize crop insurance (ca. EUR 50 million). After year 2010, the area of crops insured reached 3 million hectares and it stopped to increase despite the incentives. Farmers were most eager to secure those crops, which are susceptible to natural risks, as well as those with high shares in the sowing structure. Rapeseed production was insured almost entirely, production of sugar beets and corn – in about 30 %, and cereals – in 20 %. The most significant barriers preventing popularization of crop insurance in Poland included: fragmentation of farms and low workforce productivity, low income in farming, high diversification of production and income of farms, high significance of direct subsidies in agricultural income, as well as high policy prices and low compensation amounts. In addition, for insurance companies, crop insurance was not profitable. The planned increase in the level of insurance subsidies to PLN 1.4 billion, increase in the level of subsidies to 65 % and the maximum level of subsidized premium to 9 % should contribute to elimination of the barriers observed and achievement of the planned level of crop insurance of 70 % of the area by year 2025.

Key words: risk in agriculture, agricultural insurance, subsidized crop insurance, risk mitigation strategies, crop insurance constraints.

JEL code: Q14, Q18, G22

Introduction

In every kind of human activity, the risk factor must be taken into account, as it can never be fully eliminated. Risk is also a significant component of farming activity. Uncertainty is associated with the weather, crops, prices, government policy, situation on the global markets and other factors, which may lead to fluctuations in the level of farm income. Risk management is about selection among various alternatives to mitigate the negative financial effect, associated with such uncertainty.

In agricultural production, there are many various risks. The key five risks include:

- production risk,
- price- or market-related risk,
- financial risk,
- institutional risk,
- human or personal risk.

Farmers may undertake various actions to manage the risks encountered; most apply not one, but many different risk management tools. Some of these are associated with a single type of risk; others provide protection against several types (O'Donoghue, 2016; OECD, 2011).

The most popular risk management strategies in farming include (O'Donoghue, 2016, Wicka, 2014):

- diversification of production and sources of income,
- taking advantage of external financing sources,
- vertical integration in supply chains through takeover of ownership or shares,
- entering into contracts for sale of production and purchase of means of production,
- use of futures or options contracts,
- maintaining of liquid property,
- crop insurance against crop deterioration or natural disasters,
- employment outside the farm to increase the family income.

Agricultural production is subject to many risks. Only some of these can be mitigated by farmers independently, for instance, through diversification of production (Pietrzykowski and Wicki, 2011) or use of varieties characterized by diversified stress resistance (Wicki, 2010). Many farmers take advantage of crop insurance to mitigate risks and reduce income fluctuation. Willingness to insure crops depends on many factors. First of all, it is the observed variability of yields or crop losses (Sulewski and Kloczko-Gajewska, 2014). It has also been indicated that farmers achieving high income and having substantial assets are less eager to get insurance, keeping the risk at their farms (Farrin et al., 2016). Those farmers, who have accumulated substantial property thanks to savings, are able to take advantage of self-insurance even in the case of significant crop losses.

Not all farmers susceptible to risk decide to get insurance. Those, who do, indicate to insurance companies that risks associated with their farms is unobservable. According to Makki and Somwaru (2001), such is the case both when farmers purchase insurance and when the insurance amounts are diversified or only some crops are insured.

In Poland, like in many other countries, insurance was first introduced as a possibility, and later on became an obligation. The programme is subsidized. It was commenced in 2006; however, it has not achieved the planned effect, that is, mitigation of fluctuations in farming income due to risk factors thanks to commercial insurance. A substantial part of the risk is still borne by the state, which supports farmers suffering from crop loss or reduction (Wicka 2014). This is due to the still significant role of farming in Polish economy, particularly in employment (Wicki and Wicka, 2016). However, only 3 million hectares of crops are insured, while the governmental programme assumed about 6 million hectares; without support of the government, popularization of crop insurance is not possible, as the farmers would not be able to pay 100 % of the premiums (Bujoczek, 2017).

Crop insurance is an important component of risk management in agricultural production in Poland. The aim is to provide farmers with financial resources to cover losses in the case of crop loss or reduction due to weather risks. Thus, the market of crop insurance is very much dependent on weather anomalies, which have become increasingly frequent (Bujoczek 2017). In the last decade, they have also led to substantial losses in agriculture in Poland. Such phenomena as substantial snowfall in the late spring, frost in the period of blossoming of fruit trees, strong winds and heavy rains have led to destruction of large crop areas (TopAgrar, 2015, Top Agrar, 2017, Luczak, 2017). An effective agricultural production insurance system should be aimed at maintaining financial and organizational stability of the participating farms (Golebiewska and Golebiewski, 2013; Klimkowski and Rembisz 2014).

The present situation on the market of crop insurance in Poland

Crop insurance with premiums subsidized by the state budget has been present in Poland since 2006. Since then, the rules of insurance have been changed many times (Janowicz-Lomott and Lyskawa, 2016). Modifications applied to provisions with regard to the subject and scope of insurance, the level of subsidies from the state budget and definitions of different risks (Milewska and Wicka, 2011). A motivation for the state action in this regard was willingness to popularize insurance among farmers as the method of managing risk at farms. The last change with regard to compulsory crop insurance took place in year 2017.

In 2006, in 27 EU Member States about 23 % of the crop value were insured. Insurance amounted to euro 1 583 million, i.e. about 4 % of the declared value of yield. Spain, considered the country with most developed insurance systems in agriculture, in the world, accounts for euro 564 million, with only 5.86 million hectares being insured, indicating a relatively low market penetration (26 % of the area). Market penetration in Germany is much higher (7.26 million hectares, i.e. 43 % of crop area), while the average amount of premiums is only euro 129 million. This can be explained by the fact that in Germany insurance usually covers only one risk (hail) (Clipici, Frant, 2013). The total amount of the subsidies to insurance premiums was 497 million euros, representing 32 % of the sum insured. Level of subsidies varies greatly from country to country. In the EU, the highest subsidies to agricultural insurance were registered in Italy and Portugal. In Italy, it was 80 % of sum insured. In other countries, such as the UK, the subsidy is not applied at all. In average sum of compensation paid by insurance companies for a specified year compared to the total amount of contributions from the same period – was in the range of 60 to 70 % (Agricultural Insurance Schemes, 2008).

In Poland, agricultural crop insurance is subsidized by the state on the basis of the act of July 7th, 2005 on the insurance of crops and farm animals. Until year 2015, state subsidies to the insurance premium amounted to 50 %. Starting from year 2016, as much as 65 % of the premium has been subsidized. A prerequisite for receiving a subsidy is that the agricultural producer enters into an insurance agreement for 10 risks and the premium being not higher than 9 % of the insurance amount. In the case of cultivation of soil of the poorest quality (class 5 and 6), the tariff rate can be specified as 12 % and 15 % of the insurance amount, respectively. In the case of insurance rates exceeding 9 %, 12 % and 15 % of the total crop insurance amount, respectively, subsidies to these rates are to be reduced proportionally to the percentage of their increase, excluding tariff rates for the risk of drought and negative consequences of wintering (MRiRW, 2018).

Each farmer can take advantage of subsidized insurance for production of: cereals, corn, rape, hops, tobacco, field vegetables, fruit trees and bushes, strawberries, potatoes, sugar beets and leguminous plants. Risks subject to insurance include hurricane, flood, heavy rainstorm, hail, lightning, landslide, avalanche, drought, negative consequences of wintering and spring frost.

In Poland, only a few insurance companies are interested in sale of subsidized crop insurance. Such insurance is offered by only five out of more than thirty companies, offering property insurance. In 2018, these are the following companies:

1. Powszechny Zakład Ubezpieczeń S.A. with a registered office in Warsaw,
2. Towarzystwo Ubezpieczeń Wzajemnych „TUW” with a registered office in Warsaw,
3. Concordia Polska Towarzystwo Ubezpieczeń Wzajemnych with a registered office in Poznań,

4. Pocztowe Towarzystwo Ubezpieczeń Wzajemnych with a registered office in Warsaw,
5. InterRisk Towarzystwo Ubezpieczeń SA Vienna Insurance Group with a registered office in Warsaw.

The subsidized crop insurance system, developed in Poland, is based on a public-private partnership, which is aimed at aligning of interests of both parties. The aim of the partnership is to allow the public authorities to meet their obligations towards the society – in this case, by securing farms, which, among other things, are responsible for Poland's food security (Janowicz-Lomott and Lyskawa, 2011).

Aim and methods

The aim of this study is to assess the functioning of compulsory crop insurance subsidized by the state budget in Poland and the reasons limiting its development. Three research tasks have been completed: 1) determination of the level of use of the amount designated to crop insurance subsidy and area of crop subject to insurance compared to the planned use of these insurances, 2) determination of areas of use of crop insurance according to plant species, 3) indication of the most significant limitations to development of crop insurance.

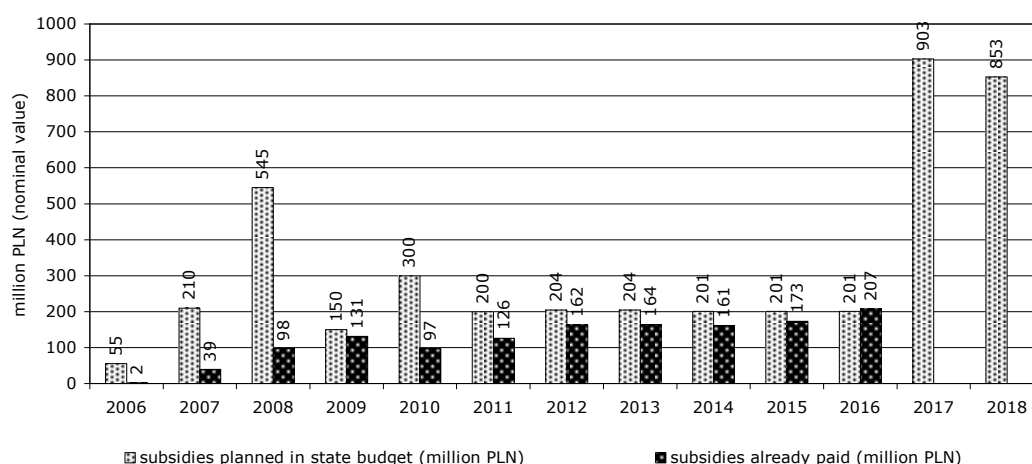
The study was based on statistical data from the Central Statistical Office on crop area in Poland and insured crop area. Data concerning insurance subsidies was obtained from reports of the Ministry of Finance and the Ministry of Agriculture and Rural Development. The author also used results of studies, presented in scientific publications.

The analysis includes the period of 2006-2016; however, detailed data on insured crop area is available only for years 2009-2015.

Due to the structure of data and the relatively short data time series, the study was based on structure and dynamics indicators; application of statistical methods was not justified.

Amounts of crop insurance subsidies

Since year 2006, when subsidies to crop insurance premiums were applied for the first time, the amount in the state budget designated for subsidizing crop insurance has increased systematically. In 2006, it amounted to PLN 55 million; in 2018 – PLN 853 million (Fig. 1).



Source: author's own work based on data of the Ministry of Finance for years 2006–2018

Fig. 1. Subsidies for crop insurance planned and paid out in the state budget in years 2006-2018

In years 2020-2026, insurance subsidies are to increase further to the amount of PLN 1420 million yearly (Janowicz-Lomott and Lyskawa, 2016). This seems justified, taking into account the fact that use of funds has increased from 19 % in year 2007 to 100 % in year 2016. In year 2016, for the first time, the amount designated for subsidizing of insurance premiums was exhausted, and some of the farmers were unable to take advantage of such insurance (Luczak, 2016; Nie podnosic dotacji..., 2016; Tornado w ubezpieczeniach rolnych, 2016; Ubezpieczenia beda..., 2017, Bedzie wiecej pieniedzy..., 2016; Kolejki po polisy, 2016).

Area subject to subsidized crop insurance

According to legal provisions, the crop insurance obligation is applicable to 50 % of the area of crops subsidized directly on behalf of the farmer. Plant species subject to protection have been listed above. Every farmer, who fails to meet the insurance obligation, is subject to a minor financial penalty, if lack of insurance is detected. Despite the financial sanctions, crop insurance has not been applied to a satisfactory extent. In Poland, the sowing area is about 11 million hectares; thus, about 5.5 million hectares should be insured. In years 2009-2015, insurance was purchased for about 3 million hectares. More detailed characteristics of crop insurance have been presented in Table 1.

Table 1

Subsidized crop insurance in Poland in years 2009–2015

Item	Subsidized crop insurance in Poland in year						
	2009	2010	2011	2012	2013	2014	2015
Area of insured crops (million ha)	2.81	2.85	3.03	2.75	3.40	3.27	2.82
Insurance contracts (pcs)	144 080	134 986	138 425	135 707	151 101	142 492	139 108
The value of insurance (million PLN)	–	7 844	10 238	12 087	14 232	13 327	13 695
Average insurance sum (PLN per contract)	–	58 108	73 965	89 068	94 190	93 528	98 449
Average insured area (ha per contract)	19	19	22	20	23	23	20
Sown area in Poland (million ha)	11.6	10.4	10.6	10.4	10.3	10.4	10.7
Share of the insured area in sown area (%)	24.2	27.3	28.7	26.4	33.1	31.4	26.3

"–" – no data available;

Source: author's own work based on Statistical Yearbook of Agriculture: CSO for years 2010–2016

Some fluctuations have been observed in terms of the share of insured crop area in total sowing area, ranging between 26 % and 33 %. However, a growth trend, which was expected to emerge as a result of subsidizing of the insurance premium, has not been observed.

Table 2

**Structure of area of crops insured under subsidized crop insurance scheme
in years 2009–2015**

Group of crops	Insured area in percent						
	2009	2010	2011	2012	2013	2014	2015
Cereals	59.71	59.66	55.76	58	56.56	53.25	55.54
Potatoes	2.27	0.55	0.52	0.5	0.42	0.77	0.60
Sugar beets	1.03	1.45	1.61	2.6	1.37	1.84	1.73
Rape	31.55	29.13	32.84	27.4	31.08	30.49	27.90
Maize	3.93	7.04	5.74	9.1	8.12	11.12	10.62
Legume crops	0.59	1.08	0.66	1.04	0.63	1.04	2.22
Fruit from berry plantations and fruit trees	0.49	0.27	1.75	0.25	0.23	0.30	0.46
Field vegetables	0.29	0.38	0.87	0.66	0.36	0.56	0.56
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: author's own work based on Statistical Yearbook of Agriculture: CSO for years 2010–2016

In years 2010–2015, the structure of insured crop area was dominated by cereals (Table 2), like the sowing structure. Every year, it exceeded 53 % of insured area. A high share in the insured crop area was also recorded for rapeseed, at the level of 30 % of the total insured crop area. Farmers also showed increased interest in insuring corn – the share of this crop in the total insured crop area increased from 7.0 % in 2010 to 10.6 % in 2016. Studies on this area indicate that farmers most often insured the crop species, for which insurance premiums were the lowest. This means they don't believe insurance protection to be effective and do their best to meet their obligations while minimizing the associated costs.

Table 3

**Share of crops insured under subsidized crop insurance scheme by groups
in years 2009–2015**

Species	Share of insured area in total production area in percent						
	2009	2010	2011	2012	2013	2014	2015
Grains	19.5	23.6	22.9	20.7	25.7	23.3	20.9
Rapeseed*	109.4	87.6	120.0	104.8	114.7	104.9	83.2
Maize (grain and silage)	15.9	27.5	22.9	23.7	25.7	29.9	24.5
Potato	12.6	3.9	3.9	3.8	4.2	9.1	5.8
Sugar beet	14.4	20.1	23.9	34.1	24.0	30.5	27.2

* – production area as in June, insured area according to insurance contracts

Source: author's own work based on Statistical Yearbook of Agriculture: CSO for years 2010–2016

In the examined period, rapeseed was encompassed with the broadest scope of insurance. Taking into account winter losses, it can be stated that almost 100 % of rapeseed crops were insured. It should be noted that the insured area applies to sowed area, and sowing area data is recorded at the end of June. On the average, ca. 10 % of rapeseed sowing area is liquidated due to winter damages (Hecka and Lyskawa, 2013). As for other important groups of plants (cereals, grain maize, silage maize, potatoes, sugar beets), the share of insured area was 20 to 30 % (Table 3). A relatively constant share of insured area for key crops was observed; only for maize, there was a substantial increase at the level of more than 5 % annually and for beets it was almost 10 % annually. It can be seen that crops with high income are more willingly insured. These are crops grown on a large scale on the farm and on better soils. Farmers who have small farms or poor soils are less interested in such insurance. For the same reason, farmers who produce livestock and produce mainly feed have little need to insure crops.

Barriers and chances for development of crop insurance in Poland

In Poland, it was assumed that crop insurance would be popularized within 2 to 3 years from its introduction. Despite subsidizing of 50 % of the premium, no more than 30 % crops were insured in the subsequent years, although the expected level was at least 50 %. The most important identified barriers preventing popularization of crop insurance include: high share of small farms, characterized by low level of sales (Golebiewska, 2011), low share of plant products in production sold, high share of farms specializing in animal production or characterized by a diversified production profile, low workforce productivity (Golebiewski, 2013; Wicki, 2012). In addition, a low level of changeability of farming income was observed, which was due to high share of direct subsidies related to CAP in total income (Hecka and Lyskawa, 2013; Wicka, 2014). Farmers also pointed to the fact that insurance was too expensive for them, while the compensation received was too low to cover the losses suffered (Plonka, 2017; Kaczala, 2015).

From the point of view of insurance companies, the value of compensation paid for losses was high and crop insurance was not profitable for them despite the warranted subsidies (Janc, 2016). After year 2010, crop insurance generated no profit for insurance companies. Therefore, neither farmers nor insurance companies were interested in developing the scope of insurance.

From the perspective of the state, the high number of damages due to extreme weather conditions leading to losses in agricultural production results in the necessity of providing non-insured farmers with support, paid directly from the state budget. This has resulted in the decision to provide additional subsidies for insurance. In order to increase profitability of insurance for farmers, the level of insurance premium subsidies was increased from 50 % to 65 %. Insurance companies are to have a warranty of minimum profitability of such insurance, as the acceptable premium level has been increased from 5 % to 9 % of the insurance total – that is, it has been almost doubled. At the same time, a fourfold increase in crop insurance subsidies has been warranted from ca. PLN 200 million to more than 800 million. In the coming years – until year 2026 – these are to reach even PLN 1.4 billion. It is expected that 70 % of crop area in Poland will be insured. Taking into account the situation observed in the field of crop insurance in Poland, it can be concluded that stagnation has occurred in the last 10 years, despite government support. The share of insured crops reached only 30 %. The planned increase in the amount of subsidies, increasing the share of subsidies in the insurance premium and increasing the upper limit of the insurance premium, should lead to an increase in the share of the insured area to 60-70 % in the next 5 years. In such development of crop insurance in Poland, the most important obstacles identified are the following: low compensation in relation to incurred damages, rare occurrence of losses exceeding 25 %, high share of subsidies in income in small and medium farms, which constitute the majority in Polish agriculture.

Conclusions

The analysis conducted leads to the following conclusions.

- 1) Crop insurance may be perceived as an important tool in coping with effects of risk associated with plant production. Since 2006, Poland has implemented the programme of obligatory subsidized crop insurance. The programme was to encompass about 50 % of total sowing area in Poland; so far, the level reached has been 30 %. The farmers were primarily interested in the insurance of cash crops, such as rape or sugar beets. Cereals or potatoes were insured in only a small percentage.

- 2) In the following years of the program's operation, less funds were used for subsidies to crop insurance than planned in the state budget. This was usually 50 to 80 %.
- 3) The most significant barriers, preventing popularization of crop insurance, include its insignificant impact on the level of income of farmers. This is mainly due to small farming areas, diversified production and sales, stabilization of income as a result of transfers within the framework of CAP. Other limitations include high premium costs and difficulty in claiming damages. Insurance will not attract the attention of small farms, with low income from agricultural production.
- 4) Increase in the premium subsidy by 30 %, increase in the premium value by 50 %, as well as increase in the subsidy amount from PLN 200 to 850 million may lead to increase in interest in crop insurance in Poland. Achieving of the planned level of 70 % of crop area being insured should be possible in 5 years.
- 5) Commercial insurance as the means of protection against plan production risk is not an effective method of coping with farming risk in Poland yet. Insurance may be effective method under the condition of a very high level of state budget support, which limits the risk of both the farmer and the insurance company. This means that the crop insurance system in Poland is an element of public support for agriculture with less and less farmers' participation.

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EFFICIENCY VERSUS VALUE OF JOINT-STOCK COMPANIES FROM AGRIBUSINESS SECTOR OF THE WARSAW STOCK EXCHANGE - A PERSPECTIVE TOWARDS TRADE-OFF DECISIONS

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Abstract. The article presents relations between the enterprise value, efficiency and capital structure of Polish joint-stock companies from agribusiness sector listed on the Warsaw Stock Exchange. The enterprise value of companies from WIG-FOOD sector was primarily subject to the market capitalization and debt fluctuations. A simultaneous decrease of the debt level and rise in cash resulted in a higher market capitalization due to a fading bankruptcy risk. A growth of earnings and profitability ratios had a positive impact on the market capitalization and enterprise value that was in line with theoretical assumption of value maximization principle. Considering the influence of profitability and debt level on the market capitalization it could be expected that managers would strive for reducing external sources of financing and increasing operating efficiency to maximize the value of their companies for shareholders.

Key words: enterprise value, market capitalization, the Warsaw Stock Exchange, WIG-FOOD index, agribusiness.

JEL code: G30, G32, G33

Introduction

Valuation of a company is one of the most difficult tasks for financial managers. In financial literature, value of an asset is defined as a function of a cash flow generated by that asset, the life of the asset, the expected growth in the cash flows and the riskiness associated with the cash flows (Damodaran A., 1999, Higgins R., 2012). In other words, the firm's value depends on its operating efficiency, market potential and specific risk associated with its business. The riskiness of a company is commonly characterized by the firm's weighted average cost of capital and is reflected in a discount rate for its cash flow (Berk J., DeMarzo P., 2017). Thus, according to a traditional approach of the DCF model, the company with high operating efficiency and growth rate of earnings with minimum level of risk will generate the maximum value for investors (Panfil M., 2009). Regarding to this, there is a direct relation between the efficiency and value of the company: higher expected earnings and profitability ratios will lead to a growth of market capitalization and enterprise value. However, the impact of risk and cost of capital on the value of business is not so obvious. Trade-off theory of capital structure states that a company can have debt levels that balance the tax advantages of additional debt against the costs of possible financial distress (Myers S., 2001). At the same time there is a view that under some assumptions the capital structure of a company does not influence its value (Modigliani F., Miller M., 1958). Practically, availability of tax benefits due to leverage as well as asymmetry of information justify the significance of capital structure decisions for business valuations.

The problem of capital structure and its influence on the value of a firm is particularly important in agriculture and food industry as these sectors are subject to a number of specific external risk factors related to seasonality, force majeure or fluctuations of supply and demand (Kahan D., 2008, Franc-Dabrowska J., Madra-Sawicka M., Bereznicka J., 2017). Besides risk aversion of managers of agricultural companies gives an additional argument for a pecking-order theory (Frank M., Goyal V., 2003). At the same time, profitability remains a key indicator for operating efficiency of agricultural companies and has a great impact on their value.

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The aim of the research is to define relations between the enterprise value, efficiency and capital structure of Polish joint-stock companies from the Warsaw Stock Exchange. Poland is an important global producer and exporter of agricultural and food products and agribusiness traditionally forms one of essential segments for investing in its economy by local and international entities. Hence understanding the principles of value creation and its main determinants in agricultural companies can give an additional impetus both for managers and investors who are engaged in Polish market.

An enterprise value of the company has been calculated according to the following formula:

$$\text{Enterprise Value} = \text{Market Capitalization} - \text{Cash and Equivalents} + \text{Preferred Equity} + \text{Minority Interest} + \text{Total Debt}$$

Main factors influencing the enterprise value are the market value of its equity and debt as well as non-operating cash and its equivalents. It should be mentioned that the market capitalization is highly dependent on future cash flow expectations, while the amount of debt arises from the financing strategy of business and largely determines the weighted average cost of capital. Non-operating cash reduces the firm's value because commonly it does not aid in generation of future cash flows and can be used for debt repayment. Taking into consideration these components of the enterprise value different profitability and debt ratios were used to characterize the efficiency of business and its capital structure (table 1).

Table 1

Ratios of financial efficiency and capital structure

	Ratio	Formula
Financial efficiency	Operating Margin	$\frac{EBIT}{Revenue}$
	Net Income Margin	$\frac{Net\ income}{Revenue}$
	Return on Assets	$\frac{Net\ income}{Assets}$
	Return on Equity	$\frac{Net\ income}{Total\ equity}$
	Return on Investment ¹	$\frac{Net\ income}{Enterprise\ value}$
Capital structure	Debt Ratio I	$\frac{Total\ Debt}{Revenue}$
	Debt Ratio II	$\frac{Total\ Debt}{Assets}$
	Debt Ratio III	$\frac{Total\ Debt}{Equity}$
	Debt Ratio IV	$\frac{Total\ Debt}{Enterprise\ Value}$

Source: authors' research

In the next step of the research, Pearson correlation coefficients were used to depict statistically significant relations between the market capitalization, enterprise value, profitability and capital

¹ In spite of various definitions of the return on investment, authors use the proposed construction as one of the measures of the efficiency of investing in particular company.

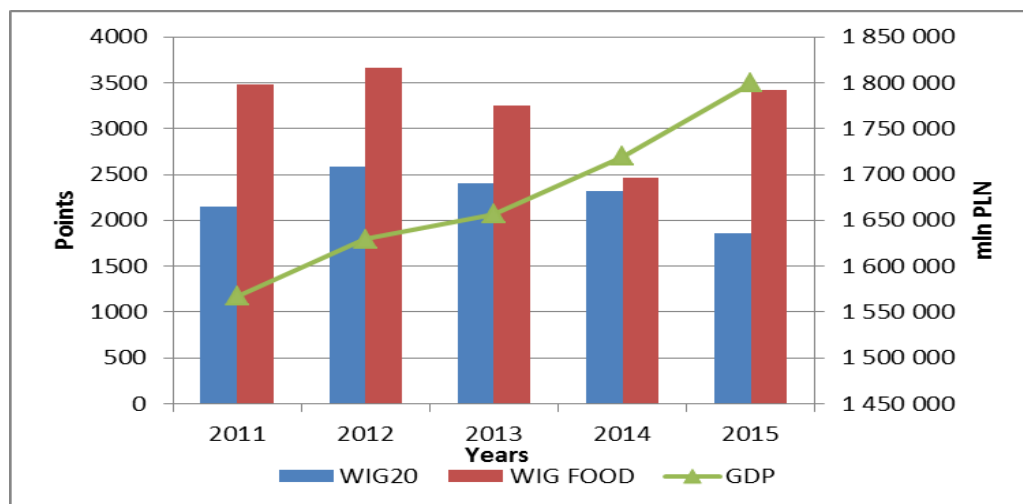
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structure ratios (Stanisz A., 2007). Basing on financial and statistical analysis recommendations concerning value creation for shareholders' have been formulated. Primary empirical data were extracted from financial statements of joint-stock companies from the food sector of the Warsaw Stock Exchange. The ultimate sample included 24 companies. Other financial data for the research was collected from the Warsaw Stock Exchange, EMIS and Bloomberg financial databases and related to period of 2011-2015.

Research results and discussion

After the accession to the European Union Poland has benefited from a very fast catch up process. For example, in 2015, Poland's GDP per capita expressed in purchasing power standards reached 69 % of the EU average, up from 53 % in 2007 (European Commission, 2017). In 2011-2015, the nominal GDP of Poland has been constantly increasing from 1566.8 mln PLN to 1799.4 mln PLN that gave the compound annual growth rate of 3.52 % (Figure 1). This illustrated a rapid development of Polish economy propelled by such fundamental factors as expanding financial sector, increasing business climate and growing consumer demand. Besides a sharp upward tendency has been noticed in agricultural sector as agricultural income in 2004-2011 has increased by 95.2 % (Ministry of Agriculture and Rural Development, 2015).



Source: authors' calculations

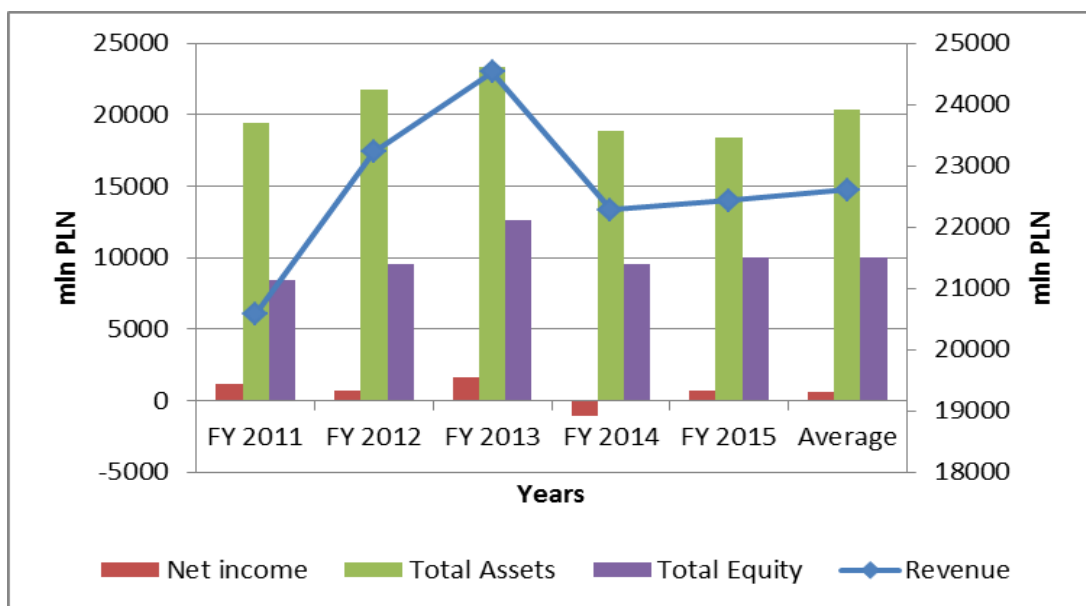
Fig.1 Gross domestic product of Poland versus WIG20 and WIG-FOOD indices

Polish capital market has benefited from the overall economic growth to a lesser extent. The compound annual growth rate of WIG20 index including Polish listed companies with the highest capitalization came to (-3.51 %) while WIG-FOOD index of firms from agribusiness sector decreased by 0.44 % annually. This could be largely explained by peculiarities of Polish capital market determined by low liquidity and great exposure to global volatility of cash flows in emerging markets. Other specific factors also included a low level of diversification of companies within Polish capital indices. On one hand, a large part of WIG20 index was represented by state-owned commodity sector companies influenced by commodity price fluctuations and political climate. On the another hand, financial institutions being a substantial group of companies in WiG20 index suffered from decreasing interest rates and margins, consolidation processes within the sector as well as from tightening competition. At the same time WIG-FOOD index was characterized by increased volatility in 2011-2015. The drop of an index from 3666 in 2012 to 3249 points in 2013 was related to a weakening demand on the products of food industry in Poland (Bartkiewicz P.,

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Lecki M., 2015). Additionally, a slump of an index by 24 % in 2014 was provoked by a group of listed companies operating in Ukrainian market. At that time a political and military conflict in Ukraine resulted in substantial losses in these firms and led to a rapid decrease in their market capitalization. A global relief of investors related to the conflict in Ukraine as well as improving demand for food products has pushed the capitalization of the whole index by 38.6 % to 3420 points in 2015. Financial situation of the companies from WIG-FOOD Index extensively corresponded to their market capitalization (figure 2). In 2011-2013 food companies demonstrated a stable market expansion supported by the growth of their balance sheets. During this period aggregated firms' revenue rose by 19.2 % while assets and equity increased by 20.1 % and 50.2 % respectively. Net income added 36.8 % in 2013 comparing to 2011. Due to substantial unrealized¹ and net losses of Ukrainian entities, the aggregate equity capital of food companies decreased by 24.4 % and assets fell by 18.9 % in 2014. Apart of a rapid growth in the capitalization in 2015 the level of equity capital rose moderately by 5.28 % and revenue grew only by 0.66 % in relation to 2014. This period also led to a drop in assets value by 2.8 %. Generally the compound annual growth rate of revenue for the whole WIG-FOOD index was 2.2 % while net income decreased by 13.4 % annually. The same ratio for total assets and equity amounted to (-1.4 %) and 4.6 % accordingly.



Source: authors' calculations

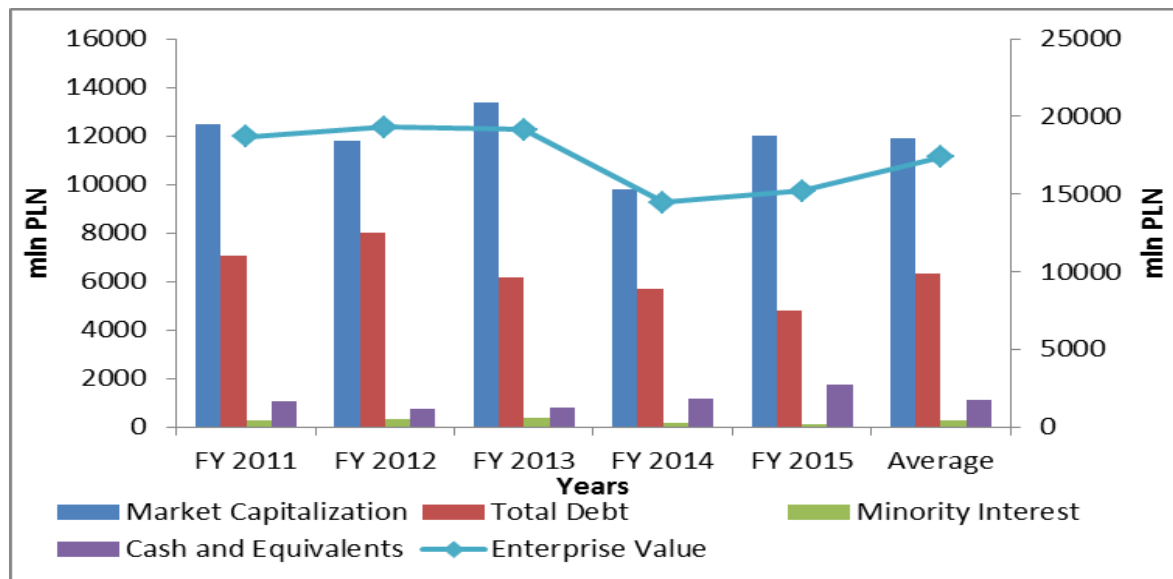
Fig. 2. Financial situation of companies from WIG FOOD Index

In 2011-2015, the total enterprise value of companies from WIG-FOOD index has decreased from 18701.2 mln PLN to 15202.9 mln PLN in 2015 and the compound annual growth rate came to (-5 %) (figure 3). The average enterprise value in the related period was 17366.9 mln PLN of which 68.4 % accounted for market capitalization and the rest was mainly formed by debt 36.5 %. At the same time cash and cash equivalents that reduced enterprise value reached 6.4 % on average. Companies from WIG-FOOD index has maintained their cash balance from 1068.6 mln PLN in 2011 to 1734.3 mln PLN in 2015 with compound annual growth rate coming to 12.9 %.

¹ Negative values in 'Other Equity' position on Balance Sheet according to Financial Accounting Standards Board (FASB).

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Source: authors' calculations

Fig. 3. The decomposition of enterprise value of companies from WIG FOOD Index

It should be mentioned that the total debt of companies from WIG-FOOD index fell by 31.9 %, while market capitalization decreased only by 3.6 % in 2011 comparing to 2015. In other words, a substantial drop of debt share in enterprise value gave a clear signal of the fading financial risk of WIG-FOOD companies and this shielded market prices from sharp declines. Moreover, the decrease of debt level by 22.6 % in 2013 and by 15.7 % in 2015 in relation to a previous year gave a rise of market capitalization by 13.8 % and 22.7 % accordingly. A strong evidence of the impact of financing decisions on value of a company has been received: investors positively interpreted the fall of debt levels of companies from WIG-FOOD Index.

Multiples of companies from WIG-FOOD index gradually went down in 2011-2015 that reflected the drop in stock prices and could be perceived as a buying opportunity (Table 2).

Relations between the enterprise value, market capitalization and efficiency of companies from WIG-FOOD index

Table 2

Period	Ratio					
	MC ¹ /Sales	MC/EBIT	MC/Net income	EV ² /Sales	EV/EBIT	EV/Net income
FY 2011	0.61	6.78	10.4	0.91	10.2	15.6
FY 2012	0.51	7.14	16.7	0.83	11.7	27.4
FY 2013	0.55	8.68	8.2	0.78	12.4	11.7
FY 2014	0.44	5.87	-9.0	0.65	8.7	-13.3
FY 2015	0.54	4.81	17.8	0.68	6.1	22.5
Weighted average	0.53	6.46	19.0	0.77	9.4	27.7

Source: authors' calculations

The price to sales ratio decreased from 0.61 to 0.54 and the price to operating income ratio fell from 6.78 to 4.81. In other words, the growth in market capitalization of companies was slower than an increase of their sales and operating profit. The price to earnings ratio demonstrated the highest volatility falling from 10.4 in 2011 to (-9.0) in 2014 and then rising again to 17.8 in 2015.

¹ Market capitalization. A commonly used way to calculate market multiples is to divide price 'per share' by the value 'per share' (Berk J., DeMarzo P., 2017). The authors use aggregate values to calculate multiples and common ratio names to identify them.

² Enterprise value.

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Such a situation emanated from a huge disproportion between market capitalization and net income of companies. A slide in enterprise value to sales ratio from 0.91 to 0.68 or by 25.4 % comparing to a moderate drop in price to sales ratio by 11.5 % in 2011 related to 2015 was a consequence of a significant decrease in the amount of debt of companies from WIG-FOOD index. At the same period of time the enterprise value to operating income ratio slumped from 10.2 to 6.1.

Companies from WIG FOOD index were characterized by a relatively high volatility of margins and returns in 2011-2015 (Table 3).

Table 3

Financial efficiency of companies from WIG-FOOD index

Period	Ratio (%)				
	Operating Margin	Net income margin	Return on Assets	Return on Equity	Net income/EV
FY 2011	8.9	5.8	6.2	14.3	6.4
FY 2012	7.1	3.0	3.3	7.4	3.7
FY 2013	6.3	6.7	7.0	13.0	8.6
FY 2014	7.5	-4.9	-5.7	-11.3	-7.5
FY 2015	11.1	3.0	3.7	6.7	4.4
Weighted average	8.1	2.8	3.1	6.2	3.6

Source: authors' calculations

Managers kept an upward trend of operating margins that rose from 8.9 % in 2011 to 11.1 % in 2015. Nevertheless, net income fluctuations resulted in decreasing efficiency ratios of food companies. In the relevant period, net income margin fell from 5.8 % to 3.0 % while both return on assets and equity slumped from 6.2 % to 3.7 % and from 14.3 % to 6.7 % accordingly. Negative profitability ratios in 2014 were caused by mentioned losses of Ukrainian companies from WIG-FOOD index. Generally, in 2011-2015 an average operating margin came to 8.1 % and net income margin reached 2.8 %. At the same time an average return on assets was 3.1 % as average return on equity made up 6.2 %. A total return on investment gave an average of 3.6 % in 2011-2015. It should be mentioned that the decrease in margins and returns was reflected in firms' capitalization and enterprise value reduction in 2011-2014, while an improvement in earnings and profitability led to a jump in stock prices in 2015.

In 2011-2015, a significant decrease in debt ratios was noticed in companies from WIG-FOOD index (table 4). The total debt to equity ratio has decreased from 83.8 % in 2011 to 47.7 % in 2015 as the average ratio came to 63.2 %. Generally, such a situation implied the drop in leverage and signalled a relatively lower profitability of equity capital. The same trend arose in the relation of debt to assets and debt to sales ratio that decreased to 26.1 % and 21.4 % accordingly. The total debt to enterprise value ratio demonstrated less volatility dropping from 37.7 % in 2011 to 31.6 % in 2015. Comparing the decrease of debt share and simultaneous rise of the enterprise value, it could be concluded that high debt level negatively influenced the market capitalization. This gave an evidence of an importance of capital structure decisions for investors. Considering a trade-off theory managers of companies from WIG-FOOD index had to pay more attention to possible bankruptcy costs than to tax benefits arising from higher leverage and accept more conservative strategies of financing (Wasilewski M., Zabolotnyy S., 2009). Moreover, risk aversion in agribusiness could result in preference to internal sources of financing in line with pecking-order

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theory. However, to fully understand the volatility of market capitalization, some external factors such as global investors' sentiment, phase of business cycle and momentum should be carefully studied.

Table 4

Capital structure of companies from WIG-FOOD index

Period	Ratio (%)			
	Total debt/Sales	Total Debt/Assets	Total Debt/Equity	Total Debt/EV
FY 2011	34.3	36.3	83.8	37.7
FY 2012	34.4	36.8	83.9	41.4
FY 2013	25.2	26.5	49.0	32.3
FY 2014	25.6	30.1	59.6	39.4
FY 2015	21.4	26.1	47.7	31.6
Weighted average	28.1	31.2	63.2	36.5

Source: authors' calculations

Table 5

Pearson correlation coefficients between the enterprise value, profitability and debt ratios of companies from WIG-FOOD index

VARIABLE	Market Cap	EV	Return on Equity	Return on Assets	EBIT/Sales	Net income/Sales	Debt/Equity	Debt/Assets	Price/Share	Price/Book
Market Cap	1	0.9872	0.3707	0.3039	0.1932	0.1705	0.0351	0.1951	0.4928	0.3419
	p= ---	p=0.00	p=.001	p=.008	p=.097	p=.144	p=.765	p=.094	p=.000	p=.003
EV	0.9872	1	0.3329	0.2566	0.1928	0.1472	0.1001	0.2712	0.4707	0.2887
	p=0.00	p= ---	p=.004	p=.026	p=.097	p=.208	p=.393	p=.019	p=.000	p=.012
Return on Equity	0.3707	0.3329	1	0.946	0.7444	0.8406	-0.1057	-0.0647	0.679	0.5437
	p=.001	p=.004	p= ---	p=0.00	p=.000	p=0.00	p=.367	p=.581	p=.000	p=.000
Return on Assets	0.3039	0.2566	0.946	1	0.7874	0.9217	-0.2985	-0.2526	0.7214	0.4929
	p=.008	p=.026	p=0.000	p= ---	p=.000	p=0.00	p=.009	p=.029	p=.000	p=.000
EBIT/Sales	0.1932	0.1928	0.7444	0.7874	1	0.9115	-0.1237	-0.037	0.5592	0.3187
	p=.097	p=.097	p=.000	p=.000	p= ---	p=0.00	p=.290	p=.753	p=.000	p=.005
Net income/sales	0.1705	0.1472	0.8406	0.9217	0.9115	1	-0.2758	-0.2227	0.6385	0.3917
	p=.144	p=.208	p=0.00	p=0.00	p=0.00	p= ---	p=.017	p=.055	p=.000	p=.001
Debt/Equity	0.0351	0.1001	-0.1057	-0.2985	-0.1237	-0.2758	1	0.9067	0.0716	0.0109
	p=.765	p=.393	p=.367	p=.009	p=.290	p=.017	p= ---	p=0.00	p=.542	p=.926
Debt/Assets	0.1951	0.2712	-0.0647	-0.2526	-0.037	-0.2227	0.9067	1	0.0006	0.0059
	p=.094	p=.019	p=.581	p=.029	p=.753	p=.055	p=0.00	p= ---	p=.996	p=.960
Price/Share	0.4928	0.4707	0.679	0.7214	0.5592	0.6385	-0.0716	0.0006	1	0.4907
	p=.000	p=.000	p=.000	p=.000	p=.000	p=.000	p=.542	p=.996	p= ---	p=.000
Price/Book	0.3419	0.2887	0.5437	0.4929	0.3187	0.3917	0.0109	0.0059	0.4907	1
	p=.003	p=.012	p=.000	p=.000	p=.005	p=.001	p=.926	p=.960	p=.000	p= ---

Source: authors' calculations

Pearson correlation coefficients indicate a strong positive relation between the market capitalization and enterprise value of companies from WIG-FOOD Index (Table 5). Moderate positive relations were demonstrated between the market capitalization (and enterprise value) and

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profitability ratios of companies from WIG-FOOD Index. This implied that an increase in profitability ratios contributed to a growth in the market capitalization and enterprise value. Value variables didn't show statistically significant linear correlations with debt ratios of firms. Only enterprise value was moderately correlated with debt to asset ratio (0.2712) that meant the increase of debt in assets could lead to a rise in enterprise value. This could be true in certain situations as according to the general formula of enterprise value total debt adds to the firm's value. However, as it was mentioned above, a growth of debt didn't automatically translate into higher market capitalization due to rising bankruptcy costs and investors' uncertainty. At the same time statistically significant negative correlations between the profitability and debt ratios gave a strong evidence of a trade-off. An increase in debt level of companies was connected to the fall of profitability. From one hand, the reason for this could be the scarcity of internal sources of financing in companies with lower earnings that led to a further increase of total debt share. From another hand, insufficient earnings and internal funds could produce the necessity of additional borrowing to meet the liquidity requirements. These arguments justified drops in market capitalization of highly leveraged companies. Considering earlier research outcomes this gave an evidence of relatively higher efficiency of conservative strategies of financing in terms of enterprise value and profitability. To sum up, stronger positive relations between market capitalization and profitability should incline managers to reduce debt that would probably result in higher financial efficiency and market capitalization as well as enterprise value of companies in agribusiness sector.

Conclusions

The article presents relations between the enterprise value, efficiency and capital structure of Polish joint-stock companies from food sector listed on the Warsaw Stock Exchange. Considering the results of research, the following conclusions have been formulated.

- 1) In spite of robust growth of Polish economy, companies from WIG-FOOD index didn't demonstrate a significant increase in the market capitalization and enterprise value in 2011-2015. The main reason for this was a weakening demand for food products influencing firms' earnings and margins as well as a number of external factors associated with specific risks of the Central European emerging market¹.
- 2) Generally, the enterprise value of companies from WIG-FOOD sector was primarily subject to the market capitalization and debt fluctuations. It was noticed that a simultaneous drop of the debt level and an increase in cash resulted in a higher market capitalization due to fading bankruptcy risk. This gave a strong evidence of an importance of capital structure for managers and investors who preferred more conservative strategies of financing.
- 3) Companies from WIG-FOOD index were financially efficient but demonstrated volatility of margins and returns for investors in 2011-2015. An increase in earnings and profitability ratios had a positive impact on the market capitalization and enterprise value that was in line with theoretical assumption of value maximization principle.
- 4) In 2011-2015, debt ratios of WIG-FOOD index has decreased that implied a higher liquidity and financial strength of companies. A slump in debt ratios led to a rise of the market capitalization and enterprise value. Hence companies with higher share of equity would be more preferable targets for investors.

¹ Including military conflict in Ukraine in 2014.

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- 5) There was an evidence of a trade-off between the profitability and debt level of WIG-FOOD companies. The market capitalization and enterprise value had statistically significant positive correlations with profitability of companies while correlation coefficients between debt and profitability ratios were negative. Considering the influence of debt level on the market capitalization it could be expected that managers would strive for reducing external sources of financing and increasing operating efficiency to maximize the value of their companies for shareholders.

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THE INVESTMENT EFFICIENCY OF THE SELECTED FOOD INDUSTRY COMPANIES LISTED ON THE WARSAW STOCK EXCHANGE IN THE YEARS 2007-2017

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Abstract. The paper analyses the investment attractiveness of companies from the food industry listed on the Warsaw Stock Exchange. For this purpose, the Sortino, UPR and Omega coefficients calculated for companies operating on the market in the years 2007-2017 were used. Selected entities have over 90 % share in the WIG-food index. The choice of effectiveness measures was dictated by the definition of risk often identified by investors with a loss. However, the period of research covers periods of worse and better stock market conditions, which is why it was decided for the years 2007-2017. For comparison purposes, these measures were also calculated for the following indices: WIG-food and WIG. The second index was included in the research to present the surveyed industry against the background of the entire exchange market. The calculations were based on daily percentage price changes. Basic measures of descriptive statistics were determined. The obtained values indicate the lack of normality of the rates of return, which eliminates the classic measures of investment efficiency. The results show that the capitalization of companies is important from the point of view of stock exchange investors. It determines the rankings created on the basis of performance indicators. However, closer research on the statistical properties of the measurements used shows that capitalization is important, but there must be other determinants. On the basis of the obtained results, it can be additionally stated that the leaders of the food market have also turned out to be attractive to investors on the entire stock exchange.

Key words: WIG-food, rating based on Sortino, rating based on UPR, rating based on Omega, correlations between ratings.

JEL code: G10, Q02

Introduction

One of the basic sectors of the economy is the food industry. Its condition can be studied in many ways. Data on individual units, dynamics of changes in the entire sector, share in GDP etc. are published. In the market economy, the results of research on entities listed on the stock exchange may be added to this information set. This is an important issue as it reflects investors' predictions and expectations regarding the condition of individual companies as well as the entire sector. Investors in the reported demand and supply issue a very strict assessment of the management of companies, their policies, skills and achievements. Therefore, the authors made an attempt to evaluate the food sector, represented by companies listed on the Warsaw Stock Exchange. It is made from the investors' point of view, which is why the basis for the analysis are selected investment efficiency ratios. The authors assume that it is investors who make the most reliable and objective assessment of companies. On the one hand, they risk their own capital, while on the other, investment efficiency is the result of assessments of many investors, not the subjective view of several or a few analysts. Therefore, the assessment of selected companies from the investment point of view is very important. The aim of the work is to verify the hypothesis that the food industry is attractive to stock exchange investors. The investors can find companies with performance indicators that are better than measures calculated for the industry as well as for the entire stock market. The subject of the research are companies included in the WIG-food sector index (WIG is the name of the main index of Polish stock exchange). It is calculated from 31 December 1998. At present,¹ it consists of 24 companies, 14 of which remain in the index since 2007. Since the research has been carried out for the last 10 years, it has therefore concerned these companies. The authors decided for such a period for two reasons: first, 10 years is long

¹ Status on 30 January 2017.

enough for statistical methods to be used and, secondly, it covers periods of better and worse economic conditions in the country and the world (2007 is the beginning of the global financial crisis). Consequently, the research concerns the following companies: Ambra, Astarta, Atlantapl, Colian, Gobarto, Helio, Indykpol, Kernel, Kruszwica, Makaronpol, Pamapol, Pepees, Seko, Wawel. The largest share in the index have ¹ Kernel (48,6 %) and Wawel (16,9 %), while the smallest: Pamapol (0,2 %) and Atlantapl (0,24 %). The surveyed entities account for 90 % of shares in the WIG-food index, which is why they can be considered as representative for the food industry. In addition, the scope of activities includes both strictly agricultural activities, as well as food processing (e.g. Pamapol), as well as typically food production, such as confectionery (e.g. Wawel). It should also be added that among the listed entities are companies with economic activity registered in Ukraine (e.g. Kernel). However, the Polish market is one of the basic recipients of the offered products, and their presence on the Warsaw Stock Exchange influences the situation on the stock exchange; therefore, they have been included in the research.

In the research of investment effectiveness, the most commonly used are classical measures such as Sharpe, Treynor, Jensen etc. However, they require the normality of the distribution of percentage changes in prices. In the case of entities listed on stock exchanges, usually short-term rates of return (daily) do not have this property, which is why non-classical measures are applied then. This is the case in this work, the authors use daily changes in stock prices and therefore the studies are based on indicators: Sortino (Sortino, Price 1994), its modification leading to upside potential ratio UPR (Sortino et al., 1999) and the Omega indicator (Shadwick, Keating, 2002). In the first case, the formula is used:

$$S = \frac{\bar{R} - m}{\sigma_{-}(m)} \quad (1)$$

Where:

$\bar{R} = \frac{1}{N} \sum_{t=1}^N R_t$, N is the amount of data, R_t the rate of return in period t . The magnitude of

$\sigma_{-}(m)$ is a risk measure defined by the formula:

$$\sigma_{-}(m) = \sqrt{\frac{1}{N} \sum_{t: R_t < m} (R_t - m)^2} \quad (2)$$

On the other hand, m is a break-even point, which may be adopted at various levels, for example it may be equal to the benchmark average, which is usually the case when the research concerns collective investment institutions. Otherwise, it may be a risk-free rate. Thus, the Sortino index refers to the average excess rate of return $\bar{R} - m$ to the total risk taking into account only the losses, which are defined by the relation: $R_t - m < 0$. Because in this work the break-even point was assumed to be $m = 0$; therefore, the profit measure is a positive rate of return.

With the same markings as above, the UPR indicator defines the expression:

$$UPR = \frac{\sum_{t: R_t > m} (R_t - m)}{\sigma_{-}(m)} \quad (3)$$

¹ All values are given as of 30 January 2017.

This measure is a modification of the previous one, because instead of the excess rate of return in the numerator, there is a measure of total profit in the analysed period.

The third measure of investment efficiency is the Omega indicator given by the formula:

$$O = \frac{\frac{1}{N} \sum_{t: R_t > m} (R_t - m)}{\frac{1}{N} \sum_{t: R_t < m} (m - R_t)} \quad (4)$$

It differs from the UPR risk measure, now it is the sum of the absolute loss values and not the modified standard deviation.

It should be added that in all the indicators used, the risk is identified with a loss. In the case of classical measures, the risk is a standard deviation (when referring to the total risk) or a beta factor in characteristic lines (market risk). For these reasons, they require the normality of returns. The authors decided on a loss as a measure of risk because it is treated in both its common understanding and in business.

Data for calculations was taken from the portals stooq.pl, bossa.pl i money.pl. Fundamental information about companies, the composition of WIG and WIG-food indices come from the website of the Warsaw Stock Exchange: gpw.pl. The data regarding the WIG broad market index and the WIG-food industry index were taken into account in parallel with the companies. This allows you to compare the ratios calculated for companies with their values for the industry and for the entire stock market.

Selected descriptive statistics of companies from the food sector

In the research, the rate of return was calculated according to the formula:

$$R_t = \frac{c_t - c_{t-1}}{c_{t-1}} \quad (5)$$

where c_t is the price of the stock at the moment t , and c_{t-1} in the previous moment. The work included daily closing prices from 1 January 2007 to 31 December 2017. Some companies appeared on the Polish stock exchange in the year 2007, when the data was slightly shorter than for the rest. This does not significantly affect the results, as the set of complete data included over 2.500 observations. The rates of return calculated according to the above formula do not come from the normal distribution. To prove this, the classic Shapiro-Wilk test was used (Dobosz, 2004), a significance level of 0.05 was assumed. For all companies, the zero hypothesis was rejected, assuming that the distribution of rates of return is a normal distribution. The basic measures of descriptive statistics are summarized in Table 1.

The table does not include the median, which at the adopted level of accuracy for all companies and indices was equal to zero. Based on the above data, it can be concluded that average daily rates of return differ from each other at most by order of magnitude and only two of them take negative values. In turn, standard deviations show a relatively small dispersion of values, ranging from 1.24 % to 3.47 %. The volatility coefficients are relatively large, which means significant volatility in the prices of companies in the food industry. It should be noted that the volatility of the WIG-food index is almost twice as high as the WIG index. Which proves that not only the surveyed companies, but the entire industry was characterized by high volatility of prices of listed assets. It is noteworthy that Atlantapl, which had a volatility around 10 times the average for the food

industry. It seems that the reason must lie in the foundations of the company. Kurtosis is positive and far from zero for all companies. Therefore, we deal with leptokurtic distributions of rates of return, which means that they are more concentrated than in the case of normal distribution centred around central moments. The coefficients of skewness are positive (the exception is Seko) and relatively small, so the distribution of rates of return is characterized by right-sided asymmetry of a small scale. At the same time, the indexes tested have left-hand asymmetry. Taking into account the industry index, it can be concluded that the asymmetry of the company is more strongly influenced by companies listed for less than 10 years.

Table 1

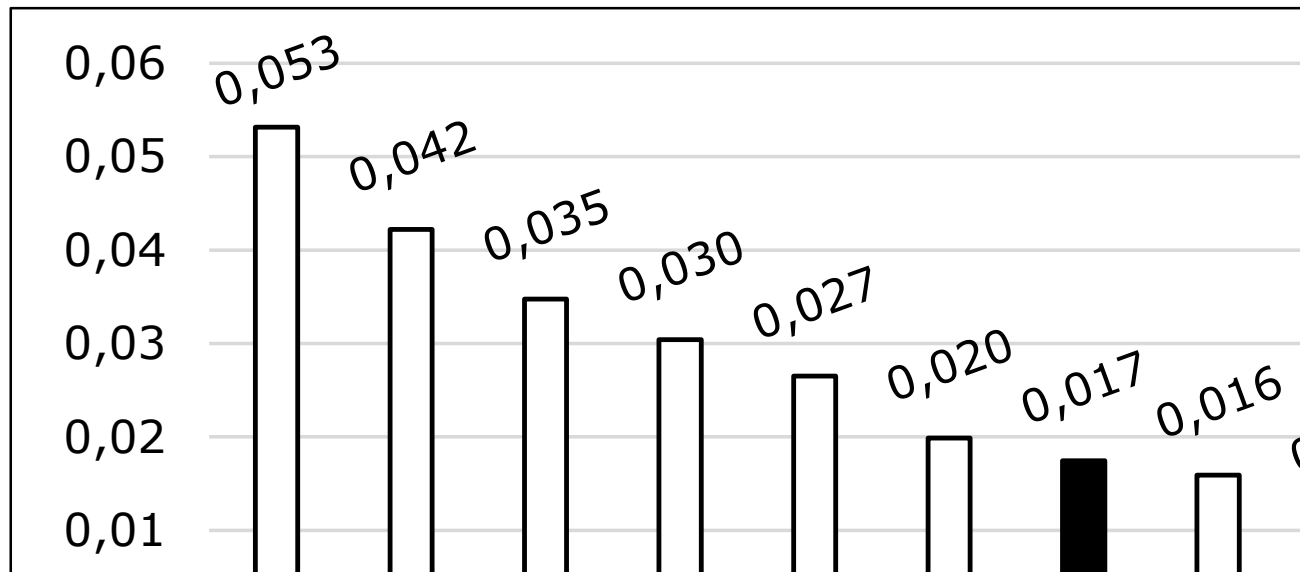
Descriptive statistics for the surveyed companies and indexes

	Average (%)	Deviation standard (%)	Coefficient of variation(%)	Skewness	Kurtosis
AMBRA	0.0462	2.5527	55.227	0.34059	7.125
ASTARTA	0.0863	3.0494	35.338	0.39277	6.2957
ATLANTAPL	0.0022	3.4498	1551.3	0.45512	4.8461
COLIAN	0.0174	2.5492	146.65	0.39357	6.9509
GOBARTO	-0.0567	3.0367	53.59	0.20756	15.147
HELIO	0.0390	2.9822	76.464	0.79553	6.9768
INDYKPOL	0.0222	2.6082	117.74	0.02756	4.2153
KERNEL	0.0640	2.7187	42.473	0.11937	5.6353
KRUSZWICA	0.0229	2.3126	92.909	0.41444	5.4529
MAKARONPL	0.0133	2.8481	213.75	0.35956	4.0868
PAMAPOL	-0.0744	3.4680	46.642	0.86431	10.693
PEPEES	0.0614	3.2542	52.984	1.6259	14.402
SEKO	0.0232	2.9413	126.7	-0.0864	6.14
WAWEL	0.0700	1.9697	28.138	0.27556	4.1343
WIG-SPOŻYWCZY	0.0094	1.4897	158.68	-0.1583	3.7484
WIG	0.0157	1.2385	79.113	-0.3682	4.056

Source: author's calculations

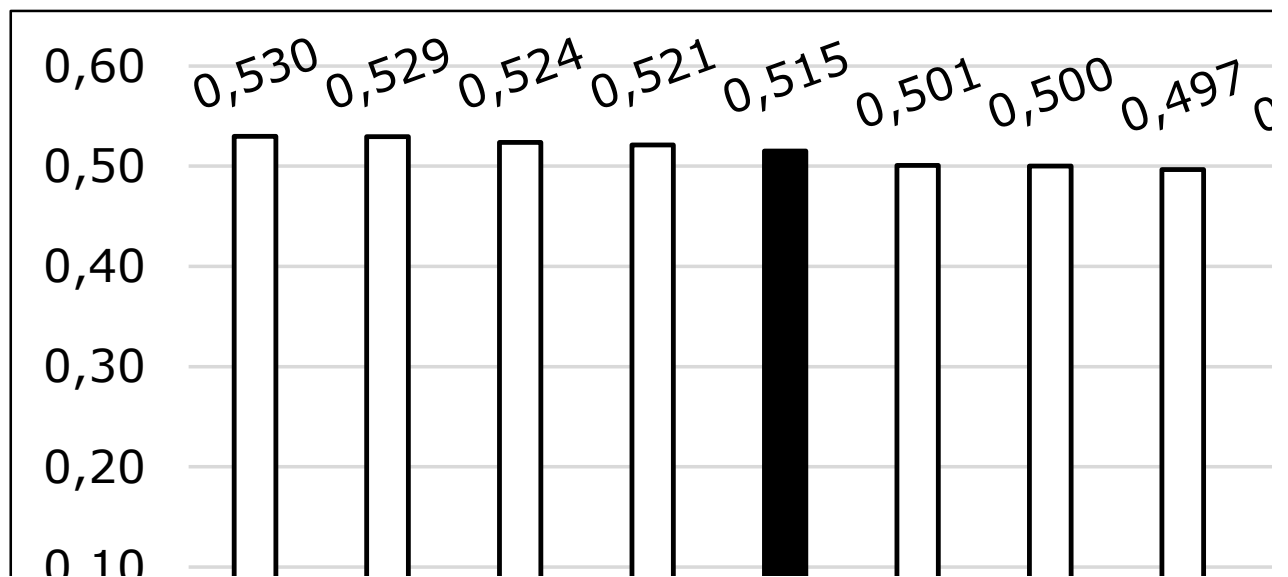
Efficiency ratios of companies from the food sector

As mentioned in the introduction, the key question to be answered by the work concerns the value of investment efficiency ratios. They play a key role in assessing the attractiveness of investments in shares of companies listed on the free market. The results of calculations of Sortino, UPR and Omega indicators are presented in the following charts. Each of them was ordered from the highest to the smallest value. The black columns were assigned to WIG and WIG-food indices. It should be added that the values of various efficiency factors are irrelevant, as the definitions are not comparable. Relevant values within each measure are important. Therefore, charts can be treated as rankings based on calculated performance indicators.



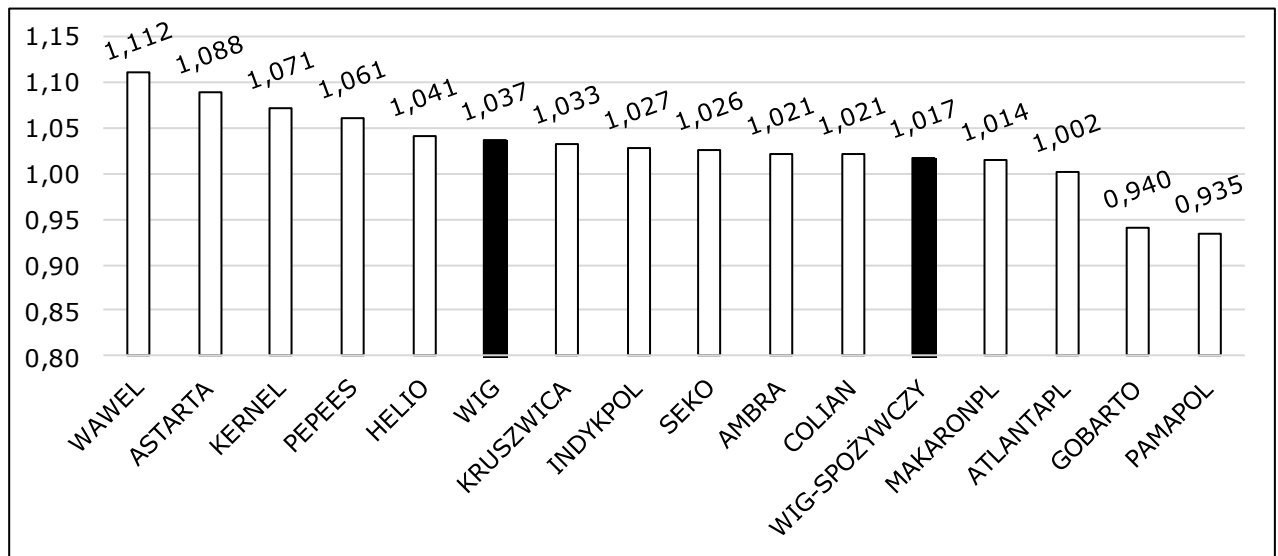
Source: author's calculations

Fig. 1. The values of Sortino coefficients ordered in descending order



Source: author's calculations

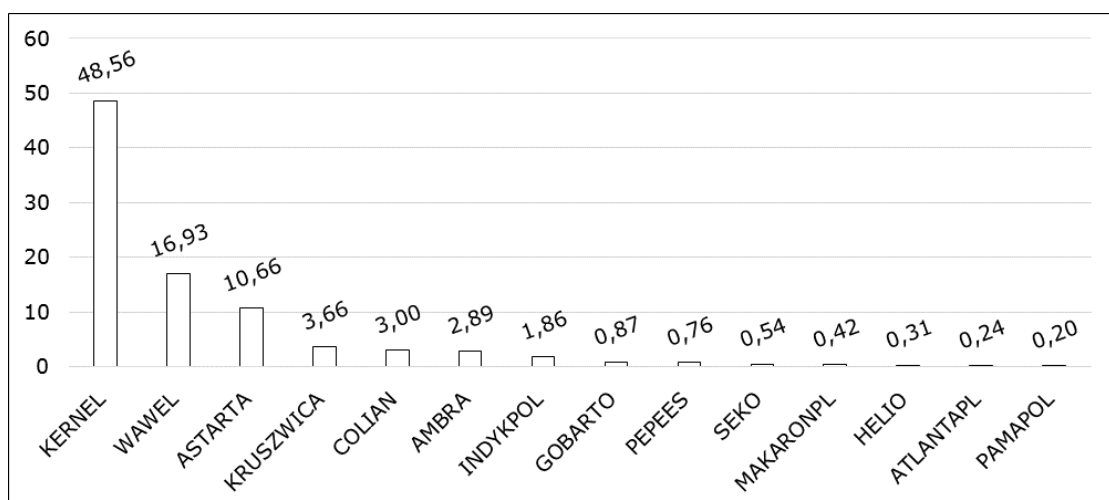
Fig. 2. Values of UPR coefficients ordered in descending order



Source: author's calculations

Fig. 3. Values of Omega coefficients ordered in descending order

In the first place, it should be noted that in the case of UPR, the ratio between indices for stock exchange indices is the opposite of that for the other two. In this highlighted case, WIG-food was characterized by a higher value than WIG. However, this does not significantly change the fact that in all cases almost the same entities occupy better positions than the stock market index, they are: Wawel, Astarta, Kernel. On the other hand, Helio only falls below the industry index in the case of UPR. It can be additionally noted that from the point of view of the Sortino index, Ambra joins the group of entities with the values of a measure larger than the market (in this case WIG). As a consequence, it can be concluded that all three performance indicators are branded by the same market leaders: Wawel¹, Astarta, Kernel, Pepees. Two of them: Kernel and Astarta are Ukrainian companies with a very wide range of food activities. In terms of capitalization, they occupy the first and third place respectively in the WIG-food index. Astarta is second only to Wawel. However, among the leaders of the ranking, Pepees occupies quite a distant position. The chart below shows the percentage shares of the surveyed companies in the WIG-food index.



Source: author's calculations

Fig. 4. The percentage share of the surveyed companies in the WIG-food index capitalization

¹ Wawel also took the first place in the ranking created by using the TMAI measure in 2003 (Zielinska-Sitkiewicz, 2017)

The three largest companies in terms of capitalization have a 76 % share in the index. It should be clearly emphasized that the leaders of rankings based on Sortino and Omega coefficients occupy positions above the index of the entire WIG market. In these cases, the WIG-food item is significantly lower than WIG.

The last chart may suggest that the size of the company is of significant importance to the ranking position. To verify this statement, Spearman's rank correlation coefficients were calculated between the rankings created on the basis of the indicators used and the ordering of companies according to their capitalization (percentage share in WIG-food). As a result, the following values were obtained: $\rho_{Sortino} = 0,714$, $\rho_{UPR} = 0,450$, $\rho_{Omega} = 0,675$. However, at the significance level of 0.05, the Spearman correlation coefficient calculated for the UPR-based rankings turned out to be statistically insignificant. As a consequence, the remaining rankings can be linked to the capitalization of companies. However, the values of rank correlation coefficients are not too high. This means that from the point of view of investment efficiency, capitalization is not the only factor influencing investors' attractiveness, although it cannot be ignored.

On the other hand, the calculated Spearman rank correlation coefficients between the positions created on the basis of Sortino, UPR and Omega indices indicate the existence of dependence of rankings. All values turned out to be statistically significant at the significance level of 0.05. These values were: $\rho_{Sortino/UPR} = 0,824$, $\rho_{Sortino/Omega} = 0,956$, $\rho_{Omega/UPR} = 0,785$. The largest relationship occurred between the rankings obtained using the Sortino and Omega ratios.

Conclusions, proposals, recommendations

- 1) The results of the research carried out show that there are companies in the food sector that are attractive from the investment point of view. The calculated measures of effectiveness indicate large entities in terms of capitalization. However, it turns out that this may not be the only factor determining the company's choice. Of the three measures of effectiveness applied, the UPR coefficient leads to Spearman's zero ranking correlation of the ranking created and the ranking of companies in terms of capitalization. Other indicators have moderate values, but statistically different from zero. As a consequence, the explanation of ranking positions requires the identification of other factors beyond capitalization.
- 2) Comparison of the calculated measures with their values for the WIG stock index indicates that the food industry can find attractive companies from the point of view of the entire exchange market.
- 3) Continuation of the presented research requires the identification of other factors determining the value of efficiency ratios beyond capitalization. In the first step, the food industry can be linked to the state of the entire economy by building models with macroeconomic factors. Further refinement of the research should lead to econometric models for specific companies, with explanatory variables related to the factors resulting from the fundamental analysis.

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ASSESSMENT OF INVESTMENT PROJECTS IMPLEMENTED BY FARMS IN ZEMGALE REGION

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Abstract. The research aim is to analyse the use of EU project funding in the agricultural industry in Latvia in the period 2007-2016 and assess the effect of investment projects implemented by agricultural holdings in Zemgale region on the financial performance of the holdings. The research analysed the legal acts regulating the implementation of support measures under the Rural Development Programme in the programming periods 2007-2013 and 2014-2020 and calculated the financial performance and competitiveness indicators (average profit margins, solvency and financial dependence) of agricultural holdings in Zemgale region, which were compared with the national averages, based on FADN statistical data. Methods of research: monographic, graphic, analysis, synthesis, statistical analysis. The analysed indicators were grouped by planning region in Latvia (the regional division of the Rural Support Service (RSS) – the Regional Agricultural Departments – was taken into account). Based on the research findings, the authors conclude that in the programming period 2014-2020 a solution is sought to retain the existing farm structure, strengthening small farms and reducing the influence of large farms on the agricultural industry. Even though public funding is focused on investment in tangible assets in the programming period 2014-2020, it is intended not only for agricultural holdings but also for forestry and food processing enterprises. The research has found that if other circumstances remain unchanged, there is no causal association between net value added and the amount of investment subsidies – the reason of a decrease in both variables was the consequence of the 2008 crisis. The average financial dependence of farms in Zemgale region in the period 2007-2013 exceeded the maximum level, and the farms were considerably dependent on borrowed capital. The research developed recommendations for the Ministry of Agriculture of the Republic of Latvia with regard to criteria for the evaluation of support project submitters, proposing excluding enterprises with high financial dependence from participation and contributing to the competitiveness of agricultural holdings and their financial independence.

Keywords: EU funds, Latvia, Zemgale region.

JEL code: O18, R11, R51

Introduction

Total funding for measures of the Rural Development Programme (hereinafter the RDP) for farmers and rural entrepreneurs in Latvia in the programming period 2014-2020 reached EUR 1.5 bln., which was 11 % more than the available funding in the previous programming period (from 2007 to 2013) (*Eiropas Savienības atbalsts...*, 2016). Consequently, the enterprises of the agricultural industry actively use the available funding, including for investment projects, and purchase or replace obsolete equipment and machinery, purchase agricultural land and livestock, as well as construct or reconstruct production facilities and structures in order to enhance their competitiveness in the market. A comparison of the use of funding of the EU Funds (the ERDF, the ESF and the CF), measured in EUR per capita, for investment projects in Zemgale region municipalities in the period 2007-2015 with the average in Central and Eastern European (CEE) countries revealed that it was 23 % higher in the centres of national significance (Jelgava, Jekabpils) and 33 % higher in municipalities (with no centre of regional significance) with a population of more than 5000 (Jakusonoka, Rivza, 2017). The projects implemented in the territory of the Zemgale Regional Agricultural Department (hereinafter the RAD) in terms of amount and number has demonstrated a positive trend, yet their effect on the overall financial situation in agriculture has not been examined sufficiently.

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The research aim is to analyse the use of EU project funding in the agricultural industry in Latvia in the period 2007-2016 and assess the effect of investment projects implemented by agricultural holdings in Zemgale region on the financial performance of the holdings.

Information sources: regulations of the EU Council, laws and other legal acts of the Republic of Latvia, research papers available in international proceedings, national statistical data, FADN statistical data, secondary information sources and published materials of institutions and organisations.

The research analysed the legal acts regulating the implementation of support measures under the Rural Development Programme in the programming periods 2007-2013 and 2014-2020. Based on FADN statistical data, the research calculated the financial performance and competitiveness indicators (average profit margins, solvency, financial dependence) of agricultural holdings in Zemgale region, which were compared with the national averages, and assessed their changes and effects in the analysis period of 2007-2015.

Methods of research: monographic, graphic, analysis, synthesis, statistical analysis. The analysed indicators were grouped by planning region in Latvia (the regional division of the Rural Support Service (RSS) – the Regional Agricultural Departments – was taken into account). In terms of funding per project, the projects of farms supervised by the Zemgale RAD were the largest among the regions both in the period 2007-2013 and in the period 2014-2016, exceeding the national average at least by 75.5 %. For this reason, the projects implemented in Zemgale region in terms of funding received considerably affected the dynamics of development of agriculture. Accordingly, an examination of the data on Zemgale region allows judging the effect of EU funding attracted.

Research results and discussion

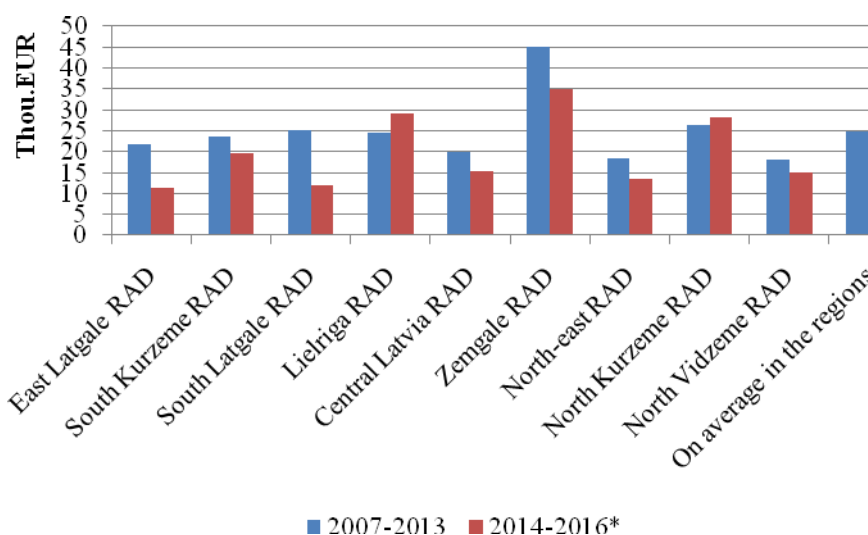
Many economists stress that in preparing and implementing public projects, it is important to contribute to sustainable development, rural and regional development, reduce poverty, ensure equal opportunities for all members of society and achieve other national strategies and targets, and in the case of limited financial means, it is necessary to choose investment alternatives, i.e. to evaluate the public projects in economic terms (Aleksnevičienė, Baranaušienė, 2014). It is also necessary to assess the effect of EU funding on the GDP of Latvia and economic growth in the regions (Rivza, Kruzmetra, Zaluksne, 2016; Jakusonoka, Rivza, 2017). The need for a complex approach has been stressed by experts in the 2007-2013 ex-post evaluation by the RSS published in 2016, which stated that "given the many aspects of rural development (including the formation of an environment for entrepreneurship, the tax policy etc.), the RDP cannot make significant effects, and it is necessary to apply a complex approach to rural development through cooperation among all national institutions that can affect the development of entrepreneurship in rural territories. Densely populated and economically active rural areas have to be set a national priority" (Zinojums Lauku attīstības..., 2016). The measures are planned and implemented within the EU common regulatory framework, and in the programming period 2014-2020 the activities and measures of the Rural Support Policy (RSP) are regulated by totally 14 EU legal documents.

The agricultural policy of Latvia as an EU Member State is based on the supportable measures of the EU CAP (Financing the Common..., 2017; Kopeja lauksaimniecības..., 2016; Lauku attīstības..., s.a.); besides, it is strongly linked with the priorities of the National Development Plan. In the period 2014-2020, rural development in Latvia is strongly linked with the rural development

priorities set by the EU: promotion of agricultural competitiveness; sustainable management of natural resources and the implementation of climate measures; achievement of balanced development of the rural economy.

In examining the role of investment projects implemented by agricultural holdings in contributing to their competitiveness, it is important to analyse the amount of and priorities for funding allocated in the programming periods. As pointed out by Tisenkopfs et al. (2015), the key priority in rural development both in the programming period 2007-2013 and in the programming period 2014-2020 is investment in modernisation activities. The only difference is that the RDP 2007-2013 focused on the modernisation of small agricultural holdings, allocating public funding of EUR 368.9 mln., i.e. 26.2 % of the total funding allocated. However, even though public funding is focused on investment in tangible assets in the programming period 2014-2020, it is intended not only for agricultural holdings but also for forestry and food processing enterprises.

Furthermore, the amount of funding allocated under the RDP 2014-2020 for modernisation exceeds the amount of public funding available in the programming period 2007-2013 by 32.6 %, amounting to EUR 489.1 mln. or 32 % of the total financial support for rural development. The support amount of the European Agricultural Fund for Rural Development (EAFRD) is shown in Figure 1.



*Data for the period through 31.12.2016 within the programming period 2014-2020.

Source: authors' construction based on operational information published by the Rural Support Service, s.a.

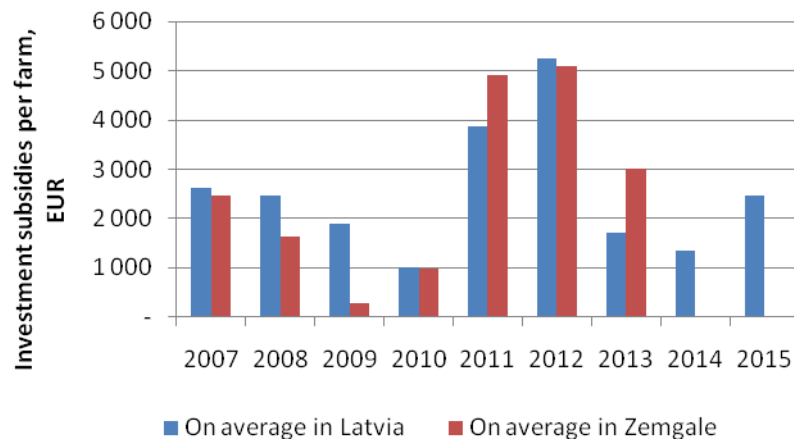
Fig. 1. EAFRD support funding per project by Regional Agricultural Department territory in 2007-2013 and 2014-2016, thou. EUR

The key priority is small agricultural holdings with a turnover of less than EUR 70 thou.; the amount of funding allocated reaches EUR 68.6 mln. (14 % of the total funding available for modernisation). The purpose of the priority is to support investment in the restructuring, diversification and efficiency enhancement of agricultural holdings. The authors conclude that in the programming period 2014-2020 a solution is sought to retain the existing farm structure, strengthening small farms and reducing the influence of large farms on the agricultural industry.

Changes in the average amount of investment subsidies per agricultural holding in Zemgale region are presented in Figure 2.

An analysis of the average size of investment projects per farm in Zemgale region and in the entire country reveals that there was no considerable difference. In the period 2007-2013, the

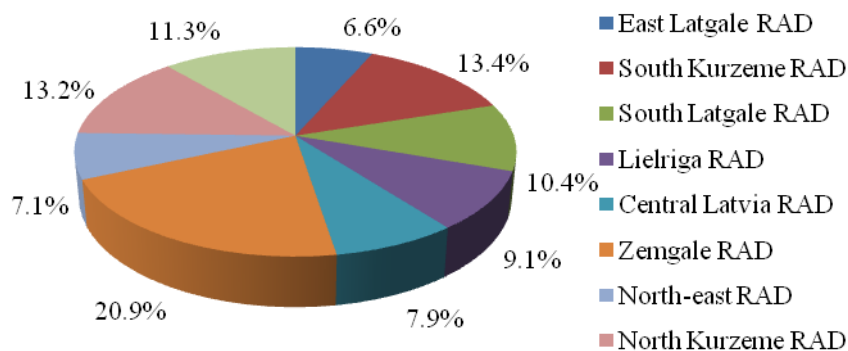
average investment by farms in Latvia was 2687 EUR, while in Zemgale region it was EUR 2631. Of the total amount of funding available for modernisation, EUR 489.1 mln., only 18.3 % were absorbed in the period through the end of 2016 (Operativa informacija par..., s.a.).



Source: authors' construction based on FADN data, 2007-2013.

Fig. 2. Average amount of investment subsidies per farm in Zemgale region and in Latvia, EUR

It is possible to conclude that at the beginning of the programming period 2014-2020, due to the slow EU funding administration process, the absorption of the funding was considerably behind the schedule and the implementation of modernisation activities was postponed. The percentage breakdown of public funding disbursed by RAD territory under the measure "Investment in tangible assets" in the period from 2014 to 31 December 2016 is presented in Figure 3; in some RAD territories, the absorption rate was only 7 % of the planned amount in the period 2014-2020 (Figure 3).



Source: authors' construction based on operational information published by the Rural Support Service, s.a.

Fig. 3. Percentage breakdown of total public funding invested in projects implemented under the measure "Investment in tangible assets" in the programming period 2014-2020 (as of 31.12.2016) by RAD territory, %

As of 31 December 2016 in the programming period 2014-2020, 2160 projects were implemented among all the activity groups under the measure "Investment in tangible assets". The largest number of projects (343) was implemented in the territory of the South Latgale RAD, while the third largest number, behind South Kurzeme (312), was implemented in the territory of the Zemgale RAD (290 or 13.4 %). The amount of public funding, EUR 18.7 mln., disbursed in the territory of the Zemgale RAD considerably exceeded those disbursed in the other RAD territories,

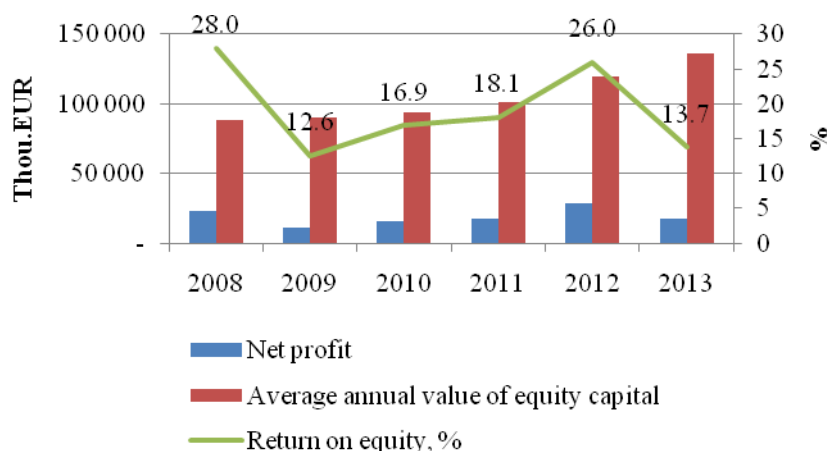
ranging from EUR 5.9 mln. in the East Latgale RAD (6.6 %) to EUR 11.9 mln. in the territory of the South Kurzeme RAD, or 13.4 % of the total financial support disbursed.

Besides, the largest amount of funding attracted for modernisation both in the programming period 2007-2013 and in the period from 2014 to the end of 2016 (under the RDP 2014-2020) was reported in Zemgale planning region. The most active recipients of funding located in the territory of the Zemgale RAD were agricultural, processing and forestry enterprises.

Of the total amount available in the period 2014-2016, EUR 18.7 mln. or 20.9 % were absorbed in Zemgale region, yet there is a significant difference if measured per farm. In the group of large farms (with a net turnover of more than EUR 70 thou.), the maximum amount of support disbursed for a farm reached EUR 2 mln., and the large grain farms of Zemgale region used almost the entire amount of funding, leaving an insignificant share of the funding for smaller ones.

In a situation where investment projects, especially for modernisation, have a support intensity of less than 50 % of eligible costs, investments in farm development could be made only by means of borrowed capital. However, investment support is granted to the farms demonstrating good financial performance; consequently, a sufficient amount of capital has to be at the disposal of the farms in order to ensure their continuous operation in the case of having financial obligations as well.

The research analysed to what extent the average return on equity of enterprises enhanced or worsened in the period from 2007 to 2013. Changes in the return on equity and in the components of the return on equity – net profit and the average annual value of equity capital – for farms in Zemgale planning region in the period 2008-2013 are presented in Figure 4.



Source: authors' construction based on Farm Accountancy Data Network information, 2007-2013.

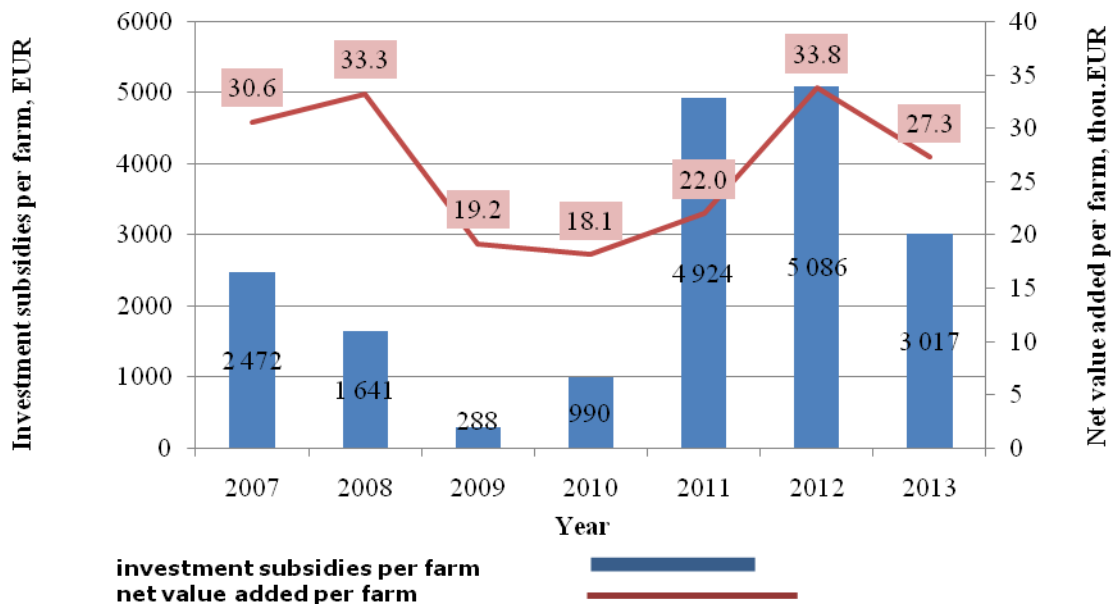
Fig. 4. Changes in the return on equity and in the components thereof for agricultural holdings in Zemgale region in the period 2008-2013, thou. EUR

It has to be taken into account that 2007 was a successful year for crop farmers; there were high crop yields and an unexpected grain price hike. For these reasons, the levels of 2007 as the base levels have to be cautiously viewed, considering the dependence of agriculture on weather conditions.

Continuing examining the contribution of farms that have implemented investment projects to the agricultural industry, the authors point to the role of turnover or commercial profitability. An increase in revenue not always leads to the desired amount of profit, which is determined by the production cost level.

An essential indicator of the competitiveness of agriculture is net value added per enterprise. The effect of investment support payments on net value added per farm in Zemgale region is shown in Fig. 5.

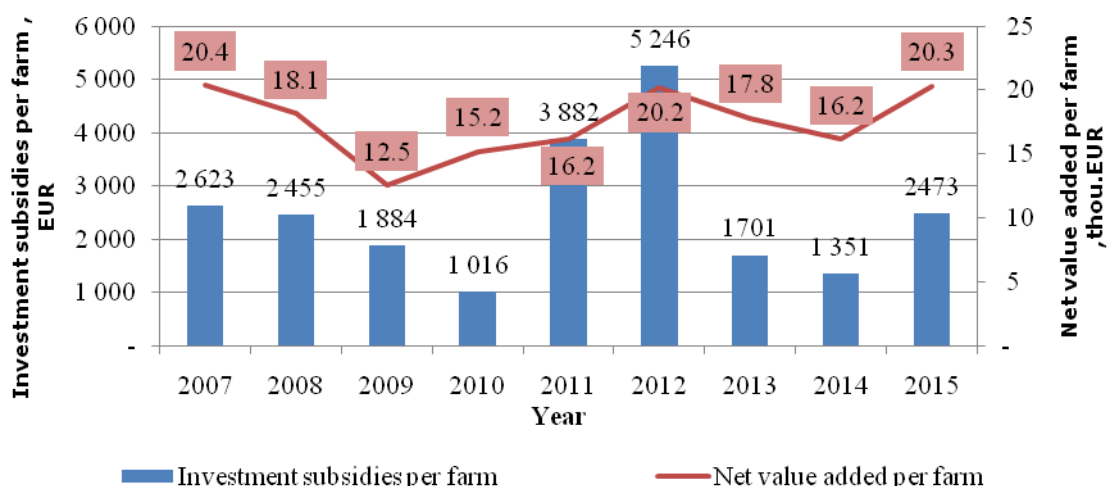
An analysis of the amount of investment subsidies received and value added generated per agricultural holding in Zemgale region reveals sharp changes in the amount of support mainly due to the financial crisis – from EUR 288 in 2009 to EUR 5.09 thou. in 2012. A decrease in the amount of investment subsidies per farm in 2009 compared with 2008 reached 82.4 %; besides, the sharpest decrease in value added generated by farms was reported in 2009, at 42.3 %.



Source: authors' construction based on Farm Accountancy Data Network information, 2007-2013.

Fig.5. Changes in investment subsidies and net value added per farm in Zemgale region from 2007 to 2015, EUR

Overall, the amount of investment subsidies from 2007 to 2013 rose by 22.0 %, yet net value added per farm decreased by 10.8 % in the analysis period. Accordingly, the authors conclude that an increase or a decrease in the amount of investment subsidies does not affect changes in net value added. The key reason for such a phenomenon is the low proportion of investment in total net value added; since the net value added of farms is considerably higher than the amount of investment subsidies (on average, 9.8 % of the net value added in the analysis period), the effect of the support, on average, on value added generation is insignificant.



Source: authors' construction based on FADN data, 2007-2015.

Fig. 6. Changes in investment subsidies and net value added per farm in Latvia from 2007 to 2015, EUR

However, an analysis of the average amount of support received and net value added generated per farm in Latvia as a whole (data for Latvia as a whole are availability for a longer period than the data for Zemgale region) reveals some causal association between the variables.

The effect of investment support payments on net value added generated per farm in Latvia is shown in Figure 6.

After analysing the relative increase in the variables in the period 2007-2015, the authors conclude that in the entire period, except for 2010 and 2011, an increase or a decrease in the amount of investment subsidies leads to an increase or a decrease, respectively, in net value added. This could be explained by the fact that the proportion of subsidies received on average per farm in the average net value added per farm is higher nationally than in Zemgale region, where the net value added was 33.0 % higher than on average nationally. Besides, the data for Latvia as a whole are available for a longer period, i.e. two more years, therefore the crisis did not make so significant effect on the variables as the amount of investment subsidies paid to Zemgale region farms on the net value added of the farms did.

In terms of net value added, the indicator values for Zemgale region are, on average, 15.7 % higher than the national average; the national average fluctuates in the range of 7.9 percentage points, while in Zemgale region it is in the range of 15.7 percentage points. In general, one can conclude that the indicators of projects implemented by agricultural holdings in Zemgale region considerably exceed the averages for the agricultural industry, and the amount of investment subsidies received by farms in Zemgale region affect their solvency and value added generated.

Conclusions and recommendations

- 1) To stimulate the development of small agricultural holdings, the Rural Development Support Department of the Ministry of Agriculture of the Republic of Latvia, when working on the new Rural Development Plan for 2021-2027, has to continue designing additional measures to support the small agricultural holdings and young farmers also under the Rural Development Plan 2014-2020, thereby promoting investment in the small agricultural holdings.
- 2) To limit the distribution of European Union EAFRD funding among the largest farms of Zemgale region, the Minister of Agriculture of the Republic of Latvia has to set a lower amount of support

to be available for one applicant, especially under the measure "Investment in tangible assets" (from EUR 2 mln. to EUR 1.2 mln.), in order to increase the availability funding for small farms.

- 3) To avoid the risk of insolvency by support applicants in the agricultural industry, the Minister of Agriculture of the Republic of Latvia has to expand the range of eligibility criteria for investment support project submitters by a farm financial dependence indicator that excludes from participation the enterprises that are highly financially dependent, thereby contributing to farm financial independence.

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THE APPLICATION OF TAXONOMIC METHODS AND ORDERED LOGIT MODEL IN THE ASSESSMENT OF FINANCIAL SELF-SUFFICIENCY OF LOCAL ADMINISTRATIVE UNITS

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Abstract. The purpose of this paper was to identify the internal determinants of financial self-sufficiency of local government units, as illustrated by the example of Polish municipalities of the Wielkopolskie voivodeship, with the use of taxonomic methods and the ordered logit regression model. The first step of the proposed approach is to assess financial self-sufficiency of the municipalities using taxonomic methods, in order to subsequently model it with econometric techniques. In the first phase, the local government units' (LGU) financial self-sufficiency was assessed with positional TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution). The results of this phase, that is, municipalities were grouped into classes by financial self-sufficiency level, were assumed to be the baseline. Afterwards, the ordered logit regression model was used. The estimated model allowed us to specify the significance (strength and direction) of selected socio-economic development factors for the financial self-sufficiency level of administrative units under consideration. The empirical basis for this study was statistical data for 2013 delivered by the Local Data Bank of the Central Statistical Office in Poland. The study confirmed that the size of local economic operators and the number of hotel beds stimulated the improvement of financial self-sufficiency levels of municipalities in the Wielkopolskie voivodeship, while the unemployment rate and the share of rural population in the total population were restraining factors.

Key words: taxonomy method, TOPSIS, ordered logit model, financial self-sufficiency, local administrative units

JEL code: C01, C02, R110

Introduction

Autonomy is usually interpreted as the right of a specific community to settle their internal affairs by themselves; this includes freedom and independence in making individual decisions (Pratchett, 2004). The autonomy (self-sufficiency) of the local government needs to be mainly considered in the financial context. This is because the financial self-sufficiency of local government units, which plays a major role for assessing their financial condition, is a key driver of a stable local development. According to Surowka (2013), the autonomy of LGUs is related, from the financial perspective, to the ability of the municipal authorities to freely decide of their incomes and revenues, and of amounts and targets of expenses and uses; and also implies independence in planning and executing the municipal budget. Financial self-sufficiency is a condition for the existence of self-government authorities. Note also that sustainable financial resources are the basis for the local socio-economic development, especially as regards rural areas. It is also the basic category that is taken into account in the analysis of financial stability of LGUs.

Financial self-sufficiency of local government units is conditioned by multiple factors, including spatial determinants (location, ease of transport), urbanization level, and the demographic and economic potential (Standar, Kozera, 2017). The analysis of internal determinants of the financial situation of local government units, with particular focus on their financial self-sufficiency levels, is an important research topic from the economic and social perspective

The main purpose of this paper is to identify the internal determinants of financial self-sufficiency of local government units, as illustrated by the example of Polish municipalities of the Wielkopolskie voivodeship, with the use of taxonomic methods and the ordered logistic regression. Data used in this study have been obtained from the Local Data Bank of the Central Statistical Office in Poland (year 2013).

Research methodology

The following research approach, comprising the two main phases listed below, was proposed for the procedure of multidimensional assessment of financial self-sufficiency levels of Polish municipalities in the Wielkopolskie voivodeship (Luczak and Wysocki, 2013).

Phase 1. The procedure to construct a synthetic measure based on TOPSIS (*Technique for Order Preference by Similarity to an Ideal Solution*) (Hwang, Yoon, 1981) method is a multi-step process, which includes: (i) selecting features of the complex phenomenon (i.e., the financial self-sufficiency of the LGU), (ii) determining the nature of features in relation to the main criterion under examination, (iii) normalizing the values of features, (iv) calculating the distance of each unit (municipality) from positive and negative ideal solutions, (v) calculating values of the synthetic development index (the synthetic measure), and (vi) linearly ordering and identifying the types of financial self-sufficiency of municipalities considered.

Phase 2. Identification of socio-economic statistically significant determinants of the financial self-sufficiency of municipalities of the Wielkopolskie voivodeship through an ordered logit regression model. We focused on the identification of explanatory variables, estimation of regression coefficients of the logit model, and interpretation of the main results.

In the first phase of this study, the positional TOPSIS method was used to synthetically assess the financial self-sufficiency levels of municipalities covered. This is because the financial self-sufficiency of LGUs is a multidimensional phenomenon that cannot be directly measured. Attempts can only be made to describe it with many features (indicators), which can then be used as a basis for assessment with a synthetic measure. The method employed, TOPSIS, is based on the Hellwig's (1972) idea of constructing a synthetic feature. It enables a synthetic assessment of a phenomenon with multiple features (see Hwang, Yoon 1981). To describe the financial self-sufficiency of selected units, in this study was used features selected based on a substantive and statistical analysis. Afterwards, features need to be grouped by determining the direction of their impact on the general criterion under consideration, that is, the level of financial self-sufficiency. The selected features may have a stimulating or destimulating effect on the phenomenon. Features that have stimulating effect, contribute to increasing the level of the phenomenon, while feature that have destimulating effect, decreasing the level of the phenomenon. Features considered to have a destimulating effect may be converted into stimulating features with the use of a negative coefficient transformation. The set of features describing the financial condition usually includes strongly asymmetric items or outliers. Therefore, this study uses the Weber's median standardization which is tolerant to such values. It is based on the following formula (Lira, Wagner, Wysocki 2002):

$$z_{ik} = \frac{x_{ik} - m\tilde{d}_k}{1.4826 \cdot m\tilde{a}d_k},$$

with: x_{ik} value of the k th feature ($k = 1, 2, \dots, K_1$) in the i th object (municipality) ($i = 1, 2, \dots, N$), $m\tilde{d}_k$ L_1 -median (Weber median) vector component corresponding to the k th feature, $m\tilde{a}d_k = med_i |x_{ik} - m\tilde{d}_k|$ median absolute deviation of k th feature values from the median component of the k th feature, 1.4826 constant scaling factor corresponding to normally distributed data ($\sigma \approx E(1.4826 \cdot m\tilde{a}d_k(X_1, X_2, \dots, X_K))$ and σ standard deviation) (Mlodak, 2006).

Then, the coordinates of positive ideal solution (PIS) and negative ideal solution (NIS) were computed according to the following formulae:

$$A^+ = (\max_i(z_{i1}), \max_i(z_{i2}), \dots, \max_i(z_{iK})) = (z_1^+, z_2^+, \dots, z_K^+)$$

$$A^- = (\min_i(z_{i1}), \min_i(z_{i2}), \dots, \min_i(z_{iK})) = (z_1^-, z_2^-, \dots, z_K^-)$$

Coordinates of PIS and NIS constitute the basis for the calculation of distances for each assessed object from the positive ideal solution (A^+) and the negative ideal solution of development (A^-) to the following formulas:

$$d_i^+ = \text{med}_k(|z_{ik} - z_k^+|) \quad d_i^- = \text{med}_k(|z_{ik} - z_k^-|)$$

where d_i^+ and d_i^- denote the median absolute deviation from the positive ideal solution (A^+) and negative ideal solution (A^-) for the i th object, respectively, and $\text{med}_k(\cdot)$ is the marginal median for the k th feature.

To construct the synthetic measure, the TOPSIS method was used using the formula (stage 5) (Hwang, Yoon, 1981; Wysocki, 2010):

$$S_i = \frac{d_i^-}{d_i^- + d_i^+}, \quad (i = 1, 2, \dots, N),$$

The values of the synthetic feature S_i are within the interval $[0,1]$. The closer a unit to the development pattern (and the further it moves away from the anti-pattern), the closer to 1 is the value of the synthetic indicator. The determined values of the synthetic measure are linearly ordered and become the basis for grouping the municipalities into typological classes by financial self-sufficiency level. The entire range of the synthetic measure was arbitrarily divided into classes. This study assumes the values of indicator S_i to fall within the following numerical intervals: $[0.00, 0.20)$ – very low level, $[0.20, 0.40)$ – low level, $[0.40, 0.60)$ – medium level, $[0.60, 0.80)$ – high level, $[0.80, 1.00]$ – very high level.

The classes of Wielkopolskie voivodeship municipalities, established in function of financial self-sufficiency levels, became the basis for formulating an ordered logit regression model for cumulative probabilities (Hilbe, 2009; Cramer, 2011). This type of model allows us to properly account for the ordinal nature of response variable of our interest (i.e., classes of identified types of financial self-sufficiency levels of municipalities, combined with a system of socio-economic indicators) and its estimation provides a more in-depth insight into the reasons for differences in the municipalities' financial self-sufficiency levels.

To identify the determinants of the financial self-sufficiency level of municipalities under consideration, the following ordered logit model (proportional odds model) was used (Borooah, 2001; Cameron, Trivedi, 2005; Hilbe, 2009):

$$y_i^* = x_i^T \beta + \varepsilon_i$$

with:

$$x_i^T \beta = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_{K_2} x_{K_2i};$$

y_i^* latent variable for i th municipality; its discrete equivalents y_i correspond to the identified classes of financial self-sufficiency level, determined as above described;

x_i vector of explanatory variable values for i th municipality (determinants of the municipality's financial self-sufficiency level);

K_2 number of features of the socio-economic situation;

β vector of parameters;

ε_i random term for i th municipality, which is assumed to have a standard logistic distribution.

The modeling procedure is performed for cumulative logits, that is, log-ratios of probability that municipality i belongs to a category no higher than j (p_{ij}) and probability of the opposite event ($1 - p_{ij}$). In the case of J categories (established based on the value of the synthetic feature), $J - 1$ logit models are formulated (Hilbe, 2009):

$$\text{logit}(p_{ij}) = \ln \frac{\Pr(y_i \leq j)}{\Pr(y_i > j)} = \ln \frac{p_{ij}}{1 - p_{ij}} = \beta_{0j} + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_{K_2} x_{K_2i}$$

for $j = 1, 2, \dots, J - 1$, where: $p_1 + p_2 + \dots + p_J = 1$, β_{0j} denotes category-specific threshold and $b_1 \dots b_{K_2}$ are the regression coefficients.

It is worth to be noted that the proposed model is based on the assumption of proportional odds, which implies that there is only one set of regression coefficients for each explanatory variable, as the ratio between all category pairs within the same group of comparisons is assumed to be proportional. Otherwise, a generalized ordered logit model could be estimated, as many regression coefficients for each explanatory variable as the number of financial condition levels minus 1. The assumption of proportional odds can be verified by means of the Brant test (Brant, 1990; Long, Freese, 2006).

Assessing the financial self-sufficiency of municipalities in the Wielkopolskie voivodeship

In the first phase of the study, addressing the assessment of financial self-sufficiency of municipalities in the Wielkopolskie voivodeship, the following 8 features of the LGUs considered were initially selected based on substantive grounds: share of own incomes in total incomes (%) (x_1), share of own incomes and total subsidies in total incomes (%) (x_2), level of own incomes (in PLN per capita) (x_3), fiscal wealth indicator (in PLN per capita) (x_4), fiscal autonomy indicator (share of tax incomes in current incomes) (%) (x_5), financial state intervention indicator (state budget contribution to total incomes) (%) (x_6), self-financing ratio (share of operating surplus and property incomes in property expenditure, %) (x_7), and share of investment expenditure in total expenditure (%) (x_8) (Kozera et al., 2016). The set of features established based on substantive grounds was subject to further statistical verification to determine their potential information (correlation with other features) and discriminatory capacity (i.e., variability across the objects considered). Afterwards, based on the statistical analysis, 6 features were selected, describing the financial self-sufficiency level of local government units, that is, x_1 , x_3 , x_4 , x_5 , x_6 and x_8 . Then, five of the features were assumed to have a stimulating effect (x_1 , x_3 , x_4 , x_5 , x_8) and only one feature (x_6) to have a destimulating effect on the level of financial self-sufficiency of LGUs. The feature with a destimulating effect was converted into an opposite feature with the use of a negative

coefficient. The set of variables retained for the study includes features that demonstrate a strong asymmetry and outlying observations. Therefore, it seems justified to employ the positional TOPSIS method based on the Weber's median and on median absolute deviations from the positive ideal solution and negative ideal solution. For this aim, the values of selected features were normalized using the Weber's median standardization (the calculations were performed with *robustX* in R) (Stahel, Maechler 2012). The standardized values of features allowed us to calculate the distance of each municipality considered from the pattern and anti-pattern with the use of the median absolute deviation. Subsequently, the values of the synthetic indicator of LGU financial self-sufficiency levels were calculated using the TOPSIS method, becoming the basis for identifying five types of municipal financial self-sufficiency levels in the Wielkopolskie voivodeship. In the typological classes identified, intra-class values of financial indicators used to establish the synthetic indicator were calculated (Table 1).

Table 1

Intra-class mean ^{a)} values of indicators of financial self-sufficiency levels of municipalities of Wielkopolskie voivodeship, Poland, in 2013

Specification	Typological class - The level of financial self-sufficiency					Wielkopolskie voivodeship
Typological class	I very high	II high	III average	IV low	V very low	
Number of municipalities ^{b)}	7	4	46	110	55	222
Percentage of municipalities (%)	3.2	1.8	20.7	49.5	24.8	100
Share of own incomes in total incomes (%)	74.0	62.0	51.1	40.5	29.7	41.8
Level of own incomes (in PLN per capita)	3681.8	2288.9	1717.4	1259.7	878.8	1260.6
Fiscal wealth indicator (in PLN per capita)	1996.3	775.6	683.0	508.3	379.0	515.6
Fiscal autonomy indicator (%)	39.7	26.2	24.2	18.6	13.5	18.6
Financial state intervention indicator (%)	25.5	37.4	41.5	54.9	67.3	54.8
Share of investment expenditure in total expenditure (%)	18.4	26.3	16.4	12.0	11.7	12.6

^{a)} The mean values of features are represented by their medians.

^{b)} Urban districts excluded.

Source: authors' based on the Local Data Bank of the Central Statistical Office in Poland.

As shown by the empirical study, typological classes with very high and high levels of financial self-sufficiency collected the 3.2 % and 1.8 %, respectively, of the total number of Wielkopolskie voivodeship municipalities. Class 1, demonstrating a very high level of municipal financial self-sufficiency, was composed of seven municipalities (Suchy Las, Przykona, Kleczew, Tarnowo Podgorne, Powidz, Komorniki and Kornik). Four of them are located in the immediate vicinity of the city of Poznan, the largest city of the Wielkopolskie voivodeship. The proximity of the metropolitan centre provides the LGUs with financial benefits. The suburbanization process, which has been observed for several years, results in a dynamic development of the residential function of rural areas, especially in municipalities located in the first ring around large urban centres. The consequence is the development of infrastructure (residential housing, transport lines, commercial and service facilities in suburban areas) and the creation of bedroom communities for the commuting population. In the Przykona municipality, the high level of financial self-sufficiency

results from the operation of a local lignite mine (high mining fees contributing to the municipal budget). In turn, as regards the Powidz municipality, that situation primarily results from the operation of a military air base in that area. The first type of LGUs were characterized by the highest share of own incomes in total incomes (74 %), the highest level of own incomes per capita (PLN 3,681.8), the highest level of fiscal wealth (PLN 1,996.3), and a minor financial state intervention (25.5 %). Average levels of financial self-sufficiency were reported by 46 municipalities grouped in the third typological class (20.7 % of all municipalities of the Wielkopolskie voivodeship). In these municipalities, own incomes per capita were less than half the amount recorded for the first type of municipalities (PLN 1,717.4 per capita). Note also that own incomes represented one half of total incomes (51.1 %). In turn, the fourth and fifth typological class, demonstrating low and very low levels of financial self-sufficiency, respectively, were composed of 110 and 55 municipalities of the Wielkopolskie voivodeship, respectively. Around a quarter of municipality surveyed (nearly 25 % of the total population) reported a distinctively low level of financial self-sufficiency. These LGUs were characterized by the lowest level of own incomes per capita (barely PLN 878.8) and, at the same time, the lowest share of own incomes in total incomes (less than 30 %). In these municipalities, the low levels of own incomes per capita and low shares of own incomes in their budgets resulted in the lowest share of investment expenditure in the total expenditure. This contributed to a slower socio-economic development of the regions concerned. These were mainly agricultural municipalities located away from large urban centres (Table 1).

Identification of socio-economic determinants of financial self-sufficiency levels of municipalities in the Wielkopolskie voivodeship

Together with the system of socio-economic development indicators, the identified classes were the basis for modeling the financial self-sufficiency level of municipalities in the Wielkopolskie voivodeship. From a predefined set of 18 socio-economic indicators, the following exogenous variables were retained: share of economic operators with 10 to 49 employees (%), share of economic operators with 50 or more employees (%), share of rural population in the total population (%), official unemployment rate (%), number of hotel beds per 1,000 population. Table 2 shows the results of the estimation of parameters for the ordered logit model of financial self-sufficiency of municipalities in the Wielkopolskie voivodeship (calculations performed with GRETL¹ (*Gnu Regression, Econometric Time-series Library*) (Adkins 2014, Cottrell, Lucchetti 2018). The estimated model fits well the empirical data (*McFadden's* $R^2 = 40.2$ %, *McKelvey and Zavoina's* $R^2 = 66.8$ %, *Count* $R^2 = 78.2$ %) and demonstrates high statistical significance (at $p < 0.05$) of most regression coefficients.

As shown by the empirical study, an increase in the value of explaining variables (*ceteris paribus*) such as official unemployment rate (%) and share of rural population (%) resulted in reducing the odds of the municipalities for moving to a higher level of financial self-sufficiency (-0.162 and -0.012, respectively) from one of the lower levels. This is because the personal income tax (which is one of the main sources of LGU incomes) and other taxes contribute much less to the budgets of municipalities with a high share of population working in agriculture and a high official unemployment rate. In Poland, the agricultural tax is the main tax burden imposed on farms, and contributes to the budgets of municipalities where the taxable land is located. Just as in many EU

¹ GRETL is available on the website: <http://www.gretl.eu/>

countries, Polish fiscal solutions include specific provisions for a more favourable treatment of the agriculture sector. This is reflected in many ways, including the exemption of agricultural incomes from income tax. In the case of agriculture, the favourable treatment extends beyond income tax. For instance, the property tax also plays a minor role in the agricultural taxation system. This is because an exemption is applicable to agricultural buildings and parts thereof which are located on farmland and are used solely for farming. The agriculture is also exempt from vehicle taxes, inheritance taxes and gift taxes. Note also the very limited fiscal efficiency of the agricultural tax in Poland because the tax rates are not linked to actual outputs and economic performance of farms. As a consequence, typically agricultural municipalities demonstrate lower levels of own income potential and financial autonomy (Kozera, 2017).

Table 2

**Results of the estimation of parameters for the ordered logit model
 of financial autonomy of municipalities in the Wielkopolskie voivodeship,
 Poland**

Explanatory (independent) variables	Coefficient	Std. Error	Odds ratio	p-values	Symbol ^{a)}
Official unemployment rate (%)	-0.162732	0.059588	0.849819	0.0063	***
Share of rural population in the total population (%)	-0.012527	0.004725	0.987551	0.0080	***
Share of economic operators with 50 or more employees (%)	0.059236	0.028709	1.061026	0.0391	**
Share of economic operators with 10 to 49 employees (%)	0.014865	0.008572	1.014976	0.0829	*
Number of hotel beds per 1,000 population	0.006715	0.002519	1.006737	0.0077	***

^{a)} If p-value < 0.001 it is flagged with three stars (***), 0.001 < p-value < 0.05 – two stars (**), 0.05 < p-value < 0.1 – one star.

Source: authors' study based on the Local Data Bank of the Central Statistical Office in Poland

Conversely, other variables retained in the model had a stimulating effect on the odds for increasing the financial self-sufficiency of administrative units. As shown by the empirical study, a municipality would have the greatest odds ratios for improving its financial condition in the case of an increase in: the share of economic operators with 50 or more employees (6.1 %); the share of economic operators with 10 to 49 employees (1.5 %); and the number of hotel beds per 1,000 population. The above features have a direct impact on the level of own incomes because the growing economic potential results in an increased contribution of the most important (most efficient) sources of own incomes, i.e. property tax, personal income tax and corporate income tax.

Conclusions, proposals, recommendations

The proposed approach to a multidimensional analysis of financial self-sufficiency levels of local government units was implemented with the use of taxonomic methods and the ordered logit model. Combined with taxonomic methods, the ordered logit model enables a more in-depth analysis of the reasons for differences in the financial condition of administrative units.

- 1) The analysis of the financial situation of local government units (e.g. the assessment of financial self-sufficiency levels) deals with complex aspects that cannot be directly measured. Therefore, the taxonomic methods (i.e. TOPSIS and the Weber's positional median) were used to synthetically assess and identify the types of financial self-sufficiency levels in Wielkopolskie voivodeship municipalities in Poland. This is a suitable approach to determine the synthetic development indicator in a case where the set of features of units under consideration includes

outliers or strongly asymmetrical values. This is exactly the case in the analysis of financial situation of local government units.

- 2) The identified classes of financial self-sufficiency levels of the municipalities became the starting point for the subsequent econometric analysis. They represented ordered categories of the explained variable in a logit model combined with a system of socio-economic development indicators. The ordered logit model used in this study proved to be a useful tool for the identification of determinants of the administrative units' financial condition. This model allowed us to specify the significance (strength and direction) of selected socio-economic development factors for the financial self-sufficiency level of municipalities. The retained exogenous variables, extending to selected socio-economic factors, had a statistically significant impact on financial self-sufficiency levels of administrative units. As confirmed by the study, the following had a stimulating impact on the improvement of financial autonomy levels of administrative units under consideration: the share of economic operators with 50 or more employees; the share of economic operators with 10 to 49 employees; and the number of hotel beds per 1,000 population. In turn, such variables as the official unemployment rate and the share of rural population proved to have a destimulating effect.
- 3) The proposed approach to assess the financial self-sufficiency levels of municipalities in the Wielkopolskie voivodeship, Poland, is a universal technique that may be used for other administrative units. The proposed research approach may also be the basis for the establishment of development documents, e.g. development strategies.

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HOME ECONOMICS

THE ECONOMIC SITUATION OF THE FOOD INDUSTRY IN EU COUNTRIES

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Abstract. The aim of this paper is to present economic situation of food industry in Poland on the background of the EU countries in the years 2011-2015. The authors used tabular and descriptive methods to present the changes in the economic situation of food industry enterprises and analysed turnover, value added, number of employees and number of companies. We calculated the median, standard deviation, coefficient of variation, skewedness and kurtosis to analyse the changes in turnover and value added of food industry in EU countries. The survey proves that the food industry is developing well. Consolidation has been noticed, which means that the food companies are growing while their number is decreasing. The turnover of the food industry increased in the years 2011-2015 in almost in all EU countries, excluding Finland (-3.5 %) and Sweden (-5.7 %). The value added of the food industry decreased in the years 2011-2015 only in the Czech Republic (-6.9 %), the Netherlands (-2.1 %), Spain (-3.5 %). The number of food industry companies decreased in the years 2011-2015 only in Austria (-0.7 %), Belgium (-9.4 %), Denmark (-0.2 %), Finland (-2.8 %), Germany (-2.5 %) and Spain (-13.3 %).

Key words: food industry, enterprises, EU.

JEL code: Q12, Q11

Introduction

Food is the basic product that fulfils the needs of consumers. Food needs can be supported by products that can be bought on the market or by products produced on your own farm. Food can be bought and consumed in different places, for example by buying products from producers or stores for preparation of food at home (Stanko, Hamulczuk 2017).

The food industry is the most important industry within the EU and the world. It is responsible for 1.048 billion EUR production in the EU. This sector employs 4.2 million people, which accounts for 15.5 % of total employment in the production sector (Data & Trends..., 2014). Another factor stressing the importance of food industry is its 13 % share of all production companies in the EU among 286.000 companies (Juchniewicz, Lukiewska, 2015). The food industry and agriculture are important sectors not only because of high employment, but also because of preventing food crises. As Timmer (2010) claims, "the food crisis is usually set off by a shock to either supply or demand for food and often involves a sudden spike in food prices". The food crisis can be described as the period of high and volatile food prices. The globalisation of food markets has an impact on food prices (Hamulczuk 2017).

The sector involves not only food enterprises, but also the agricultural sector is involved in production and distribution of food. This sector takes part in the world's Global Value Chain (Borawski *et al.*, 2017).

The development of the food industry on the farm level in the EU market is restricted by the CAP. Generally, the CAP reforms were focused on providing substantial payments to farmers. Moreover, the CAP insists on food quality, environmental maintenance, and farm diversification on the second hand (Barnes *et al.*, 2016). Other reforms in 2015 were focused on separation of farm payments from production and adding "greening requirements". The budget of the CAP increased while the funding available at the national and individual farm levels decreased (European Commission, 2013).

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Today agribusiness enterprises are dependent on various factors such as production and distribution costs, technical development, and ways of management. The food industry is characterized by a high degree of division of labour and plays an important role in the economy (Hajderllari, Karantininis, 2012). As far as the level of competitiveness is concerned, the food enterprises in Poland are at lower level compared to more developed countries of the EU. The competitiveness depends on factors controlled by agriculture and the agri-food sector. The second group of factors are external factors, mainly: climate, rural policy, and tariffs (Wieliczko, 2014). The evaluation of efficiency of the agri-food sector depends on international trade indicators and strategic management. Especially important are the integration processes of small enterprises with big trade nets among farms (Kociszewski, Szwacka-Mokrzycka, 2011). The food industry is one of the most important parts of the economy because it is responsible for the nutrition of people and is an exporter of agricultural goods. Nowadays, the agri-food enterprises try to find new export possibilities, create new investments, and increase human capital (Firlej, Zmija, 2014). The agri-food enterprises try to develop a competitive advantage by fulfilment of the requirements of customers, ensuring high quality products by proper transport and storage conditions and optimization of product flows in agri-food chains (Baran, 2012; Klepacki, Rokicki, 2011).

The aim of this paper is to present the economic situation of the food industry in Poland on the background of the EU countries in the years 2011-2016. To develop the problem of economic situation of food industry the authors wanted to answer following questions:

- 1) What is the turnover of food industry in Poland?
- 2) How does the turnover and value added change regionally?
- 3) Is the number of employees and number of companies increasing?
- 4) What is the coefficient of variation, kurtosis and skewedness of turnover and value added of food industry?

We used tabular and descriptive methods to present the changes in the economic situation of the food industry. We calculated the median, standard deviation, coefficient of variation, skewedness, and kurtosis to analyze the changes in turnover and value added of the food industry in EU countries.

Research results and discussion

The development of the food industry is important because it uses agricultural products and creates demand for agricultural products. Thus, it is very important to allow common development of agriculture and the food industry. Cheap agricultural products delivered to the nutritious industry have an impact on processed products, which can be exported at lower prices. The situation on the food market in the EU changed in 2004 after new Member States joined the EU, including Poland. Countries such as Poland had advantages in such products as beef meat, poultry meat, meat and fish products, flour and starch products, and other (Braja, Sawicka, 2017).

One of the tools which is used in evaluation of food industry development is an industrial production index (so called industrial output index or industrial volume index). It measures the changes in the price adjusted-output of industry (Data & Trends..., 2017). Total manufacturing in the EU countries increased from the first quarter 2016 to first quarter 2017 by 1.9 %. The food and drink industry's production index also increased in 2016-2017 (0.9 %). The data prove that the

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food and drink industry in the EU countries is developing slowly, but steadily (Hajderllari, Karantininis, 2012).

Table 1 presents food and drink data of the EU countries in the years 2011-2015. The turnover decreased in Sweden (-5.7 %) and Finland (-3.5 %). It increased in other countries and did not change in Slovenia. The biggest turnover rates in 2015 were found in France (179.9 billion EUR), Germany (168.6 billion EUR), Italy (132 billion EUR), and the United Kingdom (131.6 billion EUR). The smallest turnover in 2015 was found in Estonia (1.8 billion EUR), Latvia (1.7 billion EUR), Slovenia (2.2 billion EUR), Lithuania (4.0 billion EUR), and Slovakia (4.0 billion EUR). The biggest increase of turnover in the years 2011-2015 was noticed in Austria (+80.2 %), the United Kingdom (+50.2), Hungary (+38.5) and Greece (+29.1).

Table 1

Turnover industry data in the years 2011-2015

Country	Turnover (EUR billion)		Median	Standard deviation	Coefficient of variation	Skewedness	Kurtosis	Changes 2011-2015 (%)	2017 Q1 / 2016 Q1 (% change)
	2011	2015							
Austria	12.6	22.7	20.3	4.02	20.8	-1.1	-0.3	+80.2	0.4
Belgium	44.5	48.6	48.0	1.6	3.5	-1.3	0.0	+9.2	7.0
Bulgaria	4.7	5.2	4.9	0.2	4.2	0.7	-0.8	+10.6	0.2
Cyprus	1.5	-	1.5	0.0	0.0	-	-	-	-
Croatia	-	5.3	5.2	0.1	1.4	-2.1	-0.5	-	-
Czech Republic	11.3	13.3	11.6	1.3	10.6	0.4	-1.7	+17.7	6.2
Denmark	25.4	25.4	24.6	0.6	2.3	-0.4	-0.8	0.0	3.3
Estonia	1.5	1.8	1.8	0.2	9.6	-0.3	-1.4	+20.0	3.7
Finland	11.3	10.9	11.2	0.2	1.6	-0.4	-1.6	-3.5	-1.0
France	157.2	179.9	160	12.9	7.6	0.4	-1.7	+14.4	2.8
Germany	163.3	168.6	169.3	4.4	2.6	-0.3	-0.9	+3.2	2.9
Greece	11	14.2	14.2	1.8	13.8	-0.4	-1.8	+29.1	2.8
Hungary	8.3	11.5	11.2	1.6	15.5	-0.4	-1.8	+38.5	2.8
Ireland	22.0	27.1	26.4	2.6	10.3	-0.4	-1.8	+23.2	4.3
Italy	127.0	132	132	2.2	1.7	-1.0	-0.6	+3.9	2.5
Latvia	1.6	1.7	1.6	0.2	11.7	-0.8	-0.5	+6.2	4.5
Lithuania	3.6	4.0	4.0	0.3	6.9	-0.1	-1.6	+11.1	7.8
Netherlands	59.2	70.0	66.6	4.5	6.9	-0.4	-1.4	+18.2	4.5
Poland	49.7	55.6	49.7	3.2	6.1	0.4	-1.8	+11.9	9.8
Portugal	14.5	15.3	14.9	0.3	2.3	0.3	-1.2	+5.5	8.2
Romania	10.5	12.0	11.1	0.6	5.2	0.6	-0.7	+14.3	6.7
Slovakia	3.7	4.0	3.8	0.3	8.1	1.1	-0.3	+8.1	-
Slovenia	2.2	2.2	2.2	0.1	4.2	-0.8	-0.9	0.0	-
Spain	83.8	104.2	91.5	7.4	8.0	0.6	-0.5	+24.3	5.2
Sweden	19.2	18.1	19.2	0.7	3.4	-0.4	-1.6	-5.7	4.4
United Kingdom	87.6	131.6	114	16.2	14.3	-0.7	-0.5	+50.2	-

Source: authors' calculations based on FoodDrinkEurope National Federations, 2011-2015

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The increase of turnover and production of food industry in EU-15 was driven by new members joining EU. It was the effect of increasing exports of agri-food products and increased internal demand (Beba, Poczta, 2014).

The index of industrial turnover measures the development of turnover (sales) in the European industry (it is influenced by changes in prices of the traded industrial goods and by changes of the volumes of goods traded) (Data&Trends..., 2017). The turnover index in total manufacturing in the first quarters of 2016-2017 increased by 6.7 %. The turnover index of food and drink industry in the first quarters of 2016-2017 also increased by 4.3 %.

Table 1 presents the descriptive statistics for turnover in selected EU countries. The coefficient of variation informs about changes. The highest were observed in Austria (20.3 %), Hungary (15.5 %) and the United Kingdom (14.3 %). The lowest coefficients of variation in the years 2011-2015 were found in Finland (1.6 %) and Italy (1.7 %). Cyprus noted no changes in turnover.

The kurtosis, which is an asymmetry measure, has negative values in most countries of the EU what is, indicating that they were different in the analyzed period in relation to the mean. Only Belgium achieved positive kurtosis, which suggests the similarity to the mean.

The skewedness which is also a asymmetry measure, has negative values in most countries of the EU. Other countries such as Bulgaria, the Czech Republic, France, Poland, Portugal, Romania, Slovakia and Spain noted positive skewedness which suggests similar values to the mean.

The food and drink industry turnover in the first quarters of 2016-2017 increased in almost all countries. It only decreased in Finland. The biggest increase of turnover in the EU was observed in Poland (9.8 %), Portugal (8.2 %), and Lithuania (7.8 %).

Another characteristic of the food industry is profitability. It means that the company wants to achieve positive results out of activity (Szymanska, 2017). It is measured by the relationship to referenced economic value. The author measured the profitability on the pig market. She found that the return on equity in Polish pig meat enterprises was 12.45 % in 2008, 17.49 % in 2010 and in 2012 – 6.95 %. The economic downturn on the pig market caused the decrease of return on equity. It means that the food market in Poland and other countries is very sensitive to crises.

The value added decreased in the Czech Republic and the Netherlands (tab. 2). It did not change in Hungary, Portugal and Slovenia. The biggest value added in 2015 was found in France (45 billion EUR), Germany (36.7 billion EUR), the United Kingdom (38.9 billion EUR), and Italy (24.2 billion EUR). The smallest value added of the food and drink industry in 2015 was found in Estonia and Latvia (0.4 billion EUR), Slovenia (0.5 billion EUR) and Slovakia (0.8 billion EUR). The largest values were in the largest economies. The biggest increase of value added in the years 2011-2015 was found in Germany (219.1 %), Greece (100.0 %), and the United Kingdom (64.1 %). The decrease of value added in the years 2011-2015 was found in the Czech Republic (-6,9), the Netherlands (-21,0), and Spain (-3.5 %).

After introduction to the EU the new countries in 2004 the pace of the development of food industry increased. In 2008 during the world financial crises the development of the food industry decreased (Beba, Poczta, 2014).

Table 2 presents the descriptive statistics for values added in EU countries. The coefficient of variation informs about changes in value added. The highest were observed in Croatia (82.4 %), France (44.6 %) and Germany (34.9 %). The lowest coefficient of variation in the years 2011-2015 were found in Italy (9,2 %) and France (12,1 %).

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The kurtosis, which is the asymmetry measure, has negative values in most countries of the EU that is, indicating that they were different in the analyzed period in relation to the mean. Only Croatia, Estonia, Germany and Slovakia achieved positive kurtosis, which suggests the similarity to the mean.

The skewedness, which is also a asymmetry measure, has negative values in the Czech Republic, Estonia, France, Germany and other countries, which indicates that they were different in the analyzed period in relation to the mean. Other counties such as Australia, Belgium, Bulgaria, Croatia, Denmark, Finland, Greece, Hungary, Italy, Latvia, and Lithuania noted positive skewedness which suggests similar values to the mean.

Table 2

Value added of food industry data in the years 2011-2015

Country	Value added (EUR billion)		Median	Standard deviation	Coefficient of variation	Skewedness	Kurtosis	Changes 2011-2015 (%)
	2011	2015						
Austria	4.7	5.5	5.1	0.3	6.2	0.4	-0.9	+17.0
Belgium	6.7	8.1	7.4	0.6	7.9	0.2	-1.4	+20.9
Bulgaria	0.8	1.0	0.8	8.9	0.1	0.8	-0.9	+25.0
Cyprus	0.4	-	0.4	0.0	0.0	n.a.	n.a.	-
Croatia	-	1.2	1.2	1.6	82.4	1.5	0.3	-
Czech Republic	2.9	2.7	2.4	0.4	15.8	-0.2	-1.1	-6.9
Denmark	3.2	4.5	3.2	0.7	20.5	0.4	-1.8	+40.6
Estonia	0.3	0.4	0.4	0.9	12.3	-5	0.2	+33.3
Finland	2.5	2.6	2.6	0.0	3.2	0.3	-1.2	+4.0
France	29.3	45.0	29.3	12.9	44.6	-0.2	-1.0	+53.6
Germany	11.5	36.7	34.2	10.5	34.9	-1.5	0.2	+219.1
Greece	1.4	2.8	1.5	0.6	33.1	0.9	-0.6	+100.0
Hungary	2.0	2.0	2.0	0.2	10.2	1.2	0.0	0.0
Ireland	6.0	-	7.1	0.6	8.4	-0.7	-0.4	
Italy	24.2	24.2	24.2	1.7	7.2	0.5	-0.4	0.0
Latvia	0.3	0.4	0,3	0.1	16.1	0.4	-1.8	+33.3
Lithuania	0.6	0.8	0.6	0.1	13.6	0.8	-0.9	+33.3
Netherlands	14.3	11.3	13.3	1.8	13.9	-0.1	-1.6	-21.0
Poland	8.9	9.9	9.9	0.7	0.1	0.0	-1.5	+11.2
Portugal	2.9	2.9	2.9	0.1	0.1	-0.6	-1.4	-0.0
Romania	2.2	-	1.9	0.2	8.1	0.4	-1.8	-
Slovakia	0.7	0.8	0.7	0.0	6.2	1.5	0.3	+14.3
Slovenia	0.5	0.5	0.5	0.1	11.9	-0.4	-1.8	0.0
Spain	20.0	19.3	26.8	4.5	18.3	-0.4	-1.8	-3.5
Sweden	4.4	4.5	0.5	0.1	2.9	-0.4	-1.4	+2.3
United Kingdom	23.7	38.9	31	5.5	17.7	-0.0	-0.8	+64.1

Source: author's calculations based on FoodDrinkEurope National Federations, 2011-2015

The food industry is a very important source of employing people. This is very visible in Poland, where the food industry employs more than 417 thousand people and occupies 2.7 % in the country's economy. In comparison, the employment in agriculture in Poland in 2015 was 2333.4 thousand people, which occupies 16.2 % of the country's economy. The employment in

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agriculture in Poland was six times higher than in the food industry; however, it can be described as permanent. The development of the economy causes a lower contribution of agriculture in gross domestic products. This can be explained by the lower income elasticity of demand on food products in comparison to other goods (Pawlewicz, Brodzinski, 2017).

The employment in the food industry in the EU countries changed in the years 2011-2015. The number of employees decreased in the years 2011-2015 in the following countries: Belgium, Bulgaria, France, Latvia, the Netherlands, Portugal, Romania, Slovakia, Spain and Sweden (tab. 3). It increased in the remaining countries of the EU. The data exhibit the consolidation processes in the food industry in the EU countries. In Poland, all of the macroeconomic factors of the food industry increased. The biggest numbers of employees in 2015 in the food and drink industry were found in France (427.2 thousand), Germany (569.2 thousand) and Italy (427 thousands). The smallest number of employees in 2015 was found in Estonia (15.4 thousand), Slovenia (16.5) and Latvia (23.7). The biggest increase in the number of employees in the years 2011-2015 was found in Austria (43.6 %), Greece (34.1 %) and Estonia (18.5 %). The biggest decrease in the number of employees in the food and drink industry in the years 2011-2015 was found in France (-14.6 %) and Spain (-21.7 %).

The labour input measures the number of persons employed in the total manufacturing industry vs. the food and drink industry in the EU, seasonally adjusted (Data & Trends..., 2017). The employment index of total manufacturing increased in the first quarters of 2016-2017 (1.4 %). The employment index of the food and drink industry also increased in the first quarters of 2016-2017 (2.0 %).

The labour resources in the food industry were measured by Juchniewicz (2017), who analysed the food producer's competitiveness gap in Poland on the European Union market. She found that the largest share of employed persons in food production of all the employed in the EU-28 in 2013 was recorded in Germany (20.3 %), France (14.0 %), Italy (9.7 %), Poland (9.5 %), the UK (9.2 %) and Spain (7.7 %). She also measured the productivity of labour of food producers. The index was the highest in Belgium, the Netherlands, France, the UK and Germany. In Romania, the productivity was the smallest.

The competitiveness of the food industry in the EU market is determined by consolidation processes. This issue can be seen in almost all marketing chains from rural producers to suppliers of production means and retail trade. These processes are not stable and they caused different competitiveness. The strongest is the retail trade because of big shops' contribution in food trade (Stanko, Hamulczuk, 2016).

The employment in food industry in Poland and EU countries was the effect of integration and restructuring processes. The changes in labour of the food industry are similar to those in whole economy. The increased condition of the economy, increased demand on EU markets and exports of agricultural products caused the increase of employment in many countries of EU (Beba, Poczta, 2014).

Another characteristic of the food and drink industry is the number of companies (tab. 3). The largest number of companies in 2015 was found in Spain (26.016), Poland (14.534) and Portugal (10.096). The smallest number of companies in 2015 was found in Slovakia (278), Estonia (575) and Ireland (1583). The biggest increase in the number of companies in the years 2011-2015 was

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found in Italy (793.9 %), France (472.9 %) and Slovenia (86.0 %). The biggest decrease in the years 2011-2015 was found in Spain (-13.3 %), Belgium (-9.4 %) and Finland (-2.8 %).

Table 3

Number of employees and number of companies in the years 2011-2015

Country	Number of employees (1.000)		Changes 2011-2015 (%)	2017 Q1 / 2016 Q1 (% change)	Number of companies		Changes 2011-2015 (%)
	2011	2015			2011	2015	
Austria	58	83.3	+43.6	2.7	3.921	3.893	-0.7
Belgium	89	88.5	-0.6	1.8	4.912	4.452	-9.4
Bulgaria	99	95.6	-3.4	1.3	5.612	6.182	+10.1
Cyprus	13	-	-	-	863	-	-
Croatia	-	61.0	-	-4.2	-	3.256	-
Czech Republic	105	115.4	+9.9	2.1	8.360	9.157	+9.5
Denmark	55	61.6	+12.0	0.3	1.610	1.607	-0.2
Estonia	13	15.4	+18.5	0.6	422	575	+36.2
Finland	33	37.6	+13.9	-13.5	1.900	1.846	-2.8
France	500	427.2	-14.6	2.4	10.000	57.290	+472.9
Germany	550	569.2	+3.5	2.7	5.960	5.812	-2.5
Greece	65	87.2	+34.1	-	1.180	1.225	+3.8
Hungary	97	106.6	+9.9	-	6.556	6.812	+3.9
Ireland	43	47.3	+10.0	9.7	689	1.583	+129.7
Italy	408	427.0	+4.6	-	6.300	56.315	+793.9
Latvia	25	23.7	-5.2	-3.0	788	1,120	+42.1
Lithuania	42	44.1	+5.0	-4.4	1.205	1.609	+33.5
Netherlands	131	128.6	-1.8	-	4.385	6.065	+38.3
Poland	403	417.5	+3.6	3.5	13.708	14.534	+6.0
Portugal	110	107.5	-2.3	2.6	10.513	10.996	+4.6
Romania	186	180.8	-2.8	0.9	8.239	8.826	+7.1
Slovakia	30	29.3	-2.3	-	218	278	+27.5
Slovenia	16	16.5	+3.1	-	1.214	2.258	+86.0
Spain	446	349.2	-21.7	6.4	30.000	26.016	-13.3
Sweden	56	50.5	-9.8	-	3.400	4.240	+27.7
United Kingdom	370	418.2	13.0	-0.3	6.500	6.620	+1.8

Source: author's calculations based on FoodDrinkEurope National Federations, 2011-2015

Poland has faced many changes in food industry subjects, particularly on milk market. The number of wholesaler suppliers decreased from 311.1 (thousand) in 2005 to 130.3 (thousand) in 2014 (decrease 44.3 %). Poland had the biggest number of wholesaler suppliers in the EU. The smallest number of wholesaler suppliers in the EU countries was observed in 2015 in Cyprus (204) and Estonia (640). Big economies in milk production, particularly Germany had 72.6 thousand wholesaler suppliers in 2016, France - 66.7 thousand suppliers in 2015 and Austria - 33.3 thousand suppliers (Analizy i prognozy rynkowe, 2015). Moreover, the number of direct suppliers of milk decreased from 76 thousand in 2005 to 10.8 thousand in 2014 (decrease (85.8 %). However, the average wholesaler supply of milk increased from 27 tonnes per supplier to 73 tonnes in 2014 (increase 270.4 %). The average number of dairies decreased from 181 companies in 2014 to 165 in 2017 (8.8 decrease). These results demonstrate the changes on the Polish milk market (Trajer, Krzyzanowska, 2015).

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The biggest decrease of food industry enterprises is observed in small and medium-sized enterprises. The biggest increase is observed in large enterprises. These processes are the effect of concentration in food industry in EU. The level of concentration measured by the increase of numbers of large enterprises is bigger than the decrease of small enterprises (Tereszczuk, 2013).

The development of food industry in EU countries is linked with the outlays on research and innovations. The biggest has been observed in nutritious articles, beverages and cigarettes. In Poland for example most of outlays on research and development was directed to professional experience of employees and marketing of new products. The biggest increase of outlays was observed in knowledge purchase for external sources and programs (Zmija, 2015).

Conclusions, proposals, recommendations

- 1) The food industry is a very important part of the economy in the EU countries. The survey proved this development. The EU is a big producer of food and a very important player on the world markets. The EU is the largest exporter and importer of food products within the world. The enlargement of the EU in 2004 has led to the effect of creativity trade and internal trade (Juchniewicz, 2017).
- 2) The food sector is one of the fastest growing EU market sectors. However, this sector is very sensitive to financial crises. This issue can be confirmed by sudden changes in all variables analysed in this paper.
- 3) The turnover data prove the development of food industry in Europe. The turnover increased in almost all countries of the EU. It has decreased only in Sweden (-5.7 %) and Finland (-3.5 %). The biggest producers of food products in the EU measured by turnover in 2015 were France (179.9 billion EUR), Germany (168.6 billion EUR), Italy (132 billion EUR) and the United Kingdom (131.6 billion EUR).
- 4) Another characteristic describing the food industry is the value added. It is the result of turnover development in the countries. The research proved that the biggest value added in 2015 was found in France (45 billion EUR), Germany (36.7 billion EUR), the United Kingdom (38.9 billion EUR) and Italy (24.2 billion EUR). The biggest food producers of the EU are managing the market. The smallest countries and food producers are mainly importers. The smallest value added of the food and drink industry in 2015 was found in Estonia and Latvia (0.4 billion EUR), Slovenia (0.5 billion EUR), and Slovakia (0.8 billion EUR).
- 5) The employment data prove the development of food industry in the EU, which is characterized by consolidation processes and the changes of human resources by technical resources. The number of employees decreased in the years 2011-2015 in many countries, for example Belgium, Bulgaria, France, Latvia, the Netherlands, Portugal, Romania, Slovakia, Spain, and Sweden.
- 6) The number of companies also changed in the analysed period. The main producers of food with the biggest number of companies in 2015 on the one hand were Spain (26.016), Poland (14.534) and Portugal (10.096). On the other hand, the smallest number of companies in 2015 was found in Slovakia (278), Estonia (575), and Ireland (1583).
- 7) The coefficient of variation informs us about changes in turnover and value added of the food industry in EU countries. The biggest and positive changes of turnover were observed in Austria

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(20.3 %), Hungary (15.5 %) and United Kingdom (14.3 %). The biggest and positive changes in value added were observed in Croatia (82.4 %), France (44.6 %) and Germany (34.9 %).

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EVALUATION OF CHANGES IN HOUSING CONDITIONS THROUGHOUT THE POLISH RURAL AREAS USING METHODS OF RELATIVE TAXONOMY

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Abstract. The aim of the article was to assess housing conditions of population in rural areas in the provinces in Poland in the years 2007-2016 and to analyse changes taking place in this period and the scale of disproportions between regions. The research was dynamic and concerned the verification of the research hypothesis assuming that the level of housing conditions of the population in rural areas in Poland in the voivodship system is equalizing. In order to assess the level and changes of the studied complex phenomenon, one of the relative taxonomy methods was used, in dynamic terms, which is based on the construction of a medium-based synthetic meter. This method not only allows you to classify units in a given period but above all, it allows to observe changes in the value of a synthetic variable over time, wherein the construction of a synthetic feature is based on the relativistic values of diagnostic features. The research was based on data from the Local Data Bank of the Central Statistical Office in Poland.

Only in the group of provinces where housing conditions in rural areas at the beginning of the research period (in 2004) were assessed as high compared to other provinces (relative class I) some convergence in the studied phenomenon in 2004-2016 was observed. Among 8 provinces, which in 2004 were characterized by a relatively low and average lower level of housing conditions in rural areas (relative classes II and III), we can talk about increasing the disproportions within the classes distinguished in 2004-2016. At the same time, however, the synthetic assessment of housing conditions in 5 provinces from classes II and III improved and approached the level of provinces from class I in the analyzed period and only in 3 provinces this rating has deteriorated. The results of the research allowed only a partial confirmation of the research hypothesis.

Key words: housing conditions, relative taxonomy, rural areas, provinces, Poland.

JEL code: O18, C38,

Introduction

The significant differences in the socio-economic development and, consequently, in the standard of living of the population of countries and regions is one of the basic problems of the modern European economy. An important goal of the cohesion policy implemented in the EU is to equalize the standard of living and to reduce development disparities between regions. The living standards of the population, especially due to their important role in the life of every individual and family, are particularly evident in housing conditions. They can be considered in quantitative terms, indicating, for example, the availability of housing (existing housing stock), their features (area, number of rooms) and quality, i.e., for example, their equipment in technical infrastructure (water supply, sewage system, gas network etc.). The house, besides satisfying physiological needs, lying in the base Maslow's hierarchy of needs, is also a mean to fulfill all higher-level needs (security, belonging, recognition, self-fulfillment).

The importance of housing conditions for the life of the individual and the functioning of societies has been emphasized in many acts of global and EU range. European integration affects, to a large extent, the housing policies of member countries (Salamon, Muziol-Wieclawowicz 2015). According to art. II-94 paragraph 3 of Treaty establishing a Constitution for Europe (2005, p. 54) in order to counteract social exclusion and poverty, the EU recognizes and respects the right to social assistance and housing assistance, in accordance with the rules laid down in EU law and national laws and practices, to ensure a decent existence for all those who lack sufficient resources. As emphasized in the study prepared by EUROSTAT (Living Conditions in Europe 2014): "Poor

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housing conditions is an important barrier for achieving a standard of living considered as acceptable in the society".

Problems related to housing are also an important social problem in Poland. They concern both shortages in the scope of housing resources (due to the delay in construction in relation to the needs of the population) as well as housing equipment (Murawska, Gotowska, 2014, Kozera et al., 2017). The distribution of housing resources, their equipment in technical and sanitary facilities, and the needs of the society in terms of housing conditions are determined by, among others, the level of social and host development of the region, the demographic situation and changes in it, such as the level of migration, changes in the demographic structure.

In recent years, especially after Poland's accession to the European Union, rural areas are becoming more often the target of interest. Many attention is paid to their problems, prospects and development risks (Hadynski 2015; Heffner, Klemens 2016). This interest is dictated by the fact that, according to the methodology of distinguishing rural areas used by the Central Statistical Office, they occupy over 90 % of Poland's area. The demographic potential of these areas, especially those close to larger urban centres, is also growing. In 2016, rural areas in Poland were inhabited by more than 15 million people, or 40 % of the total population (Local Data Bank, access: 15.01.2018). As it results from the report *Polska wies 2016*, the most important indicators between the city and the countryside are characterized by the level of socio-economic development, as well as consumption patterns, demographic situation and many others. However, rural areas in Poland are still highly diversified on a regional basis in terms of the level of socio-economic development and, as a result, in terms of housing conditions and the standard of living of the population (Murawska, Gotowska, 2014, Murawska 2012). The issues of measuring the level of housing conditions of the population in rural areas in the regional system (provinces) is therefore extremely important from an economic, social and political point of view. This information is necessary for the implementation of the national regional development policy, as well as for the implementation of the cohesion policy objectives.

The aim of the article was to assess housing conditions of population in rural areas in the provinces in Poland in the years 2007-2016 and to analyse changes taking place in this period and the scale of disproportions between regions. The research was dynamic and concerned the verification of a research hypothesis assuming that the level of housing conditions of the population in rural areas in Poland in the system of voivodeships is balanced. This aim was achieved by a research task that involved construction of a synthetic index of housing conditions using one of the methods of dynamic relative taxonomy. This method not only allows to classify units in a given period, but above all enables observation of changes in the value of a synthetic variable over time, wherein the structure of a synthetic feature is based on the relativistic values of diagnostic features. The research was based on data from the Local Data Bank of the Central Statistical Office in Poland.

Research methodology

Housing conditions are a multidimensional phenomenon, they are examined usually using taxonomic methods (Kozera, 2016; Kozera, 2017). Among the applied research approaches, the methods of constructing a synthetic meter are often used. On the basis of the obtained values of the synthetic meter, the examined objects are sorted (eg regions) and their ranking is created. According to Wydymus (2013), the determination of the relative position of a given region (e.g.

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country, province) on this basis is highly problematic. In this situation, a relative taxonomy can be used to synthetically assess housing conditions, in which no particular simple features are considered, but rather relativized indicators, which in terms of individual features are designated as quotients of the trait value in a given region in relation to the values of other regions (Wydymus, 2013).

To assess housing conditions in rural areas in terms of voivodships in Poland in the years 2004-2016, the following diagnostic features (stimulants) were selected:

- X1 – the number of housing units in rural areas per 1 thousand residents,
- X2 – average usable floor area of a housing unit per one person in rural areas (sq.m.),
- X3 – percentage of rural population using the water supply network (%),
- X4 – percentage of rural population using the sewage network (%),
- X5 – percentage of housing units equipped with a toilet flushed with water (%),
- X6 – percentage of housing units equipped with bathroom (%),
- X7 – percentage of rural population using the gas network (%),
- X8 – percentage of housing units equipped with central heating (%).

To determine the relative value of a synthetic measure of housing conditions in rural areas in Polish voivodships in particular years in the period of 2004-2016, the procedure described by Wydymus (2013) was used, which was also used in other studies (Lira et al., 2014; Lira 2015).

The values of individual features (housing conditions) for each object (province) and each year were relativized according to the formula (Wydymus 2013):

$$d_{\left(\frac{b}{c}\right)jt} = \frac{x_{bjt}}{x_{cjt}} \quad (1)$$

where: $b \neq c$, $b=1, \dots, n$, $c=1, \dots, n$

x_{ijt} – denoted the observation in the i -th province ($i=1, \dots, n$) of the j -th housing conditions ($j=1, \dots, m$) in year t ($t=1, \dots, k$).

Thus transformed housing conditions indices of the c -th province relative to other province for feature j and year t could be presented in the following form (Wydymus 2013):

$$\mathbf{D}_{jt} = \begin{bmatrix} 1 & d_{\left(\frac{2}{1}\right)jt} & \dots & d_{\left(\frac{n}{1}\right)jt} \\ d_{\left(\frac{1}{2}\right)jt} & 1 & \dots & d_{\left(\frac{n}{2}\right)jt} \\ \vdots & \vdots & \ddots & \vdots \\ d_{\left(\frac{1}{n}\right)jt} & d_{\left(\frac{2}{n}\right)jt} & \dots & 1 \end{bmatrix} \quad (2)$$

In order to classify the objects with respect to all diagnostic features simultaneously the subsequent matrices were calculated (Wydymus, 2013):

$$\mathbf{D}_{jt}^* = \mathbf{A} \cdot \mathbf{D}_{jt} \quad (3)$$

where the matrix \mathbf{A} was defined as:

$$\mathbf{A} = \begin{bmatrix} 0 & \dots & \frac{1}{(m-1)} \\ \vdots & \ddots & \vdots \\ 1 & \dots & 0 \\ \frac{1}{(m-1)} & \dots & 0 \end{bmatrix} \quad (4)$$

The diagonal elements of \mathbf{D}_{jt}^* formed matrices \mathbf{W}_t (for each time period):

$$W_t = \begin{bmatrix} W_{11t} & W_{12t} & \dots & W_{1mt} \\ W_{21t} & W_{22t} & \dots & W_{2mt} \\ \vdots & \vdots & \ddots & \vdots \\ W_{n1t} & W_{n2t} & \dots & W_{nmt} \end{bmatrix} \quad (5)$$

The higher the value of W_{ijt} index, the greater was the advantage of the i -th province over remaining ones in the j -th feature (housing conditions) and in the t -th year.

Next, the W_t matrices were used to compute the S_{it} matrix of relative synthetic indices of development for given objects and time periods (Wydymus, 2013):

$$S_{it} = \frac{1}{m} \sum_j \frac{1}{w_{ijt}} \quad (6)$$

The values of S_{it} smaller than 1 signified relative advantage of the i -th object over others in period t .

The research drew on data from Local Data Bank published by the Central Statistical Office in Warsaw. Calculations were performed in R.

Research results and discussion

Values of the relative synthetic index (S_{it}) of housing conditions in rural areas calculated for 2004 period were used for linear ordering of the provinces: from the highest values of the index to the lowest. Next, the differences between adjacent provinces were computed and used to classify all the provinces into three typological classes. The decision to split a class was made when the differences came out relatively high. Class I of high relative housing conditions level in rural areas in 2004 comprised the provinces of Dolnoslaskie, Lubuskie, Malopolskie, Podkarpackie, Pomorskie, Slaskie, Wielkopolskie, Zachodniopomorskie, and class II of medium low relative level: Lubelskie, Mazowieckie, Opolskie, Swietokrzyskie and Warminsko-Mazurskie, class III of low relative level and, and class IV of low relative level: Kujawsko-Pomorskie, Lodzkie, Podlaskie.

The voivodships in which the housing conditions in rural areas in 2004 compared to all other voivodships were clearly better were qualified to the relative class I (the synthetic relative index in 2004 reached values below 1). In this class, there were three voivodships, namely Pomorskie, Malopolskie and Lubuskie, where in the period 2004-2016 further improvement of housing conditions was noted in comparison to other voivodships (Table 2). This was confirmed by the decreases in the value of the synthetic index between 2004 and 2016. It can be assumed that these voivodships strengthened their position of leaders in the considered period - voivodships with the highest assessment of housing conditions in rural areas. Analyzing the values of changes in the relative synthetic index between 2004 and 2016, in the case of the Pomorskie Voivodship one can speak of moderate improvement (decrease in the value of the S_{it} indicator by 1.35 %) and in the case of the other two voivodships (Malopolskie and Lubuskie) with slight improvement (changes in the value of the indicator were -0.67 % and -0.11 % respectively). In the case of five voivodships from class I located in the western and southern parts of Poland, i.e. Zachodniopomorskie, Wielkopolskie, Dolnoslaskie, Slaskie and Podkarpackie, a slight deterioration of the relative assessment of housing conditions was recorded in 2004-2016 (slight increase in the value of the S_{it} meter). However, this situation did not result from the deterioration of housing conditions in reality, but from the more dynamic improvement of conditions in other voivodships, for which they were compared. In the case of these voivodships, one can therefore speak of a relative weakening of the position of leaders in terms of housing conditions in rural areas. By far the most weakened

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position of the Slaskie Voivodeship in 2004-2016 (increase in the value of the synthetic reference rate by 6.21 %), which in 2004 was in the first place in terms of the assessment of housing conditions in rural areas (the value of the S_{it} indicator was 0.78).

Table 1

Values of relative synthetic index S_{it} of housing conditions in rural areas for all Polish provinces in 2004-2016

Relative class	Values of S_{it} index
<p>I of high relative housing conditions level in rural areas</p> <p>In 2004: $S_{it} < 1.0$</p>	
<p>II of medium low relative housing conditions level</p> <p>In 2004: $1.0 < S_{it} < 1.2$</p>	
<p>III of low relative housing conditions level</p> <p>In 2004: $S_{it} > 1.2$</p>	

Source: authors' calculation based on Local Data Bank, Central Statistical Office, Warsaw

Table 2

Values of relative synthetic index S_{it} of housing conditions in rural areas for all Polish provinces in 2004-2016 and evaluation of its change between 2004 and 2016

Relative class	Relative change in relation to other provinces		Provinces	Years													Change of values of S_{it} 2016/2004 (%)*
				2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
I of high relative housing conditions level in rural areas In 2004: $S_{it} < 1.0$	relative improvement - strengthened position of leaders	moderate improvement ($-5\% < S_{it} < -1\%$)	Pomorskie	0.91	0.92	0.92	0.93	0.93	0.91	0.91	0.91	0.91	0.91	0.9	0.9	0.9	-1.35
		slight improvement ($-1\% < S_{it} < 0\%$)	Malopolskie	0.94	0.93	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.94	0.94	0.93	0.93	-0.67
			Lubuskie	0.94	0.95	0.94	0.94	0.95	0.93	0.93	0.94	0.94	0.94	0.93	0.94	0.94	-0.11
	relative deterioration - weakening of the position of leaders	slight deterioration ($0\% < S_{it} < 1\%$)	Dolnoslaskie	0.87	0.88	0.88	0.89	0.89	0.88	0.88	0.88	0.89	0.89	0.88	0.88	0.88	0.82
		moderate deterioration ($1\% < S_{it} < 5\%$)	Wielkopolskie	0.85	0.85	0.85	0.86	0.86	0.85	0.85	0.86	0.86	0.86	0.86	0.86	0.86	1.85
			Zachodnio-pomorskie	0.81	0.81	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.83	0.84	0.84	0.84	3.86
			Podkarpackie	0.88	0.88	0.88	0.89	0.89	0.89	0.9	0.9	0.91	0.91	0.91	0.91	0.92	4.67
		appreciable deterioration ($S_{it} > 5\%$)	Slaskie	0.78	0.78	0.78	0.79	0.79	0.8	0.83	0.83	0.83	0.83	0.83	0.83	0.83	6.21
II of medium low relative housing conditions level In 2004: $1.0 < S_{it} < 1.2$	relative improvement	appreciable improvement ($S_{it} < -5\%$)	Mazowieckie	1.04	1.03	1.02	1	0.99	0.99	0.97	0.97	0.97	0.97	0.97	0.97	0.97	-6.92
			Swietokrzyskie	1.09	1.07	1.07	1.06	1.07	1.08	1.05	1.03	1.03	1.03	1.03	1.03	1.03	-6.32
		slight improvement ($-1\% < S_{it} < 0\%$)	Warminsko-mazurskie	1.13	1.14	1.15	1.15	1.15	1.16	1.17	1.17	1.17	1.16	1.12	1.12	1.12	-0.9
			Lubelskie	1.13	1.14	1.13	1.13	1.13	1.14	1.11	1.1	1.1	1.1	1.12	1.12	1.13	-0.43
	relative deterioration	slight deterioration ($0\% < S_{it} < 1\%$)	Opolskie	1.08	1.07	1.08	1.09	1.06	1.08	1.08	1.07	1.08	1.09	1.1	1.09	1.08	0.31
III of low relative housing conditions level In 2004: $S_{it} > 1.2$	relative improvement	significant improvement ($S_{it} < -5\%$)	Kujawsko-pomorskie	1.23	1.24	1.23	1.18	1.19	1.19	1.19	1.19	1.16	1.16	1.15	1.15	1.15	-6.7
		moderate improvement ($-5\% < S_{it} < -1\%$)	Lodzkie	1.22	1.22	1.21	1.23	1.22	1.21	1.19	1.2	1.2	1.2	1.2	1.2	1.2	-1.65
	relative deterioration	significant deterioration ($S_{it} > 5\%$)	Podlaskie	1.24	1.24	1.25	1.25	1.27	1.3	1.3	1.31	1.32	1.3	1.35	1.35	1.35	8.46
The range of the index S_{it} value				0.46	0.45	0.46	0.46	0.48	0.5	0.48	0.48	0.49	0.47	0.52	0.52	0.52	-

Source: authors' calculation based on Local Data Bank, Central Statistical Office, Warsaw

To the relative class II (Table 1), voivodships, in which housing conditions were rated as lower average in comparison to other voivodships (the relative synthetic value ranging from 1.04 to 1.13), were classified. In this class of voivodships there were voivodships: Lubelskie, Mazowieckie, Opolskie, Swietokrzyskie and Warminsko-mazurskie. Of the five voivodships in this class, in as many as four, in 2004-2016, the improvement of housing conditions was noted, whereas in the Mazowieckie and Swietokrzyskie voivodships, the improvement was appreciable (the decrease of S_{it} indicator by more than 6 %) and in Lubelskie and Warminsko-mazurskie - insignificant (the decrease of S_{it} indicator by less than 1 %). However, in the Opolskie Voivodeship, there was a slight deterioration of housing conditions in rural areas in the considered period.

In 2004, three provinces: Kujawsko-Pomorskie, Lodzkie and Podlaskie were characterized by a low relative assessment of housing conditions in rural areas. In the years 2004-2016, a significant improvement in terms of housing conditions was noted in the Kujawsko-Pomorskie Province (the decrease of S_{it} indicator by 6.7 %) and in the Lodzkie region - moderate improvement (the decrease by 1.65 %). In the least favourable situation were rural areas in the Podlaskie Province, because in 2004 this voivodship was on the last position in the voivodship ranking in terms of assessing housing conditions in rural areas (the value of the relative synthetic index was 1.24) and in the considered period there was a further significant deterioration of this assessment (increase in the value of the S_{it} indicator by 8.46 - it was the highest recorded increase of the S_{it} index).

From the construction of a relative synthetic measure used in the study it appears that voivodships would not differ in terms of the assessment of the studied phenomenon, if the value of this indicator for all voivodships was equal 1. Analysing the values of S_{it} indicator in individual years, it was found that only in class I, with a relatively high assessment of housing conditions in rural areas in 2004, a slight reduction in the disproportions in the studied phenomenon in 2004-2016 was noted. The range of values of the S_{it} indicator, which in 2004 ranged from 0.78 to 0.94 decreased to the range from 0.83 to 0.94 (Table 2 and Table 1).

In relative class II and III, however, there was a marked increase in disproportions, which is clearly presented in the figures in Table 1. The values of the relative synthetic index of housing conditions in rural areas in 2004 for all voivodships ranged from 0.78 (Slaskie) to 1.24 (Podlaskie Voivodeship), so their spread was 0.46 (Table 2). The values of the indicator in 2016, however, ranged from 0.83 to 1.35 (the spread was 0.52). The increase in the spread of the S_{it} indicator between 2004 and 2016 shows an increase in the disproportion between voivodships in terms of housing conditions in rural areas. At the same time, for five provinces from these classes (Mazowieckie, Swietokrzyskie, Warminsko-mazurskie, Lubelskie, Kujawsko-Pomorskie and Lodzkie) improvement in housing conditions was observed, and a synthetic assessment of their level approached the assessment of housing conditions in Class I. Only in three voivodships deterioration of the relative synthetic evaluation of the studied phenomenon and, as a result, increase in the spread of the indicator value S_{it} was observed.

The conducted empirical research allowed only a partial verification of the research hypothesis assuming that "the level of housing conditions in rural areas in Poland in the system of provinces is levelling out", as only in 13 out of 16 provinces, convergence in the studied phenomenon was observed.

Conclusions, proposals, recommendations

- 1) The use of a relative synthetic indicator to assess housing conditions in rural areas in the Polish provinces allowed not only to assess the level of the studied phenomenon in each region in relation to other regions, but also to analyse changes in the relative level of housing conditions in the 2004-2016 period.
- 2) For 50 % of provinces, housing conditions at the beginning of the research period (in 2004) were assessed as high compared to other provinces, and in the second half of the voivodeships as average lower and lower. While awaiting the convergence processes and reducing disparities between regions, convergence in the subsequent years of the relative values of indicators to unity should be expected. This would mean reducing the advantage (relative "deterioration") in terms of housing conditions in class I (i.e., the increase in the value of a relative synthetic index) and a relative improvement in the assessment of housing conditions in class II and III. Unfortunately, while in class I a convergence in the field of the studied phenomenon was observed, in the class II and III we can talk about increasing disproportions between voivodships in terms of housing conditions in rural areas.
- 3) Due to the fact that the distribution of the housing resources, their equipment in technical and sanitary facilities is related to both the economic and demographic situation of the regions, it is advisable to continue the undertaken research and link these phenomena, which would enable identification of conditions for improving housing conditions voivodships in Poland.

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THE EFFECTS OF PRIVATIZATION OF THE TOBACCO COMPANY IN THE OPINION OF EMPLOYEES

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Abstract. The change of an enterprise owner often takes place along with privatization, during which the harmony existing in the company is strongly disturbed, and the on-going changes affect the working conditions, sense of security and the relationships between employees. The aim of the research was to examine opinions of employees about changes introduced in the company after takeover by a foreign investor. The diagnostic survey method was used on a poll of 100 employees. In the research sample, the structure of employment by job positions was deliberately taken into account. The results of the survey indicate that the majority of the respondents stated that the impact of foreign capital on the Polish economy (64 %) and on company itself was positive (70 %). For the respondents, foreign capital was associated positively with enterprise development, improvement of the economic condition of the enterprise, creation of new jobs, reduction of unemployment, implementation of new technologies, rather than negatively with such issues as: corruption, dismissal of employees and liquidation of enterprises. The results indicate that, the processes of implementing changes in enterprises are an inherent element of management. In case of change of the investor, the managers should ensure proper communication of the change to the stakeholders in order to minimize the employees' anxiety due to changes related to possible dismissal from work, liquidation of the enterprise or deterioration of remuneration conditions, and, consequently, their own subjectively assessed financial situation.

Key words: privatization, investor, tobacco company, employers.

JEL code: L2, L6

Introduction

In 2014, 7.5 million tons of tobacco were produced in the world and 213.4 thousand tons in the European Union. The largest tobacco manufacturers in the world are China, India, Brazil and the USA. Over this period, Poland produced 34.9 thousand tons of tobacco and now occupies 22nd place in the world (PAP, 2017). Tobacco industry plays a significant role in the Polish economy, mainly due to the generated budget revenues and employment because in 2016, the revenues from production and consumption of the tobacco products amounted to PLN 24.4 billion, of which the largest part was excise tax – PLN 18.5 billion and VAT – PLN 5.5 billion (80 % of the price of cigarettes are taxes), and, in broad terms, the industry generates employment for 560 thousand employees, including 50 thousand people in tobacco production, 10 thousand in production of the tobacco products and about half a million people in sales. Tobacco products are sold in about 120 thousand retail outlets, and in most small kiosks and shops, their sales account for 40 % of the overall turnover in points of sale (PAP, 2018).

There are 6 powerful international tobacco companies and 40 smaller companies in the world, but tobacco production is dispersed, as tobacco is grown in 124 countries. In this state of affairs, Poland has become a place where foreign investments in the tobacco industry are highly concentrated, as in Poland there are 6 out of 31 factories of tobacco products operating in Europe. The manufacturers mainly produce cigarettes, but also they offer smoking tobacco as well as cigars and cigarillos. The production (processing) of tobacco products in Poland is dominated by foreign investors who have taken over tobacco plants as a result of privatization processes. Tobacco plants in Poland produce tobacco in six locations, namely in Krakow (Philip Morris Polska), in Augustow

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(British American Tobacco), in Gostkow (Japan Tobacco International), in Lublin (Zakłady Tytoniowe Lublin) and in Radom and Tarnow Podgorne (Imperial Tobacco Group).

The change of an enterprise owner often takes place along with privatization, during which the harmony existing in the company is strongly disturbed, and the on-going changes affect the working conditions, sense of security and the relationships between employees. In the analyses of the privatization processes in state-owned enterprises, the sociologists have emphasized the increased number of negative opinions about the on-going changes among the employees. The dissatisfaction was most often the result of non-compliance with previous promises to improve work organization and management or to significantly increase the salaries. Privatization of enterprises leads to changes in the State's economy and in the enterprises themselves, having impact also on employment in the privatized companies. Managing the enterprise after changes in the ownership structure requires knowledge of the impact of such changes on the employee attitudes. Opinions of people about the course and effects of privatization often suggest the need to undertake various activities associated with development of an enterprise organization by a new, domestic or foreign owner (Krynicka, 1992).

The aim and method of the research

The aim of the research was to examine opinions of employees about changes introduced in the company after takeover by a the foreign investor. The study involved the survey method, the survey technique was a poll of 100 employees (of 500 employees) who participated in the survey carried out on March 9-13, 2015 in Imperial Tobacco Polska Manufacturing S.A. in Radom owned by the Imperial Brands Group; they represented all the departments of the company. In the research sample, the structure of employment by job positions was deliberately taken into account.

In the surveyed company, the largest group among respondents were people up to 38 years old (38 people), while 32 % (32 people) were employees aged from 39 to 43 years. Respondents aged 44 and older accounted for 30 % (30 people); 56 women (56 %) and 44 men (44 %) took part in the survey. Among the respondents, 64 % had secondary education, 20 % of employees had a university degree, and 16 % had a higher undergraduate degree. In terms of the position held, the largest group of the respondents were production workers (28 %). The other groups were: specialists – 14 %, department directors and laboratory assistants – 12 % each, coordinators – 10 %, machinery operators, controllers and mechanists – 8 % each. Among the surveyed, the employees living in the countryside accounted for 56 %, while 44 % of the respondents lived in the city. In terms of the level of remuneration, four groups were distinguished: the lowest remuneration of PLN 1001 to PLN 2000 was declared by 60 people, 18 people indicated the remuneration from PLN 2001 to PLN 3000, only 6 respondents gained the remuneration from PLN 3001 to PLN 5000, and the group that declared remuneration of more than PLN 5 000 accounted for 16 people. The majority of respondents (62 %) assessed their financial situation as good. In turn, 32 % of the respondents declared that their financial situation is bad. Only 6 % of the respondents assessed their financial situation as very good. In the survey, 26 % of the respondents declared a 14-year or shorter working period. The same number of employees had worked for the period from 15 to 19 years, 24 respondents had worked for the period from 20 to 24 years and the same number of the respondents had worked for the period of not less than 25 years. In terms of seniority at Imperial Tobacco Polska Manufacturing SA (work in the same

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enterprise), 30 employees had worked for the period of no more than 7 years, 20 people declared that they had worked for the period from 8 to 12 years, 26 respondents declared that they had worked for the period from 12 to 18 years and 24 respondents were people working for the period of not less than 19 years at the analysed company.

Research results – occupied position and opinions of the respondents

Any organizational, ownership and technological changes may lead to conflicts. Any change, including privatization or change of investor, causes strong emotional reactions and resistance. People are afraid of it. There are differences in the interests and views among the participants of the transition process. The changes undermine a balance that has developed in the enterprise. There is a situation of uncertainty: most people are afraid of financial losses, loss of position, privileges, the need to retrain or even losing their job (Kuc, 1999). The greatest concerns of employees are the reduction of earnings, the opinion about the lack of positives resulting from changes, the fear of additional duties or degradation [(kora, 1998). These behaviours arise, among other things, from the fact that employees often do not understand the need for change. Their resistance stems from ignorance, from the conviction that they will not cope with new duties or that they are not prepared mentally to perform new functions in the enterprise. The employers (new owners) should give reliable information to their employees, stating what changes will be introduced and what will be their effects, because usually every change in human life is associated with fear. The assessment of the role of foreign capital in the performance of the entire economy, region and enterprise in the opinion of the respondents of the surveyed enterprise is presented in Table 1.

Table 1

Opinions of the respondents regarding the privatization process with the participation of a foreign investor (N=100)

Type of opinion	The number of people indicating the answer		
	Highly favourable (positive) / rather favourable (positive)	Definitely unfavourable (negative) / rather unfavourable (negative)	Hard to say
Attitude of the respondent to foreign capital	62	33	6
Impact of investments with foreign capital in the privatization process of enterprises on the Polish economy	64	26	10
Influence of a change of the investor on the company	70	20	10
Privatization of a company for employees was	40	50	10
Influence of a change of investor on the situation of employees	50	44	6
Influence of a foreign capital on the economic situation of the city	64	14	22

Source: authors' research

The data summarized in Table 1 show that the majority of the respondents (64 %) indicated a favourable impact of investments with foreign capital in the privatization process of enterprises on the Polish economy, because only every fourth respondent assessed the impact of investment as rather unfavourable or definitely unfavourable. Similarly, it was noted that a larger percentage of the respondents assessed the change of investor to an entity with foreign capital as beneficial for the enterprise (70 %) and for the economic situation of the city of Radom (64 %). It was by a

dozen of percentage points less, as compared to the assessment of privatization and changes in the investor indicated by the respondents in relation to the situation of employees. This means that the respondents more often indicated a more favourable assessment in relation to the situation, which did not concern them directly; while considering their own situation as employees, contributed to a more cautious approach in their opinions (the proportion of highly favourable and favourable assessments did not exceed 50 %). Table 2 shows the dependence of the perception of foreign capital by the respondents on the occupied position.

The data summarized in Table 2 show that people who held higher positions, such as department directors, coordinators or controllers, more often expressed a positive attitude towards the acquisition of their enterprise by a company with foreign capital, and people who held lower positions, such as a drivers, mechanists, specialists or production workers, more often showed a negative attitude.

As regards the assessment of payrolls, the research showed that the highest number of the respondents assessed the remuneration conditions in the company as rather bad, while those employed in higher positions (department director, coordinator, controller) assessed remuneration conditions as definitely good or rather positive. The employees in lower positions, such as a specialist, mechanist, laboratory worker, driver and production worker, more often assessed the remuneration conditions as rather unfavourable or definitely unfavourable. There was, thus, the dependence between the occupied position and the assessment of remuneration conditions in the enterprise.

The conducted research showed that for the respondents, the enterprise with foreign capital was most associated with the development of the enterprise (62 % of the responses) and the improvement of the economic situation of the enterprise (42 %). Another most often mentioned positive aspects were the creation of new jobs (38 %), deployment of new technologies (32 %) and reduction of unemployment (32 %); but at the same time for 35 % of the respondents, the acquisition of the enterprise by a company with foreign capital was associated with redundancies and liquidation of enterprises. For 40 % of the respondents, one of the main associations with foreign capital was corruption, that is, they emphasized the negative aspect of the investor change processes. The research shows that employees employed in higher positions more often presented positive associations with foreign capital and, vice versa, people holding lower positions more often gave such responses as corruption, redundancies and liquidation of enterprises.

Table 3 shows the opinions of the respondents on participation in the company decision-making process, the relationships between employees after investor change and the relationships between employees and their superiors after investor change as a result of privatization depending on the occupied position. The vast majority of respondents (54 %) stated that they definitely had no influence on decisions made in the enterprise. The data contained in Table 3 show that a definitive lack of sense of influence was declared by those employed in lower positions, such as production workers and specialists. The sense of influence on the decisions made was noted in the group of people employed as department directors and coordinators. Therefore, a clear dependence between the position held in the company and the sense of influence on the decisions made in it was confirmed. The higher is the position, the greater is the sense of influence.

Table 2

**Workplace and relation to foreign capital, assessment of pay conditions
in the enterprise after privatization and association with privatization
with foreign capital**

Specification	Workplace																Total
	Department director		Laboratory assistants		Machinery operators		Coordinator		Controller		Specialist		Mechanist		Employee production		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Respondents' attitude to foreign capital																	
Highly positive	10	83	-	-	-	-	2	20	-	-	-	-	-	-	-	-	12
Rather positive	2	17	6	50	6	75	8	80	6	75	6	43	4	50	12	42	50
Rather negative	-	-	4	33	2	25	-	-	-	-	8	57	2	25	12	43	28
Definitely negative	-	-	2	17	-	-	-	-	-	-	-	-	-	-	2	7	4
Hard to say	-	-	-	-	-	-	-	-	2	25	-	-	2	25	2	7	6
Assessment of pay conditions in an enterprise with foreign capital																	
Definitely good	6	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Rather good	6	50	2	17	4	50	10	100	4	50	2	14	-	-	4	15	32
Rather bad	-	-	6	50	4	50	-	-	4	50	10	71	8	100	14	50	46
Definitely bad	-	-	2	17	-	-	-	-	-	-	2	14	-	-	8	28	12
Hard to say	-	-	2	17	-	-	-	-	-	-	-	-	-	-	2	7	4
Associations of respondents in relation to the privatization with foreign capital																	
Company development	12	1	8	13	4	6	4	7	6	10	8	13	4	7	16	26	62
Improving the economic situation of the company	6	14	4	9	2	5	6	14	4	9	8	19	2	5	10	24	42
Creating new jobs	8	21	6	16	2	5	4	10	4	11	2	5	6	16	6	16	38
Reducing unemployment	12	37	4	12	-	-	-	-	6	19	-	-	4	13	6	19	32
Dismissals of employees	-	-	4	13	2	7	-	-	4	13	6	20	2	7	12	40	30
Liquidation of enterprises	-	-	4	20	2	10	-	-	-	-	2	10	4	20	8	40	20
Economic development	4	17	4	17	-	-	-	-	8	33	2	8	4	17	2	8	24
New technologies	8	25	4	12	2	6	2	6	6	19	6	19	-	-	4	12	32
Corruption	-	-	4	10	2	5	-	10	2	5	10	25	4	10	14	35	40
Total	12	100	12	100	8	100	10	100	8	100	14	100	8	100	28	100	100

Source: authors' research

According to the majority of the respondents, the relationships among employees in the company after the change of the investor did not change, according to 18 % of the respondents, these relationships had worsened, while 16 % of employees declared their improvement. According to machinery operators, controllers, specialists and mechanists (4 persons on each position) and 2 production workers, the relationships worsened, and in the opinion of 6 directors, 4 laboratory assistants, 2 coordinators, 2 specialists and 2 mechanists, the relationships improved. People in higher positions more often checked the responses showing improvement in these relationships or showing no change, which means that there was a dependence between the position held and the assessment of the relationships among the employees in the company after the change of the investor. Similarly, the relationships among employees and superiors after the change of the investor were assessed. According to the vast majority of the surveyed company employees, the relationships among employees and superiors after the change of the investor did not change (72 %), 14 % thought that these relationships improved and another 14 % thought that these relationships had worsened. People holding senior positions assessed changes as positive compared to those holding lower positions in the hierarchy. There was the dependence between the position held and the assessment of relationships among superiors and employees in the company after the change of the investor.

Table 3

Workplace and participation in decision making in the enterprise, relations among employees after investor change and relations among employees and superiors after investor change after privatization

Specification	Workplace																Total
	Department director		Laboratory assistants		Machinery operators		Coordinator		Controller		Specialist		Mechanist		Employee production		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
The feeling of influence of respondents on decisions made in the enterprise after privatization																	
Definitely yes	6	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Probably yes	4	33,3	-	-	-	-	4	40	-	-	-	-	-	-	-	-	8
Probably not	-	-	6	50	2	25	6	60	6	75	-	-	4	50	8	28,6	32
Definitely not	2	11,7	6	50	6	75	-	-	2	25	14	100	4	50	20	71,4	54
Evaluation of relations among employees after investor change																	
Improvement	6	50	4	40	-	-	2	20	-	-	2	14	2	25	-	-	16
Deterioration	-	-	-	-	4	50	-	-	4	50	4	29	4	50	2	7	18
No change	6	50	8	80	4	50	8	80	4	50	8	57	2	25	26	93	66
Evaluation of relations among employees and superiors after investor change																	
Improvement	6	50	2	17	-	-	-	-	2	25	-	-	2	25	2	7	14
Deterioration	-	-	-	-	6	75	-	-	-	-	2	14	4	50	2	7	14
No change	6	50	10	83	2	25	10	100	6	75	12	86	2	25	24	86	72
Total	12	100	12	100	8	100	10	100	8	100	14	100	8	100	28	100	100

Source: authors' research

The opinions of the respondents on remuneration, social conditions and employee participation in the decision-making process differed depending on the position and education. The research shows that only people with higher education had a definitely positive attitude towards foreign capital, but a rather positive attitude towards it was also declared by 53.1 % of respondents with secondary education. The most positive answers about job satisfaction were given by people with secondary education. In the survey, 10 people with university degrees were definitely satisfied. The conducted research shows the dependence between level of education and job satisfaction (Table 4). People with higher education were more satisfied with their work. However, the opinions of people with secondary education were divided almost half-and-half. The research shows that 64 % of the surveyed employees of the enterprise with foreign capital assessed the impact of such investments on the economic situation of the city of Radom as positive or definitely beneficial and 14 % assessed it as definitely or rather negative, with some respondents refusing to give their opinion on this subject (22 %). The study showed the dependence between level of education and the assessment of the impact of foreign capital on the economic situation of the city. People with higher education were more likely to evaluate this impact as very positive.

Table 4

Education and expectations related to the change of the investor in the enterprise and their fulfilment

Specification	Secondary education		Higher undergraduate education		Master's degree		Total
	n	%	n	%	n	%	
Post privatization job satisfaction among employees							
Definitely yes	-	-	2	12.5	10	50	12
Probably yes	28	43.8	10	62.5	4	20	42
Probably not	24	37,,5	4	25.0	-	-	28
Definitely not	6	9.4	-	-	-	-	6
Hard to say	6	9.4	-	-	6	30	12
Expectations of respondents in connection with the change of the investor in the enterprise							
A promotion opportunity	18	56,,3	4	12.5	10	31.3	32
Improvement of pay conditions	46	67.6	14	20,,6	8	11.8	68
Increasing qualifications	6	60.0	4	40.0	-	-	10
Limiting stress	14	70.0	4	20.0	2	10.0	20
Introduction of free Sundays	6	75.0	2	25.0	-	-	8
Abolishing third change	6	60.0	4	40.0	-	-	10
Improving working conditions	12	60.0	4	20.0	4	20.0	20
Meeting expectations due to the change of the investor in the company							
Yes	6	9.4	4	25	10	50	20
No	58	90.6	12	75	10	50	80
Total	64	100.0	16	100	20	100	100

Source: authors' research

Most surveyed employees of the company expected better remuneration conditions after change of the investor (69.4 %). Another expectation was the possibility of promotion (32.7 %), 20.4 % of employees expected reduction of stress and another 20.4 % expected improvement of working conditions, 10.2 % of employees would like to increase their qualifications, another 10.2 % expected removal of the third shift and 8.2 % of employees would like to introduce free Sunday in the company. People with higher education had higher expectations from a foreign shareholder than people with secondary education. However, according to the majority of employees, regardless of education, the remuneration conditions in the enterprise should improve. The research shows that the vast majority (80 %) of the respondents declared that their expectations were not met after the investor in the company had changed. The higher education employees had, the more often they declared their expectations were met. It was more difficult to satisfy employees with secondary education. The respondents did not assess the social conditions in the enterprise differently. The majority (46 %) were of the opinion that the social conditions had deteriorated, and only 18 % considered that they had improved. Employees were most concerned about dismissal from work (70.7 %), liquidation of the enterprise (63.4 %) and deterioration of remuneration conditions (61 %).

Conclusions, proposals, recommendations

The survey made in the Imperial Tobacco Polska Manufacturing S. A. production plant after the investor had changed shows that:

- 1) the majority of the respondents assessed the impact of foreign capital on the Polish economy (64 %), the economic situation of the city of Radom (64 %) and the enterprise employing them (70 %) as positive;
- 2) almost 60 % of the respondents before privatization and 84 % after privatization assessed the situation of the company as positive,
- 3) for the respondents, foreign capital was associated positively (enterprise development, improvement of the economic condition of the enterprise, creation of new jobs, reduction of unemployment, implementation of new technologies) rather than negatively with such issues as: corruption, dismissal of employees and liquidation of enterprises;
- 4) people holding the top positions assessed remuneration conditions after the change of the investor as much more advantageous than those employed in lower positions in the organizational hierarchy;
- 5) there was a dependence between the position held in the company and the sense of influence on the decisions made; the higher the position, the greater the sense of influence;
- 6) people holding higher positions more often declared improvement of the relationships both among the superiors and employees and among the employees in the enterprise after the change of the investor; the vast majority (about 70 %) of respondents declared that they did not see any change in this respect;
- 7) people with higher education were more satisfied with their work;
- 8) the position held and the education of the respondent significantly affected the expressed opinion on issues related to privatization and change of the investor in the analysed enterprise;
- 9) The processes of implementing changes in enterprises are an inherent element of management. In case of change of the investor, among others, the managers should ensure proper communication of the change to the stakeholders in order to minimize the employees' anxiety due to changes related to possible dismissal from work, liquidation of the enterprise or deterioration of remuneration conditions, and, consequently, their own subjectively assessed financial situation.

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CONVERGENCE PROCESSES IN THE INCOME SITUATION OF ELDERLY HOUSEHOLDS IN THE BALTIC SEA COUNTRIES

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Abstract. The aim of this paper is to present diversification in the income situation of elderly households in the Baltic Sea Region countries (BSR) and factors affecting this process. For this purpose, dynamics and average annual rate of changes and the convergence rate were calculated, a regression model was constructed and cluster analysis was conducted. This study showed that despite an improved income situation in the countries of Central and Eastern Europe (CEE) and the observed convergence processes, the income situation of the elderly households in the European Union-15 (EU-15) is better and in the analysed years of 2005-2015 no significant changes were observed in this respect.

Key words: elderly households, income situation, convergence, regression, cluster analysis.

JEL code: D190, I310, J140

Introduction

In view of the progressing population ageing process, we may observe an increased interest in ageing not only in the medical or sociological, but also economic and financial aspects. Population ageing is a universal phenomenon. Visible changes in the population structure appeared as early as the 19th century in Europe, along with socio-economic transformations related with modernisation of European societies, experiencing a demographic transition from the expanding population stage characterised by high birth and death rates to the stationary stage, with low mortality and death rates; however, the intensity of these changes is gaining in importance. For example, the ageing process for the Polish population in the next decades will be progressing rapidly. For almost 2 million children aged up to 4 years, we have over 4 thousand centenarians, while in 2050 per 1 million 300 thousand children up to 4 years old there will be as many as 60 thousand people aged 100+ (Central Statistical Office, 2014). Demographic changes result both from the increasing life expectancy, thanks to advances in medicine and increased health awareness as well as decreased fertility rates. Quantitatively the elderly constitute an increasingly important group of consumers of goods and services with a specific and relatively high economic potential, which through its financial decisions will play an increasingly importance role on the market of goods and services.

In view of the above, population ageing and the income situation of such a population is a problem of importance, investigated using the interdisciplinary approach. Its role has extensive consequences both for employment, social security, the pension system, healthcare, as well as many other aspects of the economy. This increased importance of the elderly has become so apparent that it has led to the concept of the silver generation, as well as silver economy, to refer to the existing and growing potential of economic growth in state budget revenues and consumer income related with population ageing, taking into consideration the specific nature of needs of individuals aged 50+ (Swiecka B., 2016; the European Commission, 2015). The silver generation comprises a wide variety of individuals differing in terms of their social status, income, health, as well as the social and cultural context. It includes both wealthy, active individuals, and poor individuals with declining health. Since meeting the demand for goods and services for the ageing population will affect the level of economic growth and profitability of businesses catering to those needs, the silver economy thanks to the highly promising prospects for development is called the "golden market", which results from the effect of scale manifested in the forecasted high profitability (Swiecka B., 2016; Cornet G., 2015).

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The term "ageing population" refers to the increase in the number of the elderly at the simultaneous decrease in the number of children in the population. The definition of old age in many cases is related to retirement age, which varies both in individual countries and with time. The process of ageing is not uniform worldwide. The term "the elderly" refers to individuals aged 60+ (according to the WHO) and 65+ (according to the UN), and those in the retirement age (according to the Statistical Office in Poland) (Szarota Z., 2010). Literature sources on the subject indicate that the primary factor determining the threshold of old age is the age, which – depending on the country and in many cases also on the sex – is over 50 years. The World Health Organisation distinguishes four stages of old age (Szarota Z., 2013):

- middle age – 45–59 years,
- young old age, starting from 60 years of age and lasting until 74 years of age,
- mature old age (75–89 years),
- late old age or longevity (as referred to by gerontologists), starting at 90 years of age and lasting until death.

According to the French strategy for the silver economy, initiated by Ministère des Affaires Sociales et de la Santé in December 2013, the ageing society may be divided into three groups: active, fragile and dependant, differing in their demand for goods and services (European Commission, 2015). The Federal Reserve System *Survey of Consumer Finances* divides households in terms of the age of the head of the household into *older old* – 70 years and over, *younger old* – 62–69 years, *middle-aged* – 40–61 years and *young* – until 40 years old (Swiecka B., 2016 after the Federal Reserve System, 2013). The classifications presented above indicate the heterogeneity of age groups among the elderly, all differing in terms of their needs and potential.

In turn, literature sources published in English-speaking countries apply the following division of the elderly: 1) young old - individuals aged 60 / 65-74; 2) old - aged 75-84; and 3) the oldest old aged 85 years and more. According to the UN, the conventional threshold for retirement age is 65 years. However, it needs to be remembered that old age is not only equivalent to the age of a given person expressed in years. We distinguish calendar (chronological) and biological age. The frequently observed discrepancies between the chronological and biological age result from the effect of many factors (Zalega T., 2016).

The aim of this study is on the one hand to show the diversification in the income situation of the elderly in the BSR countries and to specify factors affecting this situation. For this purpose, the forward regression model will be applied. On the other hand, changes in this situation will be investigated by calculating the average annual rate of change and verification whether convergence processes occurred in the years 2005-2015. Moreover, cluster analysis will be conducted using Ward's method to identify the effect of changes in factors modifying the income situation of the elderly households on the clustering of the analysed BSR countries. Data for analyses were collected from the EUROSTAT database to ensure their comparability.

Results and Discussion

When analysing the income situation, we need to remember that in the years 2005-2015 income of the elderly increased and these changes were considerable in some countries (Table 1). Net income in the households, where at least one person is aged at least 65 years increased over 2-fold in Latvia,

Table 1

Dynamics				average annual rate of change and convergence of income in households					in which at least one person is over 65 years old in BSR countries in the years 2005-2015				
Specification	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Dynamics	Average annual rate of change
	thousands of Euro											(%)	
Denmark	17.7	18.1	18.9	19.7	21.0	21.2	23.0	22.5	23.3	24.5	24.6	38.7	3.1
Estonia	2.5	3.0	3.5	4.1	4.9	5.0	4.9	5.1	5.4	5.6	6.1	142.8	10.1
Finland	14.9	15.8	16.5	17.3	18.6	19.8	20.4	21.3	21.8	22.7	23.3	56.1	4.3
Germany	16.3	15.0	16.7	17.2	17.4	17.7	18.0	18.3	18.6	19.0	19.5	19.2	1.2
Latvia	1.7	1.9	2.5	3.0	3.7	4.0	4.1	4.1	4.2	4.4	4.6	168.5	12.3
Lithuania	1.9	2.2	2.6	3.5	4.1	4.4	4.0	4.1	4.5	4.6	4.6	138.4	11.2
Poland	3.0	3.6	4.0	4.3	5.1	4.4	5.1	5.4	5.6	5.8	6.0	101.9	7.9
Sweden	17.4	18.6	18.7	19.6	20.3	19.4	21.9	23.9	25.8	27.5	25.7	47.4	3.7
Convergence indicator	0.441	0.413	0.384	0.353	0.323	0.322	0.334	0.335	0.332	0.334	0.326	x	x

Source: author's calculations based on Eurostat, access date: 28/03/2017.

Lithuania, Estonia and Poland. In those countries, the average annual rate of change was higher than in the others and amounted to approx. 10 %. The improvement of the income situation in the elderly households, most evident in the Baltic countries in the CEE group, is also confirmed by the convergence rate calculated for these years. It shows the convergence process affecting income between the Baltic states from the CEE group and the EU-15 countries. Changes in this index indicate that in the course of these years the diversification in the income situation in the analysed countries decreased by almost 1/3.

In order to analyse which factors had the greatest effect on changes in the BSR states in the at-risk-of-poverty rate by household type, where at least one person is aged 65 years (the explained variable), the forward stepwise regression analysis was performed. Based on the preliminarily assumed 13 factors determining the income situation of elderly households (i.e. those, in which at least one member is over 65 years of age) such as: - inability to face unexpected financial expenses, - relative median income ratio, - part-time employment, - people living in households with very low work intensity, - the average number of adults, - overcrowding rate by household type, - average number of rooms per person by type of household, - inability to make ends meet, - mean consumption expenditure, - housing cost overburden rate, - share of housing costs in disposable household income, - share of the costs of furniture and equipment, carpets and other floor coverings in the disposable income of the household, - share of rent related to occupied dwelling in disposable household income, and after considering several assumptions, e.g. that: - the number of observations has to be greater or equal to the number of estimated parameters, - coefficient of variation for each of the parameters has to be greater than 0.1, - the correlations between the explaining variables need to be weaker than with the explained variable, - tolerance was greater than 0.1, - corrected R-square has to be the greatest possible and the Variance Inflation Factor may not exceed 10. After adopting the significance of variables at the assumed

level of 0.05 %, a multiple regression equation was obtained with two explaining variables: inability to make ends meet and average income per person (Table 2). A positive value of the regression coefficient shows a positive effect of such a parameter as inability to make ends meet. The value of the standard error of estimation of 3.27 (evaluation of the random deviations of the model) is interpreted as the average deviation of the percentage observed in the population from the theoretical percentage established from the model. The value of the coefficient of determination is $R^2 = 0.95$. This means that 95 % of total variation, i.e. the percentage of the elderly at risk of poverty is explained by the model. The results of the analysis of variance shows the following distribution of total variation (530.8): variation explained by the regression model – 477.3, i.e. approx. 89.9 %, and residual variation of 53.5, i.e. 10.1 %. This shows that the fit of the model is satisfactory. In this study the variable, i.e. inability to make ends meet, has the greatest partial correlation coefficient amounting to 0.796.

Table 2

Regression values for factors determining an increased risk of poverty among the elderly households in BSR countries in 2015

Specification	B	error B	t(5)	p	Tolerance	R ²	VIF
Free term	12.68	4.79	2.65	0.045680			
Inability to make ends meet	1.30	0.44	2.94	0.032400	0.37	0.63	2.69
Average income per person	-0.00028	0.000208	-1.33	0.241263	0.37	0.63	2.69

Source: author's calculations based on Eurostat, access date: 28/03/2017

This variable alone explains 86.4 % variance of the dependent variable, after the effect of other independent variables is excluded. The observation of a lack of grounds for the rejection of the zero hypothesis ($H_0: B_i = 0$) does not mean this hypothesis may be accepted. For this reason, a lack of proof for the significance of a variable may not be the only reason for its elimination from the regression model. The largest part, over 37 % variance of variables for the inability to make ends meet and income per person, is not explained by other independent variables. The housing cost index brought the least to the model, as the statistic of the Fisher test (F) was less than 1. However, the constructed model is useful, since the tolerance of none of the variables was below 0.1 and the Variance Inflation Factor for each variable is below 10. These variables were included in the model, as their values of the F statistic were greater than the threshold value of 1. It may be concluded from the model that a decrease in income per person by 1 thousand Euro to the greatest extent (by 0.3 %) increases the percentage of the elderly at risk of poverty and it is followed by the inability to make ends meet. This inference seems rational and provides some insight into factors having the greatest effect on the deterioration of the income situation of the elderly in the BSR countries.

In order to evaluate the income situation of the elderly households in the BSR countries, the cluster analysis was also conducted using Ward's method both for the year 2005 and 2015. These analyses verified whether in the course of 10 years any significant changes occurred in the grouping of the investigated countries. When studying the income several factors were considered, i.e. inability to face unexpected financial expenses, relative median income ratio (65+), mean income per person, at-risk-of-poverty rate, part-time employment, the percentage of people living in households with very low work intensity, the average number of adults, overcrowding rate by household type, the share of people living in under-occupied dwellings, the average number of rooms per person, inability to make ends meet and mean consumption expenditure per person.

Considering the assumptions that correlations between variables may not be too strong, while skewness should only be positive and the coefficient of variation should exceed 10 %, the analysis was finally conducted on four weakly correlated variables, where the greatest value at the diagonal of the inverse matrix was 4.6. In order to ensure comparability of the results for 2005 and 2015, the same factors were considered. Finally, the analysis was conducted based on three variables: the percentage of individuals at risk of poverty or social exclusion, the share of part-time employment in total employment and mean consumption expenditure per person. This analysis provided a division of the analysed countries in terms of factors determining the income situation of households into two basic groups. One of them comprised the EU-15 countries, while the other group consists of the EU-13 countries. In the investigated 10-year period, no major shifts were observed between the analysed groups of countries. The former group of countries was composed of Denmark, Finland, Germany and Sweden, while the other comprised the CEE countries, i.e. Estonia, Lithuania, Latvia and Poland. Such a division is determined by the economic and income situation of these countries, which was also determined historically (Table 3).

Table 3

Cluster analysis using Ward's method in terms of variables characterising the income situation of the elderly households in BSR countries for both 2005 and 2015

Specification	Poverty indicator (%)	Part-time employment (%)	Mean consumption expenditure (Euro/person)
2005			
I group: Denmark, Finland, Germany and Sweden			
Mean	10.8	63.6	20 436.8
V (%)	31.8	4.5	5.7
II group: Estonia, Lithuania, Latvia and Poland			
Mean	37.5	42.1	3 479.5
V (%)	30.4	26.2	12.8
2015			
I group: Denmark, Finland, Sweden and Germany			
Mean	7.9	64.7	21 872.3
V (%)	33.9	11.4	14.3
II group: Estonia, Poland, Lithuania and Latvia			
Mean	20.9	36.3	5 173.5
V (%)	30.5	18.2	4.9

Source: author's calculations based on Eurostat, access date: 28/03/2017

It results from the cluster analysis conducted using Ward's method both for 2005 and 2015 that despite the convergence process observed in the analysed years in terms of income earned in the CEE countries in relation to the EU-15 countries, changes in the factors influencing the income situation of the elderly households are rather slow and caused no major changes in the re-grouping of the investigated BSR countries. It may be observed that in 2015 the former distinguished group of countries differed from the latter group by an over 2-fold lower risk of poverty among the elderly households and an almost 2-fold greater percentage of the elderly employed part-time and over 4-fold higher consumption expenditure per person, which still results from the better income situation of the elderly households in Western European countries. In turn, when comparing the changes in the analysed variables in 2015 in relation to 2005 we may observe that the percentage of individuals at risk of poverty among the elderly was reduced in both analysed groups of countries,

which nevertheless was more evident in the CEE countries. In turn, the percentage of the elderly employed part time within the investigated period changed slightly in these groups. In contrast, consumption expenditure increased in both groups, in the EU-15 countries it was slightly, by as little as 7 %, whereas in the CEE countries it was by as much as almost 50 %. Such a high increase in funds spent on consumer goods in the CEE countries indicates an improved income situation of the elderly in those countries and thus confirms the occurrence of a convergence process in the income situation of the elderly households.

In the theory of consumption, economics income is treated as a major determinant indicating satisfaction of needs for a household and its individual members. It is the main measure for the level of prosperity. According to the Eurostat methodology applied in studies on income and living conditions of the population, an individual household is defined as a person living alone or a group of persons living together in the same dwelling and sharing the living expenses.

Total disposable income of a household is calculated by adding incomes earned by individual members of the household and income obtained at the household level. Disposable income of the household includes:

- Income from labour (remuneration of employees and profit from self-employment),
- Income from private investments and from real property,
- Transfers between households,
- And all social benefit transfers received in cash, including old age benefits (Wyrzykowski P., 2014).

Personal disposable income is a key economic index of consumption, which along with the other factors defines the allocation of amounts spent to meet the needs of consumers. Income obtained by consumers may thus be considered an economic foundation for each household, determining in this way the standard of living, the level of consumption and the ability to meet joint and individual needs of the household members (Zalega T., 2016, after Carroll Ch., 1997; Flavin M.A., 1981; Shefrin H.M. and Thaler R.H., 1988; Zalega, T. 2012).

The starting point for the analysis of problems related with income in the household is provided by the absolute income hypothesis proposed by J.M. Keynes, the permanent income hypothesis by M. Friedman and the life cycle theory by A. Ando and F. Modigliani. In contrast to the absolute income hypothesis by J.M. Keynes, assuming the dependence of consumption on current income, the permanent income hypothesis by M. Friedman assumes that consumption expenditure of households depends on permanent income rather than current income, the former understood as the mean lifetime income. Milton Friedman (1957) divided income earned by an individual into two parts: the permanent element connected with the potential of that individual resulting e.g. from their education, skills or profession (in theory corresponding to permanent income) and the variable (temporary) component reflecting other elements affecting income (considered to be random). The life-cycle theory by A. Ando and F. Modigliani is connected with the hypothesis of permanent income. This is equivalent to the need to accumulate savings throughout active employment in order to maintain the level of consumption when retired, i.e. when the income is reduced. This theory distinguishes two periods: professional career when people accumulate wealth, and retirement when they may take advantage of the wealth accumulated during their active employment, which in turn makes it possible to maintain a specific standard of living even when their income is lower (Zalega T., 2016 after Dirschmid W. and Glatzer E., 2004). This hypothesis assumes that the present consumption of households is not dependent on current

income. Future plans and income forecasts are more important. As a consequence, the current consumption of an individual may be expressed as the function of resources, return on accumulated assets and age (Zalega T., 2016, after Modigliani F. and Brumberg R., 1954).

At present we may observe considerable diversification in the income situation of the elderly in the European Union. On the one hand this is caused by the economic situation of the analysed countries, the offered support system and the material situation of older citizens in the analysed countries. The income situation of the elderly is thus determined by several factors - both economic, cultural and social, as well as tradition and cultural conventions for family life in a given country.

Observed demographic changes connected mainly with the progressing population ageing lead to an increase in the importance of the segment of old age consumers on the market. A key criterion in the evaluation of market attractiveness of these segments is connected with the purchasing power of consumers, which results from their income level. It is disposable income that determines to the greatest extent the market behaviour of consumers.

The elderly contribute significantly to the socio-economic life as members of the family, employees, volunteers and consumers (the so-called silver economy). The existing stereotype of the elderly as single and poor individuals is being replaced by the image of active individuals and consumers interested in the active lifestyle, whose attitude to life is more hedonistic as well as individuals trying to satisfy their needs and those of their immediate family members. For this reason the elderly are increasingly often perceived as an important segment of the market.

We need to stress here that the elderly were brought up in the times of frequent shortages of basic products, thus their resourcefulness is much greater than that of the younger generations. It is assumed that it is the effect of the so-called financial optimism, known in financial behaviourism, as it is confirmed also by the Genworth Index, a financial reflection of the society and an indicator of how well households cope financially, according to which Poles are the greatest optimists as far as financial future is concerned. However, despite owned property, frequently inherited from generation to generation, the situation of the elderly in Poland is difficult, as indicated e.g. by the level of disability benefits and pensions, which permit them to satisfy basic needs and in many cases being so low that they do not satisfy them fully. Polish old citizens spend over 90 % of their income on daily needs, including medication, which share in expenditure is much higher than in more affluent countries (the old EU) (Swiecka B., 2016). Moreover, studies show that the elderly spend a greater share of their income to pay for housing, food and healthcare, and less on clothing, transport and household equipment and fittings than the young consumers. Scientists analysed the relative weight or the share in the budget for the categories of expenses in the case of older consumers in comparison to households of individuals from other age groups. They applied a two-stage regression model, since expenditure and all other measures were determined simultaneously (Koelln K. et al., 1995). Moreover, we need to remember that the higher the household income, the greater the importance of higher rank needs. A significant role in this respect is played by the discretionary income, commonly called discretionary funds. It is this part of disposable income, which is left after meeting the basic needs, making it possible to satisfy higher needs (secondary needs). We refer here to the normal standard of living, when max. 80 % income is spent on basic needs and the other 20 % are discretionary funds (Zalega T., 2016).

Finally, we need to remember that demographic changes connected with ageing of European societies will have many future economic consequences (Wyrzykowski P., 2014 after Morrow K. and Roeger W., 2012):

- the pressure on state budget expenditure related to the elderly will increase,
- the savings rate will decrease,
- changes will take place on the labour market – the number of actively employed will decrease, the retirement age limit will increase,
- the economic growth rate may decrease as a result of lower investments in the household sector.

It is forecasted that in the European Union by 2060 the share of pensions paid in the public welfare system in GDP will increase. This will mainly result from an increase in the size of this population group, since the relation of the pension paid in the public welfare system to average wages in the national economy will decrease by 19 %. To a considerable extent the old age dependency ratio will also increase. In 2060 the ratio will be as low as 2 individuals aged 18-64 years per 1 person aged 65 and older (in 2013 it was almost 4). This may lead to a further deterioration of the income situation for the retired population (Wyrzykowski P., 2014).

Concluding remarks

- 1) The analysis showed that the income situation of the elderly households is still markedly diversified between the EU-15 countries and the CEE states. However, in the course of the investigated period we may observe evident convergence processes in terms of earned income. It is also confirmed by the calculated dynamics indexes as well as the average annual rate of change.
- 2) At the same time the cluster analysis conducted using Ward's method showed that 10 years is an insufficiently long period for major changes in the grouping of the analysed countries in terms of the income situation in the elderly households.
- 3) In turn, the calculated regression model showed that among the many factors affecting the income situation of the elderly the most significant effect on the increase in the percentage of the elderly at risk of poverty may be played first of all by the obtained income, as well as the ability to satisfy basic needs, which is crucial for the future in view of providing an adequate quality and standard of living for the elderly.

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THE EFFECT OF MACROECONOMIC FACTORS ON BUSINESS MODELS IN FINTECH INDUSTRY

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Abstract. The Internet and technological possibilities trigger significant changes in the business environment and force companies to reconsider their use of new technologies. The decision to use new technologies makes it possible to open new market segments as well as to expand the business beyond one country's borders. This trend brings new business potential, but at the same time it involves new risks, which must be qualitatively and timely managed to ensure the sustainability of the business model. Business modelling is an excellent tool which entrepreneurs can use in order to adapt their activities to a new market challenges and predict the consequences as well as improve their management skills for risk assessment. The aim of this research is to find out what and how macroeconomic factors affect business modelling of the financial technology (FinTech) at both industry and company level. In this research the authors used a continuous comparative analysis method as well as content analysis method (Martinsons et al, 2016). In interviews, experts were asked to assess the significance of specific macroeconomic factors by using the Likert scale. As a result of the research, the difference of the influence as well as their dependencies and modifications on different levels of business modelling was determined. This result forms the basis for conclusions about the most important impact factors, the areas of their influence and possible consequences that affect business modelling at both industry and company level.

Key words: business model, impact factor, macroeconomic, FinTech.

JEL code: G23, F62

Introduction

We live in a time when *"digital transformation affects everything, making it faster, wider and more systematic"* (Matzler, 2016). It has never been so easy to create an idea, to start a business and to immediately conquer the entire world market. Also, never before has it been possible to get out of the market so quickly because of the new business models (Matzler, 2016). The Internet and technological capabilities contribute to changes in the business environment and force companies to reconsider the use of new technologies in their businesses and to make decisions about improving their competitiveness through the benefits of the digital age. Only 55 % of European business executives have been contemplating the impact of technology on their companies, but only 30 % companies believe they are ready for the technological transformation (BDI, 2015). The decision to use new technologies makes it possible to open new market segments as well as to spread the business beyond the borders of one country. A large majority of global operating banks intend to increase their partnerships with FinTech companies over the next 3 - 5 years and expect an average return on investment of 20 % on their innovation projects (PWC, 2017). This trend brings new business potential, but at the same time it involves new risks which must be qualitatively and timely managed to ensure the sustainability of the business model. Business model is an excellent tool which entrepreneurs can use in order to adapt their activities to new market challenges, predict the consequences as well as improve their management for risks that the influence factors cause. Awareness and assessment of the factors makes it possible to timely develop alternative scenarios and diverse approaches.

The aim of this research is to determine the macroeconomic factors in accordance with the PESTEL model that influence business models in FinTech the most at the industry and the company level.

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The tasks of the research are: to study the theoretical aspects of business models and their levels; to describe FinTech companies briefly; to analyse the effect of macroeconomic factors on both industry and company level in FinTech.

Various methods were used in the research: the theoretical part consists of the scientific literature analysis. Semi-structured interviews with 3 FinTech experts (OC, MR, PB), representing Fin Tech industry (E-Money Institution (ENIM) of Malta, represented by OC; short-term lending company (PLK) of Russia, represented by MR; Payment Institution of Great Britain, represented by PB), were conducted during the course of the research. The research data were processed by continuous comparative analysis, using open coding, level 2 coding, axial coding and content analysis method with inductive and deductive approach (Martinsone et al., 2016). In interviews, experts were asked about the influence of macroeconomic factors, the differences and impact areas at the level of both industry and company and to assess the significance of specific macroeconomic factors by using the Likert scale with points 1-5, where is 1(irrelevant); 2(unimportant); 3(moderate); 4(important); 5(very important). The data are presented in the form of a diagram. The choice of experts was based on the diversity of their expertise (OC – 10 years, PB – 20 years, MR – 4 years). The companies represented by experts are completely different and unrelated to each other.

Theoretical aspects of business models, levels and business modelling area.

The concept of "business model" (BM) in literature is becoming an increasingly widespread topic. Business modelling takes central stage due to technological development that occurs in business. Business model is a design with content, structure and management (Amit, Zott, 2001), consists of components (clients, strategies, resources and value system) and has a dimensional logic (Schallmo, 2013), in which one dimension supports the other, interacts with activities and limits of the company and creates value for the client (Hamel, 2001). Of particular importance is the interaction between these elements (Weiner et al., 2010; Osterwalder and Pigneur, 2010; Wirtz, 2010), thus BM becomes a tool for innovation and significant advantages (Skarzynski and Gibson, 2008) The business model is considered to be not just a competence of the company management, but a role-playing game involving all company's employees (Pateli and Giaglis, 2004). In addition to the elements and dimensions of business models that have been mentioned before *"a new component should be added and it is called – technology"* (Mueller, 2017). It can be considered as a BM element and impact factor, a value creation mechanism and *"a backbone"* (Wisniewski, 2016). Until now there is no consistent theoretical approach to the concept of BM in the literature: it can be concluded that a business model is a logical and contemplated interplay of company's decisions, business activities and participants, which describes the place, the time and the reason of business (Mitchell un Coles, 2003); the benefits for customers and partners (Schallmo, 2013); the ways in which customers and partners benefit (Schallmo, 2013); the mechanism of service creation and participants in its provision (Gassmann et al, 2013); the way in which the benefit translates into profit (Schallmo, 2013); profit reallocation way (Bieger un Reinhold, 2011) and the involvement and placement of technologies to create company value and promote the operational efficiency of the company (Matzler, 2016).

The concept "FinTech" has emerged relatively recently and expresses its essence, including *"... the provision of financial services through intensive use of the latest technology"* (Jhoon, 2015; Song, 2015; Shim and Shin, 2016). FinTech companies operate in the financial sector alongside

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banks and offer their customers payments, money transfers in electronic and virtual currency. These companies are recognizable as fast lenders or peer-to-peer platforms, in which clients manage their money as well as borrow and lend it to each other. Those are securities market consultants that compete with banks by offering a high consulting level through robots. FinTech companies are not only those who offer products or services but also those who develop them.

The theoretical focus on business models in the FinTech industry is still too small: the number of studies identified in the EBSCO database for the period from 2015 to 2018 is 21 (EBSCO, 2018). This indicates that this industry is still very young: it is considered that the financial crisis of 2008 was the occurrence that triggered a new wave of business and investment (Menat, 2016), but its rapid growth is not taken into account sufficiently enough. Funding of FinTech start-ups has increased at a compound annual growth rate of 41 % over the last four years, with over USD 40 billion in cumulative investment (PWC, DeNovo Q2, 2016).

Business modelling takes place in a specific business model environment (Schallmo, 2013; Wirtz, 2010). This environment is divided into different levels: general and specific (Schallmo and Brecht 2010; Weiner et al., 2012). The general level (Wirtz, 2010) includes the abstract and industrial sublevel, where the business models are created without relation to any industry or enterprise (Wirtz, 2010). This is a comprehensive description of how a company can work on the market (Schallmo and Brecht, 2010). The next level is the specific level (Schallmo, 2013) that includes three sublevels (Schallmo and Brecht, 2010): the sublevel of the enterprise (Wirtz, 2010; Osterwalder et al., 2005); the sublevel of business unit (Wirtz, 2010) and the sublevel of product and service (Wirtz, 2010), where the company develops the business logic for its products and services, their production, sales etc. Dividing the business modelling area into levels makes it possible to subordinate several business models and understand their application. Awareness of the business modelling diversity and modifications at different levels allows the company to combine the elements of various business models and creatively mix them in order to model the most appropriate business logic for itself. But, it is always necessary to evaluate the impact factors which translate this model into a real business plan including potential risks and threats, as well as their management strategy and alternative scenarios. In accordance with PESTEL model, macroeconomic impact factors have six dimensions (Schallmo and Brecht, 2010): "P" for political, including the political power, political system etc.; "E" for economic (unemployment, competition, supply and demand, inflation, currency risks etc.); "S" for social (education, income, demographic data, life style etc.); "T" for technological (product life cycle, processes, innovations etc.); "E" for ecological (environmental health, climate change, chemical pollution etc.); "L" for legal (legislation and jurisprudence) (Worthington and Britton, 2009).

Research results

The aim of this research is to determine what macroeconomic factors in accordance with the PESTEL model have a significant impact on business models at the level of FinTech industry and of the enterprise, and what aspects and areas are affected at each them. Factors that the interviewed experts ranked as irrelevant (1) and unimportant (2) were not analysed in this research.

The interviewed experts agree that the technological, political, economic and legal factors are the most obvious impact factors for the FinTech industry (Figure 1). After assessing and comparing the impact at the enterprise level and the industry level, the conclusion is possible that the impact

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of factors at the enterprise level is more pronounced and intensified, especially for those enterprises which operate internationally (Figure 2).

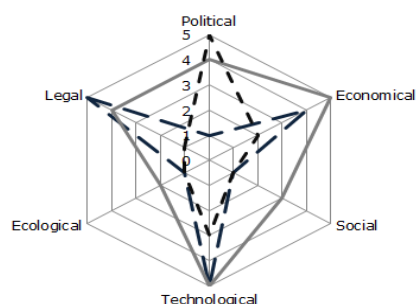


Fig. 1. The impact of macroeconomic factors at the level of FinTech industry

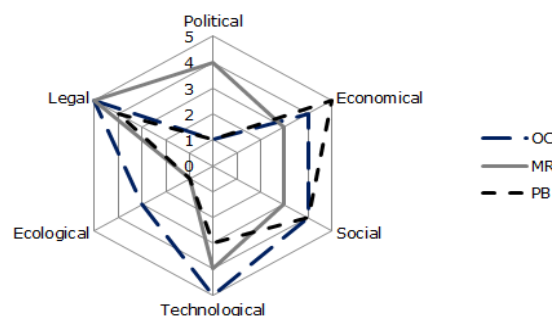


Fig. 2. The impact of macroeconomic factors at the level of FinTech enterprise

It is possible to identify the most dominant factor at both levels - it is the technological factor. This can be explained by the fact that technology forms the basis of the industry's existence and the processes are affected by technology that *"determines and influences the model at the industry level"* (interview with OC, 26.01.2018.). The opinions of the experts are different about the impact on the enterprise level: PB points out that *"a technological revolution has taken place"* (interview with PB, 29.01.2018.), existing opportunities are in use. But OC and MR similarly believe that technology is the cornerstone of the industry and the technology-driven processes are a factor that *"determines and influences the industry model"* (interview with OC, 26.01.2018.). This difference can be explained due to the fact that the market in which the PB operates is more technologically advanced than the markets in which MR and OC operate. This diversity of the development level also generates innovation. Innovations are crucial in FinTech sector, because they *"attract new investors"* (interview with PB, 29.01.2018.). In this way *"process automation, which verifies customer data and information"* (interview with OC, 26.01.2018.) appears and triggers *"the change of player's approach"* (interview with OC, 26.01.2018.). Emergence of innovation *"stimulates the growth in demand for risk capital"* because FinTech is the *"profitability area in which they are currently investing"* (interview with PB, 29.01.2018.). The life cycle affected by the use of technology is *"the recovery option of the product"* (interview with PB, 29.01.2018.) and the FinTech companies use it in saturated markets. It means that both the product life cycle and planning period are getting shorter.

The impact of the political power as a *"dominant force"* (interview with PB, 29.01.2018.) determines the existence of the business model at the FinTech industry level and answers the question *"whether this industry is needed at all?"* (interview with PB, 29.01.2018.). An example for this statement is Georgia, where *"in one week one FinTech company became monopoly because it was good for politicians"* (interview with MR, 27.01.2018.). Another example is the Blockchain *"that was accepted by the Lithuanian Government"* (interview with MR, 27.01.2018.), which indicates the interest at the national level and *"facilitates its infiltration in the FinTech area"* (interview with MR, 27.01.2018.). Experts point to the importance of a political factor by describing their activities in Kazakhstan and Georgia. The political will *"is able to change ... the direction of the company and destabilize its work"* (interview with MR, 27.01.2018.). Because of the public policy entrepreneurs are *"forced to change their headquarters"* (interview with PB, 29.01.2018.). In this way it reduces the risk of unforeseen decisions and the model itself becomes *"more attractive to potential investors"* (interview with PB, 29.01.2018.). Hence, when the enterprise develops its business

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model for working outside the EU's economic area, the strength of political factor becomes different and the risk of it becomes higher. Apart from this fact, each entrepreneur strives to achieve his goals and to gain the most profit from entrepreneurial activities. From the economic point of view, the company must focus on that market *"where there is more money and more income"* (interview with PB, 29.01.2018.). The experts also point the profit as the most important thing that *"investors can get to return the invested capital"* (interview with PB, 29.01.2018.). Therefore, there is a necessity to get right balance between the profit chance and the high risk due to the political situation. The companies which are going to establish their business in countries in which the profit chances are high but the industry directly depends on unforeseen and unexpected political decisions, have to include in their model the risk mitigation programs and to make provisions for alternative scenarios in undermined situations. The regulatory framework and its orderliness in the country is determined as well. On the one hand, the legal framework depends on the political will, on the other hand, the legal factor affects *"how we do our business"* and *"limits or extends the development of the industry"* (interview with OC, 26.01.2018.) (Figure 3).

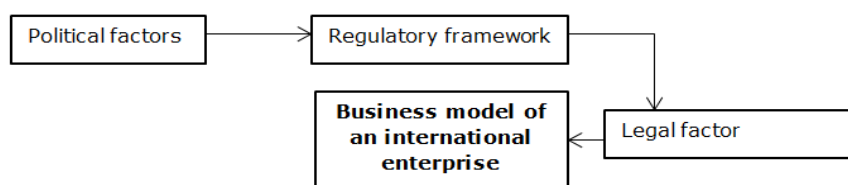


Fig. 3. Dependencies between political and legal factors

For instance, a change in tax regulation can *"downgrade company's financial position and in this way destabilize it"* (interview with MR, 27.01.2018.). But, the regulation limits the processing of data, changes the conditions for the production and management not always to the detriment of enterprises. For example, *"if the 2nd payment service directive had not been implemented, banks would still be allowed to do what they want"* (interview with PB, 29.01.2018.). It means that the regulatory framework can be seen not only as a framework for limits and restrictions, but also as a guideline for improving positions for the market players (Figure 4).



Fig. 4. Impact of the legal factor

If the company chooses to work in a country with a strong legal framework, it *"increases its credibility among its customers and investors"* (interview with PB, 29.01.2018.). This decision also could be seen as a step towards the customers and the differentiation from competitors.

The next significant factor is the economic factor because *"the model would be possible only if there were demand there"* (interview with OC, 26.01.2018.). The model *"can also affect the development of demand"* (interview with OC, 26.01.2018.) and even change it (Figure 5).

The impact of this factor on the industry business model is less pronounced than on the enterprise business model. Inflation affects the *"supply and demand"* and *"destabilizes the situation" at enterprise level* (interview with MR, 27.01.2018.): in particular, if the company works in countries outside the EU's economic area, the depreciation of the currency could lead to deterioration of the company's financial situation. The currency risk as an economic factor

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influences financial stability indicators as well and is a very important factor for international operating FinTech enterprises. By operating outside the single currency area and working with different currencies, the company must make provisions for *"currency risk mitigation and development of crisis scenarios"* (interview with MR, 27.01.2018.), *"capital adequacy calculation intensity"* (interview with OC, 26.01.2018.) and constitution of reserves. The business model has to be considered in relation to the sufficient diversification of the currency portfolio in order to balance currency risks.

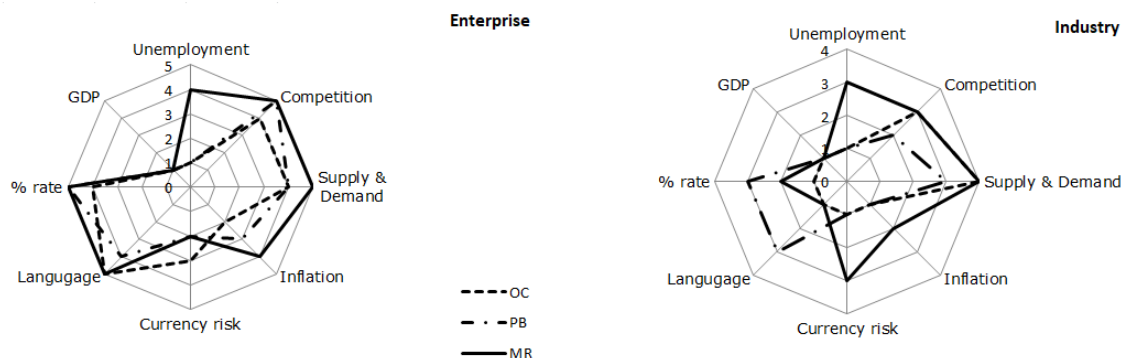


Fig. 5. **Impact of the economic factor**

The experts interpret the effect of the unemployment factor differently: it *"does not affect the industry model"* because it shows if there is *"enough or not enough workforce"* (interview with OC, 26.01.2018.). The other expert believes that unemployment *"... could limit FinTech's capabilities"* (interview with MR, 27.01.2018.). It depends likely on the professional experience of both experts and geographical situation of presented enterprises.

The whole FinTech industry" *is based on and fosters competition"* (interview with PB, 29.01.2018.). It is very hard for FinTech companies to conquer in saturated markets, so they are looking for niches *"where there are simply no competitors"* (interview with MR, 27.01.2018.), because strong competition *"requires the industry model to be adapted"* (interview with MR, 27.01.2018.). FinTech companies are trying to differentiate themselves from competitors and attract customers by using *"social responsibility and customer reaction to it"* (interview with PB, 29.01.2018.). In this way it is possible to get closer to the customers. Competitive innovations affect the existence of an enterprise if *"you do not know about and cannot track"* (interview with MR, 27.01.2018.).

Experts evaluate the social factors very differently considering that, on the one hand, they *"do not play an important role at the industry level"* (interview with OC, 26.01.2018.), but, on the other hand, *"population growth determines the intensity of technology development"* (interview with PB, 29.01.2018.). The particular importance is given to social networks, because they *"promote the industry"* (interview with PB, 29.01.2018.) and *"react on it"* (interview with PB, 29.01.2018.) as well as express *"a social sense"* (interview with MR, 27.01.2018.) (Figure 6).

The internationalisation trend also affects the language in which FinTech company works and communicates with its employees and customers. When the company designs the business model for working in various countries, it must *"choose both the working language for internal communication and the methods for working with other speaking employees"* (interview with OC, 26.01.2018.). Demographics significantly affect the company's performance and enable the entrepreneurs to *"choose new and educated professionals who themselves come from FinTech environment"* (interview with MR, 27.01.2018.). In a country with *"poor demographics"* (interview

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with MR, Jan 27, 2018) FinTech's development "would not have such a great prospect" (interview with MR, 27.01.2018.). Experts believe that young people create FinTech's "added value with their creative and courageous ideas" (interview with OC, 26.01.2017.).

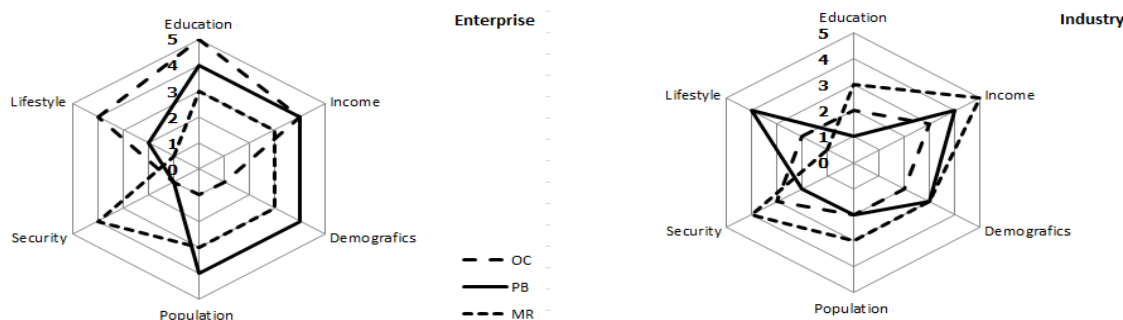


Fig. 6. Impact of the social factor

Education is very important, because "smart and educated people track trends, understand business and know what to do" (interview with MR, 27.01.2018.). In this way, the company reduces the risk of missing the most important latest trends in its industry. High income level influences the customer behaviour and makes it possible "to spend more time to explore new technology opportunities" (interview with PB, 29.01.2018.) until it "becomes a lifestyle because it's fashionable" (interview with PB, 29.01.2018.).

In order to emphasize the differences between the impact of macroeconomic factors on business model at the industry and enterprise level, the authors of the research counted the points assigned to experts for valuing significance of each factor, obtained the total impact value and listed the most significant factors (see Figure 7).

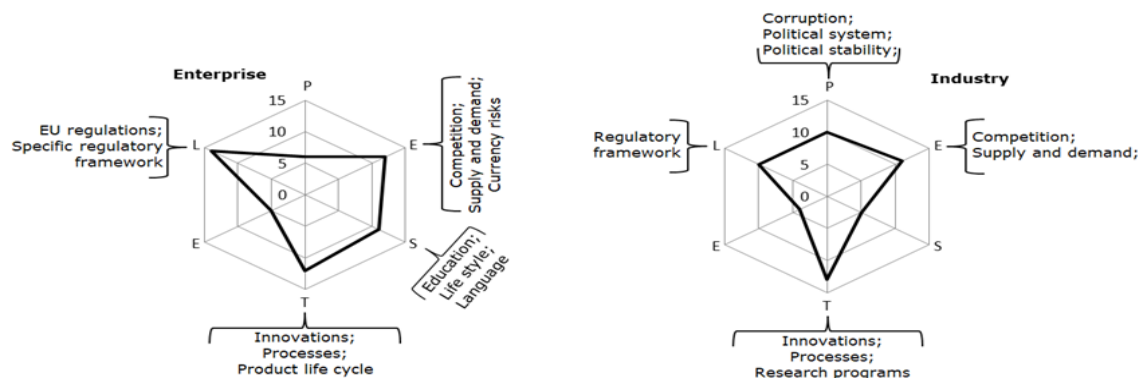


Fig. 7. The impact of macroeconomic factors at the industry and enterprise levels

The most important impact factor at the enterprise level is the legal factor, which company have to take into account by modelling its business. The second factor is the technological factor which determines the existence of the industry and enterprise consequently. The next macroeconomic impact factor is the economic factor in form of competitiveness, currency risk, supply and demand at the level of the enterprise and in form of unemployment rate, supply and demand, currency risk and percent rate at the level of the industry. The aforementioned makes conclusions and recommendations possible for companies with international business models.

Conclusions and recommendations

- 1) The political will determines the existence of the FinTech industry and business models of market participants consequently. This means that companies which are going to establish their

business in countries with huge dependence on political decisions, have to model their risk mitigation programs including alternative scenarios for fast changeover.

- 2) The political will directly affects the quality of the regulatory framework at the industry level. By creating of business model at this level the focus on the political impact is the most important, because it determines quality and sustainability of the model.
- 3) By modelling business in third countries the entrepreneurs have to evaluate those macroeconomic impact factors which influence their model from the industry level.
- 4) The legal impact factor forms the basis for the activities of FinTech companies, but it improves more slowly than the industry develops. It means that the usage of the technological progress and innovations that prevail in FinTech industry could lead to the risk of unregulated activities.
- 5) The higher is the risk caused by the impact of macroeconomic factors the higher is the profit chance. Companies which are operating in such markets have to balance their profit chances with their risk appetite and make provisions for diversification of these risks to ensure the sustainability of their business model.

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EFFICIENCY AND PRODUCTIVITY OF FIELD CROP FARMS IN LUBLIN PROVINCE IN 2014-2016

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Abstract: The aim of this study was to analyse technical efficiency and productivity changes in field crop farms in Lublin province. The assessment of technical, pure and scale efficiency of those farms during 2014-2016 was performed applying non-parametric method of Data Envelopment Analysis (DEA). The Malmquist indices were used to measure the efficiency and productivity changes. The field crop farms based on their economic size were divided into small, medium and large. The study showed that mean technical efficiency of small farms was 83 %, medium – 81 % and large – 94 %. Technical inefficiency in Lublin region occurred due to pure technical efficiency rather than scale efficiency. It means that inefficient management practices had an impact on farm performance. Therefore, in order to increase competitiveness of Polish crop field farms, it is important to improve management practices. In the studied period the share of farms operating under increasing return to scale decreases with the growth of farm size. The improvement of efficiency of those farms could be achieved by increasing their size. The result indicates that 4 % of small, 14 % of medium and 9 % of large farms were operating under a decreasing scale efficiency, which means that those farms were operating above their optimal scale and could, therefore, increase their efficiency through size reduction. In all the farms, the average annual productivity changes were below 1. The decrease was mainly due to a technological detrition of 5, 6 and 38 % respectively for large, small and medium farms.

Key words: technical efficiency, scale efficiency, farm size, field crop farms, Malmquist indices.

JEL code: D24, Q12, P51

Introduction

Measuring efficiency has become a key indicator to control and plan production. The Data Envelopment Analysis (DEA) is a non-parametric method for measuring and evaluating performance of peer decision making units (DMUs) compared to the best practice frontier (Toma et al., 2015). Since the first development by Charnes et al. in 1978, the method has been extensively used by researchers in different sectors (Charnes et al., 1978; Sueyoshi et al., 2017). The agriculture is one of the sectors where DEA is frequently used for computing efficiency (Odeck, 2009; Vasiliev et al., 2008; Toma et al., 2017). The DEA has two different orientations: input and output (Charnes et al., 1978). The objective of input orientation model is to minimize inputs, whereas output remains at the same level. In the output oriented model, the objective is to increase outputs with constant input (Malana and Malano, 2006). Toma et al. (2015) stated that input-orientated model is more appropriate for agriculture because it depends on limited inputs. Also, in production system farmers have more control over input rather than output (Syp et al., 2015). Fogarasi and Latruffe (2009) in their research applied an output-oriented model because they assumed it is easier for farmers to modify their final outputs than the amount of inputs. However, Coelli et al. (2005) stated that both models produce similar results and thus the choice of orientation is not important. In addition, DEA allows to evaluate under which returns scale each farm operates: constant (CRS), decreasing (DRS) or increasing (IRS) return to scale.

The aim of the present study was to evaluate the influence of farm size on field crop farms performance in Lublin province in the years 2014-2016. The studies proceeded in three steps. In the first phase, the analysis of efficiency was performed by using technical, pure technical and scale efficiency. Next, farms' scale operation was assessed. Finally, the productivity changes were calculated by applying Malmquist productivity indices.

The authors have chosen this voivodship for their study because the utilized agricultural area (UAA) of this province accounts for about 10 % of the country's UAA, which places this voivodship on the 3rd place in the ranking of Polish voivodships (CSO, 2017). An average farm size in the analysed province is 9.1 ha, while in Poland – 11.5 ha (CSO, 2017). In 2016, it was the second province in terms of the number of applicants submitted for payments, third in the declared area in ha, and payments under the single area payment and greening were of 9.8 % national payments in the frame of Common Agricultural Policy (CAP). Several papers have analysed efficiency and productivity of Polish farms. However, most of them applied simple standard efficiency indicators. According to authors' knowledge, this is the first study in Poland that has estimated the field crop farms efficiency and productivity in Lublin voivodship based on their economic size using DEA models.

DEA uses linear programming to construct the efficient frontier with the best performing observations over the data applied and calculates efficiency measures relative to this frontier (Charnes et al. 1978). The distance from a farm to frontier provides a measure of its efficiency. Efficiency (total, pure and scale) scores get values between 0 and 1. The fully efficient farm receives score 1 (i.e. on the frontier) and a larger score presents a higher efficiency. The score lower than 1 points out to what level of inputs could be reduced and still produce the same quantity of output. A farm technical efficiency (TE) score was calculated under the assumption of CRS. The TE was divided into two scores: pure technical efficiency (PTE) and scale efficiency (SE). PTE was estimated under VRS and referred to management practices. While SE was the ratio between TE and PTE, and presented the potential scale economies accessible to the farm.

Table 1

Descriptive statistics of the FADN data set applied in DEA: 2014-2016

No	General information	Farm size		
		Small	Medium	Large
		(8<=€<25)	(25<=€<100)	(100<=€<500)
1.	Number of farms	102	149	15
2.	Total output (PLN)	69 263	221 485	700 356
3.	UAA (ha)	17.4	47.3	129.6
4.	Labour input (h)	3 246	4 483	7 274
5.	Intermediate consumptions (PLN)	39 521	125 717	385 781
6.	Total assets (PLN)	448 605	1 275 581	3 395 123

Notes: PLN – Polish currency. UAA – utilised agricultural area. h- labour input in working hours

Source: authors' calculations based on the FADN data

In order to evaluate the role agricultural holding size on the performance of Polish crop field farms, the micro data from Polish Farm Accountancy Data Network (FADN) for the period of 2014-2016 were used. In the scope of the research, there were only the farms that had collected data in all studied years. Based on EU standard classification of "Type of farming" (TF) to perform the analysis, the authors have chosen the farms classified as field crop farms (TF 1). In those farms, at least 66 % of standard output comes from production of field crops. Next, the set of our farms was divided according to their "Economic size" (ES 6) into three groups: small, medium and large. The standard output (SO) of small farms ranged from 8 to 25 K Euro (€), the medium – from 25 to 100 K€, and the large from more than 100 to less than 500 K€. In the input-oriented DEA model, the authors used four inputs, namely: labour input (SE011) expressed in work hours, total utilised agricultural area (SE025) in hectares, total assets (SE436) and total intermediate consumption

(SE275). Values of total assets and intermediate consumption were presented in zloty (Polish currency). In the study, the dependent variable was total output (SE131) in zloty.

Table 2

Descriptive results of small farms efficiency estimates

No	Efficiency scores	Mean	Standard deviation	Minimum	Coefficient of variation
1.	TE				
2.	2014	0.839	0.135	0.572	0.160
3.	2015	0.824	0.136	0.494	0.165
4.	2016	0.823	0.139	0.470	0.169
5.	2014-2016	0.829	0.125	0.549	0.150
6.	PTE				
7.	2014	0.685	0.188	0.330	0.275
8.	2015	0.625	0.195	0.260	0.313
9.	2016	0.687	0.191	0.287	0.278
10.	2014-2016	0.666	0.170	0.350	0.256
11.	SE				
12.	2014	0.815	0.169	0.330	0.207
13.	2015	0.761	0.200	0.322	0.262
14.	2016	0.834	0.167	0.319	0.200
15.	2014-2016	0.803	0.160	0.360	0.200

Source: authors' calculations based on the FADN data

Table 3

Descriptive results of medium farms efficiency estimates

No	Efficiency scores	Mean	Standard deviation	Minimum	Coefficient of variation
1.	TE				
2.	2014	0.795	0.132	0.463	0.166
3.	2015	0.829	0.132	0.539	0.160
4.	2016	0.799	0.135	0.533	0.169
5.	2014-2016	0.807	0.134	0.463	0.166
6.	PTE				
7.	2014	0.667	0.176	0.231	0.265
8.	2015	0.694	0.181	0.135	0.260
9.	2016	0.654	0.180	0.299	0.276
10.	2014-2016	0.672	0.180	0.135	0.268
11.	SE				
12.	2014	0.838	0.160	0.321	0.191
13.	2015	0.837	0.160	0.152	0.191
14.	2016	0.816	0.154	0.391	0.189
15.	2014-2016	0.830	0.158	0.152	0.191

Source: authors' calculations based on the FADN data

In addition to the evaluation of farms' technical efficiency, their productivity was assessed using Malmquist productivity indices (Caves et al., 1982). The Malmquist total productivity index (TFP) was divided into: the technological change index (TC), which evaluated shift of the frontier over time, and TE change index which evaluated changes in TE efficiency (Fare et al., 1992). Next, TE change index was decomposed into change of PTE and SE. Indices equal to 1 indicated no change, whereas indices greater or lower than 1, respectively progress or regress. The average change indices were calculated as geometrical means. The DEAP software was applied to measure the

efficiency and productivity of field crop farms. Some descriptive statistics for inputs and outputs used are presented in Table 1. Research results and discussion

Table 4

Descriptive results of large farms efficiency estimates

No	Efficiency scores	Mean	Standard deviation	Minimum	Coefficient of variation
1.	TE				
2.	2014	0.926	0.079	0.711	0.085
3.	2015	0.943	0.097	0.732	0.102
4.	2016	0.951	0.060	0.823	0.063
5.	2014-2016	0.940	0.081	0.711	0.086
6.	PTE				
7.	2014	0.856	0.144	0.443	0.168
8.	2015	0.866	0.144	0.544	0.166
9.	2016	0.863	0.100	0.686	0.115
10.	2014-2016	0.862	0.131	0.443	0.152
11.	SE				
12.	2014	0.919	0.112	0.623	0.121
13.	2015	0.917	0.109	0.683	0.119
14.	2016	0.909	0.087	0.705	0.096
15.	2014-2016	0.915	0.103	0.623	0.113

Source: authors' calculations based on the FADN data

Table 5

The proportion of farms according to scale – Constants, Increasing and Decreasing – as an average 2014-2016

No	Description	Farm size		
		Small	Medium	Large
		(8<=€<25)	(25<=€<100)	(100<=€<500)
1.	Share of farms operating under:			
2.	Constant (%)	9	8	29
3.	Increasing (%)	86	78	62
4.	Decreasing (%)	4	14	9

Source: authors' calculations based on the FADN data

Table 6

Productivity change indices of small farms during 2014-2016

No	Average productivity change indices	Mean	Minimum	Maximum	Standard deviation
1.	TE change index	0.998	0.761	1.524	0.118
2.	PTE change index	1.011	0.873	1.354	0.068
3.	SE change index	0.988	0.761	1.215	0.087
4.	TC change index	0.992	0.771	1.244	0.062
5.	TFP change index	0.991	0.702	1.509	0.131

The averages of productivity change indices are the geometrical means

Source: authors' calculations based on the FADN data

Table 7

Productivity change indices of medium farms during 2014-2016

No	Average productivity change indices	Mean	Minimum	Maximum	Standard deviation
1.	TE change index	1.000	0.606	1.34050	0.126
2.	PTE change index	0.998	0.795	1.370	0.079
3.	SE change index	1.007	0.762	1.341	0.100
4.	TC change index	0.955	0.690	1.217	0.085
5.	TFP change index	0.959	0.621	1.451	0.124

The averages of productivity change indices are the geometrical means

Source: authors' calculations based on the FADN data

Table 8

Productivity change indices of large farms during 2014-2016

No	Average productivity change indices	Mean	Minimum	Maximum	Standard deviation
1.	TE change index	0.990	0.773	1.111	0.079
2.	PTE change index	0.986	0.890	1.054	0.036
3.	SE change index	1.003	0.868	1.111	0.054
4.	TC change index	0.993	0.862	1.064	0.056
5.	TFP change index	0.983	0.807	1.143	0.101

The averages of productivity change indices are the geometrical means

Source: authors' calculations based on the FADN data

Tables 2-4 present DEA results for small, medium and large field farms regarding each analysed year and average of 2014-2016. The large farms performed the best in each year and on mean with an average TE of 0.940 (Table 4). These show that the mean potential for input savings among large farm owners was only about 6 %. The TE of large farms was the lowest in 2014 and has increased in the subsequent years. The opposite tendency occurred in small farms (Table 2). Despite this fact, the average TE of small farms in the studied period was higher than average TE of medium farms (Table 2-3). The coefficient of variation of TE in large farms range from 0.063 to 0.102 with the average for the analysed period of 0.086 (Table 4). The low variation in TE coefficient values show uniform distribution of TE thought the sample. In the other two farm groups, the values of average coefficients of variance TE were twofold compared to large farms but still low because they varied from 0.15 to 0.166. A different classification compared to TE means was observed for PTE averages in the period of 2014-2016. These values were following: 0.862, 0.672 and 0.666 respectively for large, medium and small farms. A similar ranking to PTE was observed in SE. The proportion of farms operating under IRS points out that 86 % of small farms tend to operate below their optimal scale (Table 5). The share of farms working under IRS decreased with the growth of farm size. Our results show that 78 % of medium and 62 % of large farms could improve their efficiencies by increasing their size. In the performed analyses, the highest share (14 %) of farms producing under DRS were found in the medium size farms. These show that the farms were operating above their optimal scale and in fact could rise efficiency by size reduction. In the group of large farms, the number of units operating efficiently amounted to 29 %, and was over threefold higher than in small and medium farms. The average Malmquist total productivity (TFP) changes indices as well as the average changes in TFP components for small, medium and large farms in the studied period are presented in Tables 6-8. The average TFP changes were as follows: 0.991, 0.959 and 0.983 respectively for small, medium and large farms. The figures indicate that productivity in all groups of farms decreased. The smallest reduction was recorded for small farms (0.9 %) and the largest for the medium ones (4.1 %). Whereas, in large

farms the decrease amounted to 1.7 %. The decline of TFP was mainly due to a technological deterioration 0.7 % in large, 0.8 % in small and 4.5 % in medium farms. Those figures confirmed that technological changes (TC) were negative for all farms in varying degree. By contrast, the medium farms which performed the worst in terms of TFP and TC change, did not recorded any changes in the TE values. For the small and large farms, average TE changes were lower respectively of 0.2 and 1 %. The further breakdown of TE change presents that in medium farms, the main source of unchanged technical efficiency indicator was the increase of scale efficiency by 0.7 % because the value of technical improvement decreased by 0.2 %. The opposite findings are shown in small farms where efficiency decline depends mainly on SE decreased because of the technical improvement growth by 1.1 %. This suggests that owners of these farms improved their farming practices by reducing the input use and scale efficiency. In large farms, progress in SE (+0.3 %) did not offset the decrease of PTE changes (-1.4 %).

The first time DEA model was applied to Polish crop farms by Latruffe et al. (2005) to compare TE and PTE between 2000 and 1996. The average UAA of analysed farms corresponded to the average UAA of medium farms from our study. Therefore, the authors compared their results from medium farms to their study, where the input data were similar to FADN data applied in the research. All efficiency scores obtained were higher than calculated by Latruffe et al. (2005). The differences between averages of 2014-2016 and data for 1996 were as follow: 0.15, 0.03 and 0.1, respectively for TE, PTE and SE. Whereas, differences with scores for 2000 amounted to 0.24 for TE and 0.03 for SE. There was no difference between PTE values. The Latruffe et al. (2005) stated the mean reason for the decrease of TE in their study could be the influence of weather conditions, because both years were not very beneficial for agriculture; however, no exceptional crop losses were recorded. In the period of 2014-2016, the weather conditions did not have negative influence on field crop production. In both studies, the SE scores were high because analyses were performed for specialized farms. The lower PTE values in each research in comparison to SE indicate that inefficient are mainly too poor management practices. In both studies, the share of farms operating under the CRS were equal to 78 %. Those data suggest that farms were too small and should gain efficiency by increasing size. The share of farms working under DRS were 16 and 14 %, respectively for Latruffe et al. (2005) and authors' studies. This implies that those farms were too large. In authors' study, the share of farms operating efficiently was by 2 and 5 % higher than in studies performed for 1996 and 2000 year, respectively. The outcome of this study confirmed that field crop farm size has an impact on farm efficiency. This is in agreement with the research of Latruffe et al. (2005). The results of current analysis reveal that smaller farms tend to produce IRS whereas larger units produce DRS. Those outcomes are in line with Odeck (2009) studies performed for specialized Norwegian grain farms and well known neoclassical production theory.

Rusielik (2010), based on Central Statistical Office data, calculated TE and PTE for Polish agriculture in the period from 2003 to 2006. The values of TE obtained by him ranged from 0.876 to 0.937 and were slightly higher than TE scores of small and medium field crop farms from our study. Whereas, the TE indicators of large farms were on a similar level. The PTE values computed by Rusielik (2010) ranged from 0.96 to 0.98 and were higher than obtained in our analysis. Kagan (2014) calculated TE, PTE and SE for agricultural enterprises for 2010-2012 in Poland which owned at least 100 ha UAA. Consequently, his scores can be compared with results of large farms. Values obtained by Kagan (2014) range for TE from 0.673 to 0.802, PTE from 0.717 to 0.832, and SE

from 0.831 to 0.957. The TE and PTE scores were lower than our outcomes, while the SE indicators were similar. Kulawik et al. (2014) calculated TE and PTE for a small group of field farms in Poland in 2007-2011. The average value of TE for the period mentioned above amounted to 0.72 and was lower by 0.09, 0.11 and 0.22 than averages calculated by authors respectively for small, medium and large farms. All the analyses stated above were performed using input-oriented DEA model; however, they varied in the selection of farms and the period of analysis. Moreover, in each of those studies different data were applied. The Latruffe et al. (2005) research is an exception. Similar data input but related to different time span were used by Vasilev et al. (2008), Ghali et al. (2016) and Latruffe and Desjeux (2016). In Vasilev et al. (2008) studies, the efficiency scores were calculated for Estonian grain farms in which UAA were above 180 ha. Therefore, all the results of this study could be referred to the results of authors' analysis performed for the large farms. The TE of those farms ranged from 0.70 to 0.78, whereas in Poland varied from 0.93 to 0.95. However, there were no differences between PTE and SE scores. The share of farms working under IRS recording by Vasilev et al. (2008) was the same as in authors' study. However, in Lublin region the proportion of farms working efficiently amounted to 29 % while in Estonia it was only 15 %. Ghali et al. (2016) measured TE and PTE of France field crop farms based on data from 2010. The average UAA of these farms was 148 ha. So, the data from this study could be compared with efficiency of large farms. The average TE of Polish farms in 2014-2016 was higher by 0.29 compared to French farms (0.65). While the difference of PTE value was only 0.05 and standard deviation was the same. Despite both PTE scores were high and there were little differences between them there was a place for improvement of management practices. Latruffe and Desjeux (2016) calculated efficiency indices for 1990-2006 for French field crop farms with average size of 120 ha. So again, the results of this study could be compared with the outcome of large farms in Lublin region. The average TE (0.499) and PTE (0.531) scores were lower than values calculated by authors and researchers mentioned above. However, the SE (0.928) score for these farms was on a similar level as in current research and different studies. The average Malmquist productivity (TFP) changes indices in France and Lublin region were below 1. The decrease of TFP index in France of 2.4 % was due to drop of TE change by 2.5 % and TC by 0.03 %. In Poland, the decrease of TFP by 1.1 % was caused by diminished TE by 0.06 % and TC by 0.05 %. In the analysed farms, in Lublin region SE change index increased by 0.05 % whereas in France decreased by 0.09 %. Those numbers indicate that farmers in Lublin region limit input saving to a greater extent than adopt input saving techniques.

Conclusions, proposals, recommendations

- 1) The FADN database allows to apply homogenous variables and indicators across countries and over time to conduct analysis of farms' performance.
- 2) This study was the first which provided efficiency and productivity estimates for field crop farms in Lublin region during 2014-2016. All scores for this region are in line with those obtained by the previous studies.
- 3) The arable farms in Lublin region are located on high quality soil which resulted in higher efficiency and productivity scores.
- 4) The efficiency estimates in Lublin region showed that technical inefficiency is mainly caused by pure technical inefficiency rather than scale efficiency. It means that inefficient management

practices had a great impact on farm performance. Therefore, in order to increase competitiveness of Polish crop field farms, it is important to improve management practices.

- 5) All farms during 2014-2016 recorded decrease in productivity change. The medium farms had the highest reduction (-2.1 %) whereas the small ones had the lowest (-0.01 %). In all groups of farms, those changes were due to technological regress.
- 6) This paper contributes to knowledge about the efficiency and productivity of Polish crop field farms and to the literature on efficiency and productivity changes.

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SCALE EFFICIENCY OF FARMS WITH DIFFERENT SYSTEMS OF REARING PIGS

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Abstract. The efficiency of pig farms largely depends on the scale of production. Based on data from 66 farms, the models for different effects of scale were developed. They were differentiated in the field of open and closed rearing cycle. For this purpose, the DEA method, which enables to determine the effectiveness of a multi-dimensional system was used. Farms with fixed effects of scale prevailed in the group with open rearing cycle. They were characterized by the lowest share of their feed in the feeding of pigs and a small percentage of leased farmland. Due to the optimal scale of production to obtain, the owners of these farms achieved the highest income. Farms with increasing scale effects accounted for the largest share in the group with a closed cycle farming. They stand out the fewest resources and factors of production and the smallest scale of production. At the same time, these farms achieved the lowest economic results. A different situation occurred in farms with diminishing effects of scale. These farms were characterized by the world's greatest factors of production, the largest scale of production and the largest share of the cost of feed in the cost of production.

Key words: scale of production, efficiency, pig farms, rearing cycle.

JEL code: D24, Q12

Introduction

Pork production has great significance in the total output of meat production for many countries in the world. In fresh and processed condition, it is one of the most favourable products in the foreign market. Its advantages over other livestock products are numerous because of the quality, economical production and possibility for fully industrialised technology, which makes the pig production sector to be very important for the slaughterhouses and meat industry (Petrovska 2011, p. 1).

Pig farming is an important part of Polish agricultural activity, too. Sales of live pigs in 2015 constituted 11.0 % of global agricultural production and 13.3 % of commercial agricultural production (Small Statistical Yearbook of the Republic of Poland 2017, p. 265). The share of pork in the overall meat consumption accounted for 55.2 %, and its average consumption was 41.4 kg / person (Meat market 2017, p. 73). According to GUS (Polish Central Statistical Office), Poland occupies the seventh position in the EU-27 in terms of the pig livestock population, and is fifteenth in the world. In 2014, the share of Polish pork accounted for 8.2 % of the EU-27 and for 1.6 % of the world production (Statistical Yearbook of Agriculture, 2017, p. 403, 443).

In Poland, the main problem in pig production is an excessive fragmentation of farms, and what follows, insufficiently high scale of production, which leads to limited economic effects. The dominate role in the pig farm structure play those entities that keep several pieces of this species. In 2012, their share was 45.2 %. The agricultural units in which there were dozen pigs accounted for approximately 1/5 of the farms. A similar proportion was true for the agricultural holdings with 20 to 49 pigs. The proportion of farms keeping larger herds, numbering from 100 to 199 animal units, was 3.9 %. While the percentage of farms with the largest herds of pigs amounted to only 3.1 %, although it was gradually increasing in 2012. The structure of pig farms observed in the largest pork producers in the EU-27 showed a decidedly larger proportion of large-scale farms numbering 1.000 or more pig units.

A small stock density is a fundamental limitation of the competitiveness of Polish pig farms. Production volume reached by the majority of Polish pork producers in the frequency of farrowing and fertility of sows are much lower than those found in the Western Europe. A small scale of production in farms and a low technical effectiveness hamper the achievement of their respective

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economic results. Even the best breeders are not able to reach parity income level without a proper scale of farming, which determines the profitability of the production of live pigs. Therefore, the aim of the study was to determine the scale efficiency of production in farms with different systems of pig farming. The task of the research was to recognize the characteristics of farms with different scale production and to recommend actions to increase production efficiency.

Materials and methods

The study covered agricultural holdings in which the minimum sale of pigs accounted for 60.0 % of their commercial production, and which kept 50 and more sows and/or produced at least 1000 fattening pigs per year. The principal reason for choosing these criteria was that only farms with large-scale production can compete with the biggest producers of pork in the EU. The surveyed facilities were selected in two stages. First, there were selected regions of greatest importance in pig production in Poland. Next, the Polish Regional Agricultural Advisory Centres were requested to localize farms that meet the required criteria. Eventually, the research covered 66 farms specializing in the production of live pigs, which provided the data gathered through an interview questionnaire directed in 2010.

The farm data analysis was based on the DEA method, which allows determining the efficiency in a multi-dimensional system (Parlinska, Bezat 2008, p. 122). In addition, it allows recognizing which installations have good economies of scale and what direction they should take to develop (Rusielik, Prochowicz 2007, p. 29).

To assess the economies of scale of the surveyed agricultural holdings, it was accounted for that the economies involved the value of a farm production and expenditures covered investment in the land (the number of ha of AL), labour inputs (the number of full-time employed persons), the fixed capital investment (the value of fixed assets) and working capital (the costs of consumption of materials, energy and external services). These variables allowed to calculating investment-oriented technical efficiency of farms having fixed and variable economies of scale. It was assumed that for the units engaged in economic farming to minimize inputs is more important a goal than to maximize production. Then, the scale efficiency (SE) was determined. In order to determine in which area a given farm operates, whether it has an increasing or decreasing scale, the author calculated the efficiency of not increasing economies of scale (TENIRS) and it was compared with technical efficiency with varying economies of scale (TEVRS).

The data provided the basis for the development of the model farms with different economies of scale. A further distinction was made between them into open and closed cycle systems of farming. The basis for this approach provided such differences between the units as varied resources of land, labour and capital, different organization and production technology.

Research results and discussion

The scale of production is a fairly complex term, which makes it difficult to give it an unequivocal meaning. According to Samuelson and Marks (1998, p. 238) the scale production of a company is the size of investment, all production factors that are used. Whereas Wos and Tomczak claim (1979, p. 191) that the term refers primarily to the volume of production, although it is also indirectly related with the resources and inputs of production factors, which stems from the obvious relationship between the production and expenditures. In turn, Kowalski's (1993, p. 19) general approach to the scale of production defines it as "the volume of a single, separable production

process." In his opinion, the precise meaning of this concept is based on the analysis of the context.

Production at a certain scale implies some kind of organization and economics of production and the associated production efficiency (Wos, Tomczak 1979, p. 193). Increasing the scale of production entails certain benefits, known as economies of size. They result from a faster production growth in relation to the consumption of the factors of production. The concept of economies of size means that the average cost per unit of production decreases as the size of the farm increases. The economies can occur because the farmer is able to spread more production over the same level of fixed expenses. Or, economies of size can occur when a farm is able to obtain volume discounts for inputs such as seed or fertilizer (Duffy 2009). These benefits rise as the scale of production increases, but not without limitation and not always in direct proportion to the increasing scale of production. If the volume of production increases at the same rate as the input of production factors, then the economies of scale stay constant. On the other hand, when the volume of production grows faster than the input of production factors, then the economies of scale are increasing. The converse indicates to the decreasing economies of scale. The economies of scale occur, however, only up to a certain level of production. Once a certain threshold has been crossed, there can be observed an increase in the unit cost of production and the so called reverse economies of scale, also referred to as diseconomies of scale. The reverse economies of scale take place when an increase in the consumption of factors of production does not result in a corresponding increase in production (Kowalczyk 1998, p. 241).

The major benefits of increased scale of production in the farm are:

- reduction of unit production costs due to lower fixed cost imposed on the production unit;
- possible use of new production technologies, which are uneconomical on a small scale;
- labour productivity growth owing to simplified means of keeping and handling larger herds and to fewer preparatory and terminating activities;
- upgrading skills of persons engaged in production;
- introduction of modern management techniques and control of production processes;
- improving the quality of production, and hence the competitive strength of production;
- obtaining favourable selling prices and lower purchase prices of means of production;
- making the best of technical progress, mechanization of production, rationalization of work, new manufacturing technologies etc.
- The increase of the production scale may entail some adverse effects. These include:
- the growth of natural and market risks due to the limitation of offer associated with a higher scale;
- increased risk of various diseases;
- the increase in environmental pollution.

The question about optimal farm size has a long history in agricultural economics. Numerous authors have been analysing the relationship between farm size and efficiency (Fandel 2002; Bielik, Rajcaniova 2004; Hughes 2000; Madau 2010; Rasmussen 2011). Many research works have concerned the scale efficiency in pig farms too (Petrovska 2011; Asmild, Hougaard 2006; Umeh, Ogbanje and Adejo 2015). More detailed analyses were carried out in this study. The scale efficiency of production was determined in farms with different systems of pig farming. The analysed farms were divided into two groups with a closed and open rearing cycle. The closed cycle is considered to hold all technological groups of pigs and the final product are porkers. Renovation

of the herd on these farms are made on the basis of own or purchased animals. Open cycle is characterized by a specialization in one or two stages of the production cycle, regardless of the origin of the material for production.

42 farms out of the surveyed group were engaged in closed-cycle pig farming. All technological groups of pigs were kept there, the final product being fattening pigs. The statistical description of these farms is presented in Table 1.

Table 1

The scale of production and selected outlays in closed-cycle farms

Variables	Average	Min.	Max.	Standard deviation
Live pigs production in tonnes	866.5	329.1	4152.3	630.5
Utilized Agricultural Are in ha	99.0	8.3	466.0	100.8
Number of persons employed on a full-time	4.0	1.1	21.0	3.4
Fixed capital in thous. PLN	1306.2	501.9	4193.3	691.7
Working capital in thous. PLN	566.8	224.9	3390.3	497.9

Source: author's study

Of all closed-cycle farms, only 28.6 % had an optimal scale of production, namely the one that allowed for the most efficient use of the investments. The growing nature of the scale marked 40.5 % of farms. This means that the production of these units increased faster than the amount of factors of production. In contrast, 30.9 % of agricultural holdings from the study group were characterised by a decreasing scale. In these units, production was increasing more slowly as against the expenditure incurred.

Closed-cycle pig farms with different economies of scale differed in terms of the index levels of available resources, organization of production and results (Table 2). In farms with constant economies of scale, an average arable land area was 58.6 ha. At the same time the owners of these farms exploited leased agricultural land to the minimum. The leased land area in this group accounted for only 14.1 %. Farms with constant economies of scale were also characterized by the highest pig density. On average, 100 ha of arable land accounted for 612.4 LSU of this animal species. In addition, these farms benefited from their own feed in feeding pigs to a minimal extent. The average contribution of concentrate feed of own production amounted to 36.9 %. Almost 2-fold greater amounts of feed were purchased. Therefore, the average share of feed costs in direct costs of pig production reached the level of 86.9 %. The costs of purchase of animals accounted for just 3.3 %. In this group of farms, a rational use of inputs made way for high economic results in the form of agricultural income at the level of PLN 223.9 thousand.

Farms with decreasing economies of scale were characterised by the largest arable land area, which averaged 196.2 ha. Leased land accounted for more than 1/4 of this area. In addition, these farms had the highest labour force. An average number of full-time employed persons was 7.1, with about half of the full-time employees being hired. Their participation averaged 52.3 %. Agricultural holdings with decreasing economies of scale were also marked by the highest value of fixed assets (PLN 1917.9 thousand on average) and by the highest level of debt (11.2 %). At the same time, these farms, as compared with the others, invested many of their funds, i.e. on average PLN 376.5 thousand per year. They were characterized by the largest scale of production, which averaged 376.5 tons of live pig annually. Compared with the first group of holdings, this scale was nearly three times higher and as against the units with increasing economies of scale, more than four times higher. However, due to a large area of these farms an average stocking

density of pigs in this group was the lowest and amounted to 176.2 LSU per 100 ha of arable land. At the same time, these farms benefited to the greatest extent from their own feed in the pig feeding, which share in feed doses was 65.3 %. Thus, the share of costs of feed in direct costs of pig production in this group was the highest and represented 92.8 %. Whereas the proportion of costs incurred to purchase the animals, compared with other groups of agricultural holdings, was the lowest and averaged 1.5 %. These holdings were characterized, however, by the highest farm income at the level of PLN 327.7 thousand.

Table 2

**Selected characteristics of closed-cycle farms
with different economies of scale**

Variables	Economies of scale:		
	Fixed	Growing	Decreasing
Arable land area in ha	58.63	53.60	196.20
The share of rented UAA in %	14.1	19.5	52.3
Number of persons employed on a full-time	3.0	2.8	7.1
The share of wage labour inputs in %	24.7	14.8	52.3
The value of fixed assets in thous. PLN	1182.4	907.7	1917.9
Debt ratio in %	10.2	7.8	11.2
The value of investments in thous. PLN	126.2	88.1	376.6
The scale of life pig production in tonnes	189.7	109.2	230.9
Stocking density of Pigs per 100 ha UAA	612.4	297.7	176.2
The share of own fodder in feeding	36.9	50.4	65.3
The share of fodder costs in %	86.9	87.9	92.8
The share of purchase animals in %	3.3	4.4	1.5
Agricultural income in thous. PLN	322.0	139.9	327.7

Source: author's study

Farms with increasing economies of scale had the smallest average area of arable land, normally totalling 53.6 ha. The share of leased land in this group accounted for 19.5 %. Compared to the other farm groups, holdings with increasing economies of scale were characterized by the smallest labour force, which numbered on average 2.8 persons employed on a full-time basis. At the same time, the participation of hired workers in those farms was highly limited. The share of paid labour force there was 14.8 %. Agricultural holdings with increasing economies of scale were also characterized by the lowest value of fixed assets, at the level of PLN 907.7 thousand. Regardless of this, the owners of these farms invested very little, comparing with other groups. The average value of investment amounted to PLN 88.1 thousand per year. Furthermore, these farms were characterized by the lowest level of debt. The share of foreign capital in the business assets accounted for only 7.8 %. The scale of production in this group was the lowest. An average pig production amounted to PLN 109.2 thousand tons per year. Whereas the stocking density of pigs in farms with decreasing economies of scale accounted for 297.7 LSU per 100 ha of arable land. More than half of feed fed to pigs came from own production, but the share of feed in direct costs in this group was similar to that in agricultural holdings with constant economies of scale. The proportion

of the costs of purchasing livestock accounted for 4.4 %. The level of agricultural income achieved in these farms was the lowest, averaging PLN 139.9 thousand.

An open cycle pig farming was conducted in 24 farms. It involved specialization in one or two stages of the production cycle. Most often it meant fattening of purchased piglets or weaners. The statistical description of these farms is presented in Table 3. In this group, an optimal scale of production was observed in 47.6 % of agricultural holdings. Increasing economies of scale could be observed in 23.8 % of the units. A different situation was observed in 28.6 % of farms with decreasing economies of scale. Farms in the separate groups were highly specialized. A different situation was observed for available resources, organization of production and economic performance.

Table 3

The scale of production and selected outlays in closed-cycle farms

Variables	Average	Min.	Max.	Standard deviation
Live pigs production in tons	999.1	345.1	3373.3	701.6
Utilized Agricultural Are in ha	63.0	8.0	201.0	58.0
Number of persons employed on a full-time	4.0	1.0	8.0	2.0
Fixed capital in thous. PLN	1292.9	453.3	3199.5	822.1
Working capital in thous. PLN	1219.0	298.0	4879.3	1056.7

Source: author's study

Farms with constant economies of scale exploited a smaller area of arable land, covering on average 54.3 ha (Table 4). They also benefited from the lease of land to a minimum extent. The share of leased land accounted for an average 13.0 %. Whereas an average number of full-time employed persons was 4.0 per farm. At the same time, half of the employees were agricultural contract workers. What is more, farms with constant economies of scale were marked by a lower indebtedness. The share of foreign capital in financing farming activities accounted for 27.9 %. In the other groups of farms, the percentage of debt was about ten per cent lower. In addition, the holdings of the first group invested most of their resources. Their value of investments averaged PLN 166.6 thousand per year. Nonetheless, the scale of production of live pigs was higher than in agricultural holdings with increasing economies of scale and lower than in farms with decreasing economies of scale.

It amounted to an average of 268.9 tons of live pigs a year. In contrast, the farms with constant economies of scale exhibited definitely the highest density of herds. Stocking density of pigs per 100 ha of arable land amounted on average to 2251.4 LU. The pig feeding resources were dominated by purchased feed. The share of the farm-produced feed was 27.4 %. The largest per cent of direct costs of pork production constituted the feed costs (49.9 %) but the cost of purchasing animals also had a large share, amounting to an average of 47.5 %. What is more, farms with constant economies of scale met the highest agricultural income. On average, their agricultural activities had a turnover of PLN 252 thousand.

In the farms with increasing economies of scale, an average arable land area was only slightly larger than that reported in the first group and covered 58.15 ha. Leased land constituted more than 1/4 of this area. Additionally, these farms were characterised by lower labour force. As few as 2.0 persons were full-time employed there. Concurrently, 25.1 % of these were contract workers. Farms with increasing economies of scale also stood out for the lowest value of fixed assets,

amounting on average to PLN 799.5 thousand. The share of foreign capital in their assets value amounted to 16.8 %. At the same time the owners of these farms invested only PLN 42.8 thousand per year, which is more than four times less than in the other groups. The scale of production in these units was the lowest and amounted to 126.8 tons of livestock per year. Similarly, the stocking density of pigs was lower than in the other groups of farms and averaged 432.9 LSU per 100 ha of agricultural land. The share of own feeds in the pig feeding was higher by 11.7 pp in comparison with farms with constant economies of scale. In contrast, the percentage of costs of feed and purchasing livestock was at a similar level to that of the first group. At the same time, farms with increasing economies of scale reached their lowest level of agricultural income. Compared with the income of the other groups of farms, it was more than twice lower.

Table 4

Selected characteristics of open cycle farms with different economies of scale

Variables	Economies of scale		
	Fixed	Growing	Decreasing
Arable land area in ha	54.34	58.15	79.81
The share of rented UAA in %	13.0	25.6	24.7
Number of persons employed on a full-time	4.0	2.0	5.2
The share of wage labor inputs in %	49.3	25.1	43.8
The value of fixed assets in thous. PLN	1309.3	799.5	1686.4
Debt ratio in %	27.9	16.8	13.7
The value of investments in thous. PLN	166.6	42.8	162.0
The scale of life pig production in tonnes	268.9	126.8	355.7
Stocking density of pigs per 100 ha UAA	2251.4	432.9	818.5
The share of own fodder in feeding in %	27.4	39.1	42.0
The share of fodder costs in %	49.9	49.6	53.9
The share of purchase animals in %	47.5	46.7	43.9
Agricultural income in thous. PLN	252.0	112.4	219.5

Source: author's study

Agricultural holdings with decreasing economies of scale were characterised by the largest areas of arable land, which averaged 79.81 ha. Almost 1/4 of these lands were leased. In addition, these holdings had the largest labour resources. On average, 5.2 persons were employed there on a full-time basis. At the same time hired workers represented 43.8 % of labour input. An average value of fixed assets was also the highest in this group as it amounted to PLN 1686.4 thousand. On the other hand, the level of indebtedness of agricultural holdings with decreasing economies of scale was the lowest compared with the other groups of farms. The debt ratio of the total assets amounted to an average of 13.7 % and was more than two times lower than in the first group of farms. On the other hand, the value of investments in farms with decreasing and constant economies of scale was similar, accounting for an average of PLN 162.0 thousand. Moreover, the holdings with decreasing economies of scale were characterized by the highest scale of production, which amounted to 355.7 tons of live pigs per year. The average density of this animal species in this group of agricultural holdings was much lower than in the first group and amounted to 818.5 LU per 100 AL. These farms also largely benefited from their own feed in the pig feeding process, which share accounted for 42.0 %. In spite of this, the percentage of feed costs in direct costs of

live pig production was the highest in this group and totalled 53.9 %. In turn, the share of costs of purchasing animals was lower by 10 percentage points. In terms of the achieved agricultural income, the position of farms with decreasing economies of scale was worse than that of holdings with constant economies of scale. On average they accrued income at the level of PLN 219.5 thousand a year.

Conclusions, proposals, recommendations

- 1) Based on these results, it can be stated that some pig farms in Poland reached the optimal scale of production with given resources and that their further growth does not lead to increased efficiency.
- 2) Farms with constant economies of scale prevailed in the group of open cycle farms. They were marked by the smallest share of their own feed in the pig feeding and by a small percentage of leased farmland. Due to an optimal scale of production, the owners of these farms obtained the highest income.
- 3) Farms with increasing economies of scale were most numerous in the group of closed-cycle farms. Characteristically, they had the fewest resources of production factors such as labour and capital, and the smallest scale of production. In this group of farms, few resources were invested and participation of paid labour force was minimal. At the same time these agricultural holdings had the lowest economic results. In order to make an optimal use of the investment, it is advisable to increase the scale of production in these units.
- 4) A different situation was observed in agricultural holdings with decreasing economies of scale, where production increased at a slower rate as against the incurred expenditures. These farms were characterized by the most significant factors of production, the largest scale of production and the largest share of feed costs in the production costs. Therefore, to improve the efficiency of these farms it is required to change their organization and production technology.
- 5) The data indicate that Poland has a large potential in the production of live pigs; however, in order to be able to withstand the increasing competition in the European and global markets the scale of production in a great number of domestic pig farms should be increased.

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NEW DIMENSIONS IN THE DEVELOPMENT OF SOCIETY

REMEMBERING THE RIVER DAUGAVA: THE ECONOMICS AND ETHICS OF HYDROELECTRIC DAMS

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Abstract. Hydroelectric dams built on the largest river of Latvia – the Daugava, are essential for energy supply of Latvia. The largest of them – Plavinas hydroelectric plant, was built during the period of the Soviet rule and is still one of the largest in Europe. As a result, the valley of the river Daugava with its unique landscapes and cultural values was flooded, despite the objections by a significant part of Latvian people. Two decades later the construction of another – Daugavpils hydroelectric dam –, was suspended because of similar protests. The debates about the effects of hydroelectric dams are continuing since Latvia regained independence in 1991. The aim of this paper is to assess these debates in the context of environmental ethics.

According to approach of environmental economics, the main method for the assessment of environmental projects is the cost/benefit analysis. Likewise, the critics of construction of dams apply predictable economic costs as an argument against the construction, for instance, pointing to damages to fishery. However, economic costs were not the main reason for the protests. The main reason was the expected irreversible losses of natural and cultural values that were assessed as "priceless". Such attitude of a large part of society suggests that "non-economic" values have to be taken into account in comprehensive assessment of these projects. The significance of these values has to be recognized, and the results of cost/benefit analysis should not be a single criterion used in the assessment of the projects of hydroelectric dams.

Key words: hydroelectric power, cost/benefit analysis, environmental values, non-economic values.

JEL code: A12, A13, Q51

Introduction

The debates about the hydroelectric dams on the river Daugava are going on for more than a half of century and the construction of dams still has both defenders and critics. Both sides propose their arguments, but there is a lack of comparative and comprehensive assessment of the arguments from the ethical point of view. Ethics as the branch of philosophy is not empirical but normative – it deals with value judgments implicit in such debates. The aim of this paper is to assess proposed arguments in the context of environmental ethics, applying a case-study approach. This method of applied ethics works from the "bottom up", starting with our responses to concrete cases and then proceeding to the development of more abstract principles (Arras, 2001). In this case, our first task will be reviewing historical context in which the debates about the hydroelectric dams in Latvia have been developing. The next task of the research will be comparative consideration of the arguments proposed by both critics and defenders of the construction of dams. Then these arguments will be assessed in the light of the principles of cost/benefit analysis – the main method used in contemporary environmental economics. Finally, we will consider the problem of applying economic cost/benefit analysis to a large scale environmental projects that include irreversible environmental damages. Comprehensive assessment of such damages must take into account possible relevance of "non-economic", for example, aesthetic or cultural values that cannot be measured in monetary terms. These values are often mentioned by the critics of dams' construction. The general arguments for the relevance of various "non-economic" values will be presented. Therefore, in addition to economic cost/benefit analysis, "non-economic" values must be taken into account also in the assessment of large scale environmental projects, including the construction of hydroelectric dams.

Research results and discussion

1. Historical context

The river Daugava is essential in Latvian geography, history and economy. Historically, the Daugava has been significant for transport (particularly for timber) and fishery. In 1930's the *Times* correspondent described the Daugava as "the river of salmon and lampreys" with beautiful rocky banks in the central part of Latvia (Urch, R.O.G., 1938). However, since then the landscapes around Daugava and its role in the economy has changed significantly as the result of construction of dams for hydroelectric power plants.

In order to understand the decisions about construction of these dams, the context of political and social history of Latvia must be taken into account, as broadly outlined in the paper (and in the related documents) of historian Martins Mintauris (Mintauris, M., 2013). The summary of historical context given here is based on this paper.

The earliest ideas to use the river Daugava for producing electric power were proposed before the First World War when Latvia was a part of Russian empire. Suggestions about the construction of several hydroelectric plants were also discussed after Latvia became independent in 1918. As a result, during the thirties the first – Kegums hydroelectric plant – was constructed. It is currently producing 261 MW of power (Strikis V., 2012, 322).

After Latvia was occupied by the USSR in 1940, new plans for construction of hydroelectric plants emerged. They were facilitated by the perception of large hydroelectric cascades as the symbol of Soviet state power. In 1955, it was decided to construct hydroelectric plant designed by Moscow engineers in Aizkraukle district with planned power 600 MW (according to other calculations 300 MW). The planned plant was named Plavinas hydroelectric power station.

Unusually for the USSR of that time in Latvia, the plans of new plant caused public debate, in parts even published in mass media. In March of 1958, the petition signed by more than fifty members of *intelligentsia* (writers, artists, scientists etc.) was submitted to the government of Latvian SSR (Soviet Socialist Republic). The protest was provoked by the fact that the beautiful landscapes and historical sites of the Daugava's valley would be flooded as a result of plant's construction.

On the other hand, the leadership of Communist Party of Latvia could allude to "tens of Latvian engineers" that support the project drafted in Moscow. The ideological mood of Soviet period also should be taken into account – enthusiasm about economical and scientific-technological progress in the part of society could be genuine. Moreover, the existence of sufficient supply of electric power was not seen as something self-evident, as it is nowadays.

Crucial turning point for the decision to start the construction of Plavinas hydroelectric plant was the removal from power of the so-called Latvian "national communists" in 1959. New government of Latvian SSR started the politics of russification and promoting immigration from other parts of the USSR in order to supply the workers for new industrial enterprises. For this reason additional electric power was needed.

The construction of Plavinas hydroelectric plant begun in 1960. Relocation of burials, cutting the trees, dismantling and even blowing up buildings including an Orthodox Church, was carried out before the creation of water reservoir. The valley of the Daugava obtained "Moon's landscape", which was flooded in 1965-1966.

During the seventies another – Riga hydroelectric plant was built on the Daugava, currently producing 402 MW of power (Strikis V., 2012, 322). The project to complete the intended cascade

of dams – to build the Daugavpils hydroelectric plant was launched during the same decade. However, historical context has changed. During the second half of the eighties – the years of “perestroika”, public opinion in Latvia became more daring to express negative attitude to possible flooding of another segment of Daugava valley. Protests that started in the autumn of 1986 with the newspaper article by two journalists – Dainis Ivans and Arturs Snips, grew into wider movement – more than 34 000 people signed letters against this project (Zirnis E., 2017). Preparatory works of the project were suspended, and in the autumn of 1987 the government of the USSR stopped the project. The protests against the construction of Daugavpils hydroelectric dam were one of first actions of Latvian people that eventually lead to regaining of independent Latvian state in 1990-1991.

2. Arguments then and now

How to assess the decision to construct Plavinas hydroelectric plant, looking back over a time span of more than a half of century?

Discussing such a question now may seem meaningless, not the least because it was built during the years of the Soviet occupation when deciding such issues was not done democratically. Nowadays a proposal to construct this dam almost certainly would be regarded as unacceptable for the large majority of Latvian society. However, in general, opinions about construction of hydroelectric plants on the Daugava never have been totally negative. The first of them – Kegums hydroelectric plant was built during the years of Latvian independence. It is possible that even if Latvian independence was preserved after the Second World War, discussions about construction of new hydroelectric plants had continued.

There is also no unanimity of views concerning this issue nowadays. Positive aspects of hydroelectric plants are often mentioned by economists and engineers. About a half of electric power in Latvia nowadays is produced by hydroelectric plants; Plavinas hydroelectric plant with its present power 868 MW (Strikis V., 2012, 322) produce about 25 %. In addition, this is significant in the context of such important geo-political aspect as promoting independence from Russian energy supplies. Moreover, from global perspective, hydro-energy is one of the greenest ways of renewable energy production, which has comparatively low costs and does not produce emissions into atmosphere. Once rejected project of Daugavpils hydroelectric plant is now being defended (Strikis V., 2012, 322). According to one opinion reported in mass media, nowadays modern technologies (for instance, horizontal turbines) could create hydro-energy with lower rising of water level than in the original project.

Thus, the debates about construction of hydroelectric plants have not lost their relevance. How to assess an arguments for and against construction of hydroelectric dams that had been mentioned before the construction of Plavinas hydroelectric plant and the arguments that are mentioned now?

In the aforementioned petition of 1958 against Plavinas hydroelectric plant it is emphasized that territory planned to flood according to this project is “the most beautiful place in Latvia”, and it is “extremely important, that the project of hydroelectric plant must be such that the creation of water reservoir would require the least possible sacrifices from other branches of economy, as well as from preservation of cultural sites and people’s national traditions” (Mintaurs M., 2013, 91). In the petition these expected losses were characterized as “priceless”.

The authors of the petition did not deny the necessity of new hydroelectric plant, but their hopes were related to alternative project of so-called derivation hydroelectric plant – the construction of a dam on artificial bypass canal with the length of 45-50 km. There is the admission in the petition that without this alternative, the question indeed would arise, that “even the greatest natural beauty and the most valuable cultural monuments must be sacrificed for people’s bright future” (Mintaurs, M., 2013, 92). Concerning the last formulation, it could be added that quasi-religious language of “sacrifice” sometimes also appears in remarks of the defenders of Plavinas hydroelectric plant – as formulation that natural beauty had been “sacrificed” (though usually without mentioning of any higher value for the sake of what this sacrifice was carried out).

According to calculations mentioned in the petition, the derivation project would be only a little more expensive (2098.0 million roubles) in comparison to total predictable costs of Plavinas’ and another possibly constructed next to Plavinas plant – Jekabpils hydroelectric plant (1932.2 million roubles), but its power – a little smaller (respectively 254 MW un 310 MW). However, it should be noted that according to calculations of other Latvia’s engineers the costs of the derivation project would be considerably higher, and its effectiveness – essentially lower (Mintaurs M., 2013, 60, 72). Besides, an area or flooded territories would be larger. The deficiencies of derivation project were also admitted by its defenders.

Economic arguments against the construction of Plavinas dam were also mentioned in the petition and other publications, for instance, concerning predictable losses to fishery, to the production of dolomite, and to the development of tourism. This leaves an impression that although the essential reason for protests against planned dam was “priceless” losses of natural and cultural values, it appeared important to the authors of protests to add to their criticisms the arguments concerning the expected economic damages.

Similar approach was used in 1986-1987 during the protests against the project of Daugavpils hydroelectric dam, and in recent publications about this issue. For instance, in a recent interview Dainis Ivans claimed: “Leading hydro-engineers have told me that nowadays nobody would construct Plavinas hydroelectric plant ... firstly, because of abnormally high costs, and, secondly, it would not be permitted by the demands of the preservation of nature and of economy of natural resources. If the Daugava had remained the richest European salmon river as it was before the construction of Plavinas dam, today for sold salmon every year, we could buy more electric power than produced by all three hydroelectric plants together” (Zirnis E., 2017, 13).

Thus, critics usually mention two kinds of arguments against hydroelectric dams – economic and non-economic (based on “priceless” losses), and try to demonstrate that both kinds of arguments lead to conclusion against these projects.

According to economic arguments, all predictable benefits and costs resulting from hydroelectric plant construction must be compared. Possibly, the critics of these projects can hope that such comparisons would be sufficient to reject the dams’ construction. However, it is difficult to predict results of such calculations beforehand. Concerning possible construction of Daugavpils dam, during the debate in 1986, after preliminary works already had begun, one of engineers supporting the project, suggested: “How to proceed now? We, members of power industry, could try to calculate in roubles what are the advantages of construction of Daugavpils hydroelectric plant, but you, who are against, make an effort to calculate [the disadvantages], and in the same roubles” (Ivans D., Snips A., 1989, 55).

This suggestion, if referred to in the context of market economy, reminds of cost/benefit analysis used in the contemporary environmental economics. Its basic idea appears to be consistent with the principles of rational decision making – to compare all expected costs and benefits of a project with alternatives (including the rejection of the project) and to act in accordance of the results of this analysis. However, cost/benefit analysis is based on a questionable assumption that all costs and benefits can be calculated in monetary values. How to calculate the monetary value of the benefits of preserving the landscape because it is regarded as “the most beautiful place in Latvia”?

Defenders of cost/benefit analysis in these cases try to find a way to express in monetary values the equivalent of benefits of preserving natural environment which could be compared to costs of lost economic opportunities. Various methodologies have been proposed. In the assessment of environmental projects contingent valuation method is the most widely used (Hanley, Brabier, 2009, 45). It is based on polls on how much people would be willing to pay for, for instance, preservation of a beautiful landscape, or, how large monetary compensation they would be ready to accept for the loss of this landscape. For instance, the question could be asked: how much I would be willing to pay additionally for electricity (and for other goods prices of which depend on the price of electricity), if the plant is not constructed?

Willingness to pay for preserving natural environment can be related not only to economic opportunities (for instance, concerning fishery or tourism), but also to so-called “existence values”. These are values that an individual may attach to natural values (beautiful landscapes, rare species etc.) even if he or she never plan to travel to these places and never will be in any direct contact with them. It is quite possible that some Latvians would be willing to pay, for instance, for preservation of Indian tigers in their natural habitat, even they do not intend to travel to India. If so, this means that there are individuals that are willing to pay for the awareness that tigers as rare species exist and need to be preserved for future generations. However, in the context of environmental economics, these “existence” values also belong to economic values because they are assessed as willingness to pay.

Detailed cost/benefit analysis is a complex and expensive activity, which is full of various technical and methodological difficulties as described in environmental economics’ publications (Hanley N., Barbier, E.B., 2009; Smith S., 2011; Nikodemus, O., Brumelis, G., 2015). However, in addition to specific methodological problems, there is a more conceptual problem: are empirical (descriptive) research on willingness to pay, sufficient for ethical (normative) conclusions about the proposed actions leading to changes in the natural environment? Is it appropriate or even possible to measure all values in monetary terms?

3. Do “non-economic” values exist?

There is at least a theoretical possibility that calculations of cost/benefit analysis applied to the construction of Plavinas (or Daugavpils) hydroelectric plant demonstrate that economic benefits of preserving natural environment are lower than costs of lost economic opportunities resulting from a refusal to construct the plant.

In this case remaining argumentation for persistent critics of construction would be not be based on cost/benefit analysis, but rather on the premise that there are costs of dam construction which are in principle “priceless”, so it is wrong to construct a dam even if economic benefits of construction were higher than costs. Evidently, most critics of Plavinas (or Daugavpils) dams’

construction proceed in this way. "Non-economic" values are genuine reason for protests, and the economic reasons are mentioned mainly as additional.

Which approach is more justified – based on economic cost/benefit analysis or based on "non-economic" values? Do "non-economic" values – values that in principle cannot be measured in monetary terms – exist?

There is the debate in environmental ethics between defenders of anthropocentric approach who claim that reasoning about environmental values is meaningful solely from human (including future generations) perspective, and defenders of other (bio-centric, holistic etc.) approaches who claim that living nature also has an intrinsic value. However, in order not to extend this discussion too far, let us only look from anthropocentric perspective.

In the context of market economy, the idea of "non-economic" values may seem meaningless in a principle. A value of any goods or services is identical with a price that a consumer is willing to pay for them. As economist Thomas Sowell explains, *all* values are "non-economic" (Sowell T., 2011, 591). The task of economics is to explore conditions how these "non-economic" values are created and distributed in the most efficient way. Efficiency is promoted by market, which also compares these values by exchange. Thus, it could be said that all values are also economic – the economic value appears in equivalent exchange. Sowell adds that in economics it is not meaningful to reason about objective or "true" values; economic values are solely subjective. Otherwise it would not be possible even to explain an exchange by selling and buying. For example, if I buy a newspaper for 50 cents, subjectively I evaluate obtained newspaper as more valuable than 50 cents, but a seller, on the contrary, evaluates obtained 50 cents as more valuable than a sold newspaper. It would be meaningless to ask for objective or "true" value of this newspaper (Sowell T., 2011, 37).

However, if we are looking beyond the economic sphere of selling and buying, do other kinds of values exist in addition to economic values? Various reasons can be mentioned in favour of this conjecture. There are values that are expressed by perceiving an object not as goods for use or sale, but in other ways, for instance, respect, or admiration of aesthetic value. To emphasize such an attitude, this kind of value can be characterized as "not for sale".

To reality of this kind of "non-economic" values also points a widespread intuition that there are values whose equalizing with price explicable in monetary terms would mean diminishing this value (Kelman S., 2012, 355). One of the spheres where such values exist is personal relationships, for example, friendship (Anderson E., 1993). In this sphere, exchanges are based on gift giving, but an exchange based on selling and buying would degrade these relationships. It is not possible to buy true friendship (as opposite to something that merely resembles friendship). Even the most radical defender of market economy would not deny this. Also, there are professions (for instance, the profession of a physician) in which internal ethical standards of excellence are introduced in order to preserve their integrity and professional values from degradation that could arise from too much dependence from profit considerations.

Values of natural environment in many cases can be viewed as a kind of "non-economic" values. They also can be regarded as "not for sale" in order to preserve them from diminishing. For instance, when asked the question, what monetary compensation a person would be willing to accept for a damaged scenery in natural monuments of the South-west of the USA (for example, the Grand Canyon) resulting from a construction of an electric power plant, more than a half of respondents replied that "infinite" compensation would be required, or refused to answer the

question, regarding it as an attempt to bribe (Anderson E., 1993, 209). So, an attitude to "non-economic" values can exhibit itself as non-willingness to pay.

Another feature of "non-economic" values is that society may accept legal restrictions for their preservation. For instance, it is prohibited to sell oneself to slavery, even if somebody is willing to do this; similar restrictions are legally introduced in respect of selling bodily parts or organs. The existence of such restrictions in liberal democratic states can be justified because of admitting that in the moments of difficulties and vulnerability, a person could submit into temptation to sell his freedom or bodily integrity, thus diminishing their value. However, the same persons are not only individual customers or entrepreneurs, but also citizens (Sagoff M., 2008). As citizens they can admit such values as common good, and support legal norms for their preservation. Attitude to natural values can be justified in a similar way.

4. Pluralistic approach to values

Acknowledging the significance of "non-economic" values raises a question: how to compare these values with economic ones? In context of the case described above, it could be asked – which values are more significant in assessment of projects related to changing the natural environment?

This way of formulating a question is based on assumption that it is possible to find some common scale of measuring both types of values. However, this seems to lead to unsurmountable difficulties. For instance, the attempt to base them on individual's existing preferences ignores the option that environmental (and other) values can have "transformative power" – an individual can start to assess these values only after he or she has been introduced to them. There is a possibility of opposite process as well – people become so accustomed with a loss of a value that they stop appreciating it.

These difficulties can be solved by admitting that qualitatively different kinds of values exist, which can be incommensurable on any common scale, thus also incommensurable with one another. This is the approach of value pluralism. It is commonly agreed that there are different criteria of value in different spheres of life. We do not assess on the same scale, for example, scientific theories and works of art. Similarly, aesthetic values are not more or less significant in comparison to economic values; they are qualitatively different.

This conclusion does not mean denying that economic cost/benefit analysis has an important role in assessing environmental projects. Cost/benefit analysis is a valuable method for comprehensive assessment of the environmental impacts of different projects. However, this method should also be applied with caution (Hansson S., 2007; Hwang K., 2016). Even if the economic benefits of a project surpass the costs, the cost/benefit analysis cannot be regarded as final judgment, but as one of the factors informing public discussion (Schmidtz, D., 2012).

The admission of value pluralism underlines the possibility of potentially difficult choices and moral dilemmas. On the one hand, it cannot be ruled out that considerable economic benefits are preferred to some losses of non-economical values. But, on the other hand, it cannot be ruled out that for the sake of preserving of significant non-economic values society may decide not to realize a project whose economic benefits exceed costs. It seems that large majority of people who are against the construction of Plavinas and Daugavpils hydroelectric dams, share this opinion. The question then arises – why do they nevertheless use additional economic arguments in support of their opinions? The most likely explanation is the fear that otherwise the attitude would be

characterized as "merely emotional". However, people's intuitions concerning values can be based on more comprehensive understanding of the issues than any preconceived economic approach.

It can be objected that admitting the role of "non-economic" values in decision making suggests replacing the cost/benefit analysis, which at least strives to objective and quantitative evaluation of the situation, with much less objective decision making. The non-economic arguments may indeed be vague, but it follows from the observation that in the presence of value pluralism, a monistic value scale is impossible. According to comment ascribed to John Maynard Keynes: "I would rather be vaguely right than precisely wrong" (cited in Aldred J., 2010, 177).

Conclusions, proposals, recommendations

The above described analysis applied to the case of building dams for hydroelectric plants on the river Daugava leads to the following conclusions.

- 1) The debates about the construction of large scale hydroelectric plants in Latvia such as Plavinas and Daugavpils plants, reveal that the main reason for objections against these projects was the irreversible loss of "priceless" environmental values.
- 2) It would be wrong to assess this widespread opinion as merely emotional attitude unjustified rationally. This attitude can be justified by comprehensive consideration of relevant values and admitting the significance of "non-economic" values that cannot be expressed in monetary terms.
- 3) Therefore, in addition to economic cost/benefit analysis, the role of "non-economic" values should be taken into account in assessment of environmental projects, and in particular to the dams' construction on Daugava.
- 4) More generally, when large and irreversible losses of "non-economical" environmental values are at stake, it is justified to consider abandoning a project even if its economic benefits are higher than costs.

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THE SOCIAL FIELD OF SMART VILLAGES CONCEPT: THE CASE OF PERIPHERAL REGION - LUBLIN PROVINCE IN POLAND

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Abstract. Lagging regions are characterised by coupling of numerous barriers to their development including the ones in the dimension of human and social capital. The concept of smart villages identifies the modes of overcoming these barriers. The aim of the paper was to operationalise and to evaluate social potential of smart village in case of lagging region (Lublin Province, Poland). A quantitative approach was applied during the research. The work uses a descriptive method in the theoretical part and statistical methods in the empirical part. In the light of the statistical analyses carried out in the research process, there has been no indication of a higher potential of rural-urban communes in comparison to rural units. The potential of social smart is strongly dispersed. A positive impact of larger urban centres in the region on the rural potential cannot be identified. However, certain concentrations can be distinguished in the framework of selected Local Action Groups (LAGs) that operate in Lublin Province. Since the peripheral regions are in particular sparsely populated by the creative class, and it is difficult to attract the creative class of people, it should be noted that investing in and promoting smart people becomes necessary catalysts for the implementation of smart villages concept. It is therefore essential to strengthen the connection between the regional and sub-regional scientific centres and commune self-governments. Fostering the activity of LAGs operating in the Community-Led Local Development (CLLD) approach in the framework of LEADER programme seems to be the desired direction of the support for endogenous potential of rural territorial units enabling the smart villages concept implementation.

Key words: smart city, smart people/community, smart village, lagging regions.

JEL code: O18

Introduction

In the era of consumer society, the quality of life constitutes an essential factor contributing to the territorial competitiveness. Territorial competitiveness, more increasingly, is built on the qualitative criteria, and not on the quantitative growth factor. The aspect of knowledge is also important. On the grounds of territorial competitiveness theory, the concept of regional smart specialisation and a new urban development trend, i.e. *smart city* was shaped, while the concept of smart villages is currently being formed. With regard to the European Union (EU), new development challenges form an integral part of the Europe 2020 Strategy for smart, sustainable and inclusive growth. As part of the EU policy, smart growth is being used in the context of knowledge and covers the policy of innovation, education and research. In this regard, it remains a particular challenge to establish the fundamentals for smart growth through the implementation of the concept of smart villages in the peripheral rural regions.

The peripherality, despite the socio-economic development, does not disappear. What is more, among the units (regions) classified as peripheral, some groups of outlier territorial units can be distinguished (lagging regions) (Olechnicka, Smetkowski, 2007: p. 1) into two categories: of extremely high indicators in different peripheral dimensions and of low dynamics of improvement of these indicators.

Lagging regions accumulate the socio-economic barriers to development. In economic terms, these include: low level of GDP per capita, low capital expenditure on public services and limited access to them, and/or their low quality. In demographic terms, peripherality manifests itself in depopulation and progressive aging of the local community, the outflow of young people, low and decreasing density of population. Peripherality in case of lagging regions is also characterized by the deteriorating quality of human capital resulting from the outflow of the best educated and the

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most active entities, and in the context of social capital - the low level of cooperation and bridging of social capital, the deprivation of local elites, and limited competences of local authorities (Nurzynska, 2016: pp.135-136).

In the peripheral regions, we observe a number of feedback loops between the indicated development barriers causing the formation of the so-called vicious circles of development (Krueger, 1993). For example, the phenomenon of depopulation of peripheral border regions also brings consequences for social capital. Aging processes may weaken social self-organization, innovativeness of attitudes, decreasing number of local community leaders. The ability to see and use the opportunities to overcome peripheral barriers depends on the activity and innovation of the community and the attitudes of local leaders. In the peripheral regions, we often encounter the problem of lack of real local leaders and the passivity of local communities (Miszczuk, 2013).

The group of lagging regions includes the provinces of the Eastern Poland Macroregion – among others Lublin Province constituting the research area. The province is located at the eastern border of the EU. In terms of economic peripherality, the region remains in the group of the least-developed regions in the EU in terms of GDP per capita expressed according to the purchasing power parity (with GDP below 50 % of the EU average) (Eurostat 2016).

In the light of barrier characteristics to development of peripheral regions, the concept of smart villages seems to be attractive in overcoming these barriers. This is a new concept requiring practical embedding in local conditions and operationalisation.

The aim of the paper was to operationalise and to evaluate social potential of smart village in case of lagging region.

The following stages of the study were adopted:

- systematising the achievements in the field of theoretical foundations of the smart villages concept, including the social identification of its dimension,
- operationalisation of the social dimension of the smart villages concept (based on data available in Polish mass statistics),
- characteristics of rural and urban-rural communes of Lublin Province - lagging region in Poland and the European Union in the aspect of smart social potential.

The following hypotheses were formulated to address the research problem.

- 1) Urban-rural units show a higher level of the social dimension of smart development compared to rural communes. Due to the level of the social dimension of smart development the structure of urban-rural communes differs from the structure of rural communes.
- 2) Communes situated in the close vicinity of the region's main medium-sized and large urban centres (capital of the region) demonstrate a higher level of the indicator of the social dimension of smart development compared to communes which are peripherally located within the region; Communes with a higher level of the social indicator of the smart dimension are concentrated (presence of clusters) around the medium-sized and large urban centres in the region.

In the theoretical part of the paper, descriptive method and empirical statistical method were used. The statistical methods applied are as follows: zero unitarisation method, similarity of structures test, Mann-Whitney U test.

Research results and discussions

1. The concept of smart city as the base of formulating smart villages concept through the lens of social field

The concept of smart city is commonly found in the academic literature along with other related terms such as: smart community, smart city, information city, creative city, learning city, knowledge city (Gil-Garcia, 2015). The term was first used in the 1990s. The dynamic development of cities and their surroundings, including the technological environment in the context of the dynamising process of globalisation and the growing competition between territories, has influenced the rapid development of the concept of a smart city. This was also supported by the political support of global institutions, including the United Nations, the European Union and the OECD (Cocchia, 2014).

The smart city concept is the result of three trends in urban research, i.e. digital city, green city and knowledge city (Chourabi et al., 2012). Smart city is a multidimensional concept. Originally, the narrow definition was focused around information technology. Nam and Pardo presented the model of an intelligent city with three dimensions: technology, people and institutions (Nam, Pardo, 2011). Lombardi et al. (2012) distinguished six areas of smart city concept implementation. These include: economy, people, management, mobility, environment and quality of life.

In a broad definitional approach, smart city is perceived as a new paradigm in urban development (Neirotti et al., 2014), where human and social capital, education and the natural environment play an important role in the concept (Lombardi et al., 2012). An example of a broad definitional approach to a smart city through the prism of smart people is the definition of Komninos (2006: p.13): who defined them as "territories that bring innovation systems and ICTs within the same locality, combining the creativity of talented individuals that make up the population of the city, institutions that enhance learning and innovation, and digital innovation spaces facilitating innovation and knowledge management".

Literature review allows to notice that in addition to information technology, the social factor is a basic dimension/ area in the smart city concept. Quality of life, human capital (also in the context of local government competence) and social capital constantly appear in the proposals for the operationalisation of the concept (see the work of Mahizhnan, 1999, Giffinnger et al., 2007, Eger, 2009; Thuzar, 2011; Chourabi et al. 2012).

According to Bartlett (2005), intellectual capital and social capital are "indispensable endowment" to smart cities. "Smart city is about a mix of education/training, culture/arts, and business/commerce". The smart people concept comprises various factors like: open-mindedness, affinity to life-long learning, social and ethnic plurality, flexibility, creativity, cosmopolitanism or, and participation in public life (Hollands 2008). The label smart city points to "clever solutions by creative people" (Monfaredzadeh, Krueger, 2015). Initiatives under smart cities concept have an impact on the quality of life of citizens and aim to foster more informed, educated, and participatory citizens (Chourabi et al., 2012).

People are smart in terms of their skill and educational levels, as well as the quality of social interaction in terms of integration and public life and their ability to open to the "outside" world. Towards more progressive smart cities, cities should start with people from the human capital side, rather than blindly believing that IT itself can automatically transform and improve cities (Shapiro, 2006, Hollands 2008).

People are the protagonists of a smart city, who shape it through continuous interactions (Albino et al., 2015: p.9). For this reason, creativity is recognized as a key driver of smart city, and thus education, learning, and knowledge have central roles in a smart city (Thuzar, 2011).

Another category connected with social field of smart city concept is community (Nam, Pardo, 2011). The importance of this factor emulates the concept of smart communities where members and institutions work in partnership to transform their environment (Berardi, 2013). This means that the community of a smart city needs to feel the desire to participate and promote a (smart) growth (Albino et al., 2015: p. 9). According to Monzon (2015: p. 22), the main challenges to face in the smart people action field are improving social cohesion and quality of life.

In view of the need to implement the assumptions of the Europe 2020 Strategy, the concept of smart growth in rural areas, the concept of smart villages emerged in the European Union's development policy. The emerging concept refers to rural areas and communities that use their strengths and resources and take advantage of opportunities. In smart villages, traditional and new networks and services are enhanced by means of digital technologies, telecommunications, innovation and better use of knowledge for the benefit of residents and enterprises. The concept of smart villages does not offer a universal solution. It is territorially embedded, based on the needs and potentials of a given territory and guided by the strategy, supported by new or existing territorial development strategies. The concept of smart villages refers to settlements in rural areas as well as rural landscapes (EU Action for ..., 2017).

Technology is important in the concept of smart villages, as are investments in infrastructure, business development, human capital, potential and building a civic society. Good management and involvement of citizens is also important. The concept of smart villages draws attention to the abilities of using e-skills, access to e-health and other basic services, innovative solutions in the field of environmental protection, the use of circular economy in relation to agricultural waste, promotion of local products supported by technology and ICT, implementation and reaping the full benefits of smart specialisations in agri-food projects, tourism, cultural activities, etc. (EU Action for ..., 2017).

In the European Union, the implementation of the smart villages concept also results directly from the Cork Declaration guidelines for the development of rural areas. One of the key recommendations of the Cork 2.0 Declaration (2016) is the need to work across policy fields to promote rural prosperity. As a response on this declaration the Smart Village initiative was launched by European Commission. "It aims at improving the implementation of EU policies in rural areas. To do this, digital technologies, innovations and the better use of knowledge will be enhanced to benefit rural populations and businesses" (Innovation and digitization..., 2017; Villages and small..., 2017).

The smart city concept in the dimension of smart people and the "being smarter people" process is closely related to the concept of inclusiveness development postulated in the Europe 2020 Strategy. Promoting social inclusion, reduction of poverty and economic development in rural areas has become a priority in the development of EU rural areas. These demands are implemented as part of the LEADER programme, while the Local Action Groups (LAGs) have become the institution involved in the animation of disadvantaged groups (Guzal-Dec, Zwolinska-Ligaj, 2017a; Guzal-Dec, Zwolinska-Ligaj, 2017b).

In the context of the implementation of the smart development concept with regard to rural territorial units, it should be remembered that territorial units located in peripheral regions do not have the same access to resources as growth centres or communes directly adjacent to them (Bilbao-Osorio, Rodriguez-Pose, 2004 ; McCann, Ortega-Argiles, 2015, Naldi 2015). However, in case of these regions, there are some possibilities of launching smart factors in the process of their development. Increasingly, the literature emphasizes the importance of services related to local, place-based amenities and entrepreneurship in the context of rural development (Rappaport, 2009).

2. Operationalisation of the social dimension of the smart villages concept

Based on a critical review of the literature, including proposals from Szczech-Pietkiewicz (2015), Obrebalski (2016) and Hajduk (2016), variables describing the social dimension of the concept of intelligent development were distinguished¹. The construction of a set of indicators enabling operationalisation of the smart concept in its social dimension was associated with the disclosure of difficulties such as the reference to national conditions and realities and the simultaneous consideration of the specificity of rural settlement units and the limited access to public statistics, especially with regard to soft factors/variables.

In the process of defining a set of indicators describing the social dimension of smart development, the following assumptions were adopted: data availability for rural and rural-urban communes in Lublin Province, substantive usefulness, acceptable level of variability (value of the coefficient of variation above 10 %) and the degree of correlating with each other (value of the correlation coefficient below 0.7).

Ultimately, the study used 11 variables that meet the above conditions and characterise the quality of life, human capital and social capital. Variables X_1 - X_3 refer to the quality of life, X_4 - X_8 - describe human capital, while X_9 - X_{11} - refer to social capital:

X_1 percentage of dwellings in a commune within Next Generation Access (NGA) in the total number of dwellings in the commune;

X_2 number of specialist laboratories per 10,000 inhabitants;

X_3 number of entities providing health care and social assistance per 100 inhabitants;

X_4 the gross schooling rate for primary schools;

X_5 number of members of IT associations per 1,000 inhabitants;

X_6 percentage of additional foreign language learning in primary schools;

X_7 the percentage of town councillors representing a vocational group of specialists in the total number of town councillors;

X_8 the percentage of town councillors with higher education qualifications in the total number of town councillors;

X_9 number of foundations, associations and social organisations per 1,000 inhabitants;

X_{10} the value of expenditures implemented within municipal budget as part of the Solecki Fund² per 1 inhabitant;

X_{11} number of Universities of the Third Age (UTA) members per 1,000 inhabitants.

¹ The concept of comprehensive measurement of intelligent development of rural and urban-rural communes based on 24 indicators is presented in the work by Magdalena Zwolinska-Ligaj, Danuta Guzal-Dec, Mieczyslaw Adamowicz, *Intelligent development as a concept for development of rural and urban-rural territorial units - an example of a peripheral region*, manuscript 2018.

² Funds separated from the municipal budget, guaranteed for the implementation of projects aimed at improving the lives of residents.

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The "quality of life" was described by variables characterising the availability of modern information exchange infrastructure, opportunities to develop knowledge and technical and language skills in specialist laboratories available in the communes, such as polytechnic, computer and foreign language learning and the availability of entities providing health and physiotherapeutic care and social assistance. In the study, "human capital" was described with variables referring to the quality of primary education, the degree of involvement of the population in the development of IT competencies and the level and degree of education and professional specialization of town councillors. To characterize the area of "social capital", measures related to social activity within non-governmental organizations, including the activities of seniors as part of the Universities of the Third Age initiatives, as well as the involvement of local self-government representatives in the municipality issues expressed by the level of the Solecki Fund were used.

The temporal scope of the data acquired for the construction of X_1 - X_{10} and X_{11} variables covered the year 2016, while for the X_{10} indicator, the period 2014-2016 was taken into account. The indicators were built based on the resources of the Local Data Bank of the Central Statistical Office (X_2 - X_{11}) and data of the Office of Electronic Communications. The values of the above variables have been set for 193 communes of Lublin Province, including 167 rural and 26 urban-rural communes. In order to organize the analysed territorial units in terms of the level of development criterion of the social dimension of the smart village concept, the zero uniformisation method was applied (Kukula, 2014). The formula of quotient conversion was used for normalization. Diagnostic variables were normalized according to the following formula (Kukula, 2014):

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}$$

After normalizing the variables ($j=1, \dots, m$), the value of the synthetic variable Q_i characterizing each object (commune) (r objects) was determined on the basis of the values of the Z matrix elements due to the status of the advancement of the smart villages concept (Kukula, 2014):

$$Q_i = \frac{1}{m} \sum_{j=1}^m z_{ij} \quad (i=1, \dots, r)$$

The last activity was the division of the collectivity of communes into 3 groups taking into account the state of advancement of the studied phenomenon - low, medium and high (Kukula, 2014). For this purpose, the distribution of the synthetic variable was determined according to the formula:

$$R(Q_i) = \max_i Q_i - \min_i Q_i$$

and the partition parameter k was determined according to the formula:

$$k = \frac{1}{3} R(Q_i)$$

Three groups of territorial units were separated on the basis of the following procedures:

3) a group with a high level of complex phenomenon:

$$Q_i \in [\max_i Q_i - k, \max_i Q_i]$$

4) group with an average level of complex phenomenon:

$$Q_i \in [\max_i Q_i - 2k, \max_i Q_i - k)$$

5) a group with a low level of complex phenomenon:

$$Q_i \in [\max_i Q_i - 3k, \max_i Q_i - 2k)$$

3. Characteristics of the level of development of social dimension of smart development of rural areas in Lublin Province

The lowest value of the variable of synthetic indicator of the level of smart development was 0.564 (Abramow commune), and the highest - 3.887 (recorded in case of the Rossosz commune). Therefore, the distribution of the synthetic variable reached the value of 3.323, and the partition parameter $k = 1.108$. On their basis, the intervals were determined, on the basis of which the examined territorial units were qualified to one of the three classes of the level of smart development in the social dimension (Table 1).

Table 1

Structure of communes in Lublin Province in terms of the number of territorial units representing separate categories of the synthetic indicator level of the social dimension of smart development by commune type

Category of the social dimension of smart development	The range of values of the synthetic indicator Q_s	Number of communes per category			Share of communes in the category (%)		
		Total	Rural	Urban-rural	Total	Rural	Urban-rural
High	$Q_s \in <2.779; 3.887>$	16	14	2	8.29	8.38	7.69
Average	$Q_s \in <1.672; 2.779>$	96	82	14	49.74	49.10	53.85
Low	$Q_s \in <0.564; 1.672>$	81	71	10	41.97	42.52	38.46
Total		193	167	26	100.00	100.00	100.00

Source: authors' study based on the Local Data Bank of the Central Statistical Office and the Office of Electronic Communications

The structure of the analysed municipalities of Lublin Province, in terms of the number of units representing the three distinct types of synthetic indicators, was characterized by a significant share of units classified into the low and average categories. Units representing a high level of intelligent development accounted for only 8.29 % of all rural and urban-rural communes in the region. One characteristic aspect is that only a slight number of urban-rural communes found themselves in the high-level category of the studied phenomenon. The structure similarity test was applied by means of the indicator of the similarity of structures defined by the formula:

$$\omega_p = \sum_{i=1}^k \min(W_{sk1i}, W_{sk2i})$$

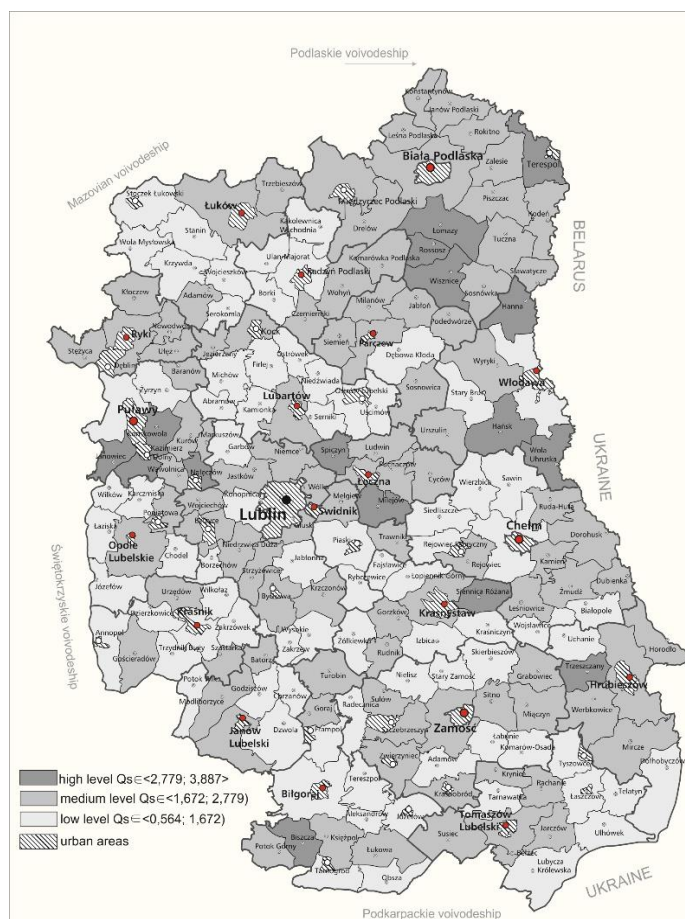
for $0 < \omega_p \leq 1$; W_{sk1i}, W_{sk2i} – index of the structure of i -th feature in the population 1 and 2.

Pointed to a very large similarity $\omega_p = 0.95$. By applying the non-parametric Mann-Whitney U test, it has been demonstrated that there is no statistical significance of differences between the level of the synthetic index of the social dimension of smart development in rural and urban-rural communes ($U=2103$, $p=0.799$). The average level of the synthetic indicator of the social dimension of smart development in rural communes amounted to 1.893, with a standard deviation of 0.602, and in urban-rural communes it was 1.827, with a standard deviation of 0.635. The first hypothesis posed in the work was a subject to a negative verification, namely that the structure of urban-rural

communes differs from the structure of rural communes due to the level of the social dimension of smart development, and that the urban-rural communes show a higher level of the indicator.

Taking into account the level of development of the social dimension of smart development, the spatial distribution of the surveyed territorial units is characterized by the presence of few, unevenly distributed aggregations of units with a high level of smart development. They are not compact blocks, yet they start to form some potential clusters. There were only two clusters in which more than two units with the highest potential were in the immediate position.

The units at a high level of smart development are located in the north-eastern part of the region. Most often, they do not occur in close proximity to larger urban centres (Figure 1).



Source: authors' study based on the Local Data Bank of the Central Statistical Office and the Office of Electronic Communications

Fig. 1. Rural and urban-rural communes in Lublin Province according to the synthetic indicator of the social dimension of smart development

The highest levels of the synthetic indicator of the social dimension of smart development were recorded in case of the city of Pulawy – an urban centre with a developed industry and a scientific and research base, located near the border of the most economically strong region in the country (Mazowieckie Province), areas of the Leczna district with rich hard coal deposits, characterized by good communication with Lublin – the capital of the region, and the areas of Bialski district, largely of an agricultural nature, developing modern and alternative sources of energy and high potential for social activity.

In addition, the emerging impact of selected Local Action Groups (LAGs) in the region can be noticed, including Bialskopodlaska LAG that groups the communes of the Bialski district; Zielony Pierscien LAG, which associates the municipalities of Pulawy, or Lepsza Przyszłość Ziemi ryckiej

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LAG. The potential impact of LAGs on the development of human and social capital requires further in-depth research.

Analysis of the spatial structure of communes with different levels of the social dimension of smart development indicates a low level of influence of former regional cities in which currently higher vocational universities are located (Chelm, Zamosc) and insufficient level of influence of the cultural and economic centre – the capital of Lublin Province.

The abovementioned outcomes indicate that the second research hypothesis can be verified negatively, namely the assumption that a spatial concentration of units with the highest level of the indicator is located in the immediate vicinity of the largest urban centres in the region.

Conclusions, proposals, recommendations

- 1) Similarly to the smart city concept, the dimensions of people/society and the quality of life, as well as activities aimed at building a civic society and social inclusion are equally important in the smart village concept. Since peripheral regions are in particular sparsely populated by the creative class, and it is difficult to attract the creative class of people, it should be noted that investing in and promoting smart people becomes an indispensable catalyst for implementing the smart villages concept.
- 2) The studied peripheral region, like other units of this type, exhibits a low potential of social component in the scope of the smart development; the rural and urban-rural communes of the region are mostly characterized by a low level in terms of the analysed variables describing the quality of life, human and social capital. A higher potential of urban-rural units compared to rural communes was not noticed. The social smart potential is strongly dispersed. There is also no positive impact on the rural potential by the major urban centres in the region. Certain aggregations are distinguished within the framework of selected LAGs operating in the region.
- 3) Strengthening the LAG's potential as part of the CLLD initiative seems to be a desirable direction to support the endogenous potential of rural territorial units enabling implementation of the smart villages concept. As part of the LAG's activity, projects promoting the development of social capital should be favoured, alongside with educational initiatives including in particular: distance/ e-learning, learning by doing, and long-time learning.
- 4) There is also a need to strengthen the interaction links between regional universities and the local self-governments of surrounding communes; it seems that universities can fulfil the important role of local and sub-regional centres stimulating inter-sectoral cooperation, including cooperation with local governments; cooperation in the dimension of education, culture and social activation, and cooperation that aims at strengthening human capital and leads to the manifestation of social innovations in the above dimensions. Another possible area of cooperation are initiatives with entities from the economic sector, which will result in innovations that affect the quality of life.

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THE DEVELOPMENT OF GREEN CARE IN POLAND

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Abstract. The article presents research results and evaluation of the pioneering green farms in Poland. The aim of the research was to provide the data which would allow to define the conditions the farms must meet in order to provide green care services, while taking into account the local socio-economical characteristics at the same time. The study involved the qualitative methods such as the free-form interview, and the participant observation (a week-long stay combined with working on the "Kociewie Tuscany" farm). Altogether the authors visited 15 pioneering farms, and conducted 34 interviews with the people who provide green care services, representatives of the authorities and green care beneficiaries. The general conclusions are very positive: without a doubt Poland offers favourable conditions for the growth of green care farms, which are developing successfully. However, a serious concern is looming in the distance which might lessen the enthusiasm of would-be green care farmers: what will happen when the funding of the project has ceased? Unfortunately, there is no definite answer to this question yet. Currently, however, the major objective is to create the appropriate training schemes and the effective evaluation methods.

Key words: green care farms, green care, qualitative research methods.

JEL code: I30, Q12, Q13, Z10

Introduction

The unfavourable demographic trends, especially the increasing proportion of the elderly citizens group within societies, pose a considerable challenge for the contemporary European and non-European states (Fonseca M.L., 2008; Kuijsten A.C., 1996; Lesthaeghe R., 2010; Malnar D., Malnar A., 2015; Reher D.S., 2007; Sackmann R. et al., 2014). Poland has one of the fastest-ageing population in the European Union (Krzyszowski L., 2011; Mucha J., Krzyszowski L., 2010; Richert-Kazmierska A., 2015; Rosochacka-Gmitrzak M.R., 2014; Sobolewska-Poniedzialek E., 2016). There have been numerous warnings by different analyses that the undesired shape of the population pyramid is not only a threat to the efficiency of the pension system but it also generates increased demand for medical and social services (Arai H., et al., 2012; Spillman B.C., Lubitz J., 2000; Weiner D.E., 2007). Another negative consequence of the ageing process of a society is the diminishing labour resources (Bookman A., Kimbrel D., 2011; Borsch-Supan A., 2003; Muramatsu N., Akiyama H., 2011; Niewiadomska A., 2016). It is estimated that the number of people aged 65 or over in Poland will grow from the current 15 % to 24.5 % by 2035, and the figure will reach 32.7 % by 2050. With regards to the number of 80-year-olds, compared to the current 3.9 %, the figures will reach 7.8 % and 10.4 % respectively (Sytuacja demograficzna ..., 2014). Depending on factors such as tradition, culture, patients' needs and available funding, different countries developed a range of methods aimed at providing help for the elderly and the people who need assistance in everyday life. This help takes the form of care services, which are may be provided by public, private, commercial and non-profit institutions and their success and efficiency is the derivative of successful cooperation between the government and non-government sectors.

However, as far as the strength of bonds between representatives of different generations are concerned, considerable cultural differences were observed among European regions. It is a common belief in many North-European countries that the elderly care should be guaranteed by the state, while citizens of the south-European countries believe otherwise, i.e. that this responsibility should rest on the families of the elderly relatives (Kujawska J., 2015). In Italy for example, the so-called "social farming" (L'agricoltura sociale) has been flourishing for a dozen or so

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years which, according to Francesca Giare, is the natural derivative of the Italian farming and rural tradition. The Italians argue that the idea of social farming has numerous benefits. On the one hand, it influences consumer behaviour as more high-quality products enter the market. On the other, it creates new job opportunities for the socially-excluded people and, above all, working on a farm is a perfect supplement of medical treatment and care service. These characteristics can in effect redesign and re-evaluate the whole system of social care (Giare F., 2009). However, the pioneers in the development of green care are the Dutch (De Boer B. et al., 2017; Hassink J. et al., 2010; Dessein J. et al., 2013; Nowak S.J. et al., 2015) who build care facilities not only for the elderly but for people suffering from addictions or mental diseases. In 1998, there were 98 working welfare centres in Holland but the change of the finance system in the mid-90s of the twentieth century exerted a considerable effect on the development of these facilities in the following years. Green Care in Holland was inspired by the work of the American Corporation for Independent Living (CIL) (History, 2015), whose work influenced many Dutch institutions and personnel. The basic ground rule of the CIL is to provide a disabled person with individualized care, which means securing all the essential instruments so that these people can function as normally as possible, despite their disability (Haaster et al., 2012). This led to the creation of the Person Related Budget (Persoonsgebonden Budget, PGB) in Holland in 1995. It secured funds for eligible candidates who had been approved by the Care Assessment Centre (Centrum Indicatiestelling Zorg, CIZ). The level of care was carefully adjusted to the personal needs and living conditions of the patients. Since 1995 beneficiaries of care services in Holland, rather than choosing services provided by typical care organizations, have started considering alternative care services such as green care farms.

Living and working on a green care farm is more beneficial than staying in a typical clinic but also very different. Since the work is repeated daily, it becomes a routine which helps to divert patients' thoughts from their addiction. People who live in the countryside and work on farms know very well that there are always certain jobs and things to do. Despite all the improvements offered by technology, living on a farm still means hard work. Having said that, working on a farm brings numerous advantages (Artz B., Davis D.B., 2017; De Boer B. et al., 2017; De Bruin S. et al., 2017; DelSesto M., 2017; Lund I.E. et al., 2015; Steigen A.M. et al., 2016). For example, those people who have never experienced physical work learn how to respect nature, and realize that it follows its own patterns, which require discipline and responsibility. Naturally, hard physical work makes people hungry, and it is no secret that a full stomach helps patients to relax and regain their strength. The Dutch research proves that despite the fatigue, the patients who stay on green care farms gain a whole new experience, something they have never felt before. They learn anew how food is produced, they discover how much time and effort is required for crops to grow and become quality food. To quote one Dutch research respondent, "[Green care farm] is where people live in harmony with nature which affects them during every visit." (Elings M., Hassink J., 2008; p. 314). So, let us now investigate the situation of green care farms in Poland.

Fewer and fewer country dwellers are involved directly or indirectly in food production. Preoccupied with different investments on their farms, contemporary farmers have less time to engage in social activities. However, the research proves that a considerable number of them still participate in the work of different social organizations. Farming remains the main source of income for less than a half of country dwellers. The rest of them pursue other functions: tourist,

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welfare and residential, the latter being particularly popular with former city residents who prefer living conditions offered by the countryside. Although the development of welfare farms in Poland is still in its pilot phase, it has already brought some promising results. The aim of our research was to examine the leading welfare farms in Poland. Sharing our findings can benefit not only the development of non-agricultural functions of the countryside, but it can also provide the assistance and therapeutic support for the increasing group of beneficiaries.

By engaging in, inventing and promoting new forms of social activities, the farm owners are truly outstanding. Their guest patients are actively involved in such activities as onotherapy (donkey riding as a form of medical therapy), performing different farm works, and preparing Italian cuisine meals for themselves and the farm guests. It is the only farm in Poland which has already signed the next contract for providing welfare services within the Green Welfare Scheme, in partnership with the Social Services Organization in Nowe. The patients are soon going to be employed on a temporary basis, which will undoubtedly benefit their self-esteem and boost their confidence. This positive feedback has been confirmed by a consultant psychologist. The outstanding performance of the farm owner has been recognized by the Foundation for Social and Economic Initiatives (FISE), who invited him as the only Polish representative to take part in the International Meeting of the Social Leaders organized by the British Council in London.

The ups and downs of the welfare system

The first equivalents of contemporary welfare facilities in Europe were established as early as the Middle Ages. One of the most famous examples, described by Eugene Roosens and Lieve Van de Walle, was a town called Ghel in Flanders, an area which belongs to Belgium today (Roosens E., Van de Walle L., 2007). The facility offered help by including patients in everyday farming work as a form of a therapy. More examples of farms which doubled as care facilities can be found in the second half of the 19th century. Mentally ill patients or those suffering from physical disabilities were placed under the care of institutions scattered around the countryside or in enclosed areas lying on the outskirts of big cities, close to parks, woods etc. (Bird W., 2007). We encountered the remains of such a facility in the area near the border between Poland and Germany during a joint research with archaeologists.

Many Polish people think of Germany as of a highly-developed country with strong economy, good organization skills, and attractive employment opportunities (Lada A., 2016). Numerous advertisements promoting work for those willing to provide care for the elderly in Germany are frequently displayed in Polish cities by different institutions. It is worth remembering that Germany has extensive experience in providing care services, which is supported by the evidence we found during our joint research with anthropologists and archaeologists working on the Tormersdorf-Toporow project. They studied the remains of former inmates of a care facility, which had been established by the protestant "Zaoryst" Guild of at the end of the 19th century. The facility was established in order to provide help for the neglected youth, pensioners, people with no means no secure their living and mentally-ill patients (Rozycki B.W., 2011). By using the osteological methods and looking for pathologies in the bone samples, the anthropologists were hoping to learn about the patients' condition (Konczewski P., et al., 2016). Although no publication including these findings has been released at the time of writing of this article, it is obvious that the facility in Tormersdorf maintained high medical standards. The skull remains proved that some inmates suffered from serious genetic disorders. According to the researchers, one of the inmates

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must have been at least 16 or 17 at the time of death, which proves that the care at the facility must have been superb as the deficiencies exhibited in the skeletons proved the existence of such in-born defects as split upper jaw (meaning that the child could not have been fed by its mother), serious intellectual deficiencies and, in all likelihood, not having been able to talk. Experts agree that with such serious shortcomings a child would not have been able to survive for more than a few years without high-quality care. During the Second World War the facility served as a temporary camp where the Jews from the Silesia were imprisoned (Rozycki B.W., 2011).

We can only speculate how well the German care would have developed had it not been for fascism, its propaganda and Hitler's demands to introduce the Euthanasia Programme, which was codenamed "T4" (Adamczewski L., 2013). This is how Adolf Hitler commented on the propaganda film entitled *Opfer der Vergangenheit* ("Victims of the Past"), which documented the life of patients of mental care institutions spread across Germany: "All that is weak inevitably dies in nature. People have sinned against the law of natural selection. Not only have they protected worthless lives but they also secured their reproduction. This is what we have brought upon us: the sane live in dark narrow streets and collapsing barns while the idiots and retards dwell in palaces built especially for them, palaces they cannot even appreciate" (Adamczewski L., 2013, pp. 85-86). Paradoxically, this central European country equally shocked and surprised with its discipline and efficiency, including the welfare of the weak, the sick and the elderly. After all, it is in the contemporary Germany where, apart from France and Iceland, public institutions and national health service operate with passion and devotion in perfect harmony with green care farming. Although each of the countries can boast numerous examples of model farms which provide high-quality green care, there are no universal solutions which might be used in anywhere. The same is true about statistical data. While it illustrates how the work on green care farms can help the elderly or the disabled, it is merely the information about their range and popularity. Good practices used in green care farming are particularly valuable to us in Poland, as they set the example to follow. Using experience from other countries, we can develop our own solutions, based on human resources, social, economic, institutional and natural assets.

The pioneer green care farms in Poland - research results

The research was conducted between March and December 2017 in 15 pioneering green care farms in Poland located in the Kujawsko-pomorskie province. Its aim was the qualitative assessment of the operation of the farms, diagnosing basic problems and drawing conclusions for further research with a view to make green care farms more popular in Poland and provide ground for their legal recognition.

The appearance of green care farming as a new trend in the, so called, social farming or farming for social purposes is a relatively new idea in Poland. Social farming is an uncharted area on the map of the farming industry in Poland and its functioning is still in the experiment phase. Although different public health institutions have already recognized the potential and values of the natural environment as elements assisting therapy, the new approach, the one in which farms begin to acquire new, therapeutic functions is typically pioneering in character. The efforts to create green care farms in the Kujawsko-pomorskie region were inspired by similar attempts, which were carried out between 2002 and 2004 in Podkarpacie and Lubelszczyzna provinces (Ordyczynski M., 2004). In 2013, the employees of the Kujawsko-pomorskie Agricultural Advisory Centre (KPODR) in Minikowo initiated talks with a group of farmers from the Tuchola Forest area, belonging to "The

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Tuchola Forest Agricultural Farm Association". The discussion concerned the possibility to include new functions and provide welfare services by the farmers. During several meetings, owners of agritourist farms were informed and acquainted with the idea and the functioning of green care farms in Holland. Actually, one member of the Association Board, who had already been to Holland and had known about the Dutch system, immediately became an eager supporter of its introduction in Poland. Apart from the agritourist farm owners, a number of participants attended the meeting. They included representatives from the County Office in Tuchola, "the Tuchola Forest" Local Action Group and other local leaders. After several meetings, the KPODR specialists agreed upon the future course of action. The major task was to enlarge the scope of the Farmer Vocational Re-orientation Project called "New Job, New Opportunity", financed by the Regional Operational Programme (8.1.2), so that it would encompass the international co-operation component. The idea of the international component was to inform the farmers who would be interested in offering welfare farm services about the functioning of green care farms in Holland, and to develop recommendations for similar initiatives in Poland.

In Autumn 2013, a group of 17 agritourist farm owners or their family members participated in an intensive two-hundred-hour-long course for workers who provide day care for the elderly and the disabled. The course included both theoretical and practical components. The trainees spent at least 100 working hours in a nursing home in Wysoka in the Tuchola district. During this time, they had the opportunity to learn about the essentials of care work, and to develop relationships with the patients. The experience allowed them to make an informed decision, whether they were ready to undertake the duties of a care worker looking after the elderly and people with disabilities. Not surprisingly, the agritourist farm owners were very interested in the course.

The development of the international component of the project was launched in 2014 followed by co-operation with a Dutch company called "DLG Government Service for Land and Water Management". Owing to the extensive experience of the Dutch it was possible to prepare the layout for introducing green care farms in the Tuchola Forest. The first stage was a visit by a Dutch expert to examine the farms whose owners wished to start offering care services. It was followed by a series of seminars for farm owners and stakeholders from the Tuchola county. The visit helped to prepare the initial plan of action and guidelines for a study visit in Holland which took place in June 2014. During their stay in Holland the Polish farmers and specialists (people who would assist in the introduction of the green care farms in the Kujawsko-pomorskie province) had opportunity to visit several green care farms. They exchanged ideas with farm owners and patients, learned about the running and functioning of the farms, each of which had different characteristics. Without a doubt, the time spent in Holland was very productive and helped farmers to plan the launch of similar facilities in Poland. What was particularly important for them was realizing the special requirements of different target groups of patients.

After return from Holland, during several days of seminars and visiting every farmer who wanted to undertake the new challenge, a general layout of the green care concept in the Tuchola Forest was laid out (Individual Plans for Green Care Farms – IPUGO in Polish). After that every farm was scrutinized to ensure that its rooms and the whole facility meet strict technical standards necessary to offer the patients high quality care. An initial financial analysis was prepared in order to advise farmers about the cost of transforming the existing farming business or agritourist farm into green care farm. In 2016, KPODR Minikowo launched another project aimed at developing day

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care services within the 2014-2020 Regional Operational Programme (Priority Axis 9 Solid Society, Action Plan 9.3: Developing Health and Social Services, Sub-action 9.3.2: Development of Social Services). In Autumn 2016, 15 care farms have been selected in the following counties: Brodnica, Mogilno, Swiecie, Tuchola and Wabrzezno. After personnel training, adaptation of rooms and farm facilities, the farms started providing care services in January 2017 and will continue to do so until mid 2018. The patients are people who depend on assistance of other people in everyday life. They will be able to benefit from support and special classes for up to eight hours a day, five days a week (in groups of 3-8). Every beneficiary (225 people altogether) is entitled to use the services for 6 months. The project provides each farm with professional advice, and support for its functioning and developing its offer so that it is best suited for the patients' requirements. What is more, both the patients and the personnel have unlimited access to psychologist services. Further training sessions will be organized to promote green care farm services in the whole country. At the moment, the elderly in Poland can benefit from individual type of care, which lasts less than eight hours a day. The project promotes group therapy which, by introducing the social context, will help to solve psychological problems of the elderly who suffer from solitude.

Conclusions

- 1) A good prognosis in this case is the fact that appropriate provisions have been included in the Strategy for Responsible Development (Strategia ..., 2017) under the auspices of the Ministry of Economic Development. Elderly care, as the element of levelling development opportunities and fighting social exclusion, is one of its priorities. In fact, a number of strategic projects refers directly to the situation of the elderly. Following a suggestion by KRUS (Farmers' Insurance Fund), one of the strategic projects entitled "Fighting unfavourable demographic-epidemic trends. Health precautions" will now include the "Active elderly farmer" component. Its operations will concentrate on improving farmers' health by eliminating unnecessary risks.
- 2) Our observations indicate that both institutions and individual people should double their efforts in order to diversify their actions and initiatives aimed at helping the elderly and people who depend on others in their everyday lives. The elderly inhabitants of rural areas almost always find themselves at a disadvantage regarding such aspects of life as satisfying one's needs and aspirations, working conditions, satisfying salary, access to public services and cultural assets, being a part of a local society, having influence on processes and changes affecting individuals, and having access to medical centres or welfare facilities (cf. Leonard R., Johansson S., 2008; Manthorpe, J. et al., 2008; McCann S. et al., 2005).
- 3) On the other hand, the elderly represent human capital which often remains unused in rural areas. We are confident that activation and self-realization helps the elderly remain independent for longer periods in their lives. However, creating a universal care system, with the potential to help every elderly person is nearly impossible as every commune in Poland is a separate social environment, which may be friendly or hostile to its residents. Despite certain similarities, they may differ, for example, in the way the residents' needs are satisfied (Rosner A., Stanny M., 2016). For residents of a small village the major concern may be the road network and accessing basic facilities such as shops or a kindergarten, while those living in bigger villages will be more concerned with issues such as the access to public offices (police station, village hall, medical centre).

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- 4) The ageing of the society requires us to find new response mechanisms, and to engage both government and non-government institutions. Therefore, every group of people requires specific social security measures depending on the place where they live and the type of social structure. Green Care farms are the innovative type of providing complex care for the elderly citizens in Poland.

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CHANGES IN THE ADDED VALUE CHAIN IN ECONOMY 4.0

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Abstract. For a few years, we can observe dynamic changes in the economy, which are also referred to as the fourth industrial revolution or economy 4.0. The main directions of the changes include progressive digitalisation, automation, and robotization with a view to improvement of the effectiveness and responsiveness to the consumers' needs. Concurrently, we are facing changes in the global added value chains. The purpose of this study is to show the changes leading to the growing importance of the pre- and postproduction and dilution of the significance of the central production services. As a consequence of the changes attributable to the fourth industrial revolution, also "intelligent" added value chains arise, which will self-organise, optimize and control themselves on the inter- and intracompany scale.

Key words: economy 4.0, added value chains and networks.

JEL code: O32, O33, F63

Introduction

The western civilisation has already witnessed three industrial revolutions, which may be determined as erratic changes in the industrial processes resulting in a considerable improvement in the productivity. The first of them contributed to improved productivity owing to use of water energy, increased use of the steam energy and introduction of new machinery and equipment into production. The second industrial revolution was characterised by switching to the mass, serial production owing to use of electrical energy and intensification of work distribution. The third industrial revolution consisted in using the electronics and IT to continue automation of production. The fourth industrial revolution that we are facing now, is also referred to as "industry 4.0" or "economy 4.0". The concept of industry 4.0 proposes a completely new level of automation of production. On the one hand, it is related to the existing production concepts such as gradual establishing of data base networks and on the other hand it is aimed at generating automation of processes through highly flexible combination of the network data level with the actual factory processes which opens completely new forms of controlling and organizing production processes. These changes are primarily aimed at achieving a leap in the automation. The fourth industrial revolution also entails dynamic changes in the distribution of added value in the added value chains. The purpose of the study is to show the changes occurring in the economy which are generated by the fourth industrial revolution, with particular emphasis on the changes in the global value added chains.

Industry 4.0 in the light of economic theories

Transformations in the economy that every industrial revolution entails, are also reflected in the science. Consequently, the existing theories are modified and new ones are arising. With regard to changes in the economy, which are referred to as the first industrial revolution, A. Smith did not focus on the recent technological achievements such as invention of the steam machine, but generally referred to machines facilitating human life. He argued that the process of replacing humans by machines was underway, along with specialisation and distribution of work (Smith A., 2007). According to A. Smith, specialisation was a natural thing following from the human nature, and primarily from egoism. Consequently, specialisation sets the production process in order and makes it more effective and contributing to the wealth of nations (Olender-Skorek M., 2017).

The period of the second industrial revolution is preceded by the works of J. Schumpeter, who wrote about the process of creative destruction and new capitalism adopting dynamic

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characteristics. It is just the static model of capitalist economy getting more dynamic that is perceived as the greatest contribution by Schumpeter into the theory of economics (Stankiewicz W., 1998, p. 270). Schumpeter attributes a high role to the entrepreneurs, who in the process of creative destruction introduce innovations which are defined as new products, technologies or solutions. He also points out that innovations replace the hitherto obsolete solutions by being their more modern, more effective and more up-to-date versions, like the steam machine which was replaced with electricity (Schumpeter J. A., 2008).

The third revolution, which is referred to as the information revolution, is based on knowledge and its key role in the economic development. In the hitherto revolutions and concepts of the neoclassic economy (including Schumpeter), production was primarily based on work and earth. However, at this point, knowledge becomes important, which becomes an additional production factor of sorts. The third revolution is focused on information and it is information that creates the added value for the economy. This recalls the reflections of Friedrich von Hayek on the dispersed knowledge. This Austrian scholar has drawn attention to the problem of collecting and processing huge amounts of information, which, quite often, bring no valuable knowledge, and to the information noise surrounding people from which they have to extract the valuable information (Hayek F., 1998).

Nowadays, we are facing changes occurring in the economy which are referred to as the fourth industrial revolution or industry 4.0. It is based on the growing role of information, its collecting and transformation by modern technical solutions, including in particular any and all so-called co-existing application systems. The fourth industrial revolution differs from the preceding ones in that it is not only the collecting of information but rather about fast processing of large amounts of data and their skilful use. In discussing the nature of the fourth industrial revolution, we can also invoke the concept of the dispersed knowledge by Friedrich von Hayek. According to him, one of the main problems of the economic policy was to find the best method of using the dispersed knowledge, which, in turn will allow to design an efficient economic system. It seems that an important effect of the fourth industrial revolution will be a possibility of collecting and effectively using the dispersed knowledge.

Industry 4.0 as an element of economic development

Nowadays, we commonly recognize term: industry 4.0 (*German. Industrie 4.0*), which first appeared in the public domain during the 2011 Hannover fairs, as a name for the common initiative of the representatives of the business, political, and academic circles to promote the concept of reinforcement of the competitiveness of the German industry. The federal government of Germany made the *Industrie 4.0* an integral part of governmental initiative "*High-Tech Strategy 2020 for Germany*", which is aimed at promoting Germany as the global leader of the technological innovation (Czyzewski A., et al. 2017). The term was subsequently popularized by Klaus Schwab, Chairman of the World Economic Forum. According to Schwab, the most important thing that differs this revolution from the preceding ones is its speed. Big changes occurring in the industry and economy in the past had been slowly structured for decades. On the other hand, the technological breakthrough of our times is advancing at an extremely fast pace. Importantly, all the changes occur not only and exclusively in a single area; they apply not only to development of mobile networks or sensors, but also to nanotechnology, brain research, 3D print, or the science

about materials. The fourth industrial revolution is an innovation of the entire system (DzierzekA., 2015).

Industry 4.0 entails three phenomena (Gajewski J. Paprocki W. Pieriegud J., 2016):

- Universal digitalization and ensuring regular communication of people with each other, of people with devices and devices with each other;
- Increasingly often implemented disruptive innovations which allow rapid increase of the effectiveness and efficiency of the functioning of the social and economic system;
- Attaining such level of development of machines that they acquire the capability of autonomous behaviour thanks to employing the artificial intelligence in their control process.

According to Kevin Werbach, industry 4.0 develops in three dimensions. The first of them encompasses the so-called economy of sharing or the on-demand economy. This dimension is not only about the sharing of resources but primarily about services such as Uber and Airbnb, which facilitate on-demand access to resources. The other dimension is the internet of things as part of which devices of all types are connected within the network. Devices equipped with sensors communicate with each other more fast and efficiently than with the aid of humans. Consequently, this allows for automated factories using the artificial intelligence to anticipate customers' needs or autonomous cars driving passengers safely to their intended destinations (Werbach K., 2017). And finally, the third dimension, i.e. the *big data* and the analytics feeding the artificial intelligence, researching our consumer, communication or health behaviour and habits, guessing our needs, prompting solutions, steering production lines so that we get what we just need at the right time (Czyzewski A., et al. 2017).

Those three dimensions altogether bring the world to potentially become a single network, in which practically anything can become a data generator and all those data can be integrated, analysed and processed and skilfully used.

According to experts, success of industry 4.0 in Germany depends on introduction of the state-of-the-art. Technologies into six branches of the economy: the machine, electrical engineering, motor, chemical, agriculture and IT industries (Godlewski A., 2016).

Added value chain in economy 4.0

The term value chain means all the activities undertaken by companies and employees from the time of origination of product (goods or service) until its ultimate application which, taken together, decide about the value provided by the company to its surroundings. The global value chain is distributed among many companies and geographic locations. They include e.g. activities such as designing, production, marketing, distribution and end customer support (Kuzniar A., 2017). The model of value chain serves the purpose of making the strategic diagnosis of an organisation consisting in locating such activities at the enterprise which contribute most to the competitive advantage of the company, and consequently, translate into the profit generated by the company (Bochniarz P. et al., 2015).

Most frequently, an analysis of the global value chains applies to the production or service companies. However, in the agrifood sector, value chains are also developed. In the latter sector, the value chain links the agriculture, food processing and distribution which have a substantial effect on the level of economic well-being, and the social and ecological situation of citizens (Czyzewski A., 2001). The complex chain of the value of the agrifood sector includes companies generating means of production for the agriculture, farmers, traders, food businesses and retailers,

all of whom must ultimately satisfy diverse requirements of consumers. The agrifood sector covers a wide variety of entities at each phase of business activity. They include B&R businesses, farmers running their farms to satisfy their needs, technologically advanced big farms, ecological food stores, small and medium enterprises and cross-national corporations. According to KPMG, in 2012, the share of that value chain contributed to a total pool of profits of approx. USD 600 billion (The agricultural and food... 2013). Table 1. presents the level of profitability of the main sectors of the value chain.

Table 1

Profitability level in the links of the global chain of the added value of the agrifood sector

Sector	Input	Farmers	Traders	Food companies	Retailers
Sales: US \$bn	400	3.000	1.000	3.500	5.400
Number of players	100 s	450 million	Tens	Thousands	Millions
EBIT %	15 %	Variable	2–5 %	10–20 %	5 %
R&D % sales	<1 % - (fertilizers) 10 % - (seeds)	0 %	<1 %	1–2 %	<1 %
R&D spend: US\$bn	10	–	Low	8	Low
Composition/ Sub-sectors	<ul style="list-style-type: none"> Seed Fertilizer Crop protection Machinery Animal health and nutrition Crop insurance Food ingredients 	<ul style="list-style-type: none"> Grains Fruit and vegetables Meat Dairy 	<ul style="list-style-type: none"> Handling Primary processing Secondary processing 	<ul style="list-style-type: none"> Bakery Meat Dairy Snacks Ready meals Beverages 	<ul style="list-style-type: none"> Multiples Discounters Wholesalers Independents
Range	R&D-based majors to generic manufacturers	Smallholders to agroholdings	Global agribusinesses to local middlemen	SMEs to multinationals	Corner shops to hypermarkets

Source: The agricultural and food value chain: Entering a new era of cooperation, KPMG International 2013, p. 5.

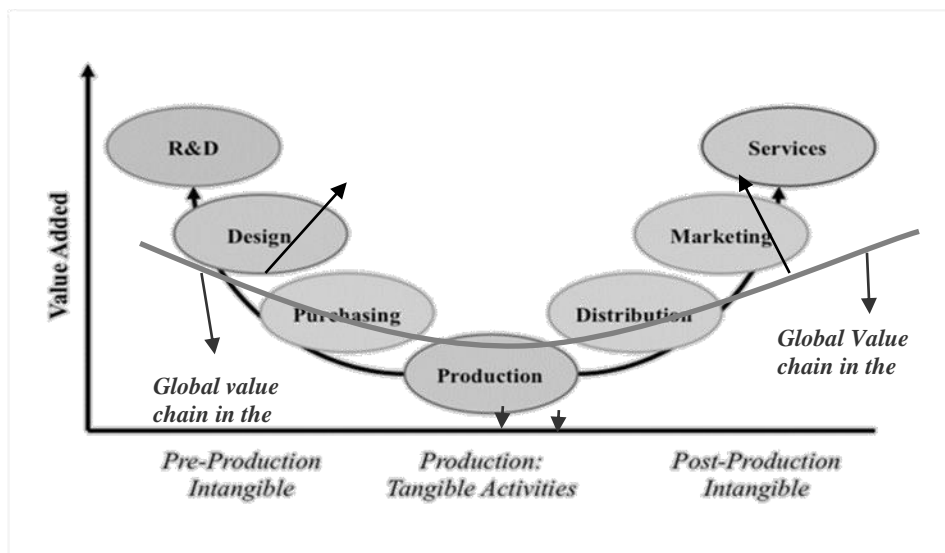
The activity of Ferrero International, the producer of Nutella, is an example of the global added value chain in the agrifood sector. The Italy-based corporation has nine plants producing Nutella, five of which are in Europe, one in the North America, two in the South America and one in Australia. Certain components for production, such as skimmed milk, are supplied from the local markets, while other components are supplied globally. Hazelnuts come from Turkey, palm oil from Malaysia, cocoa from Nigeria, sugar mainly from Brazil and Europe, and the vanilla flavour from China. Vanillin is produced by a French company, so vanillin is also produced in France. Nutella is then sold in 75 countries through sale offices. Production plants are situated wherever there are outlets and high demand for Nutella (Europe, the North and South Americas, and Oceania). There is no Nutella factory in Asia, because the product is not very popular there (Mapping global... 2012).

In the recent years, high changes in the global value chains occur which are attributable to the transformations in the economy of the fourth industrial revolution. The contemporary added value chains use cyber-physical systems, the Internet, and cloud processing for their organisation. It is an implementation of an intelligent factory, in which cyber-physical systems steer the physical processes, and create the virtual (digital) copies of the real world, make centralized decisions, and things in the real time communicate and cooperate with each other and with humans through the Internet. The progressing economic globalisation process is the basic factor contributing to this

development. The globalization process offers new possibilities, in particular, thanks to a broadly understood technical and technological development, liberalization of trade, unification of legal regulations, standards and norms. In the course of subsequent negotiations rounds as part of GATT and WTO, the world trade was liberalized and the barriers to flow of capital were reduced. The increasing defragmentation of the production process, which quite often requires multiple cross-border shipping of semi-products would not be possible without development of an appropriate transport infrastructure and costs of transport remaining at the moderate level. Development of electronic application technologies is also important, in particular with regard to the *offshoring* of services. The technologies contributed to the drop in the costs of coordination of individual links of the service chain, which may be dispersed into many countries away from each other (Kraciuk J., 2014). Changes occurring in the last decades contributed to considerable growth of nearly all the phases of the process of value adding cycle, but for one: the production phase. This means that companies which focus only and exclusively on manufacturing are exposed to pressure to reduce prices. In addition, they will be eliminated from the supply chain if they do not automate fast or build new added value in the form of the R&D processes and designing (Backer K. De., 2013).

Distribution of the added value along the value chain may be presented in the form of so-called "smile curve." The smile curve was first formulated by Stan Shih, the founder of the ACER company, in 1992. This presentation proves to be particularly valuable upon analysis of the generating activities of the global corporations and network, multi-stakeholder, international business production undertakings.

Currently, the smile curve comes in many variations and mutations. It is also used for the business analyses concerning the fourth industrial revolution. The "smile" we can see becomes increasingly deeper in the process of development of the global economy, since the added value of pre-, and post-production services is growing, while the value of the centrally placed production services is diminishing. The process is accelerating in the course of industrial revolutions, in particular during the most recent, fourth industrial revolution (Fig. 1).



Source: K. De Backer, *Global value chains and trade in value added*, OECD, Paris 2013, s. 14.

Fig. 1. Distribution of the added value in the added value chain – the U curve (the „smile curve“)

The current changes in the added value chain are predominantly attributable to the digital transformation. A two-dimensional integration occurs here (Mychlewicz C., 2017, s. 14):

- vertical – thanks to availability of the data on economic processes, they can be better integrated within the organisation, starting from R&D, purchases, through production to logistics and marketing. Comprehensive management of product lifecycle and assets becomes possible.
- horizontal – intelligent delivery and logistics systems, tracking the flow of raw materials and products and their management allow optimisation of the logistics and production processes and improvement in the planning quality. On the other hand, availability of digital data and “visibility” of production allows easier sharing of information between the organisation and its counterparties and suppliers on the one hand and clients and companies in the distribution network on the other hand.

In pace with transformation of the economy into industry 4.0, operation processes such as subcontracting, production, service, delivery and customer service will be combined by highly flexible information networks.

As a consequence of the fourth industrial revolution, the paradigm changes from the “centralised” into “decentralized” production. The decentralization paradigm means departure from the centralized management and control to creation of autonomous networks, intelligent process units, which exchange information and configure for the optimum performance of the production process and achieving the effective result while basing on product-related data. Functioning within the network imposes on a company the need of becoming oriented into its own key competencies and shifting of any other activities to cooperating parties. Owing to this business models change their orientation from products to services, i.e. to the offering within the network, of a service that is the best in their specialisation for the implementation of the given fragment of the production process. With regard to the value chain in M. Porter’s recognition, in which a product or service moves one-dimensionally to another organisational unit (with each of them adding value thereto), in the new industrial reality, value networks, which are multi-dimensional, are spoken of. Here, the source of the value is a combination of network links which is based on cooperation (Soldaty A., 2016).

As a consequence of the changes, “intelligent” value added chains arise which will organize, optimise, and control themselves, both on the intra- and intercompany basis. The optimization criteria will primarily include costs, the availability of resources and their consumption level. On the other hand, the optimization process will be possible thanks to combination of all the systems participating in the creation of the added value into a network, thanks to the possibility of obtaining information about each object participating in the process in the real time, and also as a consequence of commitment of all the resources and the possibility of determining the optimum flow of the added value from the data.

Conclusion

- 1) The economic growth and improvement in the competitiveness are strongly determined by development of science, origination of new technologies, introduction of innovations and their implementation into the real sphere of economy.
- 2) New technologies are materialized in the concept of the new model of industry under the name of industry 4.0. In this model, the area of changes encompasses the entire product life cycle and associated added value chain, i.e. the preproduction, production and postproduction phases jointly. Particular emphasis is put on the pre- and postproduction areas since they create the highest added value.

- 3) Customers' needs will be setting the direction of changes subject to strong integration processes in the value chains, products and services. All of them will be increasingly better adjusted to the individual needs of the customers. It will be possible thanks to data analytics. Leaders who can effectively use the industry platforms will gain significant advantage of the competition. A thesis may be put forth that only in such circumstances a sufficiently strong effect of complementarity and synergy will arise which is necessary for economic development.
- 4) The outcomes of the research conducted by PricewaterhouseCoopers show that in the next five years, enterprises that have been effectively implementing the solutions that economy 4.0 entails may count on increase in the annual proceeds by 2.9 % on average with concurrent reduction of costs at the level of 3.6 % (Industry 4.0 or challenges ..., 2015). Moreover, the leaders who already have performed the digital transformation will most likely achieve even more spectacular results.

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POPULATION COMPOSITION OF MIGRANTS IN SUBURBS OF RIGA METROPOLITAN AREA

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Abstract. Internal migration has been important in transforming the metropolitan regions of Central and East European countries over the past two decades. Suburban settlements are in the process of quick change, and the most obvious manifestation of those changes is expressed in socio-spatial restructuring. Previous research reveals that a close relationship exists between socio-spatial stratification and migration patterns but, despite the widespread nature of suburbanization in the post-socialist countries, this relationship has been insufficiently studied. Aim of the present study was to examine the characteristics of the usual residents and suburban in-migrants in the Riga metropolitan area (RMA). The analysis was based on individual level data from the recently released 2011 census round. These statistics are the most reliable data source of population composition in the post-socialist countries. The characteristics of population subgroups of the inner and the outer suburban ring of the RMA, which are with and without migration experience, were analysed using binary logistic regression models. The study has found some evidence of differential mobility behaviour regarding individual socio-demographic characteristics and geographic features. Thus, the research contributes to a better understanding of post-socialist suburbanization by clarifying the population subgroups behind the shift to the suburbs.

Key words: Riga metropolitan area, population composition, geographical mobility, internal migration, suburbanization.

JEL code: J61, R190

Introduction

Latvia, similarly to other post-socialist countries in Central and Eastern Europe, can be considered as a typical case of suburbanization driven expansion of metropolitan areas. This process has been studied in relation to post-socialist transformation by urban geographers in many countries of the region (Sykora L., Cermak D., 1998; Tammaru T. et al., 2004; Nuijsl H., Rink D., 2005; Ourednicek M., 2007; Krisjane Z., Berzins M., 2012; Szabo T. et al., 2014). In Latvia, several studies have addressed the intensive development of suburban settlement and changes in population composition, and mobility behaviour in the Riga metropolitan area (Berzins M., Krisjane Z., 2008; Puzulis A., Skinkis P., 2009; Berzins M., 2011a). However, the role of migration processes in the forming of population composition, has been insufficiently studied, and mostly in relation to everyday mobility (e.g. Krisjane Z., et al., 2012; Burgmanis G., 2014). Therefore, this article sheds light on changes driven by the process of residential suburbanization within the Riga metropolitan area (RMA), by drawing particular attention to changes in specific areas of influence of Riga based on its proximity (inner and outer suburban rings).

Both suburban rings (especially the inner) have a very strong functional connection with the core city. The centre of the metropolitan area provides work, study, leisure time and other opportunities for those living in the outskirts, whereas suburbia provides an opportunity of having a private house in a pleasant environment, while still being able to maintain a passable distance between a place of residence and work. Thus, suburbia can be considered as an area of privilege that often attracts migrants who represent population groups with higher economic potential; therefore, contributing to the emergence of processes related to socio-spatial differentiation. This phenomenon has been widely studied in the context of post-socialist cities and urban regions (Ruoppila S., Kahrik A., 2003; Brade I., et al., 2009; Sykora L., 2009; Kahrik A., Tammaru T., 2010; Marcinczak S., et al., 2015), and it is certain that mobility plays crucial role in shaping population composition. Especially in suburban areas that attract in-migrants from both - core city

and periphery, thus contributing to high mobility intensity. Therefore, it is important to determine the effect of mobility on the population composition.

Two research questions were provided in order to fulfil the aim of this article:

- 1) Are demographic, socio-economic and locational characteristics significant for migrants to relocate to suburbia?
- 2) What population groups are the most inclined to engage in the process of migration?

Data and methods

Geographical population mobility is closely related to various demographical, political and socio-economic factors that further influence population composition and the development of settlement patterns. In this article, demographic and socio-economic characteristics of residents of the RMA are analysed, using 2011 Population Census dataset, while the binary logistic regression was applied as the main method of analysis.

Binary logistic regression is a method of the econometric analysis (Greene H.W., 2003) that was used to divide the 2011 Population Census dataset of the RMA into two main sub-samples – migrants and non-migrants. The Census data can be considered as the most reliable and the most accurate source to determine population characteristics. Regrettably, 2011 Census provides limited information regarding internal migration. Therefore, migrants and non-migrants were divided according to their mobility to their current place of residence from any other municipality of Latvia from April 2010 to April 2011. In total, the dataset consisted of 234 793 residents of the inner suburban ring, and 181 643 residents of the outer suburban ring, which represented 20.1 % of the population of Latvia.

Migrants were placed as a group of reference and compared to non-migrants for various demographic and socio-economic indicators in order to determine a likelihood for specific population composition groups to participate in the process of internal migration. Regression coefficients were presented as the main statistical determinants in this study. In cases where the result was positive, it meant that the likelihood to participate in migration was higher than for the reference group (e.g. male residents).

Regression coefficients were estimated for demographic indicators such as gender, age group, ethnicity and family status, and socio-economic indicators such as a sector of economic activity, socio-economic status, and the level of education. In addition, two suburban rings were also compared to determine the significance of geographical location in order to shape the characteristics of internal migration.

In total, 8 sets of characteristics were taken into consideration – gender, age group, ethnicity, family status, education, economic activity sector, socio-economic status and geographical proximity. For all 8 characteristics, the reference group (Table 1) was given value 1, and all other residents representing different status, were given 0. Therefore, a linear regression model was created, that compared the characteristics between mobile and non-mobile residents.

Gender, age group, ethnicity, family status and education were characteristics derived from the Census questionnaire without any changes. However, economic activity sector, socio-economic status and geographic proximity were not originally asked to residents of Latvia. These updated characteristics incorporate other values. Firstly, economic activity sector was merged into 3 categories. Originally, residents had to answer their sector according to NACE-2 classification (Eurostat, 2008). Thus, updated primary sector incorporated agriculture, forestry and fishing from

this classification. Secondary sector represented those of mining, quarrying and manufacturing sectors. Tertiary sector consisted of residents working fields related to services and supply.

Secondly, socio-economic status consisted of 4 categories – high, upper-middle, lower-middle and low. These categories were derived from ISCO-08 classification (ILO, 2016). High status was given to managers and professionals. Upper-middle status was allocated to those working as technicians, associate professionals and clerical support workers. Lower-middle status was given to craft and related trades workers, and plant and machine workers/assemblers. Finally, the lower class was associated with agricultural, forestry and fishery workers, services and sales workers and representatives of elementary occupations. Several studies of the post-socialist context have used this division in relation to socio-spatial segregation (Musterd S., 2005; Marcinczak S., et al., 2015; Krisjane Z., et al., 2015). Lastly, geographical proximity characteristic was derived from residents' place of residence. Municipalities located in the inner ring were given 1, and those of the outer ring, were merged into an opposite category.

Results and discussion

1. Economic and demographic heterogeneity of Riga metropolitan area

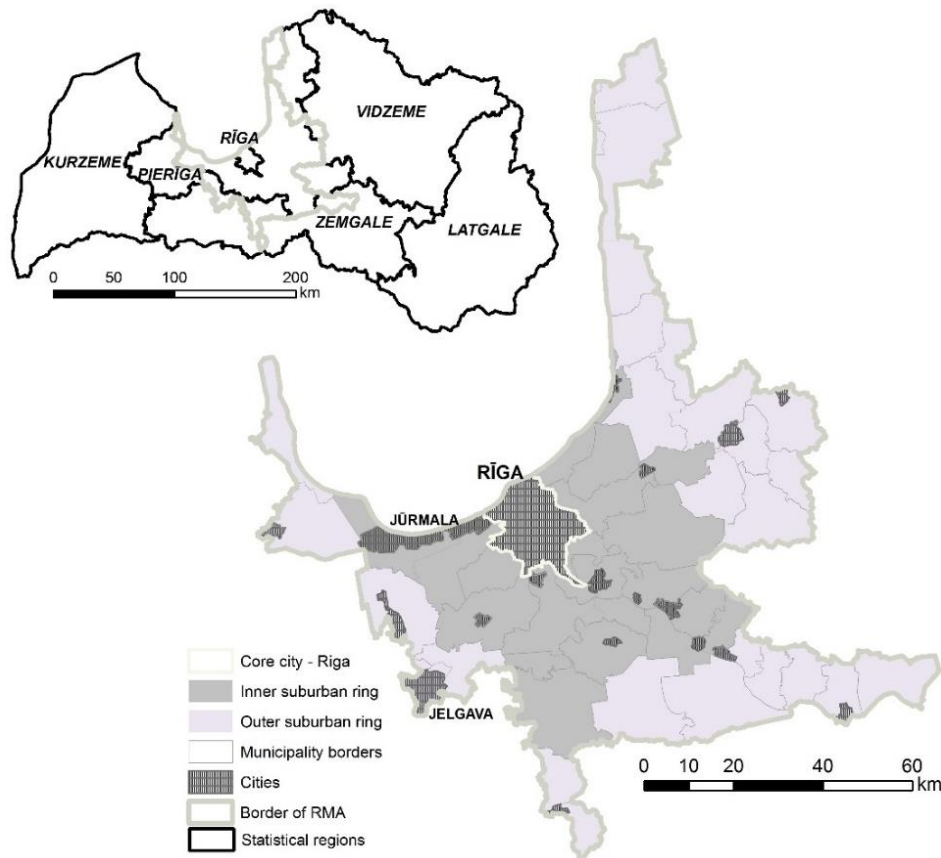
Internal migration flows in Latvia are oriented from its peripheral parts to the centre - capital city and its area of influence; the Riga metropolitan area. Whereas, within the RMA the most characteristic flows are directed from the capital city to its suburban area – Pierīga region. RMA is not considered as administrative territorial unit but has more functional purpose instead. This means, that its area of impact can change and adjust to political, economic and other type of fluctuations. This research uses the RMA borders that were refined in 2012 (RD PAD, 2012), when its estimated area was 7297.6 sq.km (11.3 % of total area of Latvia). Also, the municipalities of RMA consisted of more than 1 million inhabitants, which constituted approximately 50.4 % of all residents of Latvia in 2011. Such pattern of population formation shows not only the high population density but also the formation of economic activity.

The Riga metropolitan area differs from planning regions of Latvia in higher economic and socio-demographic conditions and rates (except Riga and Pierīga, which are included in RMA). However, the area of Riga metropolitan region cannot be regarded as an entirely homogeneous unit within its borders. It consists of three parts (Figure 1) – the core (city of Riga); the inner suburban ring (closer municipalities), and the outer suburban ring (outermost municipalities).

The municipalities of inner ring are located close to Riga - the economic centre of Latvia. Furthermore, they allow for migrants to change their living conditions from an apartment block house to a private house. The proximity of Riga allows thousands of migrants to relocate outside of Riga but still to maintain their workplace within an acceptable range of everyday commuting. On the other hand, municipalities that are in the outer ring of the RMA lack such living conditions and the proximity of commuting. According to Central Statistics Bureau (CSB 2018), the population in the inner ring has increased by 12.2 %, while it has decreased by 15.2 % in the outer ring from 2000 to 2017.

Economic characteristics also differ between both suburban rings. Personal income tax revenues allow one to evaluate socio-economic differences between the residents. If they are higher, then the municipality has greater opportunities to develop social infrastructure and, thereby, attract more migrants from Riga or other regions. In 2016, the average revenue of personal income tax in the municipalities of the inner ring was 780 euros per one inhabitant, whereas the same tax

collected by the municipalities of the outer ring was only 547 euros (RDIM, 2017). Such differences influence not only the economic development of these areas but also affect the process of in-migration and out-migration, and further encourage the change of population composition pattern. The empiric part of this article stresses the connection of mobility behaviour and demographic/socio-economic characteristics in both rings taken together, thus emphasizing the RMA as an economically powerful functional unit.



Source: author's projection based on the Riga metropolitan area border refinement project (2012)

Fig. 1. Structure of Riga metropolitan area

2. Population composition of migrants of Riga metropolitan area

Internal migration can trigger changes in population composition, when the territory receives in-migrants who differ from the long-time residents in their socio-demographic and socio-economic characteristics. As a result, in-migrants integrate within the population of their new residence area, and a new population composition, physical and social settlement structure starts to form through processes of suburbanization. After regularly gaining or losing residents at the expense of migration, a region becomes functionally different, and it starts to adapt to the new social standards.

The Population Census results show that a bigger probability to engage in the internal migration process was characteristic of the residents of younger age groups, males, people with Latvian ethnicity, and higher education (Table 1). The binary regression analysis showed that these demographic indicators are significant in shaping the characteristics of population mobility and composition. As stated above, mobile residents represented migrants from 2010 to 2011. This period included the presence of the economic crisis. Nevertheless, the results did show that the demographic factors such as gender, age, education level and ethnicity were significant to describe

differences in population composition between in-migrants and long-time resident, while socio-economic factors such as the economic activity sector and category showed that they could not be included as significant ones in shaping the nature of internal migration. Similar research about the migration in Latvia had been conducted (Berzins M., 2011b), including the RMA, where demographic factors also resulted as more significant than economic factors.

Residents within the age group from 25 to 34 were more inclined to participate in the process of internal migration, surpassing 15 to 24 year olds. Previous studies (Berzins M., 2011b; Krisjane Z., et al., 2012) claimed that the level of mobility tended to decrease with age. In this case, the results could be explained with the level of education, which was considerably higher for 25 to 34 year olds. From all residents of the RMA inner and outer ring, 25.9 % of those with higher education were from this age group, while only 5.1 % were within the age group from 15 to 24. In addition, a considerable share of members of the older age group represented the highest socio-economic category. About one fourth of this category were 24 to 35 year olds, while only 5 % represented the youngest working age group. Such results could be explained with traditional migration motives. Residential conditions and attractive environment conditions are usually the driving factors that influence migration flows to suburbia. On the contrary, work and study opportunities are dominant in migration flows to cities (Berzins M., 2011b). Residents within the age group from 25 to 34 were simultaneously the most economically stable and the most mobile group.

Latvians were more prone to participate in the process of internal migration than people with another ethnicity. This could be explained with the difference in age. The average age for Latvians was lower than for minorities, although the presence of compatriots can also be regarded as a significant stimulus to migrate or stay. Respectively, higher mobility of minorities is characteristic in the territories which are lower in the share of titular nation (Tammaru T., et al., 2011; Ivlevs A., 2013).

Table 1

Population composition of mobile and non-mobile residents in Riga Metropolitan area. Binary logistic regression analysis. Reference group: non-mobile residents

Mobile residents (N=8954) (β)	
Gender (ref.: male)	
Female	-0.25*
Age group (ref.: 15-24)	
25-34	0.281*
35-44	-0.46*
45-64	-1.036*
Ethnicity (ref. Latvian)	
Russian	-0.212*
Other minorities	-0.232*
Family status (ref.: married)	
Single	0.222*
Divorced	0.447*
Widowed	0.37*
Education level (ref.: Higher education)	
Vocational secondary education	-0.222*
Secondary	-0.315*
Vocational	-0.393*
Middle-school (Grade 9)	-0.624*
Elementary (Grade 4)	-0.687*
Economic activity sector (ref.: tertiary)	
Secondary	-0.016
Primary	0.108
Socio-economic status (ref.: high)	
Upper-middle	-0.016
Lower-middle	-0.079
Low	0.008
Geographical proximity (ref.: inner suburban ring)	
Outer suburban ring	-0.251*

* - statistically significant with a probability of 95 %

Source: author's calculations based on Population Census 2011 data

Divorced, widowed and single residents had higher probability to participate in the process of migration. Therefore, these groups tend to migrate more and to change their place of residence, while married residents relate to their place of residence in a way of their own and their family member connections with their working and study places. Mobility from suburbs to Riga can be considered as an exception. In this case, the residents of suburbia maintain a commuting distance from work to their homeplace (Berzins M., 2011b). Despite the fact, that young families with children are more characteristic to the suburban areas with a close proximity of the core city, married persons were slightly less inclined to migrate to the suburban rings of the RMA.

The residents with a higher education level were the most characteristic group to participate in the internal migration. This could be explained with two aspects – the specifics of population composition in the areas of suburbanization, and the peculiarities of the Riga city employment

structure. In former, those migrants who relocate to suburbia from Riga are people with higher average income (Berzins M., 2011b). The latter can be referred to the migrants from the periphery of Latvia, who have migrated to the inner or the outer suburban ring. They are mostly the people with a higher level of education, because employment in the tertiary (service) sector mainly requires qualified specialists, while people with a lower education level are looking for employment in primary or secondary sectors abroad. In both cases, the suburban zone of the RMA attracts people with higher education.

A geographical factor also played significant role in shaping population composition in the RMA. The Regression analysis showed that the inner circle was more mobile, while the population composition was more stable in the outer circle. Thus, it can be concluded that the process of internal migration in the inner circle has a greater impact on population changes.

Conclusions

- 1) The RMA can be regarded as a unique territorial unit of Latvia. It is characterized by the concentration of economic activities in the centre city, and higher residential mobility as a process of suburbanization in outskirts of the city. Therefore, migration and differential mobility behaviour within the RMA can be associated with differences and the changeability of population composition and settlement patterns.
- 2) The findings of this study suggest that such demographic factors as gender and ethnicity are significant in shaping changes in population through the process of internal migration, whereas socio-economic factors such as economic activity sector and socio-economic status appear to be less significant.
- 3) The findings can be explained with the dynamics of suburbanization and differential mobility behaviour within the RMA. Undeniably, post-socialist suburbanization is a unique process of urban transformation, and it has been proved that economic, social and political factors play a significant role in the changeability of population composition in Latvia. Thus, the population of the suburbia of the RMA is less resistant, and is exposed to a higher level of migration, as it attracts various population subgroups such as young families with children and people from higher socio-economic categories. Nevertheless, this study has examined both inner and outer suburban rings, which are heterogeneous in terms of the intensity of suburbanization and the proximity of Riga.
- 4) The findings indicate that migration is characteristic of 1) males; 2) 25 to 34 years old residents; 3) persons who are separated or widowed; 4) Latvians, and 5) those with higher education.
- 5) Further studies regarding the role of internal migration in both rings separately would be worthwhile. In such a case, a more detailed analysis could be done about the effect of post-socialist suburbanization, and the differentiation of mobility behaviour in both research territories.

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DETERMINANTS OF INNOVATIVENESS OF THE "NEW" EUROPEAN UNION COUNTRIES BETWEEN 2004 AND 2016 – COMPARATIVE ANALYSIS

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Abstract. The article discusses the problem of great multifariousness of "new" members of the European Union concerning remaining European countries and between each other. The aim of the research is a comparison within years 2004-2016 and an assessment of innovativeness of thirteen chosen countries which joined the European Union in 2004-2013. What is more, a goal is to enunciate the determinants of the assessment. The implementation of these indicators required using a comparative analysis of multiple indicator SII (Summary Innovation Index) as well as partial indicators, which describe respective areas of innovativeness in the European Union countries (according to assumptive methodology "European Innovation Scoreboard"). Against this background, conditionings of differences in innovativeness level of "new" countries of the European Union between 2004 and 2016 were conceptualized. The research indicated weak and strong sides of innovativeness which contributed achieving a determined position in innovativeness ranking. During the working on the article, the author used source literature, annual reports of the European Commission about the innovativeness of countries belonging to the European Union and INSEAD report, concerning innovativeness in common economy.

Key words: innovativeness, determinants, "new" countries of the European Union, comparative analysis

JEL code: 031, 033

Introduction

In modern worldwide economy, long-term development and competitiveness of a particular country extensively connect with the improvement of its innovativeness. Development trends of highly developed countries, including innovativeness leaders, rely on knowledge and innovations, human resources and cooperation in innovative processes. Experiences of those who have the highest innovation indicators show that the success is possible in those countries, which might liberate an ability to constant creation of innovations in their business entities (Larédo & Mustar, 2001; Anderson et al., 2007; Metcalfe & Ramlogan, 2008).

It emerges that innovativeness of farming relies on a large number of elements such as (Romer, 1994; Eicher & Turnowsky, 1999; Lacka, 2017; The Global Innovation Index, 2017):

- human capital - well-educated people, eager to entrepreneurial and innovative activities,
- resources of financial capital – public and private expenses on research and development,
- academic and research and development infrastructure
- open research systems,
- nets of economic, social and cultural connections,
- appropriate innovative policy and useful vernacular as well as regional systems of innovativeness.

The significant number of variables, connected economic, social, cultural, stock and organizational determinants affect country's innovativeness. Their influence is visible on every level of innovativeness analyses - in global, macrocosm (in the national economy), mesocosm (regional) and microcosm (in the innovativeness of enterprises) conceptualization. Innovative activity is meant to help the agriculture to face escalating problems of the current world (detrimental demographic and social processes, challenges connected with energy requirements, climatic changes, a need of balanced growth in conditions of the alternating economic situation of farming). The higher the level of innovativeness, the better preparation of a country to functioning in "new economy" based on knowledge. It also helps them to react to changes and developmental dangers of XXI century.

Rankings of innovativeness on a worldwide scale (The Global Innovation Index 2017, 2017) or the European Union (European Innovation Scoreboard 2017, 2017) lead that lean countries are considered to be the most innovative, having the high level of competitiveness. They are the innovation leaders and remaining states portray smaller or greater distance to them. There are four groups of countries with different levels of innovativeness in the European Union (innovation leaders, strong innovators, moderate innovators, modest innovators), but they attempt to improve their innovative position. They are supported by the European Union and innovative domestic policies.

The aim of the article is a long-term comparison and rating of innovativeness of chosen countries belonging to the European Union which joined the EU in years 2004-2013 (so-called "new" nations of the community) as well as presentation of its determinants.

Material and research methodology

To appraise the condition of innovativeness of chosen countries the author put upon figures from innovative reports of the European countries in years 2004-2016 as well as results of surveys conducted by other authors. The analysis of innovativeness level enfolds data for years 2004-2016 of following countries: Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Lithuania, Latvia, Malta, Poland, Romania, Slovakia, Slovenia, and Hungary. Enumerated Member States belong to two groups - the majority of them are former post-communist countries which were included in the European Union after socio-economic transformation in three stages - in the year 2004, 2007, 2013. On the other hand, two of them are the capitalist countries (Cyprus and Malta) which joined the European Union in 2004. Detailed analysis of summary innovation index (SII) and its components for "new members" allow evaluating how their innovativeness has changed (likewise to the average of the European Union). It helps determining which factors impacted the level of innovativeness for chosen countries in years 2004-2016.

In case of the methodology of rating innovativeness of Member Countries of the European Union (European Innovation Scoreboard 2017. Methodology Report, 2017) experts used twenty-seven measures in four groups of indicators (innovativeness components), which take part in the determination of summary innovation index (SII), expressed as a number between 0 to 1. Method of calculation of the SII is complex and proceeds in eight steps. The author can't discuss this process due to the limited scope of this article. It is described in the European Innovation Scoreboard 2017. Methodology Report (2017).

Partial indices are slightly modified in comparison to the methodology used in previous reports, i.e. for 2016. The components of innovativeness are classified as:

- structural factors - they create conditions to the creation of innovations; they include: human resources, attractive research systems and surrounding which fosters innovations;
- investments - this group includes expenses from public and private sectors on innovative activity, financial investments venture capital, outgoings on other than research and development innovative activity, staff training; they pertain to aspects of innovativeness such as financing and support;
- innovative activity - this category illustrates the efforts of the European entities in the area of innovativeness; for this purpose, it indicates measures such as the contribution of small and medium-sized enterprises which initiated product, process, organizational and marketing innovations. Other measures are the contribution of small and medium-sized enterprises which

cooperated with other entities during innovative activity, the contribution of publications which are the effects of public and private cooperation, applications of inventions and appropriable patterns, protective laws to inventions (patents);

- influence - measures appearing in this group portray how innovations affect economy; they include elements such as employment in knowledge economy sector, impact on sales - the contribution of products of medium and high technology in export as well as the participation of selling products new on market and for a company.

Results of surveys and discussion

In May 2004, ten countries joined the European Union. At this moment Cyprus, Malta and the most advanced in market transmutation post-communism nations entered this formation. For more than a decade, they used the institutional and financial support of the Community to integrate into all aspects - primarily political, economic, social and cultural. This group' consisted of the Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia, and Hungary. Later on, in January 2007 another two countries of former eastern coalition joined the European Union - Bulgaria and Romania. Their readiness for the integration was lower because of less advanced market reforms as well as institutional transformations. The last country from the group of former communist countries that joined the EU was Croatia. This country arose after the dissolution of Yugoslavia in 90s of the XX century (similarly to Slovenia). Its integration to the European Union took place in July of 2013. Countries adopted by the European Union on following stages differentiated by:

- unusual formerly political and socio-economic systems,
- level of the advancement of market, juridical and administrative transformations,
- the number of population - the smallest country was Malta with the number of about 0,5 million people and the biggest was Poland keeping a count of 38 million residents.

Other features which differentiated "new" members were: the structure of farming and socio-economic situation, level of GDP per one citizen (per capita), number of GDP per capita to an average for the European Union (amount expressed in PPS). Differentiation arose in the situation on the job market (unemployment rate and the highest payment rate), innovative and inventive potential, the magnitude of a technological gap to "old" members of the Community and distinct tools of economy policy (including innovative).

Thanks to the benefits of integration, countries achieved an ability to accelerate socio-economical changes, faster economic growth and reduction of distance to more developed and wealthier members of the European Union (it pertained to Malta and Cyprus in the smallest degree because their GDP per capita was approximately similar to an average of the European Union). The degree of the depletion of disparity to prominent countries of the Community was and still is differentiated. It results from numerous reasons, among others from period of the membership, their ability to the assimilation of economy in structures of market of the European Union as well as the results of the last global crisis. In the year 2017, the essential differences in GDP, compensations, the tempo of GDP growth (much faster in the majority of "new" members) and its determinants were visible (European Economic Forecast..., 2017).

Depicted conditionings influenced the level of innovativeness of countries accepted to the European Union in years 2004-2013 to its other members. While analysing annual reports of the European Commission encompassing years 2004-2016, it is visible that formerly as well as currently, the stable differentiation of innovativeness occurs amongst the European Union

members. Rankings of innovativeness distinct four groups of countries: leaders of innovation, sound investors (former name – innovation followers), moderate innovators and innovators achieving modest results (old name – catching-up countries). Using reports of the European Union for years 2008-2017 (i.e. Innovation Union Scoreboard 2008, 2009; European Innovation Scoreboard 2017, 2017) it is visible that the composition of particular groups overcame quite small changes. They consisted of changing of places in an almost permanent group of innovation leaders and slight variations in positions of specific members of two remaining groups – moderate and modest innovators. The thing that is decisive for affiliation to a particular group is the magnitude of SII in a given year. SII does not only describe the level of innovativeness of one specific country but also compares its magnitude to an average indicator for the European Union. In the last league table of the innovativeness of the members of the Community including data from 2016 (European Innovation Scoreboard 2017, 2017) following countries were distributed among particular groups (along with SII magnitudes):

- innovation leaders – Sweden (0.708), Denmark (0.675), Finland (0.646), the Netherlands (0.639), Great Britain (0.618), Germany (0.609); had the highest indicators of innovativeness (20 %-40 % above the average of the whole community which added up to 0.503);
- strong innovators – Austria (0.599), Luxemburg (0.599), Belgium (0.597), Ireland (0.571), France (0.539), Slovenia (0.482); their SII assumed values from 90 % to 120 % of the average for the European Union;
- moderate innovators – the Czech Republic (0.416), Portugal (0.409), Estonia (0.393), Lithuania (0.391), Spain (0.386), Malta (0.378), Italy (0.371), Cyprus (0.369), Slovakia (0.345), Greece (0.337), Hungary (0.332), Latvia (0.287), Poland (0.270), Croatia (0.270); members of this group achieved indicators of innovativeness between 50 % and 90 % of the average SII for the Community;
- modest innovators – Bulgaria (0.234), Romania (0.167); these countries achieved indicators of innovativeness lower than 50 % of the average for the European Union.

This European Commission's report dedicated for innovativeness of the European Union countries leads to long-term tendencies about the magnitude of summary innovation index SII in years 2010-2016. It shows that in the case of fifteen countries SII grew at that time, but it depleted in thirteen countries. The tempo of innovative growth was uneven. In some countries, the indicator grew at last 8 % (Lithuania 21 %, Malta 12.2 %, Great Britain 11.7 %, the Netherlands 10.4 %, Austria 8.9 %, Latvia 8.5 % and Slovakia 8.0 %). On the other hand, remaining countries, in which innovativeness improved, set down lower than 5 % SII growth. These countries are: Ireland 3.5 %, France 2.8 %, Sweden 2.3 %, Poland 2 %, Belgium 1.4 %, Luxemburg 1.4 %, Greece 0.7 %, Bulgaria 0.1 %.

In thirteen countries of the European Union in years 2010-2016 a decline of the indicator occurred, however, on distinct level. Among them, there were following countries with mentioned quantity of SII decline: Slovenia (-0.2 %), Italy (-0.2 %), Croatia (-1.4 %), Spain (-1.8 %), Portugal (-2.4 %), Denmark (-2.8 %), Hungary (-3.5 %), the Czech Republic (-3.5 %), Estonia (-3.6 %), Germany (-3.7 %), Finland (-5.1 %), Cyprus (-12.7 %) and Romania (-14.1 %).

The analysis of the European Commission's reports concerning innovativeness of the European Union countries in the even more prolonged period (years 2004-2016) shows that the first stage, it means years 2004-2009 growth of the summary innovation index occurred. The only exception was

the decline of SII indicator of Lithuania in years 2006-2010 of 0.7 % from 0.244 to 0.227 (Innovation Union Scoreboard 2010, 2011; Innovation Union Scoreboard 2012, 2013).

In years 2004-2010, the biggest tempo of innovation index was achieved by "new" member nations. Following factors influenced this process:

- upgrading the economy to more competitive because of the necessity to prepare entities of those countries to fulfil requirements of the European Union markets,
- a change of innovative policy and usage of efficient tools oriented towards the growth of creative activity among entities as well as public scientific institutions,
- accessibility of differentiated, clear and balanced system of encouragements to innovations, mixed system of financing innovation (subventions, tax credits, repayable instruments of financing innovations, development of finances venture capital),
- redevelopment of domestic and regional systems of innovativeness,
- changes in financing and organizing higher education and research and development sector,
- usage of the EU subsidies for supporting innovative processes, upgrading value of human capital, transfer and commercialization of knowledge and technology, research and development projects, creation of relations between education and industry,
- growth of financing innovative activities (including research and development) from the public and private finances as well as a slow change in financing structure (the increase of private sector's participation in financing research and development and other forms of innovative activity).

Portrayed reforms and innovative activities fulfilled "new" member nations in different tempo and areas. It resulted from differentiated economy structures, different socio-economic potentials, and innovative countries as well as their level of assimilation with the community (including their membership to Eurozone). In all discussed countries they led to the improvement of innovativeness indicators in years 2004-2009.

However, in later stage under the influence of economy crisis as well as other factors (growth of economic policy's insecurity, new economic and political priorities after the change of the government, problems of the Eurozone) occurred smaller pace of the innovative growth in new countries of the European Union. In some of them, in years 2010-2016 lowering of SII happened (Community Innovation Survey 2014, 2014). The subject of analysis of the article is the rating of innovativeness in "new" members of the European Union, so in Tables 1 and 2 there are data about SII magnitude in surveyed period. Concerning differences in used methodologies of the European Commissions' reports and discrepancy in data presented in following reports about innovativeness, the author acknowledged that the whole surveying period will split into two periods 2004-2009 and 2010-2014.

Data included in Tables 1 and 2 show that new members of the European Union in the surveyed period had quite differentiated levels of innovativeness. In majority, there were countries with SII diverging in smaller or greater level from the European average (which is confirmed by the last report of the European Commission in 2017).

In years 2004-2009, only Slovenia and Estonia (which belonged to the group of chasing lands, currently called strong innovators) achieved SII above the European Union's average. Remaining new members of the community belonged to two groups - moderate and modest innovators. SII magnitudes from the Table 1 show that these countries in years 2004-2009 (after joining the European Union and before the global economic crisis) exhibited the reduction of technological

distance to the European Union's average. The improvement of innovativeness was fastest in Slovenia, the Czech Republic, Estonia, Malta, Cyprus, Lithuania, and Hungary. In the period of economic situation's crisis, some of them worsened their innovativeness indicators.

Table 1

SII of the EU and its „new” countries (2004-2009)

S1	2004	2005	2006	2007	2008	2009
UE27	0.429	0.431	0.447	0.466	0.475	0.478
BG	0.172	0.174	0.178	0.206	0.221	0.231
CZ	0.344	0.346	0.368	0.392	0.404	0.415
CY	0.370	0.363	0.381	0.433	0.471	0.479
EE	0.413	0.409	0.421	0.443	0.454	0.481
HU	0.266	0.273	0.287	0.305	0.316	0.328
LV	0.194	0.204	0.215	0.239	0.239	0.261
LT	0.264	0.273	0.287	0.294	0.294	0.313
MT	0.274	0.280	0.292	0.215	0.329	0.343
PL	0.264	0.272	0.282	0.293	0.305	0.317
RO	0.209	0.205	0.223	0.249	0.277	0.294
SK	0.257	0.273	0.298	0.299	0.314	0.331
SI	0.388	0.393	0.412	0.429	0.446	0.466

S1 – the European Union or countries symbol

Author's elaboration based on: *Innovation Union Scoreboard 2008, European Communities, Luxembourg, 2009*, http://aei.pitt.edu/46017/1/innovation_scoreboard_2008_2.pdf. Access 12.01.2018; *European Innovation Scoreboard 2009, European Commission*, [http:// http://aei.pitt.edu/46018/1/innovation_scoreboard_2009.pdf](http://aei.pitt.edu/46018/1/innovation_scoreboard_2009.pdf). Access 12.01.2018.

Table 2

SII of the EU and its "new" countries (2010-2016)

S1	2010	2011	2012	2013	2014	2015	2016
UE 28	0.493	0.496	0.489	0.495	0.489	0.497	0.503
BG	0.234	0.245	0.199	0.223	0.223	0.227	0.234
CZ	0.434	0.439	0.423	0.421	0.412	0.421	0.416
CY	0.432	0.448	0.426	0.437	0.367	0.368	0.369
EE	0.411	0.439	0.446	0.451	0.427	0.450	0.393
HR	0.277	0.276	0.254	0.265	0.243	0.267	0.270
HU	0.350	0.349	0.325	0.326	0.329	0.332	0.332
LV	0.244	0.257	0.235	0.241	0.270	0.302	0.287
LT	0.288	0.286	0.302	0.304	0.299	0.323	0.391
MT	0.318	0.311	0.307	0.359	0.397	0.403	0.378
PL	0.261	0.263	0.251	0.254	0.251	0.257	0.270
RO	0.236	0.242	0.217	0.205	0.168	0.157	0.167
SK	0.306	0.329	0.340	0.357	0.328	0.348	0.345
SI	0.483	0.490	0.483	0.480	0.487	0.483	0.482

S1 – the European Union or countries symbol

Author's elaboration based on: *European Innovation Scoreboard 2017, European Commission, 2017*, http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en. Access 12.01.2018.

In years 2004-2016, the weakest results and the smallest progress in ablating technological gap to highly developed countries, and even to remaining new members of the Community showed: Romania, Bulgaria, Latvia, and Poland. Croatia, which has low SII cannot be rated in the same way as countries which joined the EU between 2004 and 2007 because of the relatively shortest period of assimilation.

In years 2008-2010, the deterioration of the economic situation in the aftermath of the global crisis primarily affected countries such as Cyprus, Slovenia, the Baltic states (Latvia, Estonia, and

Lithuania) as well as Romania. Afterwards, in the second wave of the crisis in the year 2012 bad economic situation affected Bulgaria and Latvia. In Poland, even the tempo of the economic growth lowered, the disaster occurred on the relatively high level to remaining EU countries. Despite that, under the influence of the dilution of the economic growth and deterioration of entrepreneur's optimism and their lower innovative activity in years 2010-2016, significant diminution of SII happened.

Partial indicators decide about the magnitude of the summary innovation index. They also help understanding why some countries are more innovative than others. They enable finding strong and weak sides of innovativeness of particular nations. It leads specific determinants of innovativeness.

To recognize them, in the case of new members of the Community, Table 3 includes partial indicators of innovativeness which describe particular innovative components in the year 2016.

Table 3

Component indices of innovation groups of new EU Member States in 2016

S ¹	Human resources	Research system	Innovation friendly environment	Finance and support	Firm investments	Innovators	Linkages	Intellectual assets	Employment impacts	Sales impact
UE28	0.481	0.451	0.497	0.473	0.475	0.478	0.479	0.493	0.538	0.664
BG	0.286	0.116	0.289	0.091	0.247	0.064	0.089	0.487	0.526	0.216
CZ	0.387	0.334	0.410	0.438	0.479	0.411	0.316	0.299	0.513	0.613
CY	0.442	0.469	0.229	0.264	0.204	0.483	0.220	0.546	0.322	0.410
EE	0.486	0.378	0.491	0.703	0.319	0.131	0.290	0.476	0.376	0.416
HR	0.308	0.162	0.209	0.288	0.449	0.344	0.255	0.195	0.333	0.161
HU	0.258	0.224	0.406	0.251	0.371	0.080	0.303	0.230	0.681	0.632
LV	0.371	0.152	0.696	0.429	0.184	0.067	0.208	0.245	0.454	0.301
LT	0.493	0.140	0.604	0.549	0.419	0.443	0.545	0.260	0.358	0.217
MT	0.252	0.354	0.480	0.130	0.283	0.377	0.094	0.796	0.841	0.309
PL	0.308	0.133	0.364	0.289	0.356	0.012	0.134	0.383	0.473	0.356
RO	0.198	0.121	0.390	0.102	0.050	0.000	0.148	0.122	0.199	0.401
SK	0.384	0.212	0.306	0.409	0.290	0.159	0.313	0.190	0.601	0.681
SI	0.688	0.410	0.497	0.228	0.589	0.427	0.531	0.460	0.399	0.489

Source: author's developed table based on: *Innovation Union Scoreboard 2017*, European Commission, 2017, http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_pl (access: 10.01.2018).

While analysing indicators of particular components, it can be noticed that countries belonging to the group of modest innovators (Romania and Bulgaria) and those which are on the concluding positions in the group of moderate innovators (Croatia, Poland, Latvia) have weak sides of innovativeness such as poorly opened and imperfect research systems, which exhibit rare contacts with international environment and sparsely connections with the entrepreneurial sector. It impacts the discrepancy between the supply of the research and development approach and the demand from entities. It also affects the insufficient transfer of knowledge and technology as well as diminutive commercialization of new solutions.

Low innovativeness of these countries is determined by following factors: minuscule participation of innovative small and medium-sized enterprises, diminutive engagements of subjects from this sector into financing research and development and other displays of creative activities. In these countries, the structure of financing innovation does not conform with OECD countries, and the system of supporting innovative movement relies mainly on public financials

(domestic and European). Functional finances venture capital and potent stimulants such as tax credits and reversing instruments did not develop. Entrepreneurs' attitudes and innovative activities develop too slowly - only a few owners of small and medium-sized enterprises consider innovations as factors of improving competitiveness. Entrepreneurs unwillingly cooperate in creative processes with other companies and research institutions (Radas & Božić, 2009). They rarely function in an industrial cluster's structure. All of above factors have small impact on innovative entities as well as the small number of products, process, marketing and organizational innovations. Besides, they cause brittle results in the area of the influence of changes on sales - what is portrayed by low partial indicators describing participation of incomes from the disposals of new products (for market or company) in overall profits of an entity and revenues from selling average and high technology products in the income of export. Inefficient innovative economy describes how indicators of innovation impact employment - there is a small number of workplaces in knowledge-intensive sectors (despite quite good signs in the area of human resources). It has a negative impact on the appearing of innovations as effects of using knowledge and technology into the development and improvement of economy's competitiveness.

Conclusions, proposals, recommendation

The surveys on the innovativeness of "new" countries belonging to the European Union and its determinants lead to conclusion that their innovativeness is diversified, what is caused by factors such as:

- membership to a particular political and socio-economical system before the affiliation,
- the magnitude of a country and the date of joining the European Union. To a greater extent,
- economy structure might have an impact as well as its potency of relations with markets in the formation,
- the level of advancement of reforms in the new members in many important for economy's innovativeness sectors - research systems, financing innovations, innovativeness attitudes among entrepreneurs, the change of the perception of innovation
- recognition by all entities (government, entrepreneurs, scientists, purchasers), that innovation is an important factor of competitiveness on a micro, meso and macroscale.

The analysis of partial innovativeness indicators for each country which joined the European Union in years 2004-2013 shows that:

- some of the countries which achieved the most prolonged period of membership did not manage to remove the significant technological gap to some highly developed European countries (Romania, Bulgaria, Poland and Latvia),
- these countries also have a worse position to nations from former eastern coalition which intensively use strong sides of innovativeness (Slovenia, the Czech Republic, Estonia, Lithuania, Hungary),
- in countries with low rates of innovativeness should be strengthened these aspects of innovativeness which are currently their weak sides,
- their innovation policy needs improvement - it is not very effective; currently, it is too slowly increasing the activity of entrepreneurs and scientists in innovative processes; it also does not advance the development of new forms of financing innovations.

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SOCIAL ENTREPRENEURSHIP AND SOCIAL INNOVATION: THEORETICAL DISCOURSE

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Abstract. Lately, international academic interest is evolving around a number of interconnected concepts that intrinsically include two apparently contradictory dimensions: social and economic. Among them, the most visible are the concepts of social entrepreneurship and social innovation, which are closely linked. The aim of the research paper is to clarify the relation between the concepts of social innovation and social entrepreneurship. Within the research, the authors used the following methods: monographic method, the methods of analysis and synthesis as well as the method of scientific induction and deduction. In scope of the research, the authors used scientific literature on social entrepreneurship and social innovation.

The research shows that social entrepreneurship and social innovation are closely interrelated concepts, since social entrepreneurship often creates and promotes social innovation. Social innovation is a mechanism in actual innovation but a social entrepreneur is a driving force for social change. In addition, a significant difference is the fact that social innovation is not necessarily linked to commercial interests, while in social entrepreneurship the involvement in commercial activities is a mandatory precondition to ensure efficient operation of the enterprise and solving of social problems.

Keywords: sustainability, social problems, social change.

JEL code: M14, O3

Introduction

The demand for innovative solutions for social problems is on a continuous rise. While a great progress has been made through technology and improved social services, every improvement raises new challenges, as well creating new problems. Therefore, new and innovative systems and paradigms are highly needed for creating solutions (Irengun, Arikboga, 2015). The field of social innovation turns critical societal problems into opportunities by actively involving the community actors. However, lately, in the international academic debate a discussion is evolving around a number of interconnected concepts, which intrinsically include two apparently contradictory dimensions: social and economic (Lisetchi, Brancu, 2014). Among them, the concepts of social innovation and social entrepreneurship are the two most well-known. The terms "social entrepreneurship" and "social enterprise" are often used interchangeably with the term "social innovation". It is clear, however, that any sophisticated understanding of how novelty transforms complex systems requires great conceptual precision (Westley, Antandze, 2010).

The aim of the research paper is to contribute to clarifying the relation between the two concepts – social innovation and social entrepreneurship. The specific research tasks were: 1) to aggregate theoretical definitions and approaches of the two concepts; 2) to analyse the main characteristic elements of the two concepts; 3) to find out and justify the theoretical differences of these concepts. In the research, the authors used the following methods: monographic method (to create a theoretical discussion and interpret research results on the social innovation and social entrepreneurship concepts, which are based on the findings of scientific literature); the methods of analysis and synthesis to separately explore elements of the problem and build interrelationships; the method of scientific induction – to create scientific assumptions and similarities based on separate elements; scientific deduction method – to logically systematize and explain empirical data. In scope of the research, the authors used scientific literature on social entrepreneurship and social innovation.

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The concept of social innovation

In the academic literature, there is a wide range of approaches to conceptualizing the term "social innovation". One of the first researchers who initiated the use of the concept "social innovation" in the 19th century was Webber who used it to denote social invention. Whereas Schumpeter (1934; 1942) defined innovation as a combination of new elements (invention of new goods, methods, raw materials in organization or industry) that is a novelty for the existing economic system. So far, several attempts to structure the field of social innovation have been made, for example by Dedijer (1984), Zapf (1991), Moulaert and Nussbaumer (2005), Pol and Ville (2009), Ruede and Lurtz (2012), Butkeviciene (2009), Dobeles (2015) and Surikova, Oganisjana, Grinberga-Zalite (2015). In addition, these categorizations often lack a systematically grounded methodology that covers the social innovation concept in various disciplines at the same time.

Based on theoretical studies, the authors define social innovation as a new, sustainable and effective solution to pressing social problems in the society. As a result of social innovation, social value is created (Dobeles, 2015). The definition is based on a fact that important characteristics of social innovation is "newness" (Dawson, Daniel, 2010; Zapf, 1991; Schumpeter, 1942), "introduction of change" (Mahdjoubi, 1997), importance in "solving social problems" (Mulgan et al., 2007; Tanimoto, Doi, 2007; Neamtan, 2003), "creation of value or benefit to the whole community" (Khutrakun, 2013) as well as "sustainability and effectiveness" (Phills et al., 2008).

Research results and discussion

The concept of social entrepreneurship

The scientific literature studies reveal that often social innovation concept is used as a synonym to social entrepreneurship. This could be explained by the fact that the currently existing definitions and approaches for explaining social entrepreneurship are rather ambiguous. In a broader sense, with social entrepreneurship we understand the creation of an innovative social value that can take place in both public and private and non-profit sectors (Austin et al., 2006). It can also be an activity that is implemented to solve social problems in an innovative and creative way (Johnson, 2000). Also, Yunus (2007) defines it as a movement and innovative initiative that is aimed to help people. It means that such an activity can be implemented both within a social enterprise and outside it; it can have either economic or non-economic character; and it can be either profit oriented or non-profit oriented activity. Therefore, such explanation leads to the conclusion that social enterprise is the basic element of social entrepreneurship.

In a narrower sense, social entrepreneurship concept is used to denote the process of social business start-ups foundation (Defourny, Nyssens, 2008). Although the main emphasis in this definition is placed on the process, it does not exclude the role of individual in it, as every process includes people, activities and organization (Nadler, Tushman, 1980), and, thus, the processes that take place within a social enterprise are not exclusion. Mair and Marti (2006) have emphasized that social entrepreneurship is, firstly, a process in which a value is created by mutually combining resources. Secondly, the combination of resources is envisaged mainly to explore and use opportunities for social value creation and thus – promotion of social changes or satisfaction of social needs. Thirdly, social entrepreneurship includes supply of a product or service as well as it can be related with foundation of new organizations. Bygrave and Hofer (1991) have pointed out that the process includes all the activities that are connected with the use of opportunities for creation of a social value and social enterprise foundation. It means that social entrepreneurship

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includes the elements that characterize social enterprises and social entrepreneurs. In scope of the current research, social entrepreneurship is defined as a kind of entrepreneurship the priority of which is the creation of social value, which ensures financial self-sufficiency and sustainability (Dobele, 2013).

Thereby, the authors conclude that although social entrepreneur and social innovation concepts are interrelated, they are not identical. By identifying criteria of social innovation and social entrepreneurship, further research will focus on the comparison of these concepts to define their common features and differences.

Analysis of social entrepreneurship and social innovation concepts

In the previous research works (Dobele, 2013; Surivoka, Grinberga-Zalite, Oganisjana, 2015; Dobele, Grinberga-Zalite, Kelle, 2015), the authors have initiated extensive public discussions and conducted surveys involving various groups of stakeholders, which gave evidence of close integration and synergy effects that exist between these two concepts. Due to the limitations in the volume of the current publication, this analysis is based on a comparison of key elements that are rooted in the two analysed concepts, thus concurrently ensuring a scientific discussion on the theoretic discourse of these concepts and spotting differences between them.

To identify social innovation, the main criteria used are newness or novelty, introduction of change, solving social problems, creation of value or benefit to the whole community, sustainability and effectiveness. While to identify social entrepreneurship, Peattie and Morley (2008) and Edwards (2008) suggest that there are two key criteria: social goal priority and engagement in commercial activities. The comparison of the criteria that characterize social innovation and social entrepreneurship is presented in Table 1.

Newness, novelty. Important characteristic of social innovation is newness. Social innovations can be broadly described as "new ways of doing things, especially new organizational devices, new regulations, new living arrangements that change the direction of social change, attain goals better than older practices, become institutionalized and prove to be worth imitating" (Zapf, 1991). Also, social entrepreneurship often includes the element of novelty (Svirina et al., 2016) that can find its expression in the management of social enterprise, its structure, strategy as well as creation of products or services. Taking into consideration the essence of social innovation, social entrepreneurs often are defined as the "agents" of new markets in those market spheres that are not attractive for private sector. Leadbeater (2007) emphasizes that social enterprises can become a significant source of innovation, especially social innovation. However, it is important to point out that although it is important to use innovative elements in social entrepreneurship to solve social problems and social entrepreneurship itself is characterized as innovative kind of entrepreneurship, the novelty element is still not a mandatory requirement in social entrepreneurship activities (creation of innovative products and services). At the same time, the outcomes of social innovation are regarded as social innovation.

Introduction of change. Social innovation creates "changes in (human) structure and organization" (Simms, 2006), thereby improving the living standards and promoting human resource development (Mahdjoubi, 1997). Also, social innovation is defined as "the guided change process, preferably supported by all involved and affected human beings that creates significant change in existing action structures and conditions in the social system based on ethical value judgements, contents and programmes" (Maelicke, 1987). The scale of change can be

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differentiated – from changes at the micro level to the macro level (Bulut et al., 2013; Khutrakun, 2013).

Table 1

Characterizing elements of social innovation and social entrepreneurship

Characteristics		Social innovation	Social entrepreneurship
Social innovation	Newness, novelty	Mandatory precondition to identify social innovation	Often includes a novelty element; however, it is not a mandatory precondition
	Introduction of change	Social innovation is a mechanism, actual innovation (a product or a service); social innovation can take place within public, private, non-profit sector, or in the space between them	Social entrepreneur is a driving force of social changes but not actual innovation; the source of social innovation is private sector (social enterprise)
	Solving social problems	Priority requirement to identify social innovation	Priority is solving of problems that are important for society
	Creation of the benefit to the whole society	Basic requirement is to provide benefit for the society and there is no financial gain or loss when it comes to social innovation	The aim is to provide benefit for the society, however it needs to be done in a financially efficient way
	Sustainability and effectiveness	Sustainability does not depend on social innovator	Sustainability is connected with economic activity of a social enterprise, which ensures the solution to a social problem in a long-term period
Social entrepreneurship	Commercial motive	It not necessarily to be linked with commercial interests, although social innovation does not exclude it	The involvement in commercial activities is mandatory
	Social goal	Important precondition to define social innovation	Priority in social entrepreneurship

Source: author's construction

Social entrepreneurship also causes changes in society, as it is oriented towards elimination of market imperfections (especially, to solve the problems of minorities or other specific society groups) (Evers et al., 2004) or to solve government problems related with providing of public services (Mulgan, Landry, 1995; Leadbeater, 1997). Social entrepreneurs create social innovation and changes in different areas including education, health, environment and business development (Haugh, 2005). However, the most important difference in the use of these concepts regarding the management of changes lies in the fact that social entrepreneurs very often create and promote social innovation and changes in society, while social innovation is a mechanism, actual innovation (e.g. micro-credits), but social entrepreneur is a driving force of social changes. Moreover, the source of social innovation in the case of social entrepreneurship is a private sector (social enterprise), whereas social innovation can take place within public sector or within private sector, either for-profit or non-profit, or in the space between them.

Solving social problems. Several researchers emphasize the importance of social innovation in solving social problems. It is defined as a new idea that works to meet pressing unmet needs and improve peoples' lives (Mulgan et al., 2007; Tanimato, Doi, 2007; Neamtan, 2003). The primary purpose of social entrepreneurship is also to solve problems that are important for the society, i.e. the aim of social enterprise is not gaining the profit for its owners but solving of different social problems (e.g. in education, healthcare, availability of technologies, environmental pollution, poverty elimination). Entrepreneurship can address national, regional or local social

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challenges and its offered solution is important and accepted by society. The problem to be solved can also be determined by planning documents and regulations, included in the government agenda or it can be an issue that is topical for society and nobody else deals with it. To sum it up, solving of social problems is a unified criterion for identifying of the two analysed concepts.

Creation of the benefit to the whole society. People who engage in a social innovation process do not intend to take benefits for themselves; instead, they try to create valuable social innovation for the whole community. It is possible for everyone to reap such a benefit. There is no financial gain or loss when it comes to social innovation (Khutrakun, 2013). Also in social entrepreneurship, one of the basic objectives is to act for the benefit of the whole society or some of its groups. The distinctive feature of a social enterprise is its willingness to promote social responsibility in the local community. For instance, the aim of a social enterprise can be to create a social benefit in a particular industry in the interests of local community or whole society, labour integration, and improvement of the target group's work and social skills (Defourny, Nyssens, 2008). Several researchers of social entrepreneurship have claimed that social entrepreneurs often create social innovation that is aimed at improving the quality of life, especially of socially vulnerable groups (Certo, Miller, 2008; Shaw, Carter, 2007; Doherty et al., 2009; Haugh, 2005). Therefore, it can be concluded that the aim of social entrepreneurship is to provide benefit for society by doing it in a financially efficient way.

Sustainability and effectiveness. Phills et al. (2008) define social innovation as a novel solution to a social problem that is more effective, sustainable, and for which the value created accrues primarily to society as a whole. It can be concluded that important element for social innovation is sustainability and effectiveness. Whereas in case of social innovation, sustainability not always is connected with ensuring financial sustainability from the side of social innovator, while in case of social entrepreneurship sustainability is closely related with financial efficiency.

Commercial motive. Social innovation should not necessarily be connected with commercial interests, although social innovation does not exclude this aspect (Murray et al., 2010). Social innovation is primarily oriented towards systematic changes (Westley, Antadze, 2010), while one of the basic criteria of social entrepreneurship is involvement in commercial activities to reach efficiently its social objective. Social enterprise produces goods that are demanded in the market and provides necessary services. Such enterprise in its activity uses efficient and viable methods to ensure its existence in a long term.

As indicated in the European Economic and Social Committee's report of 11 October 2011 to the European Commission, social enterprises are participants of economic area that produce goods, services and often have a strong element of social innovation. This finding leads to conclusion that commercial motive is one of the most important differences between social innovation and social entrepreneurship. Also, Westley and Antandze (2010) have claimed that "social innovation does not necessarily involve a commercial interest, though it does not preclude such interest".

Social goal priority. Social innovation is based on social motive (Khutrakun, 2013). Social innovation is about the satisfaction of basic needs and changes in social relations within empowering social processes; it is about people and organisations who are affected by deprivation or lack of quality in daily life and services, who are disempowered by lack of rights or authoritative decision-making, and who are involved in agencies and movements favouring social innovation (Moulaert, Nussbaumer, 2005). The priority of social enterprise is its social aim or solving of social or environmental problems that are important for society, whereas profit is a subordinated aspect

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(Pearce, 2003; Phillips, 2006; Chell, 2007; Mair, Marti, 2006; Peredo, McLean, 2006; Borzaga, Tortia, 2005; Dees, 2001). Social enterprises are characterized by their awareness of strong social values and mission, which are often aimed at enhancing the capacity of local community. Social aims can be directed towards satisfaction of particular social needs, which require a specific way how this problem could be solved (Alvord et al., 2004; Dees, 2001), or they could be directed towards improvement of society's situation (Peredo, McLean, 2006). To sum it up, social motive and solution of society's problems are a unifying aspect in the use of the concepts "social innovation" and "social entrepreneurship".

Conclusions

The concepts of social innovation and social entrepreneurship are indeed closely linked because the priority of social innovation and social entrepreneurship is social aim – solving of social problems and providing of benefits to the wider society but not particular its individuals. Owing to this reason, social enterprises can often become a significant source of social innovation.

Nevertheless, there are several substantial differences between these concepts. *Firstly*, social entrepreneurship is a social innovation in itself; thus, it is innovating the concept of entrepreneurship adding social value. However, at the same time social enterprise should not necessarily create an innovative product or service, although it is advisable. *Secondly*, social entrepreneurs very often cause and promote social innovations and changes in society. Hence, social innovation is a mechanism, actual innovation but social entrepreneur is a driving force of social changes. *Thirdly*, the source of social innovation in the case of social entrepreneurship is private sector (social enterprise) but social innovation can take place within public, private, non-profit sector, or in the space between them. *Fourthly*, a significant aspect of social innovation and social entrepreneurship is to ensure sustainability and effectiveness, yet in case of social innovation, sustainability not always is connected with provision of financial sustainability from the side of social innovator, while in case of social entrepreneurship, it is a mandatory requirement to ensure efficient operation of the enterprise alongside with solving a social problem. Moreover, social innovation should not necessarily be connected with commercial interests, although does not exclude this aspect, while for social entrepreneurship producing of goods or providing of services is a significant precondition to ensure economic viability of the social enterprise.

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SOCIAL INCLUSION CHALLENGES OF REFUGEES: A CASE STUDY

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Abstract. In recent years, as in other EU countries, the number of asylum seekers and refugees has risen steadily in Latvia. Consequently, great attention is devoted to their inclusion in society. Although there are many policy documents for inclusion policy at EU and national level and different support measures are foreseen, inclusion in the new environment is not easy. The aim of the paper is to highlight the challenges of inclusion asylum seekers and refugees face. The descriptive analysis is based on the literature review. Also an in-depth interview is used to illustrate the problems faced by a refugee family in the process of inclusion.

The paper conceptualises the terms of an asylum seeker and a refugee, gives insight into the dimensions and problems of social exclusion and inclusion, and analyses the experience of a Syrian family in case of inclusion into Latvian society. From the interview, it appears that the main problems faced by refugees are the lack of adequate financial resources, lack of awareness of their rights and legislative aspects, and insufficient Latvian language skills for adult family members. The integration of refugees into society is largely influenced by their own motivation as well as the available support.

Key words: asylum seekers, refugees, alternative status, social exclusion, social inclusion.

JEL code: I31, I38

Introduction

Due to various political, social and economic processes in recent years, the number of immigrants in European countries, including Latvia, has increased rapidly. In 2015, 1.321.600 people have applied for EU asylum, which is almost 5 times more than in 2010 (Challenges in the Labour Market..., 2016). A similar trend can be observed in Latvia (LR IM Pilsonības..., 2017).

For people who have lost their habitual environment, it is not easy to integrate into a new environment with different culture, language, legislation, health care, education system etc. The situation is also aggravated by psychological disturbances associated with both the situation in the previous place of residence and the transfer to a new home country. Although the policy planning documents of both the EU and Member States level provide support for the integration of asylum seekers and refugees, their inclusion in the new environment and society is fraught with many problems and challenges.

The aim of the paper is to highlight the challenges of inclusion that asylum seekers and refugees face. The following tasks are set: 1) to define asylum seekers and refugees; 2) to conceptualize social exclusion and social inclusion; 3) to identify the process of inclusion and its main problems from the viewpoint of refugees. The descriptive analysis is based on the literature review and on the publicly available statistical data. Also, an in-depth interview is used to concretise the problems faced by a refugee family in the process of inclusion.

Research results and discussion

1. Conceptual and policy framework

Lately, refugees and refugee crises have been talked about frequently. This concept is not always used correctly referring to all migrants. According to the 2015 Asylum Law, an asylum seeker, a refugee and an alternative status must be differentiated.

An asylum seeker is a third-country national or a stateless person who has expressed a wish to acquire refugee or alternative status at the border crossing point or when already in the territory of the Republic of Latvia (Section 1 (9), Asylum Law, 2015). Not all asylum seekers can obtain the required status, since most of them do not meet the eligibility criteria but rather are considered as economic migrants - persons who voluntarily leave their country in order to take residence

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elsewhere, mainly due to economic considerations (UNHCR, 2007). In this case, the person cannot be considered being a refugee.

A refugee is "a third-country national who on the basis of justified fear from persecution due to his or her race, religion, nationality, membership of a specific social group or his or her political views is located outside the country where he or she is a national, and is unable or due to such fear does not wish to accept the protection of the country where he or she is a national" (Section 37 (1), Asylum Law, 2015).

Alternative status is given more often than refugee status. Alternative status can be granted to "a third-country national or a stateless person who cannot be granted refugee status ..., if there is a reason to believe that he or she may be exposed to serious harm after return to the country of origin thereof and due to this reason is unable or does not wish to accept the protection of the abovementioned country" (Section 40 (1), Asylum Law, 2015).

In the last 20 years (from 1998 to July 31, 2017), only 141 of the 2418 asylum seekers have acquired refugee status, and 477 - alternative status (LR IM Pilsonibas..., 2017). The year-by-year breakdown is reflected in Table 1.

Table 1

Statistics on asylum seekers, refugees, alternative status

Year	Asylum seekers	Refugees	Alternative status
2000	5	1	-
2005	20	-	-
2010	61	7	18
2011	335	9	18
2012	189	10	20
2013	185	14	21
2014	364	3	21
2015	328	6	23
2016	350	47	107

Source: LR IM Pilsonibas un migrācijas lietu parvalde, 2017

Although there are some differences between refugees and persons with an alternate status in relation to their rights, duties and support, they also have much in common, especially with their inclusion in the new environment. Therefore, this article does not differentiate between refugee and alternative status, and the term "refugees" will be applied to both categories.

Granting asylum is an international obligation, first recognised in the 1951 Geneva Convention on the Protection of Refugees. In the area of refugee integration, EU gives support to Member States in both formulation of policy planning documents and finances. Since 1999, the EU has been working to create a Common European Asylum System and improve the current legislative framework, harmonising common minimum standards for asylum. Several directives and regulations have been developed and adopted to establish high standards and stronger co-operation to ensure that asylum seekers are treated equally in an open and fair system (European Commission, 2018).

As the article does not claim to be a comprehensive and systematic analysis of policy planning documents, attention is focused on only a few of the most significant ones. One of them - the Common Basic Principles for Immigrant Integration Policy in the EU (2004) - provides for a common approach to the integration of third country nationals across the EU and sets out priority

measures to be taken both at EU and national level and lists main integration areas: education, labour market, access to vocational training, access to basic services, active participation and social inclusion (Action Plan on the Integration..., 2016). In the context of recent refugee crisis, an important document is the European Commission's A European Agenda on Migration (2015), which includes four pillars for managing migration: 1) reducing incentives for irregular migration; 2) border management; 3) a strong common asylum policy; 4) a new policy on legal migration, where among other activities, attention is also paid to integration: "for the new programming period (2014-20), at least 20 % of ESF resources will contribute to social inclusion, which includes measures for integration of migrants with a particular focus on those seeking asylum and refugees, as well as children. The funds can support targeted initiatives to improve language and professional skills, improve access to services, promote access to the labour market, inclusive education foster inter-cultural exchanges and promote awareness campaigns targeting both host communities and migrants" (A European Agenda..., 2015).

The authors of the study "Integration of Refugees in Latvia: Participation and Empowerment" argue that refugee integration in Latvia is not conceived through targeted policy documents or strategies (UNHCR, 2015). The Commission for Citizenship, Migration and Integration in its Work Report (Session of September 2015 - Spring, 2016) also points to the risks arising from the lack of unified coordination, management and oversight in the implementation of asylum policies. At present, the main planning document for integration policy in Latvia is the Guidelines for National Identity, the Civil Society and Integration Policy (2012-2018) (2012), where integration is viewed rather widely, extending not only to asylum seekers and refugees, but to several categories of people, and the goal of integration is a cohesive society.

2. Social exclusion and inclusion

Refugees, like all citizens, have certain needs, but their situation is different. Beyond meeting the immediate needs of refugees and asylum seekers, it is essential to promote their active integration in society, as they experience high risk of social exclusion. Social exclusion is a complex, multidimensional process that manifests itself as a complete or partial marginalization of individuals, households or groups. Reasons for social exclusion are diverse: poverty, unemployment, inadequate education, and discrimination. They can overlap and be at the same time both the causes of social exclusion and its consequences. Social exclusion can manifest itself in a number of spheres of life or dimensions. This aspect of social exclusion has been focused on by several researchers. For example, Levitas emphasizes the limited participation in consumption, savings, production, political and social activities (Pantazis, Gordon, Levitas, 2006). Silver highlights three dimensions of social exclusion with several sub-dimensions:

- resources: material and economic; access to services; social resources;
- participation: economic; social; cultural and educational; political and civic;
- quality of life and wellbeing: health; living environment; crime and criminogenic situation (Silver, 2015).

In turn, Kronauer believes that "there is a far-reaching agreement on the central dimensions in which social exclusion manifests itself, regardless of the variations in conceptualization and realization of the studies: exclusion from the labour market, economic exclusion, cultural exclusion, exclusion by social isolation, spatial exclusion, institutional exclusion" (Kronauer, 1998).

Social inclusion is the opposite process, which aims to provide the necessary resources, services and opportunities to ensure individuals' full participation in different spheres of society.

Integration of asylum seekers and refugees does not have one universal definition, and a number of thematic studies use the definition of the UNHCR, in which integration is understood as the end product of a dynamic, multi-faced two-way process with three interrelated dimensions: a legal, economic and socio-cultural dimension. Integration requires efforts by all parties concerned, including preparedness on the part of refugees to adapt to the host society without having to forego their own cultural identity, and a corresponding readiness on the part of host communities and public institutions to welcome refugees and to meet the needs of a diverse population (UNHCR, 2015; Grooteman, 2016).

Although policy planning documents and legislation ensure support for the integration of asylum seekers and refugees into society, this does not guarantee that they will be fully protected from social exclusion and will not face problems and obstacles in a complex and often long process of integration. Previous studies show that challenges are possible in all dimensions of social exclusion. The main problems are related to: the field of law - insufficient knowledge of their rights and the possibilities to defend them; housing - affordability, discrimination from landlords and reluctance to rent out; employment - insufficient institutional support, problems with recognition of previous education and qualifications, discriminatory attitude of employers; financial difficulties - insufficient financial support from the state and municipalities, inability to find work and earn an adequate salary; education and schooling - educational disruption, communication barriers, little teachers' experience in a multicultural environment, difficulties in accessing higher education, racism, discrimination; health care-access to services is hampered by disadvantaged attitudes, poor medical personnel awareness of refugees and their needs, poor awareness of entitlements; social isolation - separation from and lack of contacts with family members in the home country, and restricted contacts with larger community; mental health issues due to trauma, including survivor's guilt (Agenda for Integration, 2004; UNHCR, 2015; Settlement Challenges...; Petijums par patveruma..., 2011). All of the abovementioned problems are exacerbated by insufficient knowledge of the local language, the acquisition of which also involves challenges. According to research "Integration of refugees in Latvia" (UNHCR, 2015) results, there is no centralized Latvian language training system in Latvia, there is a lack of information about the courses; the acquisition of language is also hindered by the course fee; the lack of tailor-made training programs to cope successfully with a different level of knowledge in the group; lack of opportunities to acquire the highest level of knowledge, lack of English language proficiency in Latvian language teachers.

However, refugee integration experiences may vary, not all of them experience all the above mentioned problems. As the research shows, the extent to which refugees are integrated into society depends on a number of factors, for example, on paid employment opportunities at the place of a new residence, information provided by individuals about their rights and the possibilities to receive state and local government support, as well as refugees' motivation to stay in the country of asylum.

3. Insights into the inclusion of the Syrian family

A study was conducted in December 2017, in which a family of migrants from Syria was interviewed. The family has been living in Latvia since April 2017. There are two adults and four children in the family. The family was given an alternative status, and all members of the family

are slowly integrating into the community. In the context of alternative status, the family has been granted a residence permit for only a year, which gives them a sense of insecurity about the future and opportunities to stay in Latvia.

All children are included in the education system and receive education according to their age and ability. The youngest daughter (5 years old) attends a pre-school educational institution, the middle daughter (14 years old) acquires elementary education, but the two eldest (17 years old) - acquire a profession in a vocational education institution. According to parents, all teachers are very sympathetic and good: *"...yes, everything is fine, teachers are very good, kids are eager to go to school..."*. From the beginning, everyone was worried about the success at school, since the four years spent avoiding war in Turkey and Greece; children were not allowed to get an education. The daughter, who studies at the Craft School as a hairdresser, has friends and feels good at school: *"I have some problems because of the Latvian language, but I get help and teachers are very understanding..."* Also, the son is satisfied with his choice of school and profession: *"I study at the Craft School as a cook and I really like school, I have a lot of friends..."*.

All members of the family understand Latvian language; however, it is still hard for them to express themselves in Latvian. The eldest son and daughter who are 17 years old are fluent in English and at times when Latvian language causes difficulties; they use their English language skills. Three of the eldest children are involved in a youth organization (they weren't able to tell its name), where they meet other young people, learn more about the city, and have the opportunity to learn languages. They learned about the possibility to take part in an organization at the Association "Asylum "Safe house"". The language barrier is the biggest problem for the mother because she does not have a job yet, and she uses her native Arabic at home.

The father, working at the Caramel Workshop, is satisfied with his work: *"I like work, and the attitude of the superior is good ... everything is fine."* However, the family is concerned about their financial situation, because the father earns 500 euros per month and until April the family will still receive state support of 600 euros, but then their financial situation is at risk because the mother has health problems, which makes it impossible to start a paid employment right now. Persons who have acquired alternative status have the right to receive benefits for a period of seven months within a 12-month period from the date of granting the status. Monthly payments for housing and other payments amount to 300 euros; the father believes that it will not be possible to survive on the remaining 200 euros per month: *"...we do not know what will happen after the state financial support no longer will be given ... Children have to study, my wife still cannot work ... how are we going to manage financially?"* By profession, both parents are cooks who love their profession and are very proud of their craftsmanship. Mother would like to work in a confectioner's room. The biggest problem in the financial area for the family is that they are denied the right to buy goods on credit. For example, a family would like to equip its dwelling with furniture, buy a television set, but it cannot be done because financial resources are insufficient, nor can they get a credit because of the alternative status.

All family members already consider Latvia as their home and would like to stay here: *"...we like everything here - nature, city, people, but most of all - the market (everyone is laughing)"*.

In regard to the culture, the family does not see big problems. They are glad that in Latvia they can buy all the necessary spices and products for the preparation of their national dishes. The family love baking their national sweets, which are usually enjoyed during the holidays. However, celebrating of holidays and following the traditions are hindered by the residence that is not yet

arranged in the traditional fashion. The father believes: "...during holidays the family must get together; everyone should talk and share, and the environment is extremely important...". Father also believes that the family needs a large sofa, where the whole family could sit and relax together: "...we have a good home, four rooms and a kitchen, but there is no sofa, where we all could sit; and there is no TV. It is also rather cold in our home, only sixteen degrees, I would like it to be warmer...".

They don't have any issues with the health care either: "...my wife spent two weeks in hospital because of an operation, and we didn't have to pay anything... Our family doctor also is very good."

However, in regard of being well-informed, there are some shortcomings, for example, the family believes that the hospital was paid by the "Asylum "Safe House"", rather than from the state budget. The father also mentions some disadvantages: "I would like to understand what taxes I have to pay, how much and whether I have the preferences for children - I do not know anything; I earn 2.50 euro per working hour and that's all I know...".

The family has received the most support from the "Asylum "Safe House"" association. Within the association, the family has its own trust person who informs them about the opportunities and necessary activities in the area of integration. The association's representative is happy with the family and believes that her support has been essential in all aspects of their life - she helped to find a job, schools for the children with school and housing.

Emotionally, the family is strong; they support each other and believe that they will do their utmost to arrange their life and start fully living in Latvia as soon as possible. The family is very proud of the fact that while living in Mucenieki they were already convinced they would stay in Latvia; they were the only ones living in Mucenieki who wanted to stay in Latvia rather than emigrate to another country. The biggest wish of the family is to acquire Latvian citizenship and become a part of its society.

Conclusions, proposals, recommendations

- 1) The number of asylum seekers and refugees has increased in recent years in EU countries, including Latvia. If in 2000 five people asked for asylum in Latvia, then in 2016 there were already 350 asylum seekers. Accordingly, the number of refugees and persons with alternative status has also significantly increased.
- 2) The countries that have joined the 1951 Geneva Convention on the Protection of Refugees are obliged to host asylum seekers and refugees. In order to make their integration process more successful, the EU has placed great emphasis on developing policy planning documents, has adopted a number of Directives and Regulations, and provides financial support to the Member States. The main integration policy planning document in Latvia is Guidelines for National Identity, Civil Society and Integration Policy (2012-2018). However, despite the documents developed and accepted and the support planned and provided, the integration of refugees into society is associated with many problems.
- 3) It is clear from the empirical study that the integration of refugees into society is largely influenced by their motivation to stay in the country and efforts to tackle their problems as well as the support provided by the state, local governments, NGOs and the community.
- 4) The fact that alternative status is granted only for a year creates a sense of insecurity in people regarding future opportunities that reduce their integration opportunities in society.

- 5) The main problems faced by refugees are the lack of financial resources that prevent them from settling their daily lives according to the family needs; insufficient awareness of their rights and legislative aspects that are directly related to their daily lives, for example in the field of tax policy, as well as the lack of Latvian language skills, especially for adult family members.

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THE GREY MARKET OF "INVISIBLE RELIGION" IN LATVIA

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Abstract. The paper focusses the rise of self-spirituality in Latvia with particular reference to the supply side of spiritual marketplace, discussing the services provided by two healing and witchcraft centres in Riga by using the publicly available materials. The applied research method is thematic document analyses and the general approach is phenomenological. Latvia has experienced significant diversification of its religious field, part of spiritual developments are not recognized as religious by law and general public. This is called the "grey" religious market.

Healing of common and life threatening diseases, addictions, help in family matters and business, divination in many forms, as well as magical education are common services offered by spiritual market service providers. The services are focused on self- spirituality and empowerment where the client is perceived as a collaborator rather than passive recipient of the service.

Key words: alternative spirituality, spiritual service providers, Rumpumpele witchcraft school, Amadeus Maleficus

JEL code: Z12

Introduction - the fuzzy field of "invisible religion"

The national awakening of the late 1980s, the demise of Communist ideology and following restauration of independence brought profound changes to the religious milieu of Latvia. Coexistence of varied religious experiences has always been a feature of religious life in Latvia, and this is particularly true now. Latvia scored 5.7 on the Pew Religious Diversity Index in 2014 - higher than any other Baltic or Scandinavian country (<http://www.pewforum.org/2014/04/04/global-religious-diversity>).

Close numbers of adherents (around 20 % or slightly above) belong to one of three largest denominations – Roman Catholics, Russian Orthodox, or Evangelic Lutherans. There is a steady rise in the numbers of those identifying with the Russian Orthodox church, and this increase has taken place at the expense of those who previously did not profess any religious affiliation (Krumina-Konkova&Misane, 2013; Misane,2014; Misane&Niklass,2016). However, processes within the Christian churches and institutionalized new religious communities represent only part of the dynamics of religious life in Latvia. There is still a sizable part of population who do not identify with any particular religious belief or faith community, and there is growing presence of spirituality usually branded as "alternative", "implicit" or related terms.

The distinguishing feature of alternative spirituality is that it sacralises subjective life (Heelas& Woodhead, 2005, 5). Individuals are free in their spiritual choices, which may draw insights from various religious traditions and/or their personal unique sources of moral authority and spiritual significance. This may result in rather eclectic worldviews and diverse spiritual practices. They may not be recognised as "religious" by law or even by adherents themselves but would still represent "a state of being related to a divine, supernatural, or transcendent order of reality or, alternatively, as a sense of awareness of a super-reality that goes beyond life as ordinarily experienced" (Wuthnow, 2001, 307). As such, this phenomenon fits within the sphere of interest for sociological inquiry.

It was Thomas Luckmann who first turned his attention to it and coined the influential concept of "invisible religion" (Luckmann, 1967). Luckmann recognized the decline of the institutionalized /church-oriented religion during late modernity and described the emergence of individually held beliefs and practices that diverge from the normative understanding of religion.

For Luckmann, religions are primarily symbolic universes defined as „socially objectivated systems of meaning that refer, on one hand, to the world of everyday life and point; on the other hand, to a world that is experienced as transcending everyday life“(Luckmann, 1967:43). Many constituents of symbolic universes may not refer to religion *sensu stricto* (hence its „invisibility“) but still serve as a plausibility structure in which many mundane choices (for example, wellbeing strategies - the choice of medical therapy, diet, education, consumption patterns, career building) and interpretation of their life events are grounded. Contemporary religious field is largely “fuzzy” (Voas, 2009) – individual’s personal symbolic universe is built from several spiritual practices.

This paper will focus on the providers’ side of the supernatural services and how they interpret their own calling. The consumers’ side - scope of unorthodox belief in various forms of the “super-reality”, as Wuthnow puts it, is hard to estimate in Latvia. Some insight could be obtained from the data provided by marketing and public opinion research centre SKDS that had surveyed belief in certain supernatural phenomena and superhuman skills between years 1998 and 2012.

Belief in various phenomena

Q: "Do you believe in?"

All respondents, (%)

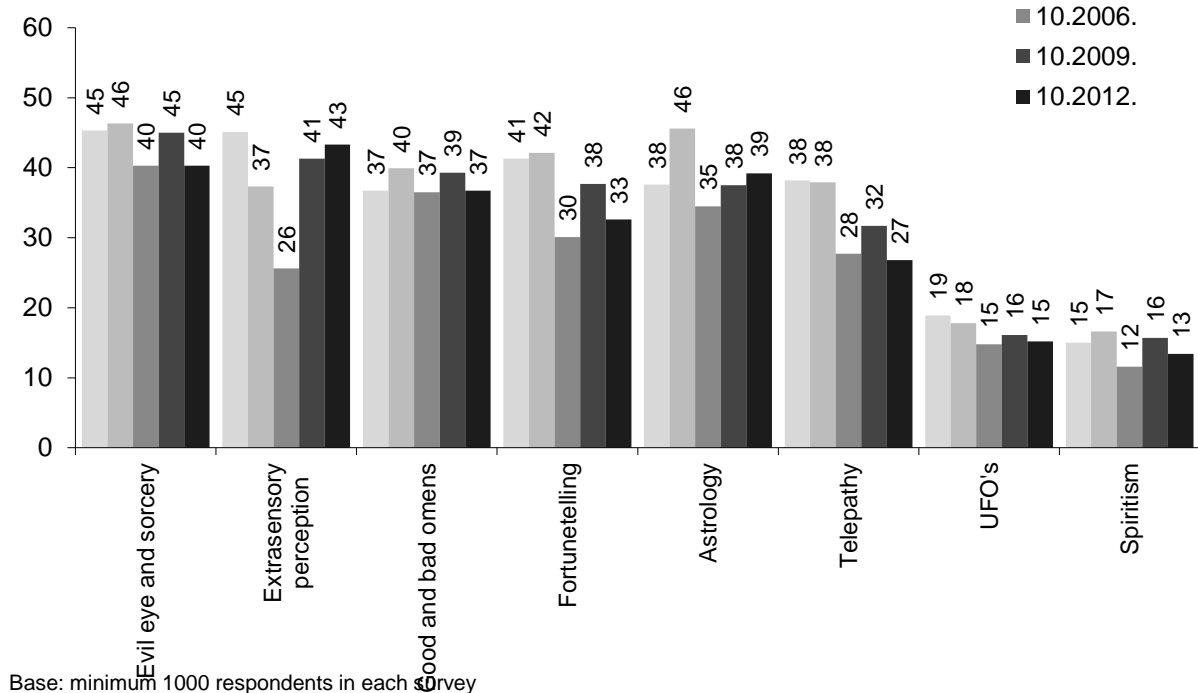


Fig. 1. **Belief in super-national phenomena in Latvia (Data provided by SKDS)**

The “grey” spiritual market

The data suggest that any provider who may wish to engage in magical and psychic trade can find a receptive market in Latvia. This is even more true for the neighbouring Estonia, considered to be one of the most secular countries in Europe. An Estonian study from 2010 found, for example, that 54 % of the Estonian population believed in astrology, 78 % believed that future events can be foreseen, 58 % - that omens predict future, and 77 % trusted that psychic healers can cure illness (Remmel&Uibu 2015, 12).

The causes for comparatively high and stable levels of the beliefs in the paranormal in the Baltic States and the post-Soviet space on the whole would require a broader study which goes beyond

the scope of this paper. Another question is whether people who responded in a questionnaire that they believed in the existence of certain paranormal forces would actually act upon that belief. Would they really prefer a psychic healer to a medical doctor if they had to choose and the expenses would be the same? But if they did, the suppliers are out there.

Concepts like "spiritual market" or "spiritual supermarket" are metaphors often used to denote the milieu of esoteric beliefs and practices where traditional folk beliefs (like belief in evil eye, various omens and the power of sorcery) intertwined with more novel and popular references to astrology and unorthodox healing practices, and can also include elements from mainstream institutionalized forms of religion. In short, it means that modern consumers can choose a religion and also construct their own version of it from many elements available. For the purpose of this paper, it is also important to note the existence of "spiritual service industry". This term was introduced by Marion Bowman (Bowman, 1999).

Fenggang Yang has suggested a tripartite system of religious markets with respect to how religion is regulated by the state – the red market (official and/or legally recognized religions), black market (banned religions) and grey market (religions with ambiguous status) (Yang, 2006). This system was developed on the basis of the religious situation in China – a strictly regulated religious market. The author finds Yang's approach most useful although it requires some modification to be applied in Latvia (and Europe in general). No religion is specifically banned in Latvia, while some religious communities have been denied registration with the state authorities or have not searched for it and hence, from the legal point of view, they do not exist. This is "black market". The "red market" is comprised of all legally recognized religions – the historical mainstream churches, registered old and new religious minorities. The author would suggest to apply "grey market" to those spiritual developments that are not recognized as religions and hence regulated by laws and regulations pertaining to religious organizations but function legally under other forms of legislation – e.g. those regulation enterprises, education or health services. For example, Latvian Register of Occupations includes, as part of *Group 5. Service and sales workers*, also a subgroup of *Other individual service providers*, naming astrologers, hieromancers, occultists, diviners (*zīlnieki*), psychics (*ekstrasensi*) and bioenergists. The specifics of qualifications required for each occupation is not particularly clear; however, there is no doubt that: (a) the above occupations are legal, and (b) their field of work is not regarded as religion despite the fact it would require some form of contact with supernatural powers.

For this study, two providers of services were selected. One is *Rumpumpele*, a certified professional school of healing. However, their own preferred identification is "White witchcraft school" (*Balto raganu skola*). Apart from courses in witchcraft, aromatherapy and massage, *Rumpumpele* also offers services of all kinds of divination and clairvoyancy, bioenergy field balancing, Reiki etc. At their premises at 8 Baznīcas Street in Riga (see www.rumpumpele.lv), there is a shop selling all kinds of esoteric artefacts. Anita Povecerovska is the Head Witch, she founded the school in 2005. As part of their educational programme, *Rumpumpele* offers both short term courses in cartomancy (for example, a course of Tarot and Lenormand card reading – a three-hour class instruction costs 20 Euros, about ten classes are required for a full course) and an extended two year course in general witchcraft with diverse programme, including classes in aromatherapy (or rather, potions mixing), lithotherapy and colortherapy, Voodoo magic, runes, egg therapy, Reiki etc. Their offer may be broad, but *Rumpumpele* is a small business. According to Lursoft database (latest data are from 2016), the core capital in 2012 was only 10 Lats/14 Euros

and there was only one employee. The firm had paid 2 340 Euros in taxes in 2015, and even less – 1 250 Euros in 2016. Lursoft has given the firm a humble 0.8 stars rating (out of 5).

Another service provider is *Amadeus Maleficus*. The centre is located at 1-1 Akademijas Square, on the ground floor of the building of the Latvian Academy of Sciences in Riga. No business enterprise is registered with this name but several NGOs and one firm uses the same address – Mairis Virsis foundation, International Esoteric Association *Inversus Veritas*, and a firm called *Kristines Svecas Ltd*. This is a bigger business (Lursoft rating is 3.5), even if the number of employees is also just one person and the core capital in 2012 was same 10 Lats as in the *Rumpumpele* case. The tax payments into state budget were 2 430 Euros in 2015 and 3 430 Euros in 2016. As of 26.01.2018, the firm owes 6977.71 Euros in tax payments. Mairis Virsis, a clairvoyant and healer, is the major figure of the entangled network behind *Amadeus Maleficus* signboard. Virsis offers a wide range of services and his home page (www.mairis-virsis.lv) includes a pricelist. Thus, up to 1-hour long healing session costs 45 Euros, a Tarot reading – 43 Euros, energy cleanse of a living space, solutions of family problems, attraction of good luck with magic runes and appropriate rituals – 59 Euros. An individually tailored charm pendant costs 75 Euros but magical charging of water, sugar or salt – 20 Euros.

These two examples were selected as they are not part of the supernatural service industry in metaphorical sense only. They actually sell something, either commodities or services, for a defined price.

Research methodology

Since the primary focus of this study is on the public supply of spiritual goods and services, only publicly available and distributed data are used, combined with focused ethnography (brief field visits). The publicity of major agents' opinions is also important because it contributes to the social construction of the spiritual milieu itself. The applied research method is thematic document analyses and the general approach is phenomenological.

Research results and discussion

Both Anita Povecerovska and Mairis Virsis deny the common discrimination of white and black magic. In their opinion, it is the intent that really matters. There exists an array of practices and magical skills that could be used either for a benevolent or malicious purpose. The witch school includes one class where the mechanics of so called "black magic" is explained (Berzina, 2016b).

Povecerovska and Virsis express some longing for the times when all kinds of magic and divination were widespread and socially more acceptable. They emphasize that it is normal to work as a magic specialist or use one's services. Asked about the possible harm arising from often visits to a sorcerer or healer, Virsis refers to the tradition: "Harm comes from not going to such people. Diviners are as ancient as humanity itself – once every hamlet had one, and people went to them in order to find clear mind, peace and health. Nothing has changed, a human being needs help and I can provide it" (*nra.lv*, 04.06.2015).

Povecerovska says that every woman is quintessentially a witch and each man is a wizard. She disagrees that exceptional gifts are necessary to practice magic. Any person possesses magical skills, they just need to be developed and cultivated. "A witch is a wise, sensible woman who [...] carries a huge amount of knowledge [...]. She is the woman who knows everything! People came and still come to witches in all kinds of life situations, since birth to the end of their days. A witch understands both the material world and cosmic laws, and can show the path through harsh

situations in life and lead along ups and downs in someone's life" (Berzina, 2016b,146). Virsis tells that the individual himself is the source of all good and evil and "the main thing is to be in harmony with oneself, with the is real meaning of life, and that is always simple and clear. The positive essence in a human being is the matter of personal choice" (Berzina, 2016a,149).

Sorcery is also understood as a self-help technique. This applies both to self reflexion, and seeing to one's mundane needs and good relationships. Povecerovska points out that many rituals have psychotherapeutic effect. "They help an individual to understand one's own personality, to get rid of fears and despondency" (Berzina, 2016b,146). Individual's magical practices (or consulting a specialist of magic) thus help to build a supportive and protective environment, instrumental for one's wellbeing.

Virsis's wife describes him as a regular churchgoer and a true believer (Berzina 2016a,149). Another publicly well-known collaborant at *Amadeus Maleficus* – Erickson therapy practitioner Anna Krimele (Lieckalnina) has a Master's Degree in theology from the University of Latvia. The fact that *Amadeus Maleficus* rents its premises from the Latvian Academy of Sciences is helpful in the building of the centre's credibility – in the media, Krimele and Virsis are sometimes described as working "at the Academy of Sciences" (rather than in the building). By renting the office space, *Amadeus Maleficus* has rented also a segment of Academy's symbolic capital and the location in itself could be interpreted as an endorsement of the services offered there. The Academy of Sciences has never issued any official position statement on the matter.



Fig.2. *Amadeus Maleficus* window at the Academy of Sciences building
 (author's photo, October 2017)

Rumpumpele is located in a spacious (by Latvian standards) converted flat of an ordinary but well-kept apartment building on the upscale Baznīcas Street in the very centre of the city of Riga. It rings respectability. The most famous Latvian diviner of all times, Eizens Finks (1885-1958), practiced his trade successfully in a modest building located in the shabby off-centre *Moskauer Vorstadt* of Riga. This is not the case anymore (even if some fortune tellers and healers still see their clients at home which may be located in any neighbourhood). In order to be perceived as

credible and reputable, any service needs respectably looking premises, a website and some marketing strategy. "Invisible religion" has become very visible nowadays.

The theme of "return of religion" to the public space is causing a lot of attention in sociology of religion (see Hjelm, 2015). God may be "back", and so are the gods, spirits and magic (polytheistic and pagan religions, and alternative spirituality are enjoying same or close levels of public attention as monotheistic religions and their institutions). The spiritual service providers usually emphasize their modern side, diverse skills and the ability to cater to any need of their contemporaries. In a paid interview, Virsis is introduced as "[...] a contemporary *magus*, clairvoyant and healer, who can understand an eighty year old lady, a businessman who turns over millions, a drunk loser, and a depressed teenager[...] He can heal cancer, free from addictions, turn the money wheel and attract luck" (Berziņa, 2016a, 149).

Rumpumpele's claims are somewhat more modest. Their emphasis is more on personal growth and empowerment rather than cures for specific illnesses or achievement of ambitious goals. The services offered are presented as reliable through reference to tradition, their magic has supposedly stood through the test of time. Thus, any investment – taking a course at the centre or using a specific service is to be considered low-risk. People have done this for centuries – this is the message. Spiritual self-development is seen as a major value in the uncertain world. Once obtained, spiritual security can not be taken away. The involvement of the clients with the spiritual service providers does not necessarily imply deep and stable beliefs in the sacred or supernatural; in fact, direct reference to the sacred is often missing. Rather, this belongs to the realm of lived spirituality, more immanent than transcendent. Contemporary magic specialists seldom (if at all) share their reflections on deep existential issues and maybe their clients would not be interested if they did. Claims to philosophical depth are found in a different segment of the esoteric market – its "high end", with the spiritual gurus who write books and participate in media discussions on the cutting-edge of the time.

The magic specialists discussed here deal with practical, mundane but emotionally significant issues of their clients' lives – sickness and substance addiction, monetary worries and financial security (or sometimes also coveted financial gain), family life, career choices. The "grey" spiritual market sells basic and not luxury items.

Conclusions

- 1) After the restoration of independence, Latvia has experienced not just political and economic changes but also significant diversification of its religious field, part of which is covered by spiritual developments that are not recognized as religious in the strict meaning of the word.
- 2) Spiritual marketplace includes also a share of "grey" market that is regulated by legislation other than concerning religion.
- 3) A number of spiritual service providers can be identified, of which this paper discussed two representatives.
- 4) Healing of common and life threatening diseases, addictions, help in family matters and business, divination in many forms, as well as magical education are common services offered by spiritual market service providers.
- 5) The discourse generally focuses on self- spirituality and empowerment where the client is perceived as a collaborator of the provider rather than passive recipient of the service.

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WORKPLACE ENVIRONMENT IN LATVIA

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Abstract. The aim of the article is to find out how the workplace environment in Latvia has changed over the last 20 years and what factors account for the overall job satisfaction. The author analyses the available labour statistics and data from three ISSP Work Orientation studies carried out in 1997, 2005 and 2016 in Latvia. The questionnaire items related to one's evaluation of job security, income, opportunities for advancement and overall job satisfaction are the focus of the article. More and more respondents agree with the statements such as "my job is secure", "my income is high", and "my opportunities for advancement are high". The labour statistics and multiple linear regression analysis support the hypothesis that higher incomes and more opportunities for advancement would increase the overall job satisfaction. Although younger cohorts and those with higher education have higher employment rates and more prospects for career advancement, the analysis shows that these groups are not more satisfied with their jobs than employees in other groups. Other factors such as interesting work, stress, relationships with management and pride in one's job are better predictors of the overall job satisfaction.

Key words: job security, job satisfaction, Latvia, ISSP.

JEL code: J28

Introduction

Workplace environment encompasses not only a physical space but also a social milieu where work takes place. The focus of this article is a social context of work and its relationship with one aspect of job quality, i.e. job satisfaction. OECD experts have identified a number of dimensions to be considered when measuring employment quality – earnings, working hours and time, job security, life-long learning, safety and health at work (stress at work), work organisation and content (autonomy), workplace relationships (relationships with colleagues and supervisors) and social security systems (OECD, 2013, p. 150). Some of those dimensions are also analysed below. Large scale surveys (ISSP, British Household Panel Survey) have identified correlations between job satisfaction and job outcomes such as relations at work, job content, promotion opportunities, incomes and job security (Clark, 2015, p. 7). In other words, having a paid job is no longer sufficient to draw satisfaction from one's job. A meaningful job and good relationships with colleagues matter, too.

The author analyses the available labour statistics and data from three ISSP Work Orientation studies carried out in 1997, 2005 and 2016 in Latvia. The questionnaire items related to one's evaluation of job security, income, opportunities for advancement and overall job satisfaction are the focus of the article. There have been a plenty of labour market studies focusing on a wide array of aspects (migration, mobility, discrimination, gender, age) in Latvia. The most notable example is a research programme "Labour Market Studies" organized by the Ministry of Welfare in 2006-2007 (Labklajibas ministrija, s.a.). However, these studies did not focus on the longitudinal aspect of labour market development. This article seeks to remedy the situation and attempts to analyse long term changes in attitudes regarding one's job. A long term perspective allows discerning some trends that are hardly visible in ad hoc measurements. Public discourse is quite critical to the development in Latvia economy and labour market. Positive changes, as this article suggests, are rarely identified, mentioned or acknowledged. First, the article provides background information on the development of Latvia economy and labour market since 1996. Second, the author analyses the survey data from three ISSP studies on work orientations fielded in 1997, 2005 and 2016. Third, the article reflects on how economic and labour market changes have shaped the attitudes of

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the employed towards their job. The main goal is to find out what factors account for the overall job satisfaction. The author proposes the following theses that may account for the overall job satisfaction. High incomes and more prospects for career advancement would increase the job satisfaction level. Younger cohorts and those with higher education would be more satisfied with their jobs than employees in other groups.

Research results and discussion

1. Changes in Latvian economy and labour market since 1996

Since 1996, Latvia experienced a steady economic growth with a significant setback during the economic crisis from 2008 to 2010. In 1996, GDP per capita was 1904 EUR (in the current prices). In 2016, the figure reached 12762 EUR (Central Statistical Bureau of Latvia, 2017e). A number of factors might account for such a growth. First, it is easier to achieve the growth rate from a low base. Latvian goods could be exported cheaply because of low production costs. Second, the prospects of Latvia becoming an EU Member State drew a lot of private investments from abroad. As an OECD report on the financial system in Latvia in 2016 indicates, the share of foreign ownership of banks in Latvia was 85.8 % (OECD, 2016, p. 15). Those investments caused a boom in the real estate sector and a staggering increase in prices and wages. Third, the membership in the EU gives Latvia an opportunity to access EU funding and cheap credit. It also allowed to weather through the economic crisis more easily.

The economic growth brought changes in the structure of Latvia economy, too. In 2000 (when the latest comparable data are available), the share of real estate sector constituted 6.5 % of the total gross value added. In 2016, the figure was 13 %. Similarly, though to a lesser extent, the share of financial and insurance sector grew from 3.3 % to 5.7 % in the same period (Central Statistical Bureau of Latvia, 2017f). Two big sectors where there were a large number of jobs in the past, namely manufacturing and agriculture, lost their share in the economy of Latvia. In the manufacturing sector, from 19.6 % in 2000 to 16.7 % in 2016. In the agricultural sector, from 5.1 % to 3.2 % (Central Statistical Bureau of Latvia, 2017f). There are now more jobs for professionals with university diploma and fewer jobs for low skilled and blue collar workers.

The economic growth created job opportunities for all but especially for young professionals. The employment rate in the age group 15-64 grew from 57 % in 1996 to 68 % in 2016 (Central Statistical Bureau of Latvia, 2017a). In the age group 25-34, the employment rate rose from 68.8 % to 79.7 %. However, persons in their preretirement age face significant problems in getting a job and retaining it. In 1996, only 33.1 % were employed in the age group. In 2016, the employment rate for the group was 61.4 % (Central Statistical Bureau of Latvia, 2017a). A few factors account for the lower employment rates for older people. A report by the World Bank on active aging in Latvia indicates (2015) that: "Outdated skills, health problems, alternative income sources, care responsibilities, and place of residence all affect labour supply among the elderly" (p.8). Furthermore, the prevailing stereotypes and discrimination on the part of some members of society may have effect on the employment levels of the older workers as well (Karnite, R., 2013).

The possession of certain skills is rewarded in the labour market of Latvia. The absolute number and share of persons with university diploma has increased from 1996 to 2016. In 1996, there were 19.6 % with higher education among the employed. In 2016, the share reached 37.1 %. The similar figures for the persons with basic education were 11.6 % and 7.4 %, for those with

vocational education 45.6 % and 32.6 % respectively (Central Statistical Bureau of Latvia, 2017a). The share of the less educated decreased because of restructuring in the manufacturing and agricultural sectors. Another reason could be the diminishing prestige of vocational education in Latvian society (Zalauskalne, A., 2013). Vocational education is often not considered as a reasonable option for further education among young people.

Despite the economic growth and the rise of highly rewarding industries, Latvia had a considerable depopulation due to low birth rate and mass emigration. In the beginning of 1996, there were 2.469.531 persons residing in Latvia. In 2016, only 1.968.957 (Central Statistical Bureau of Latvia, 2017c). Since 1996, there has never been a population increase. The population decrease rate varied from 1 to 2 % annually (Central Statistical Bureau of Latvia, 2017c).

Mass emigration was spurred by a number of factors. Latvia's accession to the EU opened the labour market in Western Europe. Many sought a job in Great Britain, Ireland, Germany and Norway (McCollum, D. et. al., 2016, p. 4). The economic recession from 2008 to 2010 increased the number of those settling abroad. Hazans (2016) argues that higher income and better working conditions abroad are the most important pull factors and one's joblessness, wage cuts and inability to pay back credits are the most often indicated push factors among emigrants (p.311).

The economic growth brought also seemingly high wage increases. However, wages are still low in comparison with Western European countries. In 1996, the average gross monthly wage was 140 EUR. In 2016, it was 856 EUR (Central Statistical Bureau of Latvia, 2017g). It should be noted that mass emigration had a positive side effect. Lehmann, Razzolini and Zaiceva argue that mass emigration mitigated the effect of the crisis on wage and unemployment levels in Latvia (Lehmann, H., Razzolini, T. & Zaiceva A., 2017). Most likely, wage cuts and unemployment might have been more severe if many emigrants would have stayed in Latvia.

Despite the economic growth and negative net migration, the unemployment rate remained very high throughout the time period from 1996 to 2016. In the beginning of the period, the rate stood at 20.5 %. Then it dropped to 6.2 % in 2007 when there was the economic boom. In 2009 in the bottom of the economic crisis, the unemployment rate reached 19.8 %. Since the beginning of the recovery in 2011, the rate dropped to 9.9 % in 2016 (Central Statistical Bureau of Latvia, 2017c).

Stark regional differences are an established phenomenon in Latvia. Riga, the capital city, is the hub of economic and labour market activities with the lowest unemployment rate, the highest incomes and the best career prospects. In comparison, Latgale had one of the highest unemployment rates in Latvia, the lowest GDP per capita. In 2016, the unemployment rate in Latgale was 13.1 %. In Riga, 6.1 % (Central Statistical Bureau of Latvia, 2017h). In 2014, GDP per capita in Latgale was 5,981 EUR. The figure for Riga – 19 912 EUR (Central Statistical Bureau of Latvia, 2017d).

To sum up, Latvia economy and labour market have experienced extraordinary changes and volatility since 1996. GDP per capita increased almost six fold. Wages increased in the similar manner. The share of the manufacturing and agricultural sectors decreased substantially with the loss of many low skilled and semi – skilled jobs. There are now more jobs for professionals with university diplomas in the financial and real estate sectors. Employment levels in all age groups increased, unemployment fell for the most of the period, except the economic recession during 2008 to 2011. Regional differences remain a permanent feature in Latvia even after twenty years. Riga, the capital city, is doing much better than other regions, especially Latgale, which faces

economic stagnation and mass unemployment. Latvia lost many economically active people due to depopulation and mass emigration. The demographic process may have a negative impact in the long run but it also mitigated the effects of the economic crisis by decreasing unemployment and sustaining wage levels. In short, an average person in Latvia in 2016 was considerably better off, had more employment opportunities and experienced less competition than in 1996.

2. Data and methodology

Survey data analysed in this article were gathered in 1997, 2005 and 2016 in the framework of the International Social Survey Programme (ISSP). Samples were representative to the 18-74-year-old population in Latvia. The author analysed only those questionnaire items that were included in all three surveys. The questionnaires in ISSP studies have a core of items and a set of questions that were included once or twice. The author did not include the latter items. He also looked at the items that were relevant only to the working population. All data presented in the following tables are weighted to adjust for the under-coverage of some social groups (young males, persons from ethnic minority backgrounds).

3. Empirical results

A battery of statements about one's job was included in the questionnaire such as "My job is secure", "My income is high" etc. The five point Likert scale was used to identify a level of agreement with the above statements where 1 represents a response category "strongly agree" and 5 – "strongly disagree". For the items "How often do you have to do hard physical work" and "How often do you find work stressful", the five point Likert scale was used with response categories 1 – always and 5 – never. For the items "Relations between management and employees" and "Relations between workmates/ colleagues", 1 represents "very good" and 5 – "very bad". For the item "How satisfied are you in your (main) job", the seven point scale was used to measure the overall job satisfaction, where 1 denotes "completely satisfied" and 7 – "completely dissatisfied". Smaller values identify more agreement and satisfaction. Negative differences in means should be interpreted as positive changes, i.e. better relationships with colleagues and more interesting jobs. Table 1 provides the descriptive statistics of those responses.

The overall satisfaction with the main job has increased since 1997. The trend is discernible through the three ISSP studies when this measurement was taken. It holds true for other measurements, too. More and more people agree with the statements "My job is secure", "My income is high" and "My opportunities for advancement are high".

It seems that respondents are now less willing to work harder for a firm to succeed than in 1997. In other words, their work commitment is less pronounced. Although people feel more secure at their job, it does not affect their perception of work stress. There are no changes in how often people find their work stressful. Surprisingly and on the contrary to what one might expect in the era of ICT, many respondents admit that they often do hard physical work. At last, it appears that relationships between management and colleagues (and among themselves) have become slightly better. Respondents more frequently point out that their work relationships are very good or quite good.

To sum up, the workplace environment in Latvia is becoming more friendly and secure. There are more opportunities for career advancement than before. More and more people admit that they have high incomes, too. As a result, there are more satisfied employees in 2016 than in 1997.

To find out which factors account for the overall job satisfaction and how they have changed over time, the author carried out multiple linear regression analysis. Beta coefficients and p-values are included in Table 2.

Table 1

Self-evaluation of one's job

	1997		2005		2016		Difference in means 2016-1997	% change
	M	SD	M	SD	M	SD		
My job is secure	2.98	1.35	2.71	1.14	2.21	1.10	-0.77	-25.86
My income is high	4.02	0.99	3.68	0.98	3.32	1.03	-0.71	-17.61
My opportunities for advancement are high	3.96	1.16	3.62	1.02	3.43	1.15	-0.53	-13.43
My job is interesting	2.32	1.20	2.56	1.04	2.16	1.05	-0.17	-7.18
I can work independently	2.62	1.36	2.89	1.15	2.76	1.29	0.14	5.19
In my job I can help other people	2.16	1.12	2.31	0.91	2.06	0.99	-0.10	-4.83
My job is useful to society	1.77	0.83	2.13	0.81	1.87	0.85	0.10	5.93
How often do you have to do hard physical work	3.50	1.39	3.29	1.40	3.06	1.46	-0.45	-12.71
How often do you find work stressful	3.01	1.15	2.93	1.06	2.99	1.25	-0.02	-0.82
Relations between management and employees	2.15	0.73	2.29	0.89	1.93	0.77	-0.22	-10.44
Relations between workmates/ colleagues	1.90	0.59	1.93	0.74	1.72	0.64	-0.18	-9.64
I am willing to work harder than I have to in order to help the firm or organization I work for succeed	2.56	1.19	3.06	1.09	2.89	1.21	0.33	13.08
I am proud to be working for my firm or organization	2.51	1.10	2.89	1.02	2.36	1.02	-0.15	-5.85
How satisfied are you in your (main) job	2.90	1.16	3.11	1.16	2.63	1.22	-0.27	-9.38

*M – mean, SD – standard deviation

** Base – the working population

Table 2

Beta coefficients of variables included in multiple linear regression analysis

	1997*		2005**		2016***	
	b	p-value	b	p-value	b	p-value
Constant	1.195	.005	.777	.007	.568	.040
Age	-.011	.004	-.011	.001	-.017	.000
Sex (males)	.099	.328	.215	.004	.147	.076
Region (Riga)	.146	.147	.119	.098	.038	.641
Education (higher education)	.048	.695	.286	.001	.116	.202
My job is secure	.082	.045	.087	.017	.034	.372
My income is high	.109	.049	.085	.049	.215	.000
My opportunities for advancement are high	-.004	.929	.098	.023	.075	.064
My job is interesting	.343	.000	.223	.000	.277	.000
I can work independently	.006	.862	.037	.299	.086	.008
In my job I can help other people	.058	.289	.014	.788	.024	.599
My job is useful to society	.099	.195	.091	.112	-.035	.518
How often do you have to do hard physical work	.016	.686	.088	.001	-.059	.042
How often do you find work stressful	-.213	.000	.093	.006	-.119	.000
Relations between management and employees	.247	.002	.171	.001	.223	.001
Relations between workmates/ colleagues	-.155	.106	.198	.000	.169	.023
I am willing to work harder than I have to in order to help the firm or organization I work for succeed	.030	.538	.090	.043	.012	.748
I am proud to be working for my firm or organization	.204	.000	.156	.002	.251	.000

*For the study in 1997, $n=366$, $F(17, 348)=16.679$, $p=.000$, $R^2=.449$

**For the study in 2005, $n=552$, $F(17, 534)=33.795$, $p=.000$, $R^2=.518$

***For the study in 2016, $n=548$, $F(17, 530)=31.686$, $p=.000$, $R^2=.504$

****Cases with Cook's distance values ≥ 1 (influential cases) and standardized residual values ≥ 3 (outliers) were not included

It appears that there are a few significant and stable factors in determining one's job satisfaction over the span of nearly 20 years. One's age is a good predictor of one's job satisfaction. Older employees are more satisfied with their jobs than the young. It is contrary to a widely shared belief that young people with higher education have more career prospects and better paid jobs. Somewhat surprisingly, region (place of residence in Riga) is not a statistically significant predictor although official statistics suggest that there are more job opportunities and a higher living standard in the capital city. Education is not a significant factor as one might expect. It can be argued that the current labour market creates more jobs and career prospects for professionals, i.e. people with higher education. However, it does not translate into the higher satisfaction levels of the highly educated employees. The agreement with the statements like "My income is high", "My job is interesting" and "I am proud to be working for my firm or organization" will most likely result in higher satisfaction levels. Similarly, good relationships with management

and colleagues do have a positive effect on one's job evaluation. However, stress and physical work have a negative impact on one's job satisfaction. Those who experienced that more often are less satisfied with their jobs. Job security was a significant factor in 1997 and 2005 but not in 2016. Work independence now seems to have more impact on one's job satisfaction. Only the next round of the ISSP study will show whether this is an established trend.

To sum up the results of the regression analysis, sociodemographic indicators (like sex, region, and education with the exception of age) have no statistically significant effect on the overall job satisfaction. There are more important factors that account for the satisfaction, i.e. interesting work, one's income, relationships with management and a pride in one's job. It matters more not who one is but what kind of job one has.

4. Discussion

Labour statistics clearly show that wages and employment rates significantly increased since 1996. In other words, there are proportionally more better paid jobs than before. The analysed survey results do reflect these trends. Respondents more often acknowledge that they have high incomes and opportunities for advancement. There are less unemployment and less pressure on the employed to be concerned about job loss. As a result, employees now feel more secure about their jobs than previously. Although to a lesser degree than one might expect from the presented results, the overall job satisfaction has also increased.

Although the labour market structure significantly changed over time (with more jobs for professionals with higher education in sectors such as real estate and financial services), the self-evaluation of one's job content and value did not change that much (within or close to the margin of sampling error). Interesting and useful work, a pride in one's job, the opportunities for working independently and helping other people are no more or no less common in 2016 than in 1997.

To a certain degree, multiple linear regression analysis supports the hypothesis that higher incomes would increase the overall job satisfaction. However, the analysis does not support that opportunities for career advancement is a contributing factor. Although there are now more jobs for individuals with higher education (as labour statistics suggest) and more respondents acknowledge that their opportunities for advancement are high, it does not have an effect on their evaluation of job satisfaction.

Factors such as sex, region and education have no effect on the overall job satisfaction. The regression analysis does not support the hypothesis that those with higher education may have higher job satisfaction levels. The questionnaire used in the ISSP studies does not include items on the content (tasks, responsibilities) of one's job that might explain why it is so. The author might speculate that jobs offered to university graduates often do not meet their expectations. A university graduate is probably more aware of different career options and the situation in the labour market. He may be more critical in evaluating his job as well.

The regression analysis also does not support the hypothesis that younger cohorts might be more satisfied with their job because they have more opportunities for advancement. Labour statistics shows that employment rates for younger cohorts are higher; therefore, it would be reasonable to assume that there are more job prospects for those cohorts. The older cohorts, however, have lower employment rates and, as a few reports suggest (World Bank, 2015; Karnite, R., 2013.), may have outdated skills and often face discrimination in the labour market. If it is so, one might expect that older people would feel less satisfied with their job but it is otherwise.

Again, the author speculates that older cohorts have lower expectation levels but the thesis should be tested in empirical research in the future.

At last, the analysis indicates the importance of non-material factors such as interesting job, good relationships with management, stress and taking pride in one's job. They are often overlooked in public discourse on employment relations and policy options. The future research in Latvia should focus more on what constitutes interesting work and how to foster good relationships with management. Higher salaries and new job prospects will not be enough to motivate and to keep employees engaged in the 21st century.

Conclusions

- 1) There has been a significant increase in wages and employment rates in all age groups since 1996 in Latvia. There is now less unemployment and less pressure on the employed, too. Some differences between groups though remain. Younger cohorts have higher employment rates and those living in Riga enjoy higher wages.
- 2) The labour market structure has radically changed during the last 20 years. There are now more jobs for professionals with higher education in sectors such as real estate and financial services.
- 3) Throughout the period between 1997 and 2016 when the ISSP studies on work orientation were carried out, respondents more and more often acknowledged that they had high incomes, more prospects for advancement and they felt more secure. As a result, there are now more employees who are satisfied with their jobs.
- 4) Multiple linear regression analysis supports the thesis that higher wages would result in higher job satisfaction levels. However, better career prospects, as labour statistics and empirical evidence suggested, would not lead to higher satisfaction.
- 5) The regression analysis does not support the theses that younger employees and those with higher education may have higher job satisfaction levels. The author speculates that the aforementioned groups have different expectations than those with less education and in older cohorts, but these assumptions should be tested in empirical research in the future.
- 6) There are a few factors that account for the overall job satisfaction – age, income, interesting work, stress, relationships with management and pride in one's job. High incomes, engaging jobs, good relationships with management, less stress at workplace and taking pride in one's job would identify high satisfaction levels. It matters more not who one is but what kind of job one has.

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LEGAL AND POLICY FRAMEWORK OF EMPLOYMENT FOR PEOPLE WITH DISABILITIES IN LATVIA

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Abstract. The European Union promotes the active inclusion and full participation of disabled people in society, defining raising the share of persons with disabilities in the open labour market as one of the priority action area. Employment of people with disabilities continues to be a topical subject with regard to the Latvian labour market. The paper deals with legal and policy frameworks of employment people with disability, social inclusion and non-discrimination as well as makes discussion on the study results regarding people with disability integration into the labour market. The state provides its support for the employment of disabled people and inclusion in the workplace through various initiatives and regulatory frameworks that are being explored in this publication. Although there are international, European Union and Latvian legal and regulatory frameworks and various policy planning initiatives, the inclusion of people with disabilities in the labour market still remains an open topic. As a result of the research, key areas of regulatory framework to improve employment and inclusion of disabled people in the labour market have been identified: the need to develop a motivating regulation for employers, to establish an effective mechanism for co-operation of different state institutions involved, to increase the responsibility of local municipalities and to develop a supportive intersectional cooperation mechanism to promote employment of people with disabilities.

Key words: legal framework, people with disabilities, fundamental right, discrimination, employment support system.

JEL code: E24, J71, K38

Introduction

One of the dominant features of legal thinking in twentieth century has been the recognition of law as a tool of social change. Although legislation is not the only means of social progress, it represents one of the most powerful vehicles of change, progress and development in society (UN, 2007). Persons with disabilities (PwD) often are excluded from the mainstream of the society and they have difficulties to be integrated in the labour market. While the importance and increasing role of international law in promoting the rights of persons with disabilities is recognised by the international community, domestic legislation remains one of the most effective means of facilitating social change and improving the status of disabled persons. International norms concerning disability are useful for setting common standards for disability legislation. Those standards also need to be appropriately reflected in policies and programmes that reach persons with disabilities and can effect positive changes in their lives (ibid.).

Quality jobs ensure economic independence, foster personal achievement, and offer the best protection against poverty. Having a job is fundamental to social inclusion, but employment opportunities of people with health problems or disability are limited. In the late-2000s, on average across the OECD countries employment rates of people with disabilities were just over 40 % compared with 75 % for people without disability (OECD, 2010). The rate of employment for people aged 15-65 having a basic activity difficulty is only 47 % in average in European Union (Eurostat, 2011). For people with disabilities the rate of poverty is 70 % higher than the average partly due to limited access to employment (EC, 2010). Employment and occupation are key elements in guaranteeing equal opportunities for all and contribute strongly to the full participation of citizens in economic, cultural and social life and to realising their potential as it is stated in EU Council Directive 2000/78/EC.

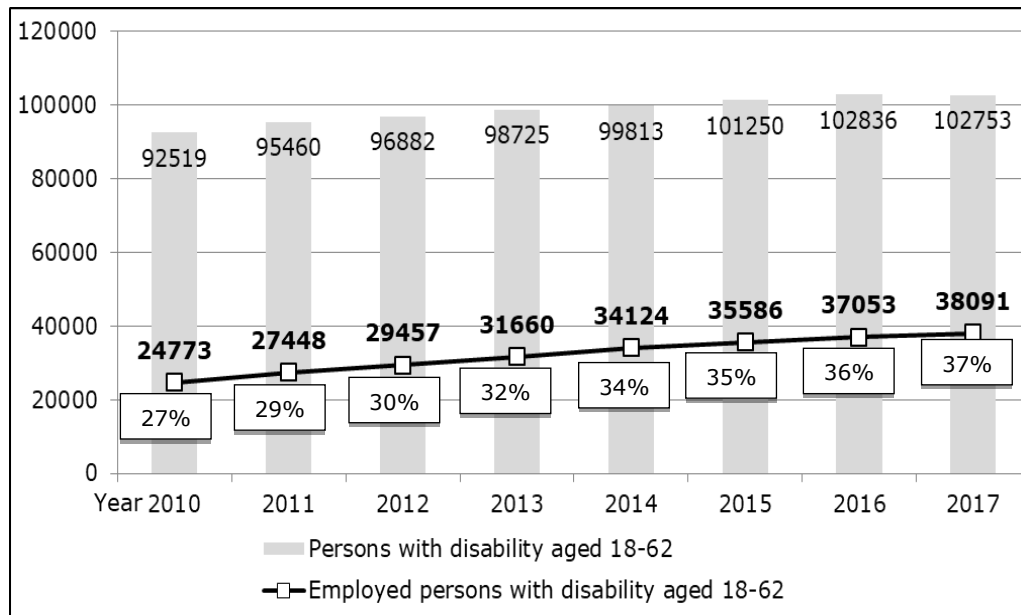
The difficult labour market integration of people with disability will create bigger problems in the future for many OECD countries given their rapidly changing demographics. Population ageing

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provides a solid argument for enhancing the efforts to mobilise the under-utilised labour potential among workers with disability. Higher participation rates for people with disability can help prevent future labour force declines. This can contribute to raising the productive capacity of the economy and reduce the costs associated with disability benefit programmes (OECD, 2010, p.23-26).

The employment of people with disabilities continues to be a topical subject with regard to the Latvian labour market. 37 % of people with disabilities in working age 18 -62 are employed in Latvia (Ministry of Welfare, 2017). Although various policy and planning documents have been developed and various initiatives have been taken in Latvia in recent years, however, studies show that employment rate of people with disabilities is changing quite slightly (Figure 1).



Source: authors' construction based on data of Ministry of Welfare

Fig. 1. Persons with disabilities at work age, number of employed persons

The economic growth in the country in 2017 has contributed to the decline in unemployment, thus registered unemployment as of 31 January 2018 was 7.0 % (Table 1).

Table 1

Unemployment rates in statistical regions of Latvia, 31 January 2018

Statistical regions	Total number of registered unemployed	Unemployment rate %	Unemployed PwD	Unemployed PwD from total unemployed in %
Riga	12847	4,1	1067	8,3
Pieriga	8665	4,4	815	9,4
Kurzeme	9145	8,1	1312	14,3
Latgale	20057	16,0	3544	17,7
Vidzeme	6809	7,8	966	14,2
Zemgale	7613	6,9	785	10,3
Total Latvia	65136	7,0	8489	13,0

Source: Data from State Employment Agency

With the resumption of economic growth in Latvia, demand for labour force is beginning to grow. It is projected that unemployment will continue to decrease, with the ever more active participation of the population in the labour market, which will be fuelled by an increasing opportunity to find work. In the case of lower unemployment, people with disabilities are more likely to find work. The lack of labour force in the country is a positive environment for those

groups of people who were previously unemployed, forcing employers to recruit employees they have previously avoided employing. Despite this, a large proportion of disabled people in Latvia are not recruited due to prejudices of their employers, according to a published study by Kantar TNS (Kantar TNS, 2017).

Despite various schemes and policy measures to get disabled people into employment, they generally have much higher unemployment rates and are more likely to be underemployed (Hersh M., 2010). Disabled people are generally at the end of the queue into employment, and they, therefore, may find it easier to obtain work in conditions of high employment (Russell M., 2002). A downturn of the economy, however, means that disabled workers who have a job may be laid off. "Disabled workers are usually last in/first out," explains Peter Blanck (Russell M., 2002).

A number of different studies on the employment promotion of the disabled persons have been conducted in Latvia (Taube M., Leimane-Veldmeijere I., 2007; Zivitere M. et al., 2011a; Zivitere M. et al., 2011b; Zivitere M., Claidze V., 2011; KPMG Baltics, 2016; Baltic Institute of Social Sciences, 2017; Baltijas Konsultācijas, Agile & CO, 2017; Kantar TNS, 2017), various conclusions and legal suggestions have been made, however, the situation has not changed significantly. Businesses operate in environments created by the interplay between economic, political and social activities. As studies show, the socialist state legacy influences the processes taking place in the society in many aspects and affects various disability policies. (Phillips S.D., 2009; Zivitere M. et al., 2011a; Mladenov T., 2017). Because of workforce demographic changes, economic development and social activity, and because of influence of international environment, the topic of employment of people with disabilities is still on the agenda.

The research problem is how the state can support employment of people with disabilities, what kind of legal framework and policy initiatives can effectively promote employment of people with disabilities. The hypothesis of the study - the legal framework is only a precondition for the employment of disabled people. The interest of all parties concerned and partnerships with all institutions and social partners involved is a ground of effective promotion of employment of people with disabilities.

The paper examines the legal and policy frameworks of employment and anti-discrimination regulation for people with disabilities in Latvia. The aim of the paper is to study existing documents on legal and policy support system for employment of people with disabilities and the partnership between state institutions, local municipalities, non-government sector and employers. To achieve the aim, the following specific research tasks are set: 1) to study international, European Union and national level legal framework and policy documents on support for employment of people with disabilities and 2) to analyse the cooperation mechanism between key players in support of employment of disabled people.

Research methods employed: comparative and logical analysis, induction and deduction, monographic, graphic and statistical analysis. Analysis of legal acts and documentation, the content analysis of studies done, and theoretical modelling were employed to achieve the aim. Because the subject is very broad, and due to limited space for publication, the authors will focus on main legal and policy documents affecting the employment of people with disabilities, but will not make a detailed analysis of each of those documents.

Research results and discussion

In Latvia, the first legal initiatives with regard to persons with disabilities in the workplace started back in 1990, with the regaining of the independency and development of the national legal system. The concept of equality and the principle of equal rights are the most important part of the Latvian legal system. Article 91 of the *Satversme* (the Constitution of Latvia) states that all people in Latvia are equal before the law and the courts (Saeima, 1922). Human rights are exercised without any discrimination.

The law *On International Contracts of the Republic of Latvia*, Section 13, requires that if an international treaty ratified by the Saeima (the Parliament of Latvia) contains different provisions than legal acts of the Republic of Latvia, the provisions of the international treaty shall apply (Saeima, 1994).

According to the hierarchy of legal acts, an overview of the documents regulating the employment of people with disabilities has been created (Figure 2). Legal and policy framework is grouped in four sections: international, European and national level, which summarizes both legal acts and strategic planning documents.

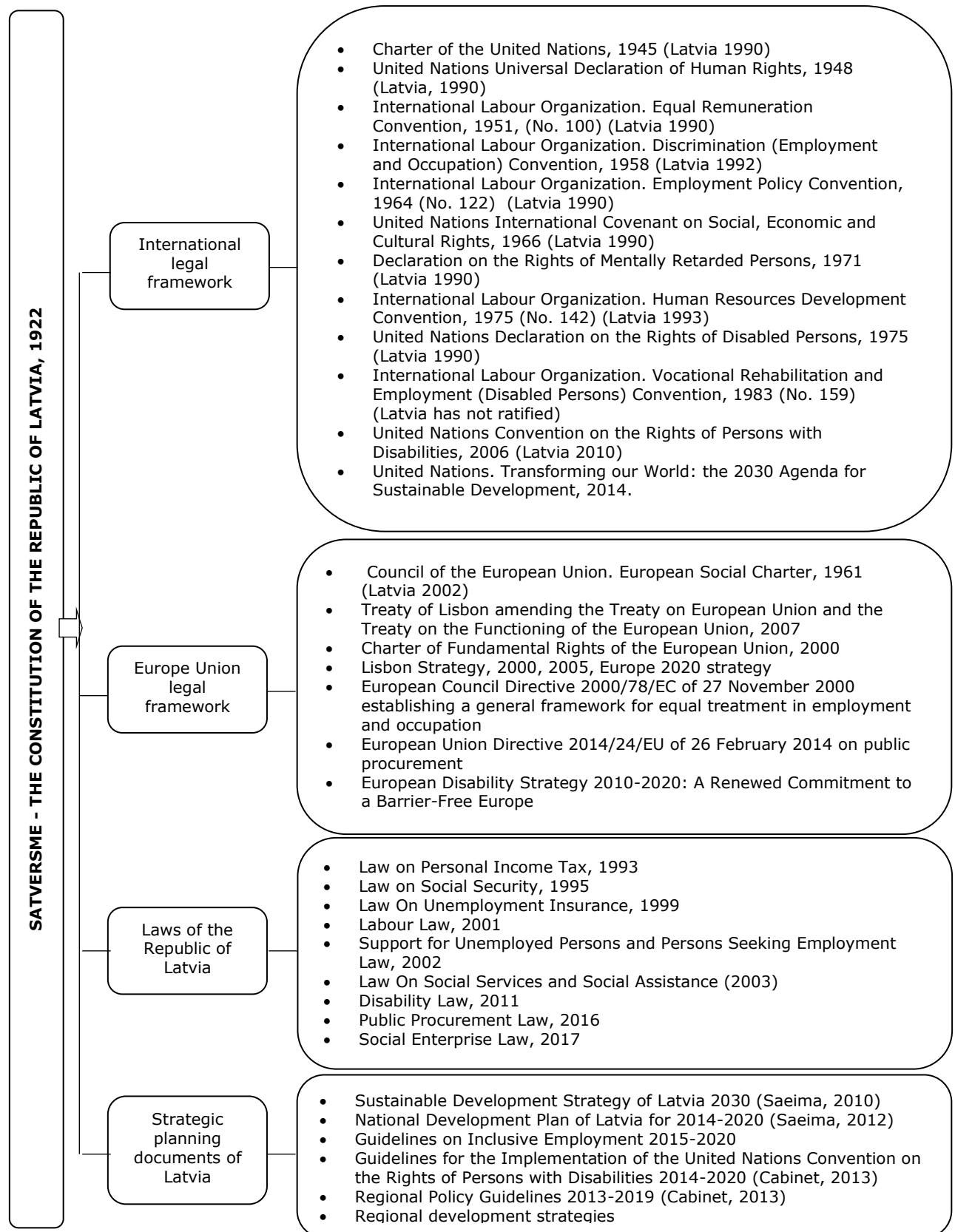
1. International legal framework

The following section outlines the relevant international legal and policy framework, including the human rights framework. All human rights are universal, indivisible, interdependent and interrelated. Persons with disability are protected by the core international human rights treaties, which protect the right to work, the right to just and favourable conditions of work, the right to equal opportunities for promotion in the workplace and the right to enjoy all other rights without discrimination: Charter of the United Nations (1945), United Nations Universal Declaration of Human Rights, (1948), Equal Remuneration Convention, 1951, Discrimination (Employment and Occupation) Convention (1958), Employment Policy Convention (1964), International Convention on Civil and Political Rights (1966), International Covenant on Economic, Social and Cultural Rights (1966), Human Resources Development Convention (1975), Declaration on the Rights of Mentally Retarded Persons (1971), United Nations Declaration on the Rights of Disabled Persons (1975), Vocational Rehabilitation and Employment (Disabled Persons) Convention (1983, Latvia has not ratified), United Nations Convention on the Rights of Persons with Disabilities (2006). The Convention on the Rights of Persons with Disabilities sets out the rights of disabled people generally and in respect of employment. In particular, article 27 of the convention protects the right to work for people with disability. Implementation of the Convention requires development of a range of policy instruments at both national and European level. The Disability Online Tool of the European Commission (DOTCOM) was developed by the Academic Network of European Disability experts (ANED) in 2011-12, in collaboration with the European Commission and the EU Member States, to map the progress being made on a range of key instruments relevant to implementation of the Convention (Priestley M., Lawson A., 2015).

Poverty denies the enjoyment of practically all human rights. The importance of international cooperation in the eradication of poverty and promotion of development is apparent (ILO, 2015). The ILO Code of Practice on Managing Disability in the Workplace (ILO, 2002) was drawn up to provide guidance to employers on practical means of implementing the types of measures contained in international instruments. While addressed mainly to employers, the Code should also prove of considerable benefit to governments, which play a primary role in providing the necessary

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legislative framework for promoting equal opportunities and treatment in the workplace (ILO, 2015).



Source: authors' construction

Fig. 2. Legal and policy framework of employment for people with disabilities in Latvia

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Human rights protection and anti-discrimination conventions have been explained from theories of social justice and equality (Miller D., 1991; Sen A., 2004; Muir E., 2015). As Stein M.A (Stein M.A., 2007) points out, each of core United Nations treaties theoretically applies to disabled persons in varying degrees, but are rarely applied in practice. Although these conventions have a declarative character and their impact on the employment of people with disabilities has been criticized (Lord J. E., Stein M.A., 2008; Miller D., 1991; Posner E. A., 2008; Russell, M., 2002), they are a powerful instrument of international legal system. The provisions of international conventions are incorporated into the national laws.

2. European regulation and policy

The EU has a strong mandate to protect and promote the rights of persons with disabilities and to improve their social and economic situation. The human rights and anti-discrimination rules are embedded in the European Union legal instruments: European Social Charter (1961), Treaty of Lisbon amending the Treaty on European Union and the Treaty on the Functioning of the European Union (2007), Charter of Fundamental Rights of the European Union (2000). The Charter of Fundamental Rights of the EU states that the EU recognises and respects the right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational integration and participation in the life of the community. It also prohibits any discrimination on the basis of disability.

Since January 2011, the EU is a party to the UN Convention on the Rights of Persons with Disabilities -the first legally binding international human rights instrument to which the EU is a party. This represents a strong European commitment to promote, protect and ensure the full and equal enjoyment of all human rights by all persons with disabilities. Its articles provide clear guidance on the steps that are to be taken to ensure that development policies and programmes in any sector area (e.g. education, health, justice, and employment) are inclusive of persons with disabilities. In order to help implement the Convention, the Commission adopted the European Disability Strategy 2010–2020 (EC, 2010), which focuses on eliminating barriers in eight main areas: accessibility, participation, equality, employment, education and training, social protection, health, and external action.

Directive 2000/78 (Council, 2000) establishes a general framework for equal treatment in employment and occupation set down the challenge to eliminate discrimination in employment. Framework Directive required all EU Member States to have measures outlawing discrimination on the ground of disability. Importantly, the Directive states that "reasonable accommodation" shall be provided, i.e. that employers are to take appropriate measures, where needed, to enable a person with a disability to have access to, participate in, or advance in employment, or to provide training.

The Council and the representatives of the governments of the Member States made joint statement (EU,2017) for a new European Consensus on Development, a blueprint for aligning the Union's development policy with the 2030 Agenda for Sustainable Development (UN, 2015). In order to ensure that no one is left behind, the Consensus reiterates the EU's commitment to a rights-based approach to development cooperation. It also stresses the commitment to promote the rights of persons with disabilities and work to ensure their participation on an equal basis.

3. Domestic regulation and policy

The field of law in which the most complete implementation of the principles of equal rights takes place is Labour Law (Saeima, 2001). The Labour Law provides protection against all forms of discrimination in all aspects of employment relations in public and private sectors. The Law states that everyone has equal rights to work, fair, safe and healthy working conditions, as well as fair work remuneration. Although statistical data proving discrimination based on a person's disability is not available, according to survey data, 50 % of respondents believe that discrimination on the basis of disability is relatively widespread in Latvia (BISS, 2017). The Ombudsman has developed informative materials for employers to reduce prejudices and negative stereotypes about people with disabilities and promote their inclusion in society as well as in the labour market (Ombudsman, 2018).

The Labour Law sets out the obligations of employers to provide reasonable accommodation for people with disabilities. Within the state programme for subsidised employment employers receive financial support administrated by the State Employment Agency. Technical equipment and technical aids for individual use are available for people with disabilities in accordance with the Social service and social Assistance Law (2003). Individual assistance at work is available within the programme for subsidised employment, with a co-worker (programme offered by the State Employment Agency).

As studies show (Baltijas konsultācijas, Agile & CO, 2017; Baltic Institute of Social Science, 2017), that the restrictions included in Part 2 of Article 109 of the Labour Law for the employer to terminate a contract of employment with a disabled worker, hinders not only the dismissal of the employed person, but also hinders the employment of people with disabilities as there are employers who do not want to take on the risk of employing a disabled persons. The OECD report also concludes that such policies are beneficial for employed people with disabilities, while the unemployed are hampered by access to the labour market, which overall has a negative impact (OECD, 2010).

The Disability Law (Saeima, 2011) prescribes the procedure by which a predictable disability and disability expert-examination shall be performed, as well as the aid measures necessary to reduce the risk of a disability and the consequences of a disability. There are laws that give benefits to people with disabilities: Law on Social Security (Saeima, 1995) and Law on Personal Income Tax (Saeima, 1993). The regulatory framework prescribes the person's choice to indicate information on disability in electronic work record card, as many workers do not want this information to be known by their income-paying employer, because they are afraid of discrimination. Thus, they choose to submit an annual income declaration in order to receive an overdue tax. Persons seeking for a job are supported by Support for Unemployed Persons and Persons Seeking Employment Law (Saeima, 2002).

It is expected that the new Social Enterprise Law (Saeima, 2017) will promote the employment of people with disabilities. According to European Directive 2014/24/EU on public procurement (EC, 2014), the Public Procurement Law of Latvia (Saeima, 2016) gives privileges for entrepreneurs who employ people with disabilities. What concerns social entrepreneurship, it is planned to include social entrepreneurs as the subjects of privileged rights agreements.

Obligatory employment quotas are an example for legislative instruments that accelerate active labour market policy - the integration of persons with disabilities into the open labour market.

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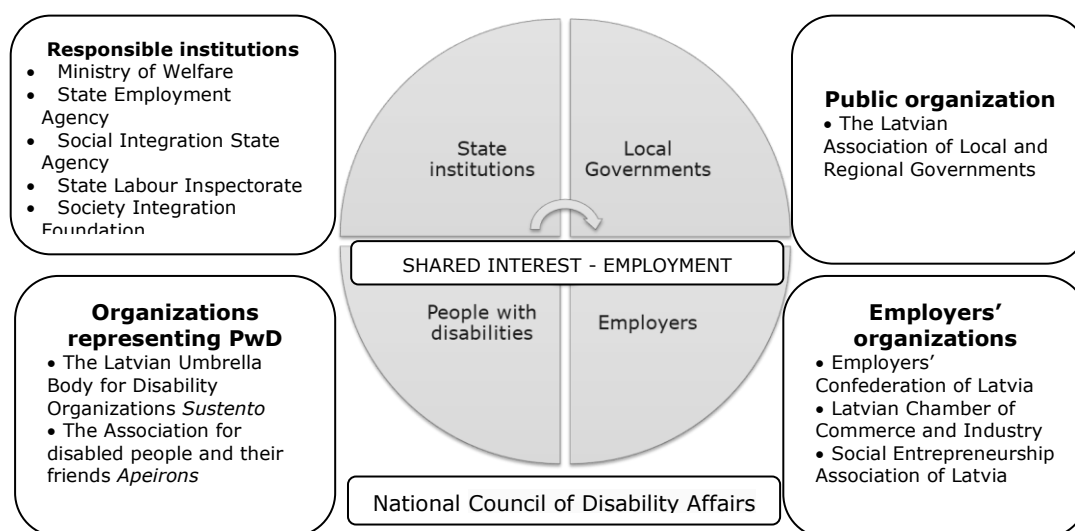
Latvia does not have a quota system yet, but discussions are underway on how to implement the quota system in Latvia.

For employers' motivation to employ disabled people State Employment Agency offers projects on subsidized jobs. However, it should be emphasized that these instruments are introduced for a certain period; therefore, there is a general lack of a system of employer motivation for employment of disabled people in the country. Activities for the inclusion of people with disabilities into the labour market lack succession and continuity. They are most often implemented through projects supported by EU financial instruments rather than based on a defined national long-term policy with adequate funding. In addition, participation in existing activities often involves a large bureaucratic burden.

The Guidelines on the Implementation of the UN Convention on the Rights of Persons with Disabilities 2014-2020 (Cabinet, 2013) provide actions towards inclusion of disabled persons into labour market by provision of appropriate support, taking into account the type of functional disorder. All strategic planning documents: Sustainable Development Strategy of Latvia until 2030 (Saeima, 2010), the National Development Plan of Latvia 2014-2020 (Saeima, 2012), the Guidelines on Inclusive Employment 2015-2020 (Cabinet, 2015) and Regional Policy Guidelines for 2013-2019 (Cabinet, 2013) contain inclusive society principles for people with disabilities. After examining the regional documents, it was concluded that regional development strategies do not mention any policies for inclusion people with disabilities into the labour market (Skestere I., 2011; Vahlina T., 2011). The same applies to municipal planning documents.

4. Key players and co-operation

More people with disability could work if they were helped with the right supports at the right time. As the OECD points out in its study, much can be gained from improvements in three areas: better cross-agency co-operation; systematic and tailored engagement with clients; and improved institutional incentives (OECD, 2010).



Source: authors' construction

Fig. 3. Key players in employment of people with disabilities

The key players, whose shared interest is employment of disabled people in Latvia, are responsible state institutions, local governments, non-governmental organizations representing

interests of people with disabilities, and employers - state and local government owned enterprises, private business and social enterprises (Figure 3). The Ministry of Welfare is the leading state administration institution in the field of equal opportunities for people with disabilities in Latvia (Cabinet, 2004a). The following state institutions operate under the subordination of the Ministry: the State Employment Agency, the Social Integration State Agency, the State Labour Inspectorate and the State Social Insurance Agency (Cabinet, 2004a). The coordination mechanism within the Government is not formally established. It is carried out through the National Council of Disability Affairs (Cabinet, 2004b). This Council involves line ministers, Ombudsman, Chairperson of the Latvian Association of Local and Regional Governments, Director of Society Integration Foundation, President of Free Trade Union Confederation of Latvia, Director General of Employers' Confederation of Latvia and representatives of key non-governmental organisations representing people with disabilities such as *Apeirons*, Latvian Association of Deaf, Latvian Society of the Blind, and others. The Council is a consultative body involved in the design and implementation of the policy of integration of people with disabilities.

The Ministry of Welfare coordinates the implementation of the Convention on the Rights of Persons with Disabilities (Cabinet, 2013) and the implementation of the guidelines for inclusive employment (Cabinet, 2015). The implementation of the Convention is monitored by the Ombudsman - an independent institution whose function is to encourage individuals to contribute to the protection of human rights and compliance with the principle of equal treatment and the prevention of any kind of discrimination. Other ministries (for example, the Ministry of Education and Science, the Ministry of Health, the Ministry of Traffic and others) are responsible for the implementation of specific activities according to the sphere of their competence.

Starting with ministerial level, there are, in general a number of public bodies that work on the integration or inclusion of persons with disabilities in the labour market, which indicates the horizontal nature of the disability policy. This may lead to problems relating to the different understanding of the needs of persons with disabilities and, therefore, inter-institutional communication and cooperation play an important role in the coordinated implementation of disability policies.

The most important player for employment people with disabilities is employer. As various studies show, employers are not interested in employing people with disabilities (KPMG Baltics, 2016; Kantar TNS, 2017). The main obstacle presented is strict labour law, which is not motivating the employer. It comes to the conclusion that most people with disabilities are employed by the companies that have developed socially responsible personnel policy.

The role of local authorities to promote employment for people with disabilities has not been efficiently studied. The local municipalities in co-operation with community based NGOs play very significant role in social inclusion. Local governments are more involved in providing social services rather than promoting employment for people with disabilities. According to the survey of municipalities (BISS, 2015; Ombudsman, 2016), only 30 % of the local governments provides support for the creation of subsidized jobs or special workshops for people with disabilities. Only two municipalities have established special support programs for persons with disabilities for commencing and conducting entrepreneurship. Among other measures, several municipalities has created jobs in their institutions, support groups for people with disabilities, which are working to increase the motivation of people with disabilities and strengthen self-confidence in order to return

disabled people to the active labour market, some has set up cooperation with local entrepreneurs (*ibid.*).

Analysing the interests, objectives, programs and activities of each stakeholder, one has to conclude that the existing support mechanism of the regulatory and policy framework has not had a significant impact on employment growth of people with disabilities.

Conclusions, proposals, recommendations

- 1) There are various laws and regulations, various targeted initiatives, but small and slow impacts on employment of people with disabilities in Latvia. Along with the legal framework, it is necessary to find an effective support mechanism for the inclusion of people with disabilities in the labour market.
- 2) Although the Labour law Article 109 was intended to protect people with disabilities, it has become an obstacle for the employer to employ disabled people, on the one hand, while it is a barrier for people with disabilities to enter the free labour market, on the other.
- 3) Regarding the critical factors in employing disabled people, employers are not motivated to employ people with disabilities. The existing legal norms are bureaucratic and little help in adapting workplaces that do not encourage motivation to employ disabled workers.
- 4) At the regional and municipal level, initiatives for the employment of disabled people are not planned efficiently; municipalities focus more on social services. It is necessary to strengthen community - based approach for inclusive employment.
- 5) A motivating cooperation mechanism between the various stakeholders - state institutions, employers, local governments, non-governmental organizations - should be created.
- 6) An open question is what can be expected from the new Social enterprise law and how it will affect the employment of people with disabilities.
- 7) The Ministry of Welfare is working on the introduction of a quota system, which is judged sceptically by employers. Future studies should examine how quotas will affect the labour market for people with disabilities and whether the quota system evolves as a motivating tool for employers.

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PROSPECTS FOR BUSINESS INTELLIGENCE DEVELOPMENT IN THE LATVIAN BUSINESS ENVIRONMENT

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Abstract. Business intelligence (BI) is a specific service niche that is developing very rapidly. The aim of the study was to identify the development opportunities of Latvian BI service companies in Latvia market. It has been ascertained that medium and large companies globally need BI systems and sometimes even small companies need it, but it depends on the particular business field, the amount of data analysed and other factors. In Latvia, there are only 1.07 % of such enterprises - in general, 1603 (0.93 %) medium-sized enterprises and only 238 (0.14 %) large enterprises. It should be taken into account that many companies have already introduced BI or similar analytical solutions, so forecasts about the acquisition of the local market and the existence of free niches can be said to have been already exhausted. Also, the saturation of the local market with similar business analytics services offered by ICT service providers should be taken into account. Therefore, in order to keep up the pace of growth and prevent stagnation of business processes, BI service providers must devise relevant strategies for businesses to enter into external markets.

Key words: Business Intelligence (BI), Information and Communication Technologies (ICT), development prospects.

JEL code: M15

Introduction

Today's business is all about data and the way that an entrepreneur can use data effectively to promote their business growth. For every business, small and medium-sized as well, the amount of data today is greater than ever. Every modern company accumulates a large amount of data on a daily basis - about customers, suppliers, competitors, units sold, their prices, discounts, changes in volumes, earnings figures, profit and loss accounts at different time intervals and many other different types of data. On a daytoday basis they are stored in various information resources. These data are vital for business development of the company.

The number of companies operating in the IT sector is increasing every year. Growing export volumes, well-paid jobs with a growing trend in the number of employees in the sector and the arrival of new companies in the sector indicate the breakthrough in the development of the IT industry. The various start-up companies and innovation technologies in the IT industry have been progressing and developing quite rapidly over the past few years, which makes competition increasingly saturated and intense. Although business intelligence is only a small part of the overall IT service basket, it is important to take into account the fact that in recent years new competitors are emerging on the market offering similar services, and large players in the industry tend to expand their range of services by including BI services.

Assessing BI development in the Latvian business environment in depth is a challenge that is both possible and impossible at the same time. Though globally, this area is evolving, business niche players are largely guided by their experience and inner feelings. Paid market research does not help in getting accurate information and only direct communication with each of the company representatives helps. It is only when speaking personally that one can determine whether the company is ready to implement BI systems in its daytoday operations. Often this is a question of corporate ambitions, finances and internal culture. However, in order to highlight the current situation, the authors evaluate the nature of the commercial enterprises active in this field and have conducted additional research by interviewing industry experts.

Research environment: Latvian BI service providers.

Research object: development prospects of Latvian BI service providers in the Latvian market.

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Hypothesis: the Latvian market is too small for BI service companies to maintain growth and keep business processes ongoing.

Aim of the paper: to study the development prospects of Latvian BI service companies in the Latvian market.

The research tasks to be achieved in order to achieve the goal: 1. to explore the role of ICT and BI services in the economy of Latvia; 2. to explore possibilities of developing BI services in the Latvian market.

The study was conducted over the period 2016-2017. The research framework was organized as follows. The monographic method is used to compile existing scientific knowledge. Using the available statistical databases data was obtained. Data are analysed using a graphical and comparative method. In-depth interviews were used to confirm the results of the research of statistical data and the authors' point of view. Two expert interviews were conducted: with Karlis Vitols (Vitols, K., 2017), Chairman of the Board of "Scandic Fusion", 2) with Ainars Bemberis (Bemberis, A., 2017), country manager of "SAP Latvia".

Research results and discussion

The chaotic term 'Business Intelligence' has been in use since the 1860s, however, in 1989, consultant Howard Dresner made the first suggestion of using this term as a main term for all categories related to data analysis methods and business decision making processes (TechTarget, 2014). From the technology side of BI, one definitely needs to mention separate tools provided by industry players like Oracle, SAP Qlik and Microsoft that are among the largest and most leading providers of data analysis platforms in the world. BI data can include historical data information, and also new data collected from different source systems. Originally, BI tools were only used by analysts and IT technicians in practice, but nowadays the portals have been upgraded to make it easy for simple users to work with them (Hocevar B., Jaklic J., 2010).

The BI field is a relatively specific business niche, because in essence it relates to not only the IT industry, but also combines system analysis and the ability to go deep into the specifics of the client's business. It is not just the next level of information technology development beyond simple software development and implementation or interpretation of communications or technology in another dimension. Business intelligence includes a wide range of analytical knowledge sets, as well as specialized tools for designing and configuring knowledge (Alaskar T., Efthimios P., 2015). Today, businesses and the business environment are much more developed than they were over the last ten years. Managers are knowledgeable and demanding about their business, as well as know where to go and what they want to achieve and, above all, how to achieve it. As a result, the characteristics of BI customers are not typical of a segment and are more complex than the breakdown of the simple (typical) segmentation criteria. The most important nuance in business intelligence is the client's understanding of BI in general and the desire to implement it in their businesses.

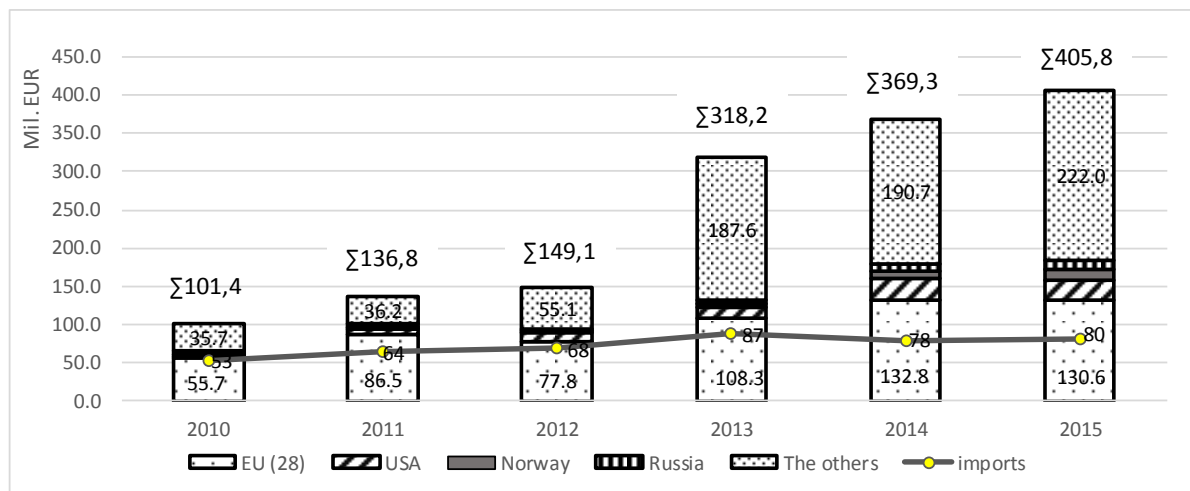
1. The role of ICT and BI services in the Latvian economy

Export performance of the ICT industry, which continues to grow with each passing year is an extremely important macroeconomic indicator. Although Latvia ICT market is relatively limited and the major customers are state and municipal institutions that need specific solutions, IT service exports are the fastest growing sector in Latvia during the post-crisis period. Since 2010, the sector's exports have grown on average by 23 % per year, and the total volume of services

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provided is increasing year by year. In 2016 and 2015, the export of Latvian IT services, according to the Bank of Latvia data, increased by 30 %, while our country's economy grew by only as much as 2 %. Exports of IT services in 2016 accounted for 2.3 % of the total exports of Latvia's goods and services. Assessing the World Trade Organization (WTO) data in the IT service sector, there is a tendency for Latvia to globally export ICT services more than directly import, and the volume of exports is only continuing to grow (see Figure 1). Since 2010, IT services have grown by as much as 300 % (!) and referring to *Certus* annual report on the industry for 2014, the main IT service export markets were the United States (10.2 %), Cyprus (9.1 %) , Sweden (9.1 %) and Great Britain (5.1 %) (Kreslins K., Meijere S., 2016). The ICT sector as a whole, in 2015, compared with the previous year, increased its exports by 1.1 % (services - 9.8 %), which in monetary terms was estimated at 114.6 million (services - 36.5 million).



Source: World Trade Organisation

Fig. 1. Comparison of Latvian IT service export and imports, mil. EUR

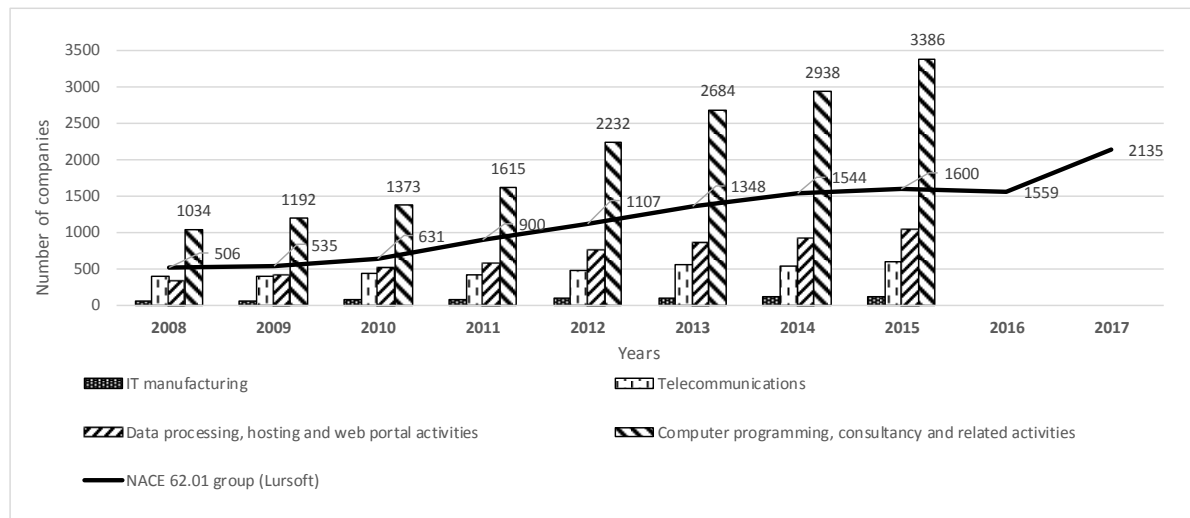
Export volumes of ICT industry services in the third quarter of 2016 compared to the same period in 2015 increased by 40 %, reaching a total of 143.82 million including exports of goods and services as indicated by the latest data from the Bank of Latvia. Latvian exports of ICT services showed even more growth, in 2017, and currently the existing indicators can be compared with the export rates of rail transport and financial services.

Although the field of ICT is a rather broad definition of the sector, the statistics of the Latvian sector are reflected in common figures and data are not divided in detail, categorising business intelligence as a separate group. The indicators of the BI industry are included in the total statistics depending on the NACE 2 classification of economic activities specified by the enterprises while submitting periodic statistical reports. For example, usually companies identifies itself to the group 62.01 - Computer Programming, which is in the 62nd overall group with relevance to "Computer Programming, Consultancy and Related Activities", although Group 63.11 "Data Processing, Maintenance and Related Activities" also includes operations related to data processing and provision of advice (CSB, statistical classification). Since the breakdown is not structured according to the required industry, the data should be treated as a provisional representation of the share of the industry. However, the main trends in the sector as a whole as reflected in Figure 2 show the rapid growth and dynamic development of the ICT sector in recent years. The apparent development dynamics of the particular industry show the rapid development trend of companies in the NACE group 62.01. The industry's growth indicators are record-breaking - that is, over a

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decade from a few companies, the market segment has become oversaturated and now the number of companies is over 2135. Just over the last year, the number of companies has grown rapidly, with a growth of more than 576 new businesses (36.9 %). The NACE 62.01 group consists of all companies whose core business involves software development, IT infrastructure provision and related services (CSB, 2017). Although the provision of business intelligence services involves the development of the core business and is part of this group, consultancy is also service provided. So, the authors would like to emphasize that this sector should, however, be subdivided into a separate subsector, since at present it often confuses the industry, at the time of submission of statistics.



Source: Central Statistical Bureau of Latvia; Lursoft

Fig. 2. The dynamics of the number of enterprises for the ICT subsectors in Latvia

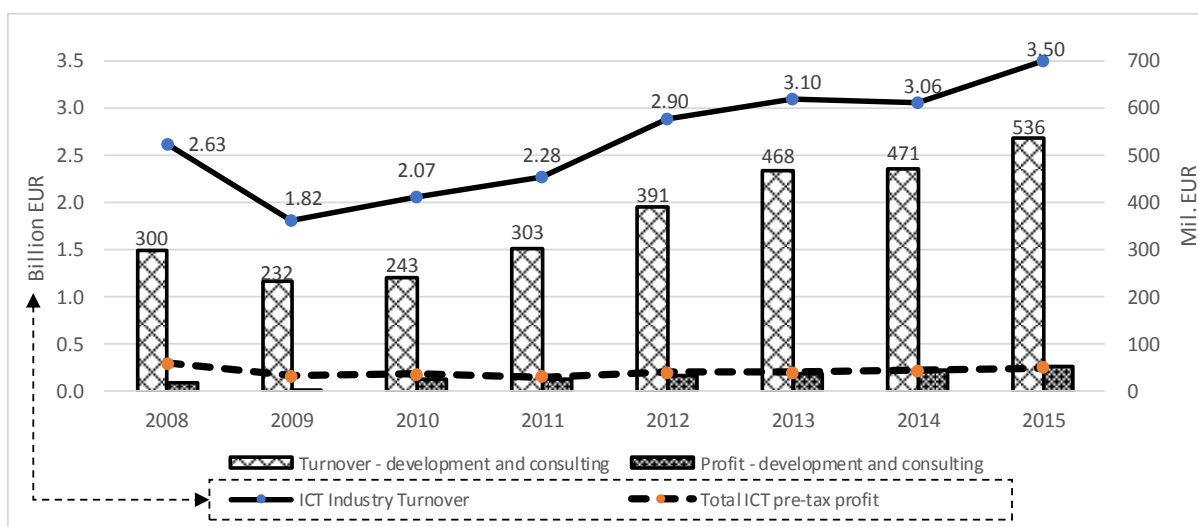
According to the data of the Central Statistical Bureau (CSB) of the Republic of Latvia, the growth of IT industry development has increased year by year and now in Latvia, there are more than 6133 companies operating in ICT, of which 3386 (more than half of all companies in the sector) are directly involved in software development, provision of consulting services, data processing, maintenance etc. The ICT sector grew by 94.6 % over the period of 5 years, from 2010 to 2015 (12.9 % over the last year), while the number of programming and consulting services increased 2.5 times, or their number increased by 146.6 % for the same period (15.2 % in the last year and 3.2 times since 2008). The ICT industry is most active in the field of computer software and consulting, but the industry is multifaceted and includes services such as IT manufacturing and data processing, maintenance and operation of Internet portals, as well as telecommunications, equipment repair etc. Lattelecom, Tieto Latvia, Accenture, Exigen Services, LMT, Mikrotiks, C.T.Co., Draugiem Group and many others are leading companies in the ICT industry.

The total turnover of the ICT industry is extremely important not only for each company individually but also for the growth of the country as a whole. Since 2009, the sector has grown more and more, which is reflected in the turnover figures. For example, in 2015 the total ICT sector turnover reached 3.5 billion. EUR, of which more than 536 million were directly from software development consulting services (Fig. 3). Accordingly, the total turnover of the sector increased by 14.1 %, but in the area of programming and consulting services, the increase was 13.8 % compared to the previous year. At the same time, profit margins for the sector increased

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by 11.7 % overall in 2015, whereas profit margins increased by 13.3 % in the programming and development sector separately, compared to 2014.



Source: Central Statistical Bureau of Latvia; Lursoft

Fig. 3. The Latvian ICT sector turnover, EUR

Meanwhile, the number of people employed in the programming and service sector in 2015 was 13423 and 29203 in the sector as a whole, which is a share of only 2 % of the total number of people employed in Latvia. However, at present, the proportion of ICT specialists in Latvia is lower than the average number of employees in the EU. The number of employed resulted in 472 million Euro as personnel costs, and tax revenues generated by the State Revenue Service (SRS) amounted to 42 million Euro. (CSB, 2017). The NACE group 62 makes an annual contribution in average of more than 100 million per year in taxes to the state budget, reaching 140.16 million euros in 2016. The share of the ICT sector's added value in the gross domestic product in 2015 reached 4.2 %. The sector is characterized by a steady increase in export volume not only in absolute terms, but also in the share of exports of all total services provided, which is why it is the high time that companies devote all their efforts on developing export markets.

2. Development of BI services in the Latvian market

According to data provided by the CSB and the Ministry of Economics of the Republic of Latvia, in 2013 there were 155'130 economically active enterprises in Latvia, whereas in 2015 there were already 172'567 - individual merchants and commercial companies, including not only merchants, but also farmers, fishermen households and self-employed persons engaged in economic activities. The Latvian business environment is mostly characterized by micro-enterprises (93.7 %, 2015) and small enterprises (5.29 %, 2015), which fall under the SME category (Figure. 4).

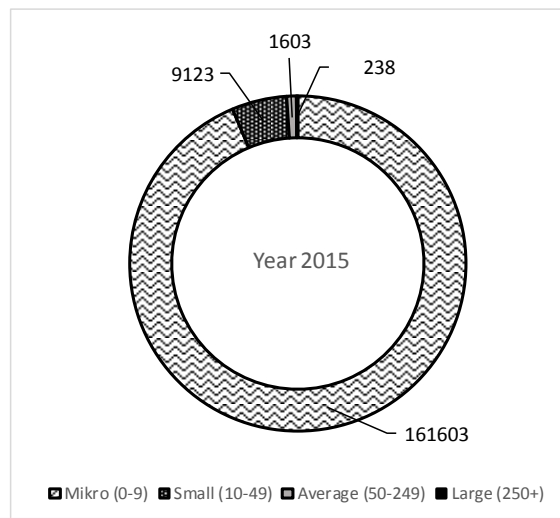
BI's prospects for today's situation will be characterized by an excerpt from the interview with Chairman of the Scandic Fusion (Vitols, K., 2017):

„Looking in depth BI consists of data analysis, planning and artificial intelligence. Today there are no customers who do not do any analytics. Data is there and it already exists in some form, mostly in MS Excel files. But this is just one part of the needs of all customers, so if the prospects are to be said, then I definitely see them in the second and third segments - in the area of planning and artificial intelligence - companies will increasingly want to closely plan their planning processes and will closely want to integrate probability forecasts for events tomorrow, evaluating the most appropriate for each company and its needs, using the software. Data analysis was what

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we started with - now the niche is already exhausted or close to that which is in tune with the number of large companies in Latvia."



Source: Central Statistical Bureau of Latvia

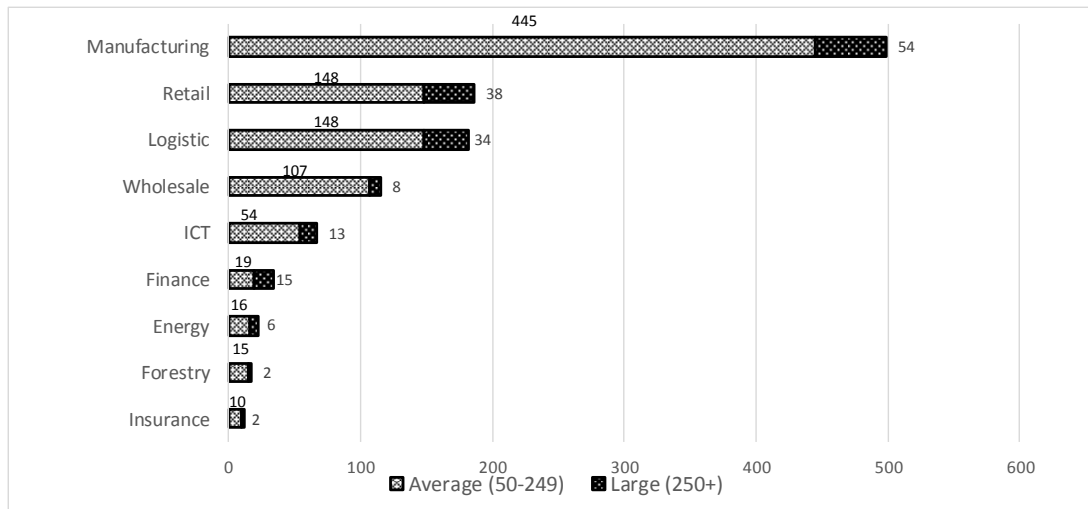
Fig. 4. Economically active enterprises in Latvia (2015)

Taking into account the fact that it is precisely the medium and large companies that are most in need of business analytics, it is concluded that the market niche is significantly limited. According to CSB data for 2015, it can be concluded that in Latvia there are only 1.07 % such enterprises in general - 0.93 % average sized companies and only 0.14 % of large enterprises. Of course, this is general information, but it should be taken into account that many companies have already introduced a BI or a similar analytical solution. However, if we evaluate the situation at the national level on how many companies in different sectors in Latvia are there purely statistically, then we can conclude that the sectors differ – some have considerably more companies, while others have considerably higher turnover and profit indicators than the former.

Figure 5 more specifically highlights BI potential clients in the corporate sector, only medium and large companies (CSB, 2017). In Latvia, there are only 31 enterprises operating in the field of insurance (38 % or 12 of them meet the criteria for medium and large companies by number of employees) and 633 financial service providers (5.4 % or 34 of them medium and large), while the other 1290 enterprises in this combined category are financial services and involved in activities complementary to insurance activities. This means that the company is affiliated with the financial sector and / or insurance, but does not directly provide these services, but acts as an affiliated company in order to enable the key players in the sector to realize their direct business.

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Source: Central Statistical Bureau of Latvia

Fig. 5. Number of medium and large sized companies in certain specific spheres in (2015)

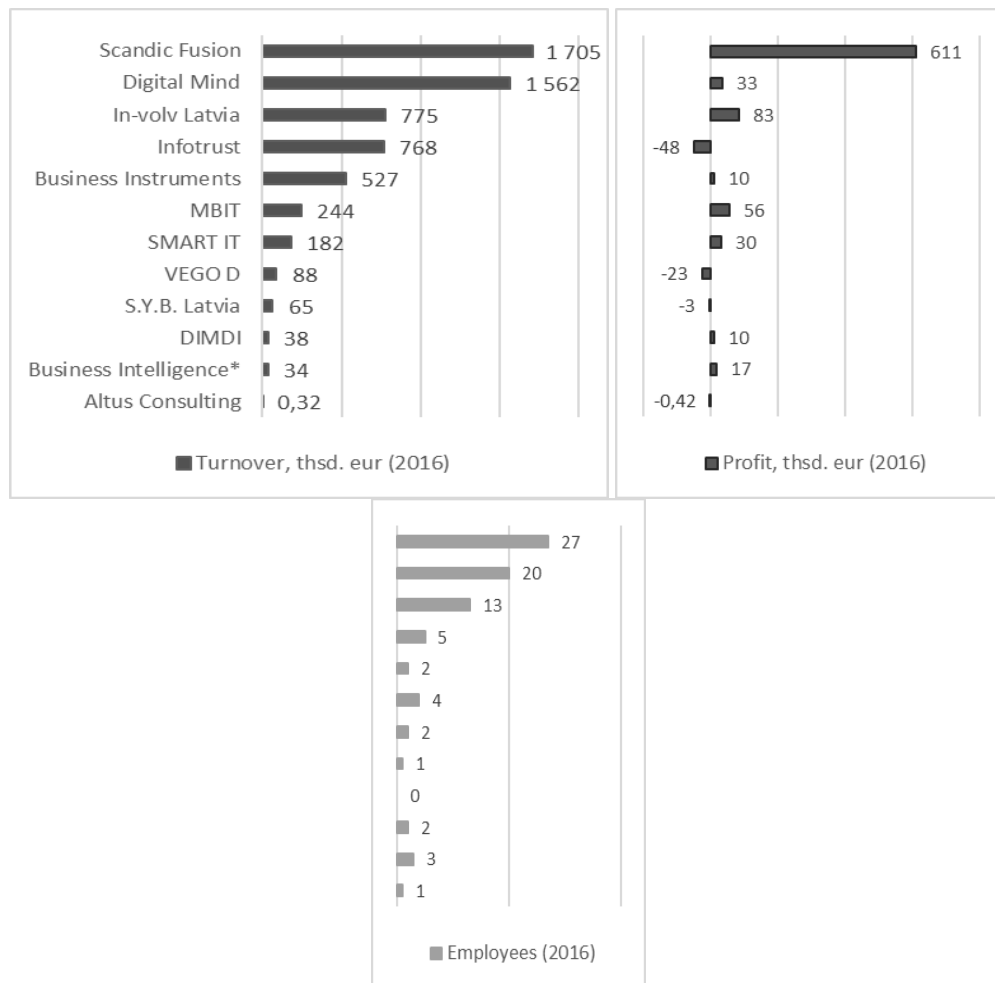
Business intelligence services are needed for companies that have large and „growing” data, so that employees can no longer process them in time and the company is no longer able to process critical information necessary for business with MS Excel tables. This means that the companies most often are "medium" or "large" enterprises and such companies with the most turnover often operate in the retail, energy, transport and ICT sectors. If we look at the information available through CSB, taking into account only the number of employees or turnover figures, the authors believe that such enterprises can only be classified in such a manner to be structured into generally accepted categories, and certainly not to determine whether a company definitely needs a BI solution or not. Referring to an interview with the Chairman of the "Scandic Fusion", a leading BI expert (Vitols, K., 2017), a "small" company with a small number of employees can also generate a turnover of several million euros a year. The introduction of business intelligence services totally depends on the client's business specifics, the amount of data, the need and the desire to improve business processes. Although the BI niche is globally promising and is only beginning to evolve, for example, it is an obvious part of every banking system, insurance, energy sector companies and its necessity is already evident today in other sectors. However Latvian market is too small. At the same time, the BI sector is developing and new competitors are entering the market, and the future scenario of growth prospects within the Latvian market alone is not promising. The growth of the sector has been considerable in recent years and development is still ongoing (Evans J. R., 2015). Comparison of direct BI competitors in Latvia is given in Figure 6.

From an interview with Ainars Bemberis (Bemberis, A., 2017), it follows that data is increasingly being stored globally and demand for their use is only rising. Karlis Vitols (Vitols, K., 2017) sees his company have been involving in North European and European companies.

In order to not just maintain the current level of achievement, but also promote the growth of the company, BI service providers need to consider the conquest of external markets and the provision of service exports, focusing on Scandinavia or other financially sound countries.

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Source: Lursoft, Annual report for 2016

Fig. 6. Comparison of direct competitors according to turnover, profit and number of employees

Conclusions, proposals, recommendations

- 1) The increasingly digitalization of sectors worldwide also contributes to the growth of the IT sector - new products and services are being created. Since 2010, export of IT services has grown by 300 % overall.
- 2) Evaluating World Trade Organization (WTO) data in the IT service sector, one can observe a trend that Latvia globally exports more ICT services than it directly imports and the volume of exports is only continuing to rise. The number of enterprises in Latvia that need BI systems is limited.
- 3) ICT sector development indicators for Latvia are at a record-breaking level, i.e. over a tenyear period from just a few companies, the market segment has become saturated and at present there are more than 2135 companies operating in this sector.
- 4) The following companies are definitely worth mentioning as leaders in the ICT market with the following turnover in 2016: SIA Tieto Latvija (39.38 mln.eur), Accenture Technology (18.36 mln.eur), SIA Lattelecom Technology (19.13 million euros) and AS "Exigen Services Latvia" (12.34 million euros). However, the main activity of these companies is the implementation of various IS systems, which are based essentially on programming according to customer's individual requests or working with the public sector and BI services are only secondary services.

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- 5) The largest and most experienced company in this field in Latvia is Scandic Fusion Ltd (2016 turnover: 1.71 million euros), which provides only BI services. It is a leading expert in the field with 11 years of experience.
- 6) Globally medium and large companies generally need BI systems, and sometimes small ones, but it depends on the particular business area, the amount of data analysed and other factors.
- 7) Given the fact that it is precisely medium and large companies that are most in need of business analytics, it is concluded that the market niche is significantly limited. According to CSB data for 2015, it can be concluded that in Latvia there were only 1.07 % such enterprises in general – 1'603 (0.93 %) medium sized enterprises and only 238 (0.14 %) large enterprises.
- 8) To maintain the pace of growth and ensure that business processes do not stop BI service providers need to develop strategies for business to enter external markets.

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CHALLENGES WHILE CARING FOR OLDER PEOPLE IN THEIR HOMES

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Abstract. In the start of the new millennium, the issues that are relating to ageing population draw attention of many policy makers as never before. The challenges that come with a rapidly aging population establish new relations between family, community and care organizations. The current study explores challenges in home care for older people in Oslo and Riga in comparative perspective. Authors explore what are the challenges in providing home care services for older people in Oslo and Riga. The study's research design is qualitative comparative case study. Results have been conducted from document and literature review on home care policy in Norway and Latvia, semi-structured interviews and express interviews. The main results show that in both cases proper social work is underestimated.

Key words: older people, carer, home care, risk.

JEL code: R1

Introduction

Researchers from various fields (gerontology, psychology, sociology, social policy, social work etc.) as well as policy makers draw attention to issues that are relating to an ageing population in the 21st century. In industrialized countries, people live longer and they have better health care than in the past (Green, Clarke, 2016). Rapid ageing demands for the social care services for older people. Policy makers have to come up with new alternatives on how to provide care for older people apart from institutionalized settings. The consequences of aging population affect the entire EU and EEA due to increasing life expectancy and consistently low levels of fertility over recent decades. The trend is expected to continue in the coming decades (EC, 2015). The challenges that come with a rapidly aging population establish new relations between family, community and caregiver organizations (Hollinrake, Thomas, 2015). The aim of the research is to find out challenges in home care for older people in Oslo and Riga applying comparative perspective. The relationship among stakeholders (caregiver organizations, municipalities, private companies etc.) and between carers, and care takers are of great importance.

Health and social care have not always been provided by professionals. Care mainly was provided by women within the family and the local community in the pre-industrial era. The development of knowledge-based occupation was a slow process, partly dependent on the development of vocational schools, and, for the medicine and the law, access to university based education. Different professional groups have a very different understanding, experiences and attitudes around participation in health and social care (Miers, 2010). The underestimated role of social work in home care relationships could be explained by historical development of professional home care as substitute of family functions in the past.

The social consequences of ageing and necessity for home care services are the topical issue in two cities: Oslo – capital of Norway, and Riga – capital of Latvia. The aim of the research is to find out challenges in home care for older people in Oslo and Riga in comparative perspective. The main research question is to find out what are the challenges in providing home care services for older people in these two cities? The tasks of the study are: 1) to construct theoretical framework for analyses of home care services for older people in the two cities; 2) to elaborate methodological framework; 3) to investigate relevant factors likely to explain differences between Oslo and Riga in home care for older people. Theoretical analysis is based on risk management, home care and quality assurances principles in home care for older people.

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Risk is considered to be a relatively new object of sociological research with rapid growth in research field in last decades (Lidskog, Sundqvist, 2013). Monica Barry, social work researcher from Stirling University defines risks in social work, paying attention on risks linked within organisational culture, inter-agency relationship and user collaboration (Barry, 2007, pp. 30-41). Authors are analysing challenges in home care according to the theory of risks by offering following risk structure. Risks are structured as risks linked with carers' and care takers' social position, and risks that could occur in relationships between both of them. The risk management approach is based on building barriers for possible hazards (for example, instructions, control etc.). The accurate and precise information about possible hazards and how to protect against them is best way in risk management (Adger, 2006, pp. 268-273). Authors are confident about necessity to focus on inter-agency relationships and user collaboration in home care case studies in Oslo and Riga.

Another parallel approach is vulnerability approach. The perspective of vulnerability could be defined as possibility to be harmed. It could be applied to aging society and home care for older people, too. If classical threats approach focus attention to external and internal threats/hazards, vulnerability approach is focused on more vulnerable elements and relations in home care, possibility to be harmed. Social care for older people is organized to support and protect vulnerable older people who need assistance. The carers also can be in vulnerable position due to overload at work, burnout and the way how care for older people is organized. Social care becomes vulnerable itself based on various patterns such as how care is managed and financed, and how society views it (Rossignoli, Fallon, Zwetkoff, 2014).

Home care is 'any type of care and support offered to older people in their homes, whether ordinary or specialised settings by formal and informal carers' (Tester, 1996). It is one of the alternative ways on how to provide help for older people towards the end of their life giving them an opportunity to stay out of long-term care institutions, letting them to live in their own home instead (Burau, Theobald, Blank, 2007). Home care is provided for older people or people with disabilities living in the community and they can receive services ranging from medical to non-medical (Newquist, DeLiema, Wilber, 2015). There could be involved representatives of various professional fields and organizations. It is a challenging task for all stakeholders to provide such a service that all parties are satisfied. Older people constitute the largest group who are using home care and these figures of them as home care service users will increase in the future. The reason for all countries to increase intensity in which they are addressing home care and engaging more actively in governing home care is the rapid ageing of their population (Burau et al., 2007). The main goal of home care services is to help older people to manage their own homes and to prevent them from premature institutionalization (Hagnelius, Wahlund, Schneede, Nilsson, 2012). Social work researchers emphasize importance for older people to receive emotional support, but it is difficult for carers in home care context to provide it since they often work under time pressure, leading to older people not receiving the emotional support that they require (Skilbeck, Payne, 2003). The coordination and cooperation between various caregivers and care takers is one of the most important issues and it is necessarily to pay attention in further empirical analysis.

Quality of home care could be characterized as topical issue for discussion among social workers, policy makers, health care representatives and other involved actors. Quality principles are the main moral responsibilities, guidelines for home care. Quality assurance strategies seek to prevent, detect, and correct problems in the quality of services provided to individuals and

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populations. Quality is multidimensional phenomena covering various aspects of research subject. Quality improvement strategies attempt to improve quality through continuous study and modification of the services being provided (Rezgale-Straidoma, Rasnaca, 2016; Adams, 1998, pp. 23-38). Authors choose to explore quality assurance principles elaborated by international team of researchers and described in the 'European strategy for wellbeing and dignity of older people (WeDO) in need of care and assistance' within the 'European Quality Framework for long-term care services' elaborated by social scientists from different countries in the context of EU Strategy 2020' (WeDO, 2012). The EU Strategy for the wellbeing and dignity of older people in need of care and assistance highlights 11 quality principles in long-term care services for older people. A quality service should be: respectful of human rights and dignity, person-centred, preventive and rehabilitative, available, accessible, affordable, comprehensive, continuous, outcome-oriented and evidence-based, transparent, gender and culture sensitive (WeDO, 2012). Main principles included the main points how the caregiving process and interaction between carers and care takers have to be organized. The implementations of quality assurance principles are threatened by risks in home care.

Data and methods

The research design is comparative case study. Home care for older people in Oslo and Riga for the analysis were chosen for several reasons: both are capitals having similar demographic characteristics, territorial distribution, and high percentage of an aging population. The economic situation as well as the amount and the variety of available resources to deal with social issues differ in great degree.

Data were obtained from extending previous knowledge of policies and organizational settings in home care for older people and how Norwegian and Latvian social welfare policy is implemented in both capitals. Additional data was collected through semi-structured and express interviews. Semi-structured interviews were done with social carers, managers of home care services, social workers and older people. Express interviews were done with relatives of older people. The variety of research participants (Table 1.) in both cases can be explained with sensitivity of this topic. Ten semi-structured and nine express interviews were held between April and June 2016 in Oslo. Seven semi-structured and five express interviews were conducted in July and August 2016 in Riga. The eleven quality principles adopted from WeDO project were used as the basis of semi-structured interviews and additional questions were asked about risks in home care for older people.

Table 1

Characteristics of the case studies

Case	Focus of the study	Participants of the study	Area of concern of the study
Case study I (Oslo)	Exploration of the perception of participants concern	Manager of social services (private company) Social worker team leader Carers Care takers Relatives of care takers	Home care organization and process for older people in Oslo
Case study II (Riga)	Exploration of the perception of participants concern	Manager of social services (municipality) Social worker- team leader Carers Care takers Relatives of care takers	Home care organization and process for older people in Riga

Home care challenges for data analysis were grouped in six categories: 1) profiles of carers and their working conditions; 2) health and wellbeing of older people; 3) gender and cultural aspects in

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providing home care services; 4) organization of home care services; 5) social work considered in home care services; 6) vulnerability of carers and care takers. Data was analysed from risk and quality principle perspective. The study was carried out in accordance with the ethical requirements of consent, voluntariness, and confidentiality.

Research results and discussion

Home care in Oslo

Norway health care system is based on equal access to all citizens irrespective of their social status, income and location' (Alzheimer Europe, 2009b). An average old age pension in Norway is 7715 NOK (831.58 EUR). According to Norwegian Labour and Welfare Administration from 1st of September 2016, the basic pension for married and cohabiting pensioners is 90 percent of the basic amount (NAV, 2016). 'The minimum pension level is a guaranteed minimum retirement pension payment from the National Insurance Scheme. With effect from 1 January 2011, the minimum pension level replaced the concept of basic pension for old age pensioners. This also applies to those who drew retirement pension before 2011 (for those who born 1954-1962), the minimum pension level will gradually be replaced with the term guarantee pension)' (NAV, 2015). The financial situation of older people is closely linked with possibilities to receive additional services, partly financed by municipalities. Home care is provided by private and municipal care givers.

Home care in Riga

In Latvia, average pension is less than 300 EUR. The minimal pensions are 70-109 EUR. The retirement age was 63 years in 2017. The retirement age will be increased up to 65 by 2025. According to CSB (Central Statistical Bureau, 2015) reports, the average old age pension in Latvia was EUR 270. The majority (60 %) of pensioners receive pensions below the average (SSIA, 2016; CSB, 2015). There is a rising demand for care in people's homes and many municipalities in Latvia (Rezgale-Straidoma, Rasnaca, 2015). The need for home care services every year is increasing by ten percent (Davidavicus, 2014). The range of social services significantly differs across municipalities, and Riga citizens had better access of home care. If an old age person needs home care services and receives pension below 380 EUR, then home care is financed by municipality. Home care could be provided by municipal, private, or non-governmental organizations. The service providers could be accessible without assistance of municipal Social Service if income level is higher than average.

The home care services for older people have been provided in both cases. The differences between two cases are in financial principles and coverage of home care services for older people. The similarities of provision of home care services for older people in Oslo and Riga are involvement of both public and private organizations.

Analysis of challenges in home care organization and process in both cases

1. Profile of carers and their working conditions

Most of the carers don't have an education in social work and social care. The lack of skills, training and instructions, as well as satisfactory educational background is one of the factors affecting work of carer. Staff members involved in social care for older people receive only three days of training provided by the employer. The deficiencies in education and skills can lead to health problems. All interviewed carers admitted that they would need more time to learn how to care for older people. The common injuries that were mentioned by carers were spinal, hip and

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shoulder injuries. Another issue is a lack of time for each visit. As result to shortage of time carers have those injuries mentioned above.

Some of the carers are already used to stress and accepting it as a trait of their profession. In both cases, carers are doing the low paid work and some of them are ashamed of their job position, because this occupation is not considered as very prestigious in both cases. The daily schedule of carers is very tight, thus it is hard for them to make on time for the next appointment for seeing a next care taker. From the carers' perspective, more flaws are on how they are being treated in setting of home care services by both care taker and service management. The fact that in both cases home care services don't provide their staff with necessary training makes them to be at the risk of vulnerability.

Carers' work conditions including tight work schedule (time limits for each manipulation) and lack of professional skills and training are the risks for them working in home care services for older people. Older people and carers believed that hiring more staff would improve their ability to control their days.

2. Health and wellbeing of older people

The similar challenge in health and wellbeing of older people is lack of human factor in providing home care services such as communication and personal approach. Older people would like to receive more emotional support. It is difficult for carers in home care context to provide it since that requires an interpersonal interaction and communication, which is time consuming. In both cases, adults' children still have to look after their older parents. Those older persons whose relatives cannot actively take part and control process of home care services are at higher risk than those whose relatives or adult children are living nearby and communicating with their older people daily.

The difference is that in Oslo every older person gets very frustrated about the fact that each time they receive help from different carers, but in Riga home care service is organized quite opposite that every time the same carer is taking care of an older person.

The lack of interaction with other people puts older people under risk to suffer from boredom, frustration and isolation. The risks in home care for older person as care taker are unsatisfied emotional needs and lack of person - centred approach.

3. Gender and cultural aspects in providing home care services

The culture and gender sensitivity is one of the quality principles of the WeDO project. Care takers in Oslo home care services are older people who are both ethnical Norwegians and people with foreign ethnical background. In Riga, it is similar, but less ethnical diversity is represented. Gender bias was mentioned by carers as well, with some of them saying that they are unsure how to address this important issue with older people as care takers. Team leaders in both cases mentioned a right to dignity and respect as important to quality of life, and some older people do not want carer of opposite gender to help them with their daily routine. Even though ethnical diversity in both cases is different, the challenge concerning gender and culture in both cases are similar. Home care service managers must consider wishes of care takers in respect to one of the quality principles in care for older people (gender and culture sensitive) when it comes to choosing a carer for them. It is not always possible to meet demands of care takers.

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4. Organization of home care services

The impact of state government policy in both cities is supported by municipalities' efforts on keeping older people as long as possible in their homes by providing them necessary home services. Social care requires high costs, and governments have been highly criticized that they are not giving enough finances aimed at home care for older people in Oslo and Riga. There are not enough social carers in home care services, but governments are not providing enough finance in order to be able to afford to hire more workers. The main task for municipality, private home care services or NGOs is to provide home care by meeting basic needs for care takers. Carers complained that daily to do list is impossible to manage in order to get on time to the next care taker.

Another challenge in both cases in home care is that one has to go through very long bureaucratic process and has to be on a long waiting list in order to get not only additional helping aid devices but also to apply for home care services. In both cities, older people are in need for a consultation and advocacy from their relatives or close friends when they are choosing home care services. Home care in Oslo is divided in three positions: home assistant, carer and medical nurse. In Riga, medical nurse is not a part of home care system and it is separate service from social care and must be prescribed by general practitioner. Some medical manipulations in Riga home care carers are doing by themselves without medical education, for example, giving medication and measuring blood pressure to older person.

The rotation of carers takes place in Oslo but in Riga the tendency is quite opposite - carers are same persons all the time with the same care taker. In Oslo, main part of carers is immigrants; in Riga, carers mainly are people from rural areas. The risks for both care takers and carers are related to the way home services are organized by their management.

5. Social work considered in home care services

In both cases, supervisors have higher education but not in all cases it is in social work. There are so many home care clients and carers for head of departments or team leaders it becomes impossible to supervise carers' work properly. Work organization slightly differs from private company and municipality home care services. There is competition among private companies and municipality home care services. Carers feel undervalued for doing their work both in Norwegian and Latvian society. Relatives of care takers point out careless attitude of carers and some of them have changed service providers several times. Not always 'private' means a better service. There is a risk for older people to become the victims of crime due to the fact that every day an older person receives help from different carers.

6. Vulnerability of carers and care takers

Vulnerability refers to both carers and care takers. Carers are in stress due to social statuses that do not provide sufficient social protection; and the prestige of their profession is low in society. They are not protected from emotional offences from care takers and their employers. The work schedule determined by employers and team leaders put carers under additional pressure thus increasing an emotional strain. Adaptive capacity of social care not always could accommodate stress of social cares and protect care takers. Social care and medical care are separated. It is necessary for authorities in social and medical care to achieve an integrated approach and actions in care provision.

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Conclusions

- 1) Lack of an appropriate education, training and skills in social care leads carers to experience stress, burnout and injuries. It exposes carers to the risk of vulnerability.
- 2) Lack of appropriate professional organizations is an important factor that describes carers' vulnerable position.
- 3) Home care service providers are lacking individual approach and some demands of older people could lead to discrimination (carers should be of the same sex, religion or ethnical background).
- 4) Home care for older people causes vulnerable position in both cases. On the one hand, frequent rotation of carers for each client exposes home care to organizational risks in Oslo. On the hand, the fact that in Riga rotation of carers is not as frequent as in Oslo also leads to different organizational risks.
- 5) The major challenge is how to overcome consequences caused by cuts in public funding for home care in both countries. The lack of qualified staff and the time management problems endanger service quality in older persons' home care.
- 6) Considering social work, in both cases there are addressed several similar challenges such as how to prevent risk of older people from being lonely and becoming victims of crime, how to make older people feel more needed, and how to make social work more effective.
- 7) It is very important to be sensitive to the culture and gender issues when providing home care services in both cases.

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CONTRIBUTION OF HIGHER EDUCATION IN REGIONAL COMPETITIVENESS AND DEVELOPMENT: CASE STUDY OF KAZAKHSTAN

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Abstract. In this paper, the role of the higher education in the regional development and competitiveness is analysed on the case of Kazakhstan as a country of Central Asian region. The goal of the research is to investigate the influence of higher education on the global and regional competitiveness, basing on the case study of Kazakhstan and as the country of the region of Central Asia. Since there is no unified approach how to measure the impact of higher education on the competitiveness of the country and regional level, the goal of this research is also to contribute in building a theoretical framework for the assessment of the influence of higher education on the competitiveness. The comparative study of the higher education and innovation indicators, using the framework of the Global Competitiveness Index, is performed for Kazakhstan in comparison with other Central Asia countries. In parallel, we discuss the influence of higher education reforms in Kazakhstan after joining the Bologna process on. Basing on our research, we can conclude that the reforms in higher education sector in Kazakhstan including the fast introduction of the Bologna principles, as well as other government policy initiatives positively influenced the competitiveness of the Kazakhstan, giving the highest place in GCI among the Central Asian countries and leading to the entrance of 6 Kazakhstani universities in the first 1000 best universities worldwide according to the QS World University Ranking. In parallel, the recommendations for further development of the higher education sector are given. Key findings are relevant to the policy makers and managers for designing the development strategies for rising the competitiveness. For policy makers, the authors advise to use wider range of indicators. The indicators used in CGI for measuring impact of higher education on the competitiveness should be complemented with other indicators like employability or those indicators applied in university rankings. The influence of the reforms of the Bologna process on the global competitiveness needs further investigation.

Key words: competitiveness, higher education, innovation, Kazakhstan, higher education indicators, benchmarking of higher education, Central Asia.

JEL code: N35, I2, A10, R58

Introduction

To be competitive in all levels – individual, national level, regional and world level – is becoming more and more important in our globalised world. However, the competitiveness is difficult to measure (Collignon, 2012). There are several methods how the global and regional competitiveness is measured. The most common indicator is relative unit labour costs (ULC), i.e. the cost of labour compensation, including taxes and social security, per unit of output (CER Rapporto Europa, 2011). Other popular international projects can be mentioned: The World Competitiveness Yearbook, The World Economic Forum's (WEF) Global Competitiveness Report (GCR), OECD's Economic Outlook (OECD, 2017). Concerning regional competitiveness, the concept is more elusive and contested (Borožan, 2008). According to the simplest definition, regional competitiveness may be defined as the ability of some region to compete with one another in some way, both within and between nations, to grow and prosper in economic terms (Borožan, 2008). However, there are not so many works concerning the impact of higher education (HE) on the global competitiveness. Only WEF propose more sophisticated approach for measuring the influence of HE on the global competitiveness. WEF defines competitiveness as the set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the economy can achieve. In addition, in the HE sector, the benchmarking of HE is still under the discussion, especially in the light of the fast developing field of "rankology" (Millot, 2015; Spitsin 2016; Gafurov, 2017).

No doubts that educated human capital is crucial for the rising of the countries' and region's economic development and competitiveness (Bauk, 2014). Main actors for preparation of the competitive and skilled workforce for both, public and private sector, are all type of HE institutions. Nowadays, HE institutions are also the main drivers of the science and innovation.

Especially HE and R&D are important because of the Fourth Industrial Revolution (FIR) (Shwab, 2016). FIR, basing on digitalisation, artificial intelligence, biotechnology, robotics, the Internet of Things, 3D printing etc. is characterised by wide spreading of technologies. The dominating role of technologies leads to the situation when the growth of every economy is more than ever dependent on the possibilities to develop educated human capital, to ensure high level of technology development, knowledge transfer and innovation in all fields, not only in production but also in other sectors like services, health, governance, education, finances etc. Since the role of the technologies is growing, the HE quality is becoming more and more important. In these conditions, HE institutions are facing with high pressure to become more competitive from the both sides, society and government; often the requirement is expressed in the form to reach higher place in some of the university rankings.

Research goal: to investigate the influence of higher education on the global and regional competitiveness, basing on the case study of Kazakhstan and as the country of the region of Central Asia, and to contribute in building a theoretical framework for the assessment the indicators of the influence of higher education. The goal is also, basing on the analysis of the competitiveness indicators of HE, to outline the main recommendations for future development of the HE sector in Kazakhstan.

Research design and approach

In this paper, the case study method, using analysis of documents, including policy documents and statistical data, is used (Yin, 2003a). For this investigation, a case study design fits well because there is a need to find out more about conditions how HE and its reforms influence the global competitiveness of a country in developing region. For our comparative analysis, we use the competitiveness definition as developed by the WEF (World Economic Forum, 2017), building on Schwab's work of 1979 (Shwab, 2016), the WEF has used the Global Competitiveness Index (GCI) later developed by Xavier Sala-i-Martin in collaboration with the Forum since 2005.

The study has following tasks: 1) to study comparatively the indicators measuring the higher education and innovation effect on competitiveness for the region of Central Asia (CA) (for countries where data are available - Kazakhstan, Kyrgyz Republic, Tajikistan); 2) to derive more detailed qualitative analysis of the HE policy and reforms in Kazakhstan after entrance in Bologna process in introducing the Bologna process reforms; 3) to develop the conclusions about the framework indicators; 4) to derive the recommendations for the policy makers for future development of the HE sector.

The novelty of the research is connected with the use of indicators adapted from the framework of GCI for the comparative investigation of the HE performance in CA. The novelty is also in analysing the CA region because there are few internationally available data about it.

Results and discussion

1. Higher education and innovation related competitiveness indicators

The regular Global Competitiveness Report (GCR, 2018) presents a set of indicators in three principal categories or also called sub-indexes and twelve policy domains (pillars) for 137

economies. The GCI combines 114 indicators that capture concepts that matter for productivity and long-term prosperity (World Economy report, 2017). These indicators are grouped into 12 pillars: 1st - institutions, 2nd - infrastructure, 3rd - macroeconomic environment, 4th - health and primary education, 5th - higher education and training, 6th - goods market efficiency, 7th - labour market efficiency, 8th - financial market development, 9th - technological readiness, 10th - market size, 11th - business sophistication, and 12th - innovation. These pillars are organized into three sub-indexes: basic requirements, efficiency enhancers, and innovation and sophistication factors. The three sub-indexes are given different weights in the calculation of the overall Index, depending on each economy's stage of development, as determined by its GDP per capita and the share of exports represented by raw materials. According to GCI, economies are divided in factor-driven, efficiency driven, innovation-driven economies (The Global Competitiveness report, 2017).

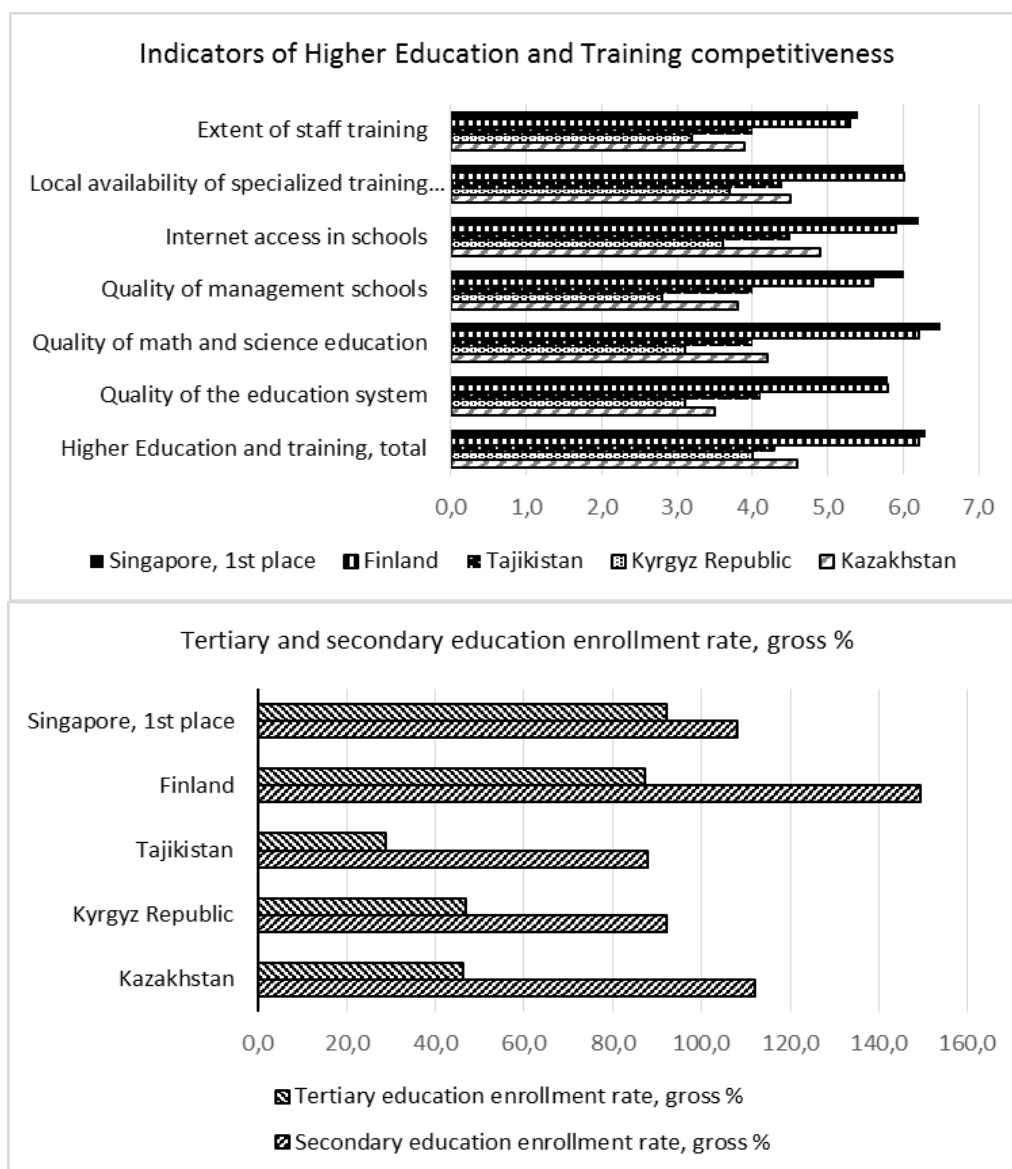
Higher education and training is included in the 5th pillar of the GCI: 1) secondary education enrolment rate, 2) tertiary education enrolment rate, 3) quality of education system, 4) quality of math and science education, 5) quality of management schools, 6) Internet access in schools, 7) local availability of specialised training services, 8) extent of staff training.

Innovation that is closely related to the science is included in the 12th pillar. Looking into the detail, sub-indicators of this pillar are: 1) capacity for innovation, 2) quality of scientific institutions, 3) company spending on R&D, 4) university – industry collaboration in R&D, 5) government procurement of advanced technology products, 6) availability of scientists and engineers, 7) number of PCT patents application per million population. The role of innovation is widely discussed in the report. Currently, WEF is exploring new ways of assessing innovation, human capital, and competitiveness at different stages of development; however, it is clear that HE, science and innovation are crucial drives for being competitive.

2. Competitiveness characteristics of the HE in Kazakhstan in comparison with Kyrgyz Republic and Tajikistan

Having deeper look on the competitiveness indicators of the CA economies, Kazakhstan has the highest score 4,32 in 2017-2018, giving 57th place out from 137 countries, Kyrgyz Republic - 102th (3.9) place, Tajikistan 70th place (4.31). Uzbekistan and Turkmenistan are not included in WER. The score of Kazakhstan is slightly declining - it was 4.4 in years 2013-2015, 4.5 in the year 2015-2016, again 4.4 in 2016- 2017, and 4.3 in 2017-2018. Kazakhstan has lost places almost exclusively because of the worsened situation of public finance, linked to the loss of oil export revenues (The Global Competitiveness Report, 2017). If we compare these data with the Gross Domestic Product (GDP) per capita, we can see a correlation: for Kazakhstan, it is 7452.8 US\$, for Kyrgyz Republic – 1072.7 US\$, for Tajikistan – 799.8 US\$ (The Global Competitiveness Report, 2017).

For estimating the impact of the HE sector to the competitiveness, we investigated the fifth pillar of GCI "Higher education and training". For Kazakhstan, there is the 56th place with the score 4.6 which is quite good. The leader of the fifth Higher education and training pillar with the score 6.3 is Singapore. Second place is taken by Finland (6.2), 3rd place – the United States (6.1) followed by the Netherlands (6.1), Switzerland (6.1). In Fig.1, the comparison of the indicators for the HE and training sector for 3 CA countries – Kazakhstan, Kyrgyz Republic, Tajikistan and pillar leaders – Singapore (1st place) and Finland (2nd place) is given.



Source: author's interpretation based on GCI 2017-2018

Fig. 1. Values of the Higher Education and Training competitiveness indicators for selected countries.

If we look in detail (Figure 1), then the best place for Kazakhstan is for the secondary education enrolment rate (gross, in %) - 18th place with fast growing trend. What concerns the tertiary education enrolment rate it is higher than in other CA countries, however the developed countries the rate is 2 times higher.

In the 2015/16 academic year, 127 higher education institutions were operating in Kazakhstan, of which five were national institutes of HE, 19 institutes, 20 academies and 83 universities. Almost two thirds of institutions of higher education, or 77 institutions, are privately owned, and another 50 higher educational institutions are state-owned. There are also five branches of foreign higher educational institutions in the country (EnergyProm, 2016). In recent years, according to the education reform launched in 2012, the number of higher educational institutions was planned to decrease, and the institutions themselves were optimized. The number of students (to 459.4 thousand people in 2015/16 academic year), as well as the faculty (to 38.1 thousand academic staff) also decreased (EnergyProm, 2016). We can conclude that the reform with the

intention to decrease the number of HE was rather efficiency driven because the high number of HE institutions contributes to the accessibility of education.

According to Figure 1, there is also a good evaluation of the quality of education and quality of the math and science education. All indicators together give the best evaluation of the Kazakhstani HE in comparison with the other two CA countries.

Due to limited space, in this paper, we do not focus on the benchmarking tools, used by the university rankings but it is interesting to mention, that Kazakhstan is the only CA country with universities included in top 1000 universities table, according to the QS World University Ranking 2018 (QS WUR, 2018). The highest place is for Al Farabi Kazakh National university (236th place), next is L.N.Gumilov Eurasian National University (ENU) with 336th place, Kazakh National Research Technical University after K.I.Satpayev 411-420, Abai Kazakh National Pedagogical University 491-500, Auezov South Kazakhstan State University 501-550, Karaganda State university 651-700, Kazakh British Technical university 651-700, Kazakh Ablai Khan University 801-1000 (QS, 2018). To our mind, this can serve as some kind of validation of the approach of the using indicators for HE evaluation from the GCI framework. Both frameworks give similar qualitative results.

3. Modernisation of HE in Kazakhstan after joining the Bologna process

Since joining the Bologna process in 2010, Kazakhstan is successful in fast introducing the modernisation agenda of higher education by implementation the principles of the Bologna process and autonomy of the universities. Being the first Central Asian state joining the Bologna process, Kazakhstan was recognized as a full member of the European Higher Education Area (EHEA). The changes in HE system of Kazakhstan were fast and dramatic. For example, more than 60 Kazakhstani universities signed The Great Charter of universities; the universities implemented the three-level system: Bachelor - Master - PhD. Master programmes were opened in 118 universities (approx. 32 527 students, of which 16 220 study by the means of the state order) (Independent Kazakh Agency for quality assurance, 2017). The European credit points - ECTS - has been introduced as a basis for the transfer of credits during academic mobility of students. The Ministry of Education and Science of the Republic of Kazakhstan (MES RK) allocates funding for academic mobility of faculty and students. According to the official data of the Centre of the Bologna process and academic mobility, in 2014, 52 Kazakhstani universities invited 1726 foreign researchers (in 2013 - 1533 researchers, 2012 - 1 349 researchers, 2011 - 1717 researchers, 2010 - 418 researchers, 2009 - 389 researchers). As good example of the fast reforms, it has to be noted that both Kazakh accreditation agencies (the Independent Kazakh Quality Assurance Agency in Education (IQAA) and the Independent agency for accreditation and rating) are members of the ENQA (European Network of Quality Assurance). In the period from 2009 to 2015, IQAA held institutional accreditation of 50 universities and more than 1100 programs. The agency attracted 153 foreign experts from 25 countries, about 1100 national experts, including 190 students and more than 200 employers. Overall, according to the data of the National Report, 66 universities (57 %) out of 115 public universities underwent the national institutional accreditation. To date, 22 Kazakhstani universities (19 %) in 139 specialties of higher and further education underwent international programme accreditation (Independent Kazakh Agency for quality assurance, 2017).

Kazakhstan together with World Bank has developed an agenda for better integration of education, science and industry. Early 2011, in Kazakhstan a new law was passed about Nazarbayevs University, Nazarbayevs Intellectual Schools, and Nazarbayevs fund.

Employability is another important issue in terms of modernisation of HE and reforms of the Bologna process. The participation of HE institutions in the employment of graduates is one of the criteria for an external evaluation of the quality of higher education. Monitoring of the employment of university graduates is conducted in most of the EHEA countries at the national, regional and institutional levels. MES RK jointly with the Ministry of Health and Social Development of the Republic of Kazakhstan (SCPP MHSD RK) (Centre of Bologna process and academic mobility, 2017) hold the annual monitoring of the employment of graduates of higher educational institutions of the Kazakhstan annually. The purpose of this monitoring is to determine the effectiveness of universities in the employment of graduates. In 2016, according to information systems of MES RK and SCPP MHSD RK, the total number of graduates was 71078, 48405 of them were employed. Thus, the overall percentage of the employment of graduates of all universities was 68 % (in 2014, 63 %, in 2015, 70 %). Every university in Kazakhstan is obliged to monitor the employability. For instance, in Table 1 the data of employability for Almaty University of Power Engineering and Telecommunication (AUPET) are given.

Table 1

Employability of the graduates of AUPET

Year	Number of graduates	Total number of employed graduates	Number of graduates employed in profession	Unemployed graduates
2015	1385	1166	1134	16 %
2016	1292	1045	1045	19 %
2017	919	745	590	19 %

Source: author's calculations based on data according to information systems of MES RK and SCPP MHSD RK

Interesting is the fact, that the best result in employment was achieved by graduates of state universities - 72 %, the lowest result of an international university - 30 %. The average result among graduates of national universities is 63 %.

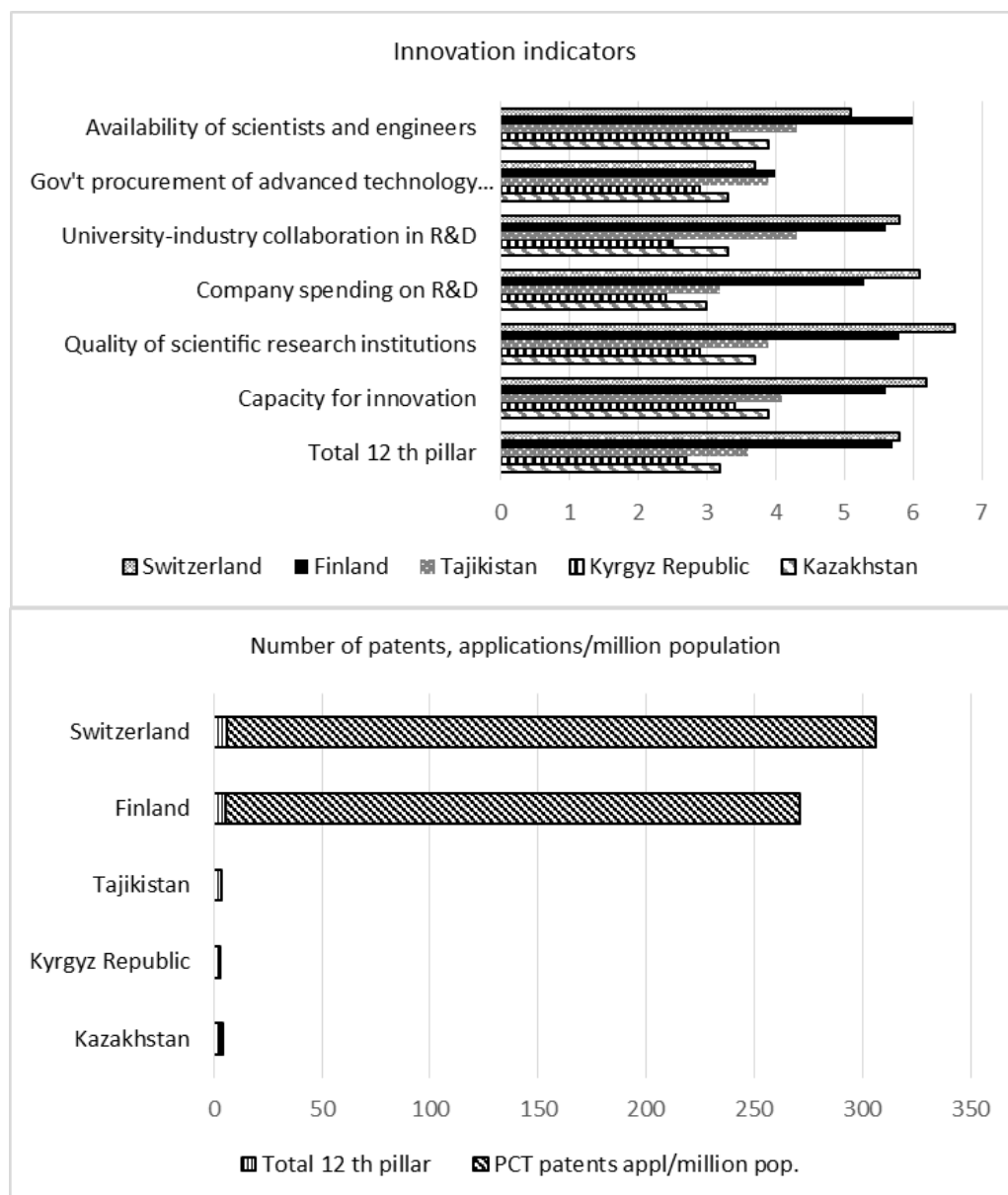
The factor of employability is not directly taken into account in the calculation of the HE competitiveness indicator in the CGI framework. In addition, other important aspects of Bologna process are not taken into account in GCI directly. Maybe they influence the indicators indirectly. The question, how the Bologna reforms influence the global competitiveness needs further investigation.

4. Research and innovation

There are any separate indicators for the research in the GCI framework. However, research is the base for innovation, included in the GCI 12th pillar. In Fig. 2, the values of the indicators of the innovation pillar are shown for CA countries in comparison with Switzerland (top 1 in Innovation pillar) and Finland (4th place).

We can conclude that innovation is one of the weakest sector in Kazakhstan (the 84th place and score 3.2, GCI). Similar situation we have for whole CA. The highest value of innovation indicator is for Tajikistan (3.6). This is a little controversy, taking into account that Tajik universities are not the top 1000 universities in QS WUR. Comparing CA with Switzerland and Finland, the huge difference is in number of patents per million population (Figure 1). The approach of Finland can serve as an example; it includes high levels of investment in human capital and complementary sophisticated innovation environment. It is interesting that the most commonly used indicator to monitor level of R&D worldwide - percentage of state gross domestic product (GDP) devoted to R&D activities - is not included in the CGI 12th pillar. This indicator is included for example in the

ranking tool of the HE systems – Universitas21 (U21, 2017). To our mind, this is an important indicator, which also should be used to monitor competitiveness of innovation system of the countries.



Source: author's interpretation based on GCI 2017-2018

Fig. 2. Innovation indicators for 3 CA countries and leaders Switzerland and Finland.

If we look of the spending to R&D from GDP worldwide, the 2014 regional averages for the share of GDP are: 1.7 % for World, 0.3 % for Arab States; 1.1 % for Central and Eastern Europe; 0.2 % for Central Asia; 2.1 % for East Asia and the Pacific; 0.7 % for Latin America and the Caribbean; 2.4 % for North America and Western Europe; 0.7 % for South and West Asia; 0.4 % for Sub-Saharan Africa (UNESCO, 2017). Research intensity overall is quite low in Kazakhstan; however, it is larger than in other CA countries. Moreover, few industrial enterprises conduct research in Kazakhstan. Only one in eight (12.5 %) of the country's manufacturing firms were active in innovation in 2012, according to a survey by the UNESCO Institute for Statistics (UNESCO, 2017). The role of national state funding in R&D is one of the most important factors for the creating basis for excellence of science; it has to be combined with reforms of research sector, ensuring the effective use of the funds.

Findings, using comparative analyse of the indicators from the framework of GCI, agrees with the conclusions from other sources. For example, also in the OECD report, "OECD Development Pathways Multidimensional Review of Kazakhstan" states that education attainment has progressed continuously in Kazakhstan, but modernisation in terms of competitiveness and internationalisation and research-based education is still an issue (OECD, 2016). Thus, the GCI approach could be used to evaluate the HE influence on competitiveness but in combination with other important indicators, like expenditure for R&D, employability etc.

Conclusions

- 1) In this paper, the influence of the indicators, connected with the HE, was analysed using the framework of GCI for the case of Kazakhstan in comparison with the other CA countries (Kyrgyz Republic and Tajikistan). The indicators, used for the assessment of the HE and training are: 1) secondary education enrolment rate, 2) tertiary education enrolment rate, 3) quality of education system, 4) quality of math and science education, 5) quality of management schools, 6) Internet access in schools, 7) local availability of specialised training services, 8) extent of staff training.
- 2) Kazakhstan is good in attainment and accessibility of HE; enjoyable are good results in math and science education. In general, there are many reforms going on in Kazakhstan in the HE sector that gives confidence that this sector will have fast development and will ensure the rise of competitiveness of the country and region. The system of monitoring the employment of the graduates is well organised in Kazakhstan and it is very important for assessment of quality of higher education.
- 3) Kazakhstan as the first CA country in EHEA introduced the reforms of the Bologna process very fast. The case study of the reforms of HE in Kazakhstan showed great progress in the modernisation of higher education and training sector. Kazakhstan has the highest competitiveness score between the countries of Central Asia, and six Kazakh universities are in the list of 1000 best world universities according to QS WUR 2018.
- 4) The analysis showed also the weakest points the CA region. The modernisation of the higher education sector has to be continued in terms of rising research based education, quality of management and business schools, digitalisation and new educational technologies, autonomy, responsibility, internationalisation.
- 5) Analysing the innovation and research indicators, it can be concluded that to reach the competitiveness of the country and region, as well as to introduce research-based education, the quality and the level of R&D has to be increased. The funding of the R&D sector has to be smart in terms of the way how the funds are distributed to increase the number of competitive scientists and the outputs of the scientific work. In addition, for the effectively working innovation system, cooperation between all its elements is required, especially cooperation between industry and universities and research centres, as well as clever innovation funding schemes.
- 6) Concerning the applicability of the HE and Innovation indicators from GCI framework, it can be concluded, that they do not give full picture of the influence of HE to the competitiveness of the country and region. The framework can be used in addition to other approaches like ranking systems and data used by governments to monitor the quality of HE like data about the employability.

- 7) The influence of the reforms of the Bologna process on the global competitiveness needs further investigation.

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HIGHER EDUCATION INSTITUTIONS' ORGANIZATIONAL STRUCTURES IN THE CONTEXT OF MANAGEMENT BY OBJECTIVES APPROACH

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Abstract. There are 47 higher education institutions (HEIs) in Latvia (IZM data, 2018), but the number of students every year becomes smaller. That leads to a necessity for consolidation of HEIs and optimization of their administrative structures. At the same time, higher education (HE) normative regulations apply new tasks and responsibilities for HEIs (e.g., the development of internal quality management systems, strategy management, etc.) which require new administrative functions, structures and additional resources. These controversial circumstances aren't supportive for HEIs' institutional management to develop processes in accordance with management by objectives (MBO) approach and to reach goals and objectives in HE studies and research. The aim of the paper is to research problems which interfere the development of organizational structures in accordance with the MBO approach in HEIs in Latvia. The authors have used the results from the HEIs' survey (DU, LLU, LU, LiepU, RSU, RTU) and interviews (ViA, VeA, JVLMA, BA, RPIVA (since 2017 consolidated with LU), LSPA) in Latvia. The paper is developed using research of the promotional thesis „Implementation of management by objectives approaches at higher education institutions in Latvia” (Stefenhagena, 2017). The research of the promotional thesis was carried out from 2010 to 2017. The conclusion of the paper is that HEIs' organizational structures are fragmented, and there is a tendency of duplicating administrative functions and duties. In order to apply MBO approach, a more sufficient analysis of administrative functions, processes, goals and objectives have to be carried out. Horizontal instead of vertical (hierarchical) cooperation among administrative units is encouraged.

Key words: higher education institution (HEIs), organizational structures, management by objectives approach
JEL code: 123

Introduction

The paper highlights the problem of developing effective and goal oriented administrative structures at HEIs institutional management. The state budget allocation criteria for public HEIs are becoming more quality and result oriented. New functions and processes what have to be integrated into HEIs' institutional structure appear year by year. There are several contradictions in the policy of HEIs administrative functions and objectives that have to be implemented. For example, HEIs administrative units/functions have to be consolidated (in accordance with the state policy, the State Audit report, 2017), but the tasks and objectives which are applied by external normative regulations for public HEIs are growing.

The research object of the paper is public HEIs in Latvia. The aim of the paper is to research problems which interfere the development of organizational structures in accordance with the MBO approach in HEIs in Latvia. In order to follow the research aim, the following tasks were carried out: 1. to research theoretical concepts of MBO approach and organizational structures in public institutions; 2. to describe the current situation and problems with MBO oriented organizational structures in HEIs in Latvia; 3. to come up with conclusions. The research methods: analysis of scientific literature, the survey and interviews conducted at public HEIs. Different level managers (survey), administrative directors and quality managers (interviews) are representatives of HEIs executive power or institutional management, and changes of organizational structures can be initiated by them.

The research results from the survey and interviews indicated that different level managers are of opinion that administrative functions in HEIs aren't balanced and they are duplicated, HEIs' organizational structures are too hierarchic preventing cooperation in execution of tasks and

processes among administrative units. Implementation of recommendations on changes in structural units of internal audit has to be not only documented but also carried out in practice. The authors' research results in some ways correspond with the results presented by the State Audit report at the end of 2017.

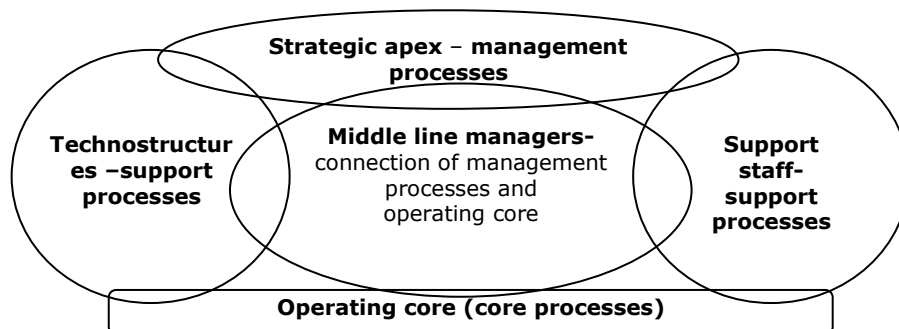
Research results and discussion

1. MBO approach and its application in HEIs' management

The MBO approach is a popular one and widely used in management science. The origin of the theory comes from the classical management theories (H. Fayol, F.W. Moonley, L. Urwick), which „formed theoretical basis for rational planning and control in industrial manufacturing" (Morgan G., 1997:18). The MBO approach was developed further by P. Drucker in his 1954 book „The Practice of Management". P Drucker reflected the classical management scheme of organization: organizations utilize human, material, financial, information and other resources, lead the recourses to a concrete objective, in order to achieve a value added result in a form of a product or service (Understanding the Theory, 2007).

There are indications in scientific sources that the MBO principles are applied to HEIs' management in the context of public management theory – the New Public Management. Italian authors T. Agasisti and G. Catalano in their research on contemporary tendencies of HEIs' management have developed a link between the New Public Management theory and the MBO approach, on the one hand, and HEIs' management processes in Europe, on the other hand: „improvements in higher education institutions' management is a part of a broader management process the aim of which is to improve efficiency and quality of the public sector" (Agasisti T., 2006:13). It has been emphasized that reforms of a better management and governance of higher education institutions are developed from the New Public Management and MBO ideas of application of new management approaches (Stensaker B. et al, 2007).

The MBO approach in every public institution, including HEI, is closely connected with the organizational structure. The organizational structure shows what are the functions and processes implemented in accordance with institution's goals and objectives. One of the most popular models of structures is the functional model of organizational structure developed by H. Mintzberg (1998).



Source: developed by authors using Mintzberg H., 1998; *Classics of Organizational Theory*, 2005.

Fig. 1. **Organizational Structure in Accordance with Functional Parts and Processes.**

The core processes and functions are those which are connected with organization's mission and strategy. Support processes and functions are those which provide assistance to core functions. There are five functional parts of organizational structure – strategic core which consists of management functions, operating core – the basic functions and processes, the middle line managers – connection of management functions with the operating core, and the support

functions – in order to implement the core processes, organizations obtain technostructures and support staff (Mintzberg H., 1998; Classics of Organizational, 2005.) (Fig.1.).

From the theoretical research it has to be stated that every public institution, including HEI, has its organizational structure which indicates tree types of processes and functions: the core processes and functions, management processes and functions and support processes and functions. Processes and functions are formed in structural units and represent organizational structure. The theoretical concepts indicate that public organizations, including HEI, organizational structure is supposed to be effective (well functioning) and goal oriented (MBO approach). Public management sources (Daft R., 2010; Governance in the 21th Century, 2003) point out that traditional hierarchic or functional organizational model isn't effective enough to operate nowadays in a dynamic and demanding higher education environment. In a hierarchic structure, higher level managers can't make decisions and solve problems as it is required by quickly changing social and economic environment. Necessity for new, flexible, flat matrix structures, horizontal cooperation, and higher level managers' direct cooperation with specialists is increasing.

2. Description of problems in current organizational structures of HEIs

Introduction and application of the MBO approach is closely connected with changes of organizational structure of HEIs. As mention in previous analysis, responsibilities and tasks, which have to be executed by HEIs' administration, are increasing.

Development of HEI's organizational structure is influenced by conditions of HEI's autonomy, the decision making power and the executive power. Organizational structure is determined by normative regulations, collegial decisions, as well as specific goals and objectives of each HEI.

The Law on Higher Education Institutions determines:

- 1) organizational structure of HEI is developed, reorganized and liquidated by the HEIs constitution;
- 2) tasks, functions, responsibilities and rights of structural units are determined by the structural units' regulations which are approved by the senate (The Law on HEIs, edition 01.01.2018.).

On the one hand, as regulated by the Law on Higher Education Institutions, HEIs are autonomous institutions which decide on their organizational structures, but on the other hand, more objectives and tasks are applied to HEIs by external normative regulations, and that requires additional administrative positions and structural units. The organizational structure of HEI can be divided into the decision making power (governance) and the executive power (management). The executive power in cooperation with administrative units (heads of administrative units, and other administrative personnel) are directly responsible for modernization of HEI's management, for the development of functions and organizational structure in accordance with goals, objectives and tasks. Changes in organizational structure – administrative units and functions, have to be made in accordance with changes in goals, objectives and tasks. For example, the practical implementation of internal quality management systems (required by the Law on HEIs, article 5, point 2) asks for new competences and functions. HEIs have to consistently foresee what structural changes are necessary in order to implement all tasks and requirements of institutional management.

The research of the higher education consulting enterprise „Dynamic University“ indicates that the majority of HEIs have pointed out that they have hired a quality management specialist for ensuring implementation of quality management. Much less HEIs have indicated that they have

responsibility of quality management implementation at each structural level or unit (AII ieksejas kvalitātes nodrošināšanas, 2013).

Based on research of HEIs' organizational structures and documents, the „Dynamic University” research results, the authors consider that quality management and internal quality assurance systems are more centralized than decentralized in HEIs in Latvia. Quality management is implemented at the institutional level by executive staff in cooperation with personnel of the administrative units. The position of a quality manager/specialist is subordinated to HEI's rector or vice-rector/administrative director. That may lead to a situation when MBO approach is implemented in a centralized manner – at the institutional management level, without decentralization to other structural levels of HEI. Similar conclusions, emphasizing the necessity to acknowledge the essence and goals of the MBO approach (quality management) at all structural levels of HEI, have been formulated by the „Dynamic University” research – „it is important to ensure that not only one structural unit or specialist is responsible for implementation of quality management. Information and facts have to be transparent and spread at all levels of HEI....Personnel may significantly impact the implementation of necessary changes in practice, thus, it has to be ensured that personnel is informed about the aims and benefits of quality management. The benefits of internal quality assurance and quality management system have to be clear. Low motivation of using quality management system is usually connected with insufficient ability to see the added value of quality management” (AII ieksejas kvalitātes nodrošināšanas, 2013:16). The responsibility to implement quality management not only at the central administrative level (centralized quality management) but also at other structural levels (faculties, institutes, departments – decentralized quality management) shows the necessity for even more administrative positions than currently exist in HEIs organizational structures. Also, it has to be stated that considering the limited resources of smaller HEIs (number of students less than 1000, e.g., - ViA, VeA, JVLMA) it might be problematic to ensure the responsibilities of MBO approach at the central and decentralised levels.

The authors consider that HEIs have to assess their resources and possibility to introduce positions of quality management/strategy management specialists because it is important that MBO approach is used at all structural levels of HEI. It is possible to combine positions, e.g., the responsibilities of quality management can be assigned to faculty deans, heads of departments or other administrative personnel.

HEIs' organizational structures are assessed also by other controlling institutions. At the end of 2017 the State Audit Office of the Republic of Latvia developed the audit report on efficiency of higher education financing system in Latvia. The conclusions are applied also to the organizational structures of public HEIs. Some of these conclusions are:

- HEI's governance and management systems are not effective, and financial and material resources are not used in a rational and effective manner;
- Organizational structures are fragmented – a large number of bigger structures consist of a significant number of smaller structures with a small number of employees;
- There is a tendency of duplicating administrative functions and duties – e.g., an organizational structure is formed to implement concrete objectives, but tasks to reach the objective are implemented by other structural units;
- HEIs organizational structures are not transparent. It isn't possible to get information on the number of administrative personnel in all organizational structures;

- The State Audit concludes that HEIs organizational structures are large by size and fragmented; they aren't optimized for saving administrative expenses. (Vai augstakas izglitības finansēšanas sistēma, 2017).

In smaller structural units, there is a tendency to employ one to two employees. The total number of academic personnel against the number of administrative personnel was compared. Although there is a tendency to decrease the number of administrative personnel, the ratio between academic and administrative personnel is still high: in 2013/2014 it was 93 %, but in 2016/2017 - 75 % (Vai augstakas izglitības finansēšanas sistēma, 2017).

Based on the State Audit results, the following recommendation was developed in order to improve HEIs' organizational structures: the Ministry of Education and Science has to develop activities for HEIs to review and optimize their structures. HEIs structure has to be developed with less fragmentation and with optimized administrative costs.

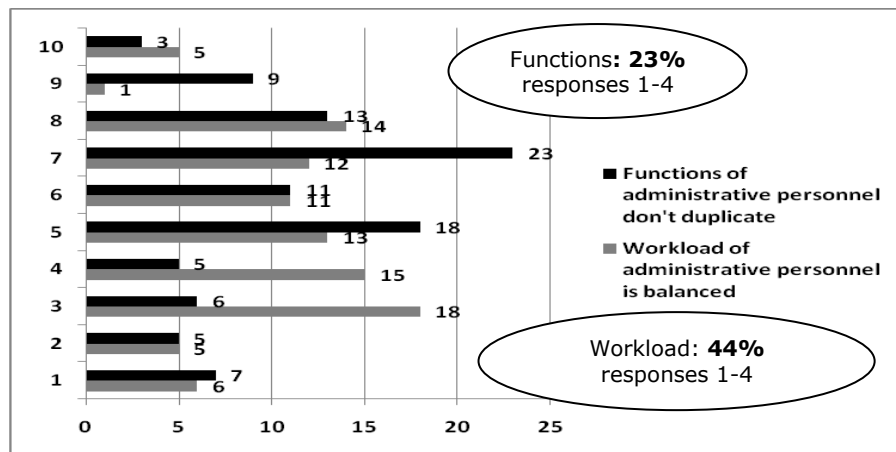
3. Results from the survey and interviews

The authors conducted a survey of different level managers at six HEIs (DU, LLU, LU, LiePU, RSU, RTU) in Latvia. The authors' task was to find out opinion of different level managers on achievements and problems of implementation of MBO approach at their institutions and to clarify the division of administrative functions of HEIs' management.

The survey contained 20 questions, 13 questions were structured as basic questions and 7 questions referred to respondents' demographical data. Questions contained rating scale from 1 to 10, where 1 – „completely disagree”, „not important” „definitely no”, 10 - „completely agree”, „very important”, „definitely yes”. The data was summarized and analysed in 3 groups: the 1st group (responses from 1 to 4) summarizes an opinion which is „definitely disagree, disagree, rather disagree”; the 2nd group (responses from 5 to 6) – lacking opinion or missing information on the issue. The 3rd group (responses from 7 to 10) summarizes an opinion which is „rather agree, agree, completely agree”.

The general set (N) – different level managers was 950. Responses were given by 209 different level managers (22 % of the general set) which was valid for the representation of a sample.

48 % of respondents were of opinion that functions of administrative personnel are clearly defined and don't duplicate, 23 % of respondents didn't agree to this statement, but 29 % respondents didn't have opinion on the issue. The majority of respondents (44 %) were of opinion that the workload of administrative personnel is not balanced, but 24 % of respondents didn't have opinion on this issue (Fig.2.).



Source: authors' research 2010-2017

Fig. 2. Respondents' opinion (%) on statements „Functions of administrative personnel don't duplicate" and „Workload of administrative personnel is balanced", n=204 (1- completely disagree; 10-completely agree).

Based on high proportion of responses – „don't have opinion", or „missing information on the issue", an assumption might be developed that different level managers are missing information about functions, assessment, training and career possibilities of administrative personnel. Information and communication problems among administrative heads/employees, executives and other managers exist. This may lead to problems of horizontal cooperation between administrative units and executives in carrying out processes and tasks.

In order to supplement and prove the survey results, expert interviews were organized at six HEIs (JVLMA, LSPA, RPIVA, VeA, ViA, BA, RPIVA) in Latvia. Administrative directors and quality managers are expertized on MBO approach in HEIs. They are responsible for implementation of quality management, strategy management and other management approaches. Interviews were conducted according to the following research topics: the management of structures and functions; optimization of administrative structures in accordance with changes in goals and objectives; assessment and evaluation of functions of administrative units and positions; how functions support goals and objectives, are they balanced. Administrative directors and quality managers expressed their opinion concentrating on the questions: are administrative directors and quality managers aware that changes in structural organization are necessary? Why the changes are necessary? What are the results of optimizing HEIs' administrative structures?

The results from the interviews with indicated that HEIs' organizational structures are too hierarchic which is considered as a preventing factor for cooperation among administrative units in coordinating tasks within processes. Administrative functions are organized in processes which consist of tasks. Every task or function has to be executed in accordance with the planned outcomes, and it has to be accomplished in certain deadlines. If there is limited cooperation among structural units, execution of tasks becomes slow and ineffective. This was justified by the following quotations:

-„HEIs have hierarchic culture, which is a preventing factor for effective management work, implementation of management by objectives approaches. We try to introduce more horizontal than vertical cooperation among structures"; -„The vertical communication and coordination have to be more supplemented by horizontal cooperation in order to sufficiently use quality management processes."; -„It is supportive, if there is not a strict hierarchy – tasks within processes have to be executed in accordance to its meaning and by cooperating".

The respondents were of opinion that objectives of internal audit aren't always explained to administrative personnel, and internal auditing of structural units is perceived as an extra administrative burden. Although in some cases the results of internal auditing were evaluated as useful and necessary to make optimization of administrative structures, the respondents were of opinion that the results of internal auditing aren't carried out in practice. HEIs' institutional environment in many cases were assessed as slow and resistant to change. The analysed results were justified by the following quotations:

-„Organizational structures are changed in accordance with the recommendations from the internal audit. But HEI's institutional environment is slow and conservative. Changes happen but in a longer period of time“; -„HEI's administrative structures will become flatter, smaller in the future“; -„There needs to be improvement in the work of internal audit. Activities of the internal audit have to be qualitative and well grounded – it shouldn't be as an extra burden for structural units. It has to be explained to all structural units – what will be audited and how the results of the audit will be used“.

Results from the interviews as well as results from the survey indicated that in order to improve efficiency of administrative processes, there needs to be cooperation between administrative units and clear division of functions. Duplication of administrative functions in administrative units is a common situation in large institutions, including HEIs: *-„... it is important in administrative work for the personnel to cooperate, functions shouldn't duplicate. Such organizational structure I see as a key element for the HEI to implement its goals and objectives“* (Authors' research 2010-2017).

As a conclusion from the results of the survey and interviews, it might be indicated that by organizing HEIs' institutional management processes in accordance with implementation of MBO approach, it is possible to reach more dynamic and effective management of core and support processes and moving to improved performance results.

The major problems of implementation of MBO approach are connected with insufficient analysis of administrative functions and slow reorganization followed by recommendations of internal audit. Execution of tasks and processes are more in accordance with the functional management structure than horizontal cooperation. The survey results indicated that almost ¼ of the respondents (23 %) were of opinion that administrative functions are duplicating, and 29 % respondents didn't have opinion on the issue, what might indicate that different level managers aren't sufficiently informed about administrative processes in HEIs.

Conclusions

In order to introduce and implement MBO approach at institutional management, the majority of HEIs have optimized their organizational structures by integrating the functions and processes of strategic, quality and performance management. Also it has to be stated that HEIs' organizational structures are organized in accordance with theoretical concepts (Mintzberg, 1998), organizational structures are divided into the core, management and supportive processes and functions.

The following problems prevent to develop HEIs' organizational structures according to MBO approach:

- 1) The functions of administrative units aren't sufficiently analysed and assessed (e.g., implementation of recommendations of functional audits), and changes of organizational structure and functions are slow and resistant to change. That is considered the obstacle of implementation of MBO approach – strategic and quality management at HEIs in Latvia.

- 2) Strictly organized vertical hierarchic structure is considered an obstacle for implementation of MBO approach. Hierarchic structure doesn't promote horizontal cooperation among structures and functions, and the execution of administrative tasks becomes slow and ineffective.
- 3) Smaller HEIs (number of students less than 1000, e.g. VeA, ViA, JVLMA) are limited in administrative resources, and positions of specialists/managers of quality and strategy management aren't introduced.
- 4) Organizational structures of HEIs in many cases are fragmented – a large number of bigger structures consist of a significant number of smaller structures with a small number of employees.
- 5) There is a tendency of duplicating administrative functions and duties – an organizational structure is formed to implement concrete objectives, but tasks to reach the objective are implemented by other structural units.
- 6) The workload of administrative functions isn't balanced among administrative positions.

Recommendations

- 1) Development of a HEI's structure as a matrix type organization, using more horizontal cooperation, principles of project and team work, in order to improve process management and achievement of outcomes and performance results, would be helpful to ensure MBO approach.
- 2) Activities for HEIs to review and optimize their structures have to be developed. HEIs structure has to be developed with less fragmentation and with optimized administrative costs.
- 3) Necessity for new and flexible administrative structures, promoting horizontal cooperation, and higher level managers' direct cooperation with specialists, is increasing at HEIs institutional management.

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THE SIGNIFICANCE OF INDIVIDUAL CONTRIBUTIONS IN AMATEUR ART PROCESS IN LATVIA

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Abstract. The proposed article takes a closer look at economic factors that are crucial for the development of the Song and Dance Celebration in a long-term. Individual contributions of amateur artists are essential for sustaining the tradition because of several reasons. Firstly, amateur arts in its essence are oriented at self-initiative. Therefore, certain financial responsibility should be taken at the lowest, individual level. Secondly, as amateur art in Latvia is strongly supported by the public authorities, stronger emphasis on individual contributions is a way to share risks and strengthen diversity of funding sources, which is especially significant in the context of negative demographic tendencies and uncertainty of economic developments.

Quantitative survey of amateur artists in 11 municipalities and 4 focus group discussions were conducted. The survey results confirm the opinions expressed in the focus group discussions that the amateur art community in Latvia is not ready to increase their financial contributions for participatory activities. In their opinion, public funding should cover costs for rehearsal venue, salary of the leader of the amateur art group, transport costs for the tours in Latvia and costs for concert costumes. The key argument is the public responsibility for safeguarding the tradition of the Song and Dance Celebration. The participants are willing to finance by themselves informal events and participation fee that covers small everyday expenses. The authors can assume that participants feel comfortable with and can justify such expenditure that increases their social capital and strengthens their belonging to the community (amateur choir or dance group).

Key words: amateur arts, participation in arts, individual contributions, funding for amateur arts, public funding.

JEL code: Z10

Introduction

Active participation in culture is a widespread leisure time activity in Latvia, a survey suggests that about half of Latvian inhabitants have taken an active part in one or several cultural activities, including amateur arts (Culturelab, 2016). The residents of Latvia rather often identify a word 'culture' with the Song and Dance Celebration (Culturelab, 2014); moreover, those who take part in amateur art activities, often prefer activities which form the process of the Song and Dance Celebration, a tradition which is unique for all three Baltic states and was inscribed on the Representative List of the Intangible Cultural Heritage of Humanity by UNESCO in 2008.

The current study is a part of the national research programme "Habitat: Sustainability of Latvian Cultural Traditions in an Innovative Environment", which is carried out by the Latvian Academy of Culture. The overall aim of the programme is to define preconditions of safeguarding and criteria for continuity of Latvian national identity forming traditions in a changing and innovative environment. The proposed article takes a closer look at economic factors that are crucial for the development of the tradition of the Song and Dance Celebration in a long-term. Authors presume that individual contributions of amateur artists are essential for sustaining the tradition of the Song and Dance Celebration in future because of several reasons. Firstly, amateur arts in its essence are oriented at self-initiative and bottom-up activities. Therefore, certain financial responsibility should be taken at the lowest, individual level. Secondly, as amateur art in Latvia is strongly supported by the public authorities and institutionalised (Tjarve et al., 2017a, 2017b), stronger emphasis on individual contributions is a way to share risks and strengthen diversity of funding sources, which is especially significant in the context of negative demographic tendencies and uncertainty of economic development.

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The specific aim of the article is to assess whether and on what extent the individual contributions are significant for amateur arts in Latvia and particularly for those artistic groups which maintain the process of Song and Dance Celebration (choirs and dance groups). Authors have set several tasks: 1) to study theoretical literature to understand whether and why individual contributions are significant in amateur arts sector in general; 2) to analyse the situation in Latvia and data regarding choirs and dance groups in Latvia, paying more particular attention at what kind of costs individual amateur artists contribute, which budget categories they are willing to cover, or which they consider to be covered by other actors, including public authorities; what their understanding of the need for individual contributions is; 3) to conclude whether individual contributions for amateur arts in Latvia are significant, or not.

Usually the amateur arts are being analysed in the discourse of social impact, social functions and as a tool for social and cultural capital (Matarasso, 1997). Financial aspects of amateur arts are less often in the centre of academic discussions (Tjarve et al., 2017a). Along with the growing significance of participation in arts and amateur art in Europe, it is timely and meaningful to analyse the sustainability factors in regards to financial preconditions of amateur arts. The previous studies of the authors (Tjarve et al., 2017a, 2017b) show that although the division of competences between the state and local governments meets the principles of decentralisation, strengthening the non-governmental sector and individual financial contributions would increase the level of decentralization and foster sustainability of the amateur arts sector and the tradition of the Song and Dance Celebration in a long-term.

Research results and discussion

1. Theoretical discussion

There is a tradition to look at amateur art as a non-paid work (Tsipursky, 2016). For the most part, amateur groups are self-financed, have no paid employees, and only part of the participants are trained professionally, or have worked as professionals (Hill et al., 2018). However, they are indirect beneficiaries from local and state government support, because their activities have been supported by cultural centres providing rehearsal venues and organising concerts, publicity, paying to professional trainers and many more (Milling et al., 2014). Their primary motive for coming together is to have fun and, often to protect what they see as a lost, or dying art form (Hill et al., 2018). As amateur art participants cannot measure benefits they gain from this good in monetary terms (Throsby, 2003), it is also hard for them to justify the necessity for individual's contributions.

Authors have already discussed the role of public incentives for amateur arts in Europe and in Latvia. The classification of fiscal measures proposed by Throsby (2010) included the following categories: (1) direct provision of cultural goods and services; (2) subsidies and grants to cultural producers; (3) tax concessions; and (4) assistance to consumers. The results of analysis showed that subsidies and grants to cultural producers was the most common form of financial support in the field of amateur art in Europe and in Latvia. Direct provision of cultural goods and services was mainly characteristic to post-soviet countries. Meanwhile, tax concessions and assistance to consumers were rather uncommon forms of financial incentives in European amateur art field (Tjarve et al., 2017a). Increasingly amateur arts in Europe are supported through different support mechanisms (Villarroya et al., 2015). As the review on the cultural policies in Europe clearly demonstrates, participation in amateur art activities is not only financed through individual

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contributions for individuals' leisure time activities, but is heavily supported through different public incentives (Tjarve et al., 2017a).

2. Methodology

Both quantitative and qualitative research methods have been applied.

For the purpose of this study, a quantitative survey of amateur artists on their individual expenditure in 2015 and 2016 has been carried out between April and June 2017, based on multidimensional survey design. Authors have selected 11 municipalities that represented different types according to the division presented in the Annex 3 to Cultural Policy Guidelines 2014-2020 "Creative Latvia" (Ministry of Culture, 2014): (1) centre of international level (the city of Liepaja); (2) national development centre (the cities of Jekabpils, Jūmala and Jelgava); (3) regional development centre (the municipalities of Kuldīga, Valka, Ludza, Alūksne, Cēsis, Balvi and Tukums). In these municipalities from 144 amateur art groups that take part in the process of the Song and Dance Celebration, 36 groups were chosen (both choirs and dance groups, representing different types and generations), and participants during rehearsals were asked to fill in self-administered questionnaires. 569 responses were received.

Also, focus group discussions "Nationwide Song and Dance Celebration: problems and future scenarios" (Research Centre of Latvian Academy of Culture, 2015) were conducted in each of four cultural regions of Latvia, specifically in towns of Kuldīga (25 September 2015, six respondents), Rēzekne (11 November 2015, ten respondents), Jelgava (18 September 2015, nine respondents) and Valmiera (2 October 2015, six respondents).

3. Description of the situation

In Latvia, there are 69.6 thousand amateur artists who are taking part in different amateur art groups: they dance, sing in choirs, make theatre or come together to knit or weave. They form 3.4 % of the total number of inhabitants in Latvia in 2016 (Central Statistical Bureau, 2018). Majority of these amateur artists sustain the tradition of the Nationwide Song and Dance Celebration in Latvia. The largest and the most significant groups are choirs and folk dance groups, which acquire common repertoire and are exposed to certain quality inspection in order to qualify for taking part in the final events of the Song and Dance Celebration in Riga.

Even though in many other countries amateur art groups are self-governed, in Latvia the process is rather institutionalised, mainly due to the organisation of amateur art sector during the Soviet period (Daugavietis, 2015) and also due to the complicated organisational process which involves numerous and diverse stakeholders. There are several fiscal support mechanisms both on national and local level that sustain the tradition of Song and Dance Celebration in Latvia (Tjarve et al., 2017a).

Those amateur arts groups, which are established by the local authorities, are mostly located at the culture centres, which operate under the jurisdiction of municipalities; therefore, they have direct administrative and financial support and are publicly owned and operated. The survey of the leaders of the amateur art groups (Research Centre of the Latvian Academy Culture, 2014) shows that 78 % of amateur art groups are established by the local municipalities. Just some of the amateur art groups operate as non-governmental organizations established by their participants, self-financed and independent.

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4. The results of the participant survey

The data collected from the survey of 569 representatives of choirs and dance groups in 11 municipalities allow evaluating the actual expenses of individuals in 2015 and 2016 and their opinion about the funding model of amateur arts.

Questions about personal expenses in the survey have been divided in two categories: regular (monthly) and occasional (few times a year) expenses. Regular expenses include (1) participation fee; (2) travel costs to attend the rehearsals; (3) costs for renting the rehearsal venue; (4) costs for paying the salary of the artistic leader. The results show that respondents of all 36 artistic groups don't have to pay for the rent of the rehearsal venue or the salary of the artistic leader. The average expenses to cover the participation fee are EUR 3.02 per month (excluding extreme values). 61 % of the respondents have stated they have travel expenses to attend the rehearsals. The travel costs vary from EUR 1.50 to EUR 150. Due to the wide range of the results it is impossible to calculate the average travel expenses per participant. The respondents have also mentioned several examples of 'Other regular expenses', for instance, presents; flowers; souvenirs; clothing and accessories; dry-cleaning; shoes and their repairing; cosmetics; hairdresser before every concert; tights; water; chewing gum; food, alcohol for informal events; excursions; renting the warehouse; printing posters; buying props; permit for entering Jurmala city; physiotherapy; remuneration for choreographer; traffic fines; as well as alternative costs for not attending the work or finding the substitute at work. Some of these expenses might be counted as the occasional ones, but due to the methodology chosen it is impossible to verify that. The results show that regular expenses per month vary from EUR 0.70 to EUR 97 (excluding extreme values). The total regular expenses of the respondents might be classified in five groups (Table 1) with EUR 0.01 - 5.00 and EUR 10.01 - 20.00 being the most common amplitudes.

Table 1

Total regular expenses per month, regarding participation in the amateur art group

	Total
EUR 0.01 - 5.00	28 %
EUR 5.01 - 10.00	13 %
EUR 10.01 - 20.00	28 %
EUR 20.01 - 35.00	20 %
> EUR 35.01	11 %

Source: authors' calculations based on the survey of amateur art groups participants, 2017, n=522

Questions about occasional expenses included (1) travel expenses to concerts and events in Latvia; (2) travel expenses to concerts and events abroad; (3) informal events; (4) clothing for rehearsals; (5) concert costumes. Responses in the category 'Other occasional expenses' included presents; flowers; cosmetics; food and drinks; participation fees in the events; printing and buying musical scores; buying folders for scores; buying books and CDs. Data show that the occasional expenses cover wide range - from EUR 1 to EUR 1620 per year in 2015 and from EUR 1 to EUR 1450 per year in 2016. Such a diversity makes it difficult to calculate the average costs per year. Data show that the occasional expenses vary a lot according to the activities of the artistic group and its plans for the season: number of concerts, tours, participation in events in Latvia and especially - going for an international tour. The question about buying clothing for rehearsals is topical only for respondents from the dance groups. The concert costumes for artistic group are usually purchased for a longer period of time. The authors observed that the most

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common expenditure in the category 'occasional expenses' is 'expenses for informal events' (food, drinks and alcohol). In 2015 77 % and in 2016 86 % of the respondents have indicated that they have had expenses in this category (averagely - EUR 39.81 per year in 2015 and EUR 44.33 - in 2016).

The survey results allow calculating the approximate total expenses regarding participation in amateur art group per year. Total expenses have been calculated based on regular monthly expenses (based on the last full month before the survey in spring 2017) and occasional expenses in 2016. It should be taken into account that the calculations are made about different years. For calculating regular expenses per year the average sum of monthly expenses was multiplied by 10 (months), assuming it as a length of artistic season. The sum obtained was summed with the average occasional expenses in 2016. The calculations show that respondents have had expenses from EUR 3.00 to EUR 2100.00 per year regarding their participation in amateur arts activities. As it can be seen, the expenditure forming models can be different; that's why actual average sums cannot be calculated. In Table 2, the total average expenses per year are arranged in five almost equal groups. The differences between dance groups and choirs can be observed.

Table 2

Total expenses per year, regarding participation in the amateur art group

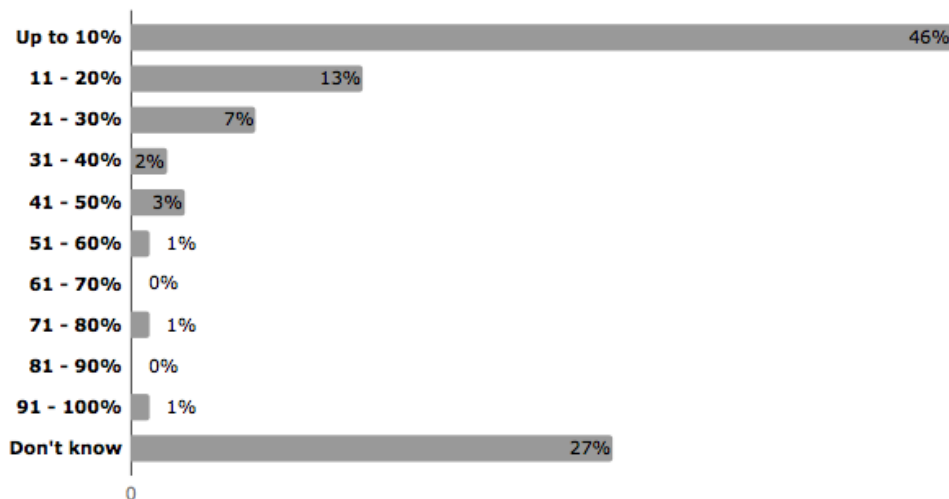
	Total	Dance groups	Choirs
< 50.00 EUR	12 %	7 %	20 %
EUR 50.01 - 150.00	23 %	18 %	31 %
EUR 150.01 - 250.00	23 %	21 %	27 %
EUR 250.01 - 500.00	24 %	28 %	18 %
> 500.01 EUR	18 %	26 %	4 %

Source: authors' calculations based on the survey of amateur art groups participants, 2017, n=546

Most of the members of dance groups spend more than EUR 250 per year. Largest part of the choir members spends less: between EUR 50 and EUR 250 per year. Yet, the authors cannot make any further interpretation of data.

The other part of questions in the survey discussed the opinions of the participants and their willingness to pay for the participatory activities. The respondents were asked to choose who should finance the expenses for the participation in the amateur art group - the state, the municipality, the participants themselves, or the expenses should be shared. The results show that the respondents are willing to pay for those categories of expenses they are actually paying - the expenses for informal events (66 %), participation fee (54 %), and travel expenses to and from rehearsals (46 %). The responses show that expenses for renting the rehearsal space (92 %), expenses for the salary of the artistic leader of the group (88 %), travel expenses to the concerts in Latvia (77 %) and expenses for the concert costumes (67 %) in the opinion of amateur artists should be financed by the state and/or municipality. The most controversial question was about financing the clothing/costumes for rehearsals - opinions were almost equally divided between all the options, and only 17 % agreed that this should be provided by the participant him/herself.

When asked to what extent the expenses of the group should be financed by the participants themselves, the tendency shows that 66 % of the participants are ready to pay up to one third from the total expenses (Figure 1) and only 1 % claims that all the expenses should be covered by participants themselves.



Source: authors' calculations based on the survey of amateur art groups participants, 2017, n=569

Fig. 1. To what extent respondents would be willing to individually contribute for their participation in the amateur art

These results confirm the results of the focus group discussions (Research Centre of the Latvian Academy of Culture, 2015) that majority of participants in amateur art activities in Latvia do not support the need to co-finance their participation in amateur art activities. For the most part, it is perceived as an obligation of the state and municipalities (validating this statement with an argument of the Song and Dance Celebration being a national tradition that should be safeguarded by public authorities). The participants are not willing to pay for the central expenses, such as the rent of the rehearsal venue or the salary of the artistic leader.

Meanwhile, the results of the survey show that in most cases limited financial resources of individuals have not been an obstacle for participation in the group activities. 54 % of the respondents admit that their activities have not been hindered by the financial barrier. 24 % admit that due to financial reasons they haven't participated in the amateur art group activities abroad.

To conclude, the results of the survey suggest that participants from the dance groups, youth amateur art groups and amateur artists in larger cities spend more than their peers in choirs, in groups from smaller municipalities and in middle generation or senior groups. That can be explained by the specific needs of the dance groups in comparison to choirs and by more enthusiastic participation in diverse events by younger generation that increases the level of individual contributions. Moreover, the correlation between the income and the expenses of an individual can be also observed, as members with higher average income per household member per month tend to spend more for their participatory activities. The survey results confirm the opinions expressed in the focus group discussions that the amateur art community in Latvia is not ready to increase their financial contributions for participatory (leisure time) activities. In the opinion of both, the survey respondents and the focus group discussion participants, public funding (on national or municipal level) should cover costs for rehearsal venue, salary of the leader of the amateur art group, transport costs for participation in the events/tours in Latvia and costs for concert costumes. The key argument is the public responsibility for safeguarding the tradition of the Song and Dance Celebration. In general state and municipal funding covers all the basic needs of the amateur art groups and formally the groups could exist without any individual financial contributions at all. Despite that the participants are willing to finance by themselves the informal

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events and participation fee that covers small everyday expenses (flowers, presents etc.). The authors can assume that participants feel comfortable with and can justify such expenditure that improves the social climate and strengthens their belonging to the group. The respondents also shared the viewpoint that small individual financial contributions are necessary to increase the level of responsibility of an individual towards the group. Further research about social impact of the individual contributions might be applied in the future.

Conclusions, proposals, recommendations

- 1) Even though the public (state and municipal) funding is essential and forms the considerable part of the funding for amateur art movement in Latvia (Tjarve et. al., 2017b), findings show that strengthening the non-governmental sector and individual financial contributions would foster sustainability of the amateur arts sector in a long-term. Firstly, amateur arts in its essence are oriented at self-initiative and bottom-up activities. Therefore, certain financial responsibility should be taken at the lowest, individual level. Secondly, as amateur art in Latvia is strongly supported by public authorities and institutionalised, stronger emphasis on individual contributions is a way to share risks and strengthen diversity of funding sources, which is especially significant in the context of negative demographic tendencies and uncertainty of economic developments.
- 2) Majority of participants in amateur art activities in Latvia do not support the need to co-finance their participation in amateur art activities. For the most part, it is perceived as an obligation of the state and municipalities (validating this statement with an argument of the Song and Dance Celebration being a national tradition that should be safeguarded by public authorities). The participants are not willing to pay for the central expenses, such as the rent of the rehearsal venue or the salary of the artistic leader. In the opinion of both, the survey respondents and the focus group discussion participants, public funding (on national or municipal level) should cover costs for rehearsal venue, salary of the leader of the amateur art group, transport costs for participation in the events/tours in Latvia and costs for concert costumes. This covers all the basic needs of the amateur art group. The participants are willing to finance by themselves the following categories: informal events and participation fee that covers small everyday expenses (flowers, presents etc.).
- 3) The results of the survey show that participants from the dance groups, youth amateur art groups and amateur artists in larger cities spend more than their peers in choirs, in groups from smaller municipalities and in middle generation or senior groups.
- 4) In most cases limited financial resources of individuals have not been an obstacle for participation in the group activities. 54 % of the respondents say that their activities have not been hindered by the financial barrier. 24 % admit that due to financial reasons they haven't participated in the amateur art group activities abroad.
- 5) The authors can assume that participants feel comfortable with and can justify such expenditure that improves the social climate and strengthens their belonging to the group. The respondents also shared the viewpoint that small individual financial contributions are necessary to increase the level of responsibility of an individual towards the group.

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BIG DATA AND ASSOCIATED SKILLS: SYSTEMATIC OVERVIEW

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Abstract. Technological development is causing increase of data available for organizations. Not only amount of data but also areas of application in organizations are increasing. However, this change is also bringing certain challenges – starting with storage of data and ending with analysis and interpretation of data to benefit from it. This research is aimed to identify skills and competences needed to operate with big data. Research question is what type of skills or competences are needed to be able to use big data solutions. Research object is big data solutions, research subject – skills or competences needed for big data solutions.

To identify needed skills and competences systematic literature overview is performed. Detailed description of research article selection is described. Scopus database is used for research article selection. After reviewing selected research articles, authors identify skills or competences in each. Afterwards most mentioned and more often identified skills are summarized. Main skills and competences that authors identified in the research are connected with three main areas – analytical, technological and managerial fields. Communication skills are mentioned as crucial to benefit from big data solutions since it requires cooperation and mutual understanding from different departments of organization.

Key words: literature overview, big data, skills, competences.

JEL code: O15, O33

Introduction

Technological development is causing increase of data available for organizations. Not only amount of data but also areas of application of the data are increasing in organizations. However, this change is also bringing certain challenges – starting with storage of data and ending with analysis and interpretation of data to benefit from it. Also employees with skills and competences that allow organizations to benefit from big data are becoming more required.

Professional organizations almost decade ago indicated that big data will have an increasing importance in business and that there will be lack of talent that will be able to work with big data (McKinsey Global Institute, 2011). The aim of this research is to identify skills and competences needed in organization to operate with big data.

Research question is what type of skills or competences are needed in organization to utilize big data. Research object is big data and research subject is skills and competences needed to operate with big data. To identify needed skills and competences systematic literature overview were performed; keywords and source for literature search were defined, selected publications were analysed, skills and competences were identified and grouped.

Organizations that want to become more efficient by utilizing big data will need to cover identified list of skills and competences. This is possible by identifying skills and competences among existing workforce or training existing employees or hiring new employees that have needed skills and competences.

Methodology of research

Literature review that is performed in systematic approach should be precise and one should be able to reproduce the review (Booth A. et al, 2012). Therefore, authors of this research are providing explicit details of search strategy. Search of literature for this research paper was performed in November and December 2017. Database used for search – SCOPUS.

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1. Selection of research papers

First step is usage of keyword "big data" in SCOPUS database, for which 38 281 results are shown in database. In the second step, additional keywords are added – "skill*" and "competence". Keywords are added in a manner so that one or another in combination with "big data" would give a positive hit. Also keyword "skill" has a form that would hit both singular and plural form of word. After second step there are 602 results left.

Third step is to limit results to specific type of research – only articles. It is done with aim to have more quality research papers that have gone through peer review and have been published. After third step there are 226 results left.

Fourth step is to limit results only to one area "Business, Management and Accounting". It is done to exclude specific area research papers that are dealing with sector specific questions. Since area of research is very closely connected with Information Technology (IT), then vast majority of articles are connected with evaluation of different technical solutions or statistical methods connected with big data and not business management related areas. After fourth step there are 50 results left.

Table 1

Article selection criteria

Step no.	Criteria	Reason	Criteria in SCOPUS search syntax	Number of results
1	Keyword 1	Main keyword for identifying area of interest	"big data"	n=38281
2	Keyword 2	Additional keywords for targeting researches	AND ("skill*" OR „competence")	n=602
3	Limit to document type "Article"	Limiting to research types that have passed reviews for publications	AND (LIMIT-TO (DOCTYPE, "ar"))	n=226
4	Limit to subject area "Business, Management and Accounting"	Limiting to area that is connected with organizations and management and that are not connected with specific fields of research like medicine, computer sciences etc.	AND (LIMIT-TO (SUBJAREA, "BUSI"))	n=50
5	Research paper keyword contains "big data"	To keep only articles which have very strong indication that area of research is connected with "big data" since authors have included these words as keywords	(filtered outside SCOPUS)	n=37
6	Authors excluded articles not related to skills or competences	After reading abstracts of all articles authors of this literature review excluded articles that did not contain information or were not related to skills or competences in connection with "big data"	(filtered outside SCOPUS)	n=21

Fifth and sixth steps are performed outside SCOPUS database. In fifth step, authors exclude all articles that do not contain keyword "big data". In that way, there are left only articles whose authors have intentionally put "big data" in keywords to indicate connection with this area. After fifth step there are 37 results.

In sixth step, authors read abstracts of selected articles to evaluate if articles are connected with research question. Specifically, if article is connected with big data and contain information about skills or competences in connection with big data. After last step there are 21 articles left. It is a final list of articles used for systematic literature overview.

Overview of performed steps can be seen in Table 1.

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2. Limitations of research

There are several available definitions of big data. Different authors indicate different number of attributes that characterize big data; in other words – different number of "V". There are definitions that contain starting with 3V – volume, velocity, variety (Chen C.P., Zhang C.Y., 2014) and even up to 7V – volume, velocity, variety, veracity, value variability, visualization (Seddon J.J., Currie W.L., 2017). Articles included in literature review are not evaluated by the definition of big data – if authors of researches are using the same definition or have the same conceptual understanding of big data.

There is limitation of the research paper field of study - articles are selected only from one field of study – "Business, Management and Accounting".

Characteristics of research papers

Selected articles split by year of publication are shown in Figure 1. It can be seen that 10 out of 21 articles are published in 2017. This confirms that researchers in the field of Business and Management area only recently have started to focus on the topic.

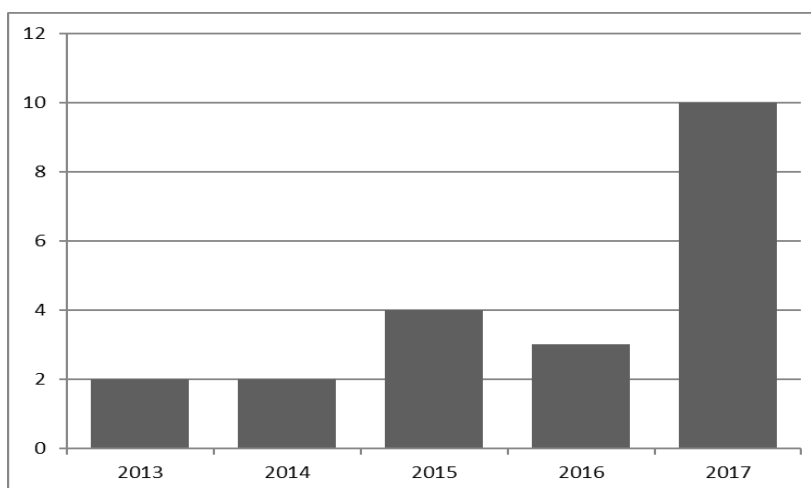


Fig.1. Article count by year of origin

9 out of 21 selected articles are published in 4 journals. Remaining 12 articles are published in separate journals and only one selected article per journals. List of journals having more than 1 article is shown in Table 2.

Table 2

Journals of publications with more than 1 article

Journal	Number of articles	Years of publication
Business Process Management Journal	n=3	2017; 2017; 2017
Business Information Review	n=2	2013; 2014
Journal of Accounting Education	n=2	2017; 2017
Journal of Business Logistics	n=2	2013; 2015

All three articles from Business Process Management Journal are published in 2017. Both articles from Journal of Accounting Education are published also in 2017. At the same time, Business Information Review and Journal of Business Logistics published articles before or during 2015. This indicates that field of Business Logistics started to research area of big data earlier than field of Accounting.

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Skills and competences for big data

Overview of identified skills and competences are shown in Table 3. Skills and competences are grouped by authors of this research based on common characteristics. Authors as well as year of publication of articles are indicated in the table.

Table 3

Skill and competence overview

Type of skills and competences	Authors, year of publication
General big data skills	<ul style="list-style-type: none"> Hofacker C.F., Malthouse E.C., Sultan F., 2016 Murawski M., Bick M., 2017
General analytical competences	<ul style="list-style-type: none"> Amankwah-Amoah J., 2015 Carillo K., 2017 Muller S., Jensen P., 2017 Tambe P., 2014 James R., 2013 Waller M.A., Fawcett S.E., 2013
Advanced analytical competences	<ul style="list-style-type: none"> Alharthi A., Krotov V., Bowman M., 2017 Cook D., 2015 Gamage P., 2016 Martin-Rios C., Pougnet S., Nogareda A.M., 2017 Schoenherr T., Speier-Pero C., 2015
Business competences	<ul style="list-style-type: none"> Alharthi A., Krotov V., Bowman M., 2017 Amankwah-Amoah J., 2015 Cegielski C.G., Jones-Farmer L.A., 2016 Cook D., 2015 Dubey R., Gunasekaran A., 2015 Frisk J.E., Bannister F., 2017 Hackl P., 2016 Martin-Rios C., Pougnet S., Nogareda A.M., 2017 Schoenherr T., Speier-Pero C., 2015 Tambe P., 2014 Waller M.A., Fawcett S.E., 2013
Data management skills	<ul style="list-style-type: none"> Carillo K., 2017 Cegielski C.G., Jones-Farmer L.A., 2016 James R., 2014
Technical competences	<ul style="list-style-type: none"> Cook D., 2015 Hackl P., 2016 Izhar T., Torabi T., Bhatti M.I., 2016 Martin-Rios C., Pougnet S., Nogareda A.M., 2017 McKinney E. Jr., Yoos C.J., Snead K., 2017 Murawski M., Bick M., 2017 Tambe P., 2014 Yusuf I.I., Thomas I.E., Spichkova M., Schmidt H.W., 2017

Authors categorized identified skills or competences in 6 broader groups. Each group contains several skills or competences mentioned in analysed articles. First group is General big data skills – two articles included in this category. One research paper has mentioned ability to evaluate big data datasets (Hofacker C.F. et. al, 2016). Second research paper indicates general big data skills (Murawski M., Bick M., 2017) without further explanation what can be understood with big data skills. Common characteristic for this group is very general indication of big data skills without specifics.

General analytical competences are second group. 6 out of 21 articles have mentioned analytical competences in different forms – business analytics (Tambe P., 2014), ability to interpret data (James R., 2013) and ability to extract value from data (Muller S., Jensen P., 2017) as well as

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quantitative skills (Waller M.A., Fawcett S.E., 2013) and analytical competences as part of company culture (Carillo K., 2017). Common characteristic for this group is high level analytical competences in different forms.

Advanced analytical competences are third group. Common characteristic for this group is more specific and advanced level analytical skills mentioned in the article in different forms. One article mentions lack of data science skills (Alharthi A., Krotov V., Bowman M., 2017) in the organizations. Complex problem solving skills are mentioned in context of advancements of building and environment professions (Cook D., 2015). One author mentions advanced analytical skills as prerequisite for successful utilization of big data in public sector (Gamage P., 2016).

Business competences are the broadest group. This group contains articles that discuss competences like data driven decision making (Alharthi A., Krotov V., Bowman M., 2017). Since big data solution implementation is associated with costs, then another article also indicates importance of having data driven decision making in the company (Tambe P., 2014). Only one research paper contained information that knowledge of industry is important to succeed in big data usage (Waller M.A., Fawcett S.E., 2013). This group also includes articles that discuss managerial skills that are needed to process changes associated with big data usage (Martin-Rios C., Pougnet S., Nogareda A.M., 2017). Authors have also classified ability to cooperate with other professions (Cook D., 2015) and business units (Amankwah-Amoah J., 2015) as a business competence. One research is aimed at developing master degree programme for predictive analytics (Schoenherr T., Speier-Peró C., 2015). It contains skills and competences starting from advanced analytics and ending with decision making competences.

Data management skills is fifth group, it contains rather technical type of competences and skills – data gathering, interpretation and visualization (Cegielski C.G., Jones-Farmer L.A., 2016). One author indicates a need for multidisciplinary educational programmes in case of big data analytical competences (Carillo K., 2017). Development of technologies and increasing amounts of data drives demand for specialists who can manage and review large datasets (James R., 2014).

Technical competences are mentioned in at least 7 articles. These are competences connected with knowledge of specific software (Izhar T., Torabi T., Bhatti M.I., 2016), (Yusuf I.I., Thomas I.E., Spichkova M., Schmidt H.W., 2017) or broader type of skills like knowledge of databases (Martin-Rios C., Pougnet S., Nogareda A.M., 2017). More than one author points to broad skills like technical competences without detailing what exact skills are needed (Tambe P., 2014) or general digital competences that are not explained in details (Murawski M., Bick M., 2017).

Conclusions, proposals, recommendations

- 1) Starting with 2017 there is a huge increase of published research papers related to skills and competences in connection with big data in the fields of Business, Management and Accounting. This indicates that area of research is very new and more researches should come in future.
- 2) Utilization of big data requires very broad range of different skills and competences. One person will not be able to cover all needs connected with big data solutions. Authors of this research created 6 broad groups of skills and competences discussed in fields of Business, Management and Accounting.
- 3) There are many articles that refer to very general skills needed for utilization of big data. Skills like big data skills are not self explanatory and one cannot interpret what it is that person should know or be able to perform.

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- 4) Ability to cooperate and communicate with others is mentioned in at least two articles. Authors emphasize importance of interaction due to nature of big data – very specific IT type of skills are needed to store data, manage software that usually is performed by IT employees. Interpretation and analysis of data is performed by analysts and requires different type of skills while decision making is done by management and requires general understanding of big data and managerial skills. In order to successfully utilize big data, communication between three parties should be done.
- 5) Authors of this research identified only one article that indicated need for knowledge of industry to successfully utilize big data. Authors recommend to research this area further to evaluate if big data skills and competences can be successfully transferred between industries or they must be adapted in any way for each specific industry.

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STROKE LITERACY AMONG STROKE SURVIVORS' FAMILY CAREGIVERS

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Abstract. Stroke literacy among family caregivers of stroke survivors is important to avoid stroke and manage the situation after stroke. The stroke often causes serious health problems; therefore, the patient's family members are usually those who guide his/her stroke treatment and rehabilitation process, do homecare and prevent stroke recurrence. Accordingly, qualitative and clear information as well as skills in obtaining, evaluating and using it are important competences for caregivers. The aim of this study is to better understand stroke literacy among family caregivers of stroke survivors in Latvia, with a focus on information sources family caregivers used, on issues family caregivers feel the most / least informed about. The research object is stroke survivors' family caregivers. Two methods – survey and qualitative content analysis – were applied in this study. Total of 51 caregiver in the survey completed a self-administered questionnaire, and 100 articles in the Internet have been analysed. The study results show that the Internet is an important source to obtain information about stroke and caregivers who search information on the Internet feel less informed about several stroke related issues. Study results also indicate many cases when caregivers had not obtained or had not understood the information provided by doctors, as well as show the limited amount of useful information about stroke treatment, rehabilitation, and support.

Key words: stroke, stroke survivors' family caregivers, stroke literacy, the Internet.

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Introduction

The article gains understanding about the stroke literacy among family caregivers of stroke survivors in Latvia, with a focus on information sources family caregivers used, on issues family caregivers feel the most / least informed about. Four research questions were defined in this study:

- 6) How do the family caregivers obtain information about stroke issues?
- 7) What are the stroke issues family caregivers feel the most / least informed about?
- 8) What information about stroke issues is available for caregivers in the Internet?
- 9) Does the feeling of being informed about stroke issues differ between the caregivers who have used the Internet to obtain stroke related information online and those who have not used the Internet to obtain the stroke related information?

Stroke is a widespread cerebrovascular disease that may cause significant effects on the person's life. According to World Health Organization, there are 15 million persons suffering from stroke. For about five million people of them die and five million become disabled (Yu et al., 2013). About one third of stroke survivors need help with daily tasks after stroke (Wang et al., 2015). In Eastern Europe, the incidence of stroke is higher than in Western Europe: 300 – 500 stroke cases per 100.000 inhabitants in Eastern Europe vs. 200 – 250 stroke cases per 100.000 inhabitants in Western Europe (Millers, 2010). Similar statistics can be observed with mortality – Eastern Europe shows higher death-rates from cardiovascular diseases than Western Europe (World Health Organization, 2012).

Higher incidence and death-rates of stroke are strongly related to society's ability to pay for health care services and their accessibility. The socio-economic situation varies in different regions of Latvia. Comparing mortality from circulatory diseases (incl. stroke), expressed per 100.000 inhabitants, in 2015 the highest death rate was in Latgale (1057.2) and Vidzeme (914.4); the lowest was near the capital of Latvia – in Pieriga region (660.2). Lower stroke incidence rates in Pieriga region can be explained by better availability of services, a lower demographic load over working age, and higher average revenue per household member; thus, more people can afford to

pay for health care services (Human Development Report 2015/2016). Quality of roads, especially in winters, and availability of public transport is also crucial, firstly, for avoiding stroke via visiting doctor regularly, and, secondly, for getting specialized aid at a stroke unit as soon as possible in the case of stroke.

Stroke is also associated with various lifestyle factors, such as alcohol abuse, smoking, preventive health measures, and healthy lifestyle. As it is known, half of the main stroke risk factors are modifiable, such as high blood pressure, diabetes, cardiovascular diseases, high cholesterol, alcohol abuse, cigarette smoking, physical inactivity, obesity, atrial fibrillation, asymptomatic carotid stenosis, and dyslipidemia (Wong et al., 2012). Thereby, knowledge on healthy lifestyle and stroke symptom awareness has an important role in stroke prevention, especially after the first stroke accident, as the risk of stroke recurrence becomes higher. Unfortunately, in real life not enough attention has been paid to stroke prevention. According to the McKevitt et al. study, in Riga, Latvia the need to prevent stroke recurrence was not generally regarded to be the priority among stroke survivors. More attention was paid to dealing with consequences of stroke (McKevitt et al., 1993).

Awareness of stroke related information is defined as stroke literacy, which is analysed in this study. Stroke literacy is a very recent concept – it refers to the situation when a person demonstrates stroke risk factors and symptoms' awareness, and correctly identifies the brain as the place where stroke occurs (Morren et al., 2013). This concept has evolved from the concept 'health literacy'.

Stroke literacy studies carried out so far have not analysed the caregivers' awareness of stroke rehabilitation and aspects of care giving to stroke survivors. These are important aspects as at the end of treatment in hospital caregivers sometimes feel not enough informed about the state-funded rehabilitation possibilities and conditions of receiving homecare; caregivers lack sufficient knowledge and skills in everyday work (washing, dressing, and cooking etc.) (Egbert et al., 2006), in care giving (Mak et al., 2007), as well as they lack awareness of the nature of the disease and the support available (Giosa et al., 2014). Therefore, in stroke literacy analysis, rehabilitation and care giving dimensions must be addressed, as both of them are essential components of the stroke recovery process and in coping with the new situation. In stroke literacy analysis, attention should be also paid to other competences examined in health literacy researches:

- 1) person's ability to access, understand, appraise, and apply stroke information in order to make judgments (HLS-EU Consortium, 2012);
- 2) health care provider and patient interaction – to evaluate patient's ability to understand instructions for medication and to follow a health care provider's recommendation for a diagnostic test;
- 3) prevention - to evaluate patient's ability to maintain and improve health, to identify signs and symptoms of health problems that should be addressed together with a health care professional and to understand how eating and exercise habits decrease risks of serious illness development;
- 4) navigation of health care system - to observe the person's knowledge of the health care system and its functioning, the person's knowledge of individual rights and responsibilities, competencies to give informed consent for a health care service (Kutner et al., 2006).

Stroke literacy is an important issue due to several reasons - low stroke and health literacy may result in poorer health outcomes (Wallace et al., 2016), it may result in more often health problems because of medication errors and misunderstanding of treatment (Kanj et al., 2009), it

may result in more use of hospital services with higher emergency risk and mortality, and poorer self-management skills (Rowlands et al., 2014). It might also lead to unhealthy lifestyle (Kanj et al., 2009).

As stroke may cause significant impact on person's health, including physical and cognitive consequences, the family members are often those persons who look after stroke survivors - guide their treatment and rehabilitation processes, perform in homecare and prevent stroke survivors from stroke recurrence, especially when stroke consequences are severe and when the cognitive function of stroke survivor is affected. Therefore, high quality understandable stroke related information as well as the caregivers' skills to obtain, evaluate, and use such information is important competences nowadays.

For the analysis of the stroke literacy among family caregivers of stroke survivors, two methods have been applied in this study. The first method used was a survey of the caregivers of stroke survivors. The survey was conducted at four public and private rehabilitation centres and hospital departments in Latvia (near the capital city, in the Eastern part and in the Western part of Latvia). The author chose to recruit respondents in rehabilitation institutions as no stroke survivors' database was available due to the security of personal data. Respondents filled in a self-administered questionnaire. The sample size and survey method obtained do not reflect the target group as precisely as needed for national and representative sample, but results allow exploring the dominant views of the group.

The survey was carried out in March – May 2016. A total of 51 respondent participated in the survey. Majority of the respondents were women (38); there were 13 men. The mean age of respondents was 48.3, ranging from 20 to 81. Majority of the caregivers were immediate family members. The survey was administered in two most used languages in Latvia - Latvian and Russian. Mainly all questions were open-ended and contained linear scale. Data were analysed using various methods. Descriptive statistics were used to describe the information sources and stroke knowledge. To find out whether there are significant differences between the answers given by the two groups of respondents (caregivers who had used the Internet to obtain stroke related information (n=24) and respondents who had not used the Internet to obtain stroke related information (n=24)), the Chi-Square Test and T-test have been used. Level of significance in crosstabs and t-test was set at 0.05 (Trochim, 2006).

The second method used in this study was a qualitative content analysis with aim to analyse what information is available to caregivers in the Internet. Content analysis was carried out in April-May 2017. A total of 100 web articles in different websites have been analysed. The articles were selected in "Google.lv", using five specific key words, which matches the way information is searched by family caregivers: „stroke”, „stroke treatment”, „rehabilitation after stroke”, „stroke survivors' home care”, and „support for stroke survivors”. Using each keyword, first 20 articles in Google search were selected for analysis. Articles were in Latvian language (Table 1).

In the content analysis the author drew attention to the following indicators: (a) who is the author of the article (is it public authority, NGO, hospital, mass media, social portal or other), (b) are there references in the article, (c) is there further guidance on sources where to get more information about stroke, and (d) does the article provide the necessary information to the question searched.

Table 1

Articles analysed in the qualitative content analysis

No	Articles found by the keyword:	Mass media website	State, municipality website	Hospital, medical institution website	Blog, forum	Other	Total
1.	"stroke"	7	1	2	0	10	20
2.	"stroke treatment"	6	0	2	1	10	20
3.	"rehabilitation after stroke"	6	4	5	3	2	20
4.	"stroke survivors' home care"	4	3	4	3	6	20
5.	"support for stroke survivors"	2	8	4	0	6	20

Source: Author's calculations based on qualitative content analysis

Research results and discussion

1. Acquisition of information

Improvement in stroke prevention and modifiable risk factors requires effective health communication strategies to address knowledge gaps about the fact that stroke can be preventable and to improve modifiable lifestyle factors, e.g. smoking and obesity (Appleton et al., 2015). Survey results show that the most popular source used to obtain stroke related information was the chief doctor (n=36), the general practitioner (n=29), the Internet (n=26), and acquaintances, friends or family members (n=23). Other stroke survivors and their family members (n=12) and medical books (n=11) were more rarely used information sources.

The study results show that obtaining and understanding the wide range of stroke related information and understanding the medical terms and language are a challenge for patients. According to the survey:

- 28 of all (51) respondents assessed their skills in obtaining the information (from doctors, media, acquaintances and other sources) to be "good / very good", 18 of all respondents assessed their skills to be "average" and five to be "poor / very poor".
- 15 of all respondents rarely or never obtained answers to the questions they had searched for (from doctors, media, acquaintances and other sources), 24 of all respondents often obtained answers to the questions they had searched and 11 – always obtained answers to the questions they had searched;
- 12 of all respondents rarely understood the information provided by the doctors, 23 of respondents often understood the information, while 14 of respondents – always understood it;
- from all respondents, who once experienced situation when they had not understood the information provided by the doctor (incl. persons who rarely or often understands information provided by the doctors), 22 respondents answered that they rarely or never tried to clear it out or to find more information about the issues they had not understood.

Significant support in understanding the information should be provided by the doctor, especially the general practitioner. However, according to the survey results, only 29 caregivers (out of 51) had asked for information to the general practitioner. In Latvia, a general practitioner is a primary care physician who takes all care of a patient. General practitioner is supposed to consult patient in all uncertainties, explain medical information and guide the patient in treatment, rehabilitation or illness prevention processes to avoid negative consequences that might appear

from incorrect self-treatment or inactivity. Survey results show that the general practitioner's role in case of stroke should be strengthened.

Survey results provided above also show that the Internet is an important source of information – 26 of all (51) respondents have searched stroke related information online. Statistics also prove the important role of the Internet. In 2016, 81 % of population in Latvia aged 16-74 used the Internet in last 3 months (in 28 EU countries - 82 %) (Eurostat, 2016). The use of the Internet has increased in last years. Often, better ICT skills also correlate with better health literacy skills, as concluded by Rowlands et.al. (2014) and Wong et al. (2012).

The Internet has a great potential to provide understandable and useful health information, providing information in more visual and interactive way (Christmann, 2005), e.g. video streams, applications and others. The Internet ensures an easy access to information and provides various possibilities to find the latest information worldwide. Interaction possibilities, like online social networks and forums on special health topics, can also support information extraction. One of the EU studies shows that half of the society who seeks information on the Internet thinks that the Internet plays the main role in the fact that they understand health related information and can interact with doctors (Christmann, 2005). Due to a widespread pool of information, the Internet is a great tool that might help to enhance stroke literacy, health knowledge and support people to become responsible for their own health. However, at the same time it involves danger that the information provided via Internet is false, low quality or too complex for the users (Christmann, 2005). One of the Australian studies shows that readability of Australian health websites is above the average Australian level of reading (Mak et al., 2007). Therefore, clear information in the Internet related to stroke and health topics, as well as patients' skills in information evaluation are important issues to be addressed in future.

2. Information available in Latvian websites

To find out what information is available to caregivers in the Latvian websites, the author made the qualitative content analysis. Content analysis shows that information about stroke as a disease, stroke causes and risk factors, stroke symptoms and action in case of observing these symptoms can be found easily. Mainly these online articles are published in mass media websites and can be found there more often than in governmental sites. Information about stroke as a disease, stroke causes and risk factors, stroke symptoms provided in mass media websites has been displayed correctly. This is indicated by the fact that such information can be found in scientific publications and is provided by medical specialists. However, articles rarely contain references, therefore the lack of references makes difficulties for the reader to verify the facts and be sure about them. Also links to other sources are usually not provided.

Regarding to the articles found using keyword "stroke treatment", the main available information in the Internet is the fact that the patient should get first aid and undergo thrombolytic treatment at a specialized stroke unit (Latvijas Ārstu biedrība, 2008). Two articles analysed provide information on the number of days to be spent in hospital in acute stroke treatment (Millers et.al., 2010 & Liepājas reģionālā slimnīca, 2010). There is limited information on the specifics of stroke treatment in hospital after receiving the thrombolytic treatment, e.g. treatment in neurology department and early rehabilitation. In articles analysed, two articles partly explains the acute stroke treatment process (Liepājas reģionālā slimnīca, 2010). One of them - clinical guidelines - is highly medical, with many medical terms, and is difficult to understand (Latvijas Neurologu

biedrība, 2013). Thereby, the author concludes, information found in the Internet does not help caregivers and stroke survivors to feel competent about stroke treatment process and its requirements. Sufficient information, especially published by public authorities, is missing despite the fact that it is essential for stroke survivors' caregivers. Moreover, this information is relevant and essential for a large number of individuals who face the stroke for the first time, as the stroke is one of the most widespread diseases.

Analysing the available information about stroke rehabilitation, the author concludes that a person can obtain information about state-funded in-home rehabilitation service and can find links to the National Health Service website, where information about institutions providing home rehabilitation service is given (Veselības ministrija, 2017). A lot of articles found are published in 2012 when home rehabilitation service was established. After year 2012, articles have been published less often. The author concludes that no information is available on where to receive state-funded or private ambulatory and stationary rehabilitation services - which institutions provide such rehabilitation, what are the queues for the services, how many days of rehabilitation is ensured, how much does it cost, what are the special requirements for rehabilitation etc.

Information regarding the stroke survivors' home care aspects can be rated on average. In articles found using key word "home care", information is given mainly about the medical rehabilitation, three articles give information about bedsores and ways how to avoid them (Medicine.lv, 2015), some articles give information about the fact that there are care services and that they are expensive (Gruntmane, 2017). There is information about palliative care, and two articles give advices in home care (washing etc.). The author believes that the articles found should contain information not only about these topics, but should also provide information about specially adapted exercises for stroke survivors, psychological condition of a person after stroke, and recommendations in interaction with the stroke survivor.

Regarding to the support measures for stroke survivor, articles contain information about the medical rehabilitation. There are also articles that provide information about the social support provided by the municipality. One article provides information about professional and social rehabilitation, technical aids and social support for disabled persons. One article gives recommendation on food choice after stroke. Useful article found is also one made by the organization VIGOR containing information that the organization provides free psychological help to stroke survivors and their caregivers. In the author's opinion, more articles should be published about psychological support services for stroke survivors and their caregivers and practical aspects how to apply for social support.

3. Stroke issues family caregivers feel the most / least informed about

Evaluating the topics stroke survivors' caregivers feel the most and least informed, survey results show that the caregivers felt most informed about the necessary health checks and their frequency to reduce the risk of stroke (1.67 points, where 1 - well informed and 4 - not well informed) and patient's care at home (1.71 points). The caregivers felt least informed about the place where to seek social assistance if necessary (1.88 points) and about healthy lifestyle requirements after stroke (1.83 points). Their being informed about the time when stroke rehabilitation has to be started (after stroke) and their being informed about stroke risk factors were evaluated with average 1.79 and 1.75 points relevantly. When comparing these results between two groups - caregivers who had used the Internet to obtain stroke related information

(n=24) and respondents who had not used the Internet to obtain stroke related information (n=24), statistically significant differences were observed. Two T-test results approved Chi-Square test results saying that respondents who had sought information on the Internet evaluated their knowledge of healthy lifestyle requirements after stroke and stroke risk factors lower than those who had not sought information on the Internet. Here are the results (lower average quantity means being informed better):

- feeling informed about healthy lifestyle requirements: those who had used the Internet (mean 2.21), those who had not used the Internet (mean 1.46);
- feeling informed about stroke risk factors: those who had used the Internet (mean 2.08), those who had not used the Internet (mean 1.42).
- additional T-test showed one more significant difference - respondents who had sought information on the Internet evaluated their knowledge of where to find social support lower (mean 2.13) than those who had not used the Internet for seeking information (mean 1.63).

These results indicate that information search on the Internet is linked with insufficient knowledge of healthy lifestyle requirements after stroke, knowledge of stroke risk factors and knowledge of where to find social support. In author's opinion, information search on the Internet might be related to lower patient-doctor interaction skills, poorer understanding of information given by physicians, and insufficient information provided by doctors. Patients may feel uncomfortable asking more questions and admitting they do not understand physician's provided information. Further analysis of this topic is recommended to find out the real underlying causes.

Conclusions, proposals, recommendations

- 1) Obtaining and understanding a wide range of stroke related information is a real challenge for patients - 23 of 51 respondents assessed their skills in obtaining information to be "average / poor or very poor"; 15 of all respondents rarely or never obtained answers to the questions they had searched for; 12 of respondents rarely had understood information provided by the doctors, and from all respondents, who once had experienced situation when they had not understood the information provided by the doctor, 22 respondents rarely or never tried to clear it out or to find more information about the issues they had not understood. Simpler information, indications where to find information and avoiding jargon in communication with patients might improve caregivers' stroke literacy.
- 2) The role of the general practitioner in Latvia should be strengthened. It is the primary care and the most accessible physician, who holds full medical history of the patient, who is supposed to consult the patient in all uncertainties, explain medical information and guide the patient in the treatment and rehabilitation processes. But according to the survey, only 29 from 51 caregiver asked for the necessary information to their general practitioner.
- 3) Survey approved that the Internet is an important source of information. Survey results indicate that information search on the Internet is linked with insufficient knowledge of healthy lifestyle requirements after stroke, knowledge of stroke risk factors, and knowledge of where to find social support if necessary. It might be explained by lower interaction skills with doctors, poorer understanding of information given by physicians, or insufficient information provided by the doctor or the hospital / health centre. Such results indicate that more attention should be paid to ensuring information about healthy lifestyle and stroke risk factors, especially by general practitioners.

- 4) The Internet has a great potential to provide clear and useful stroke information, especially to caregivers with low stroke literacy, providing information in more visual and interactive way. However, in Latvian websites, incl. public authorities' website, there is a lack of information that (a) explains the specifics of stroke treatment after receiving the thrombolytic treatment, e.g. treatment in neurology department and early rehabilitation, (b) that explains where stroke survivors can receive state-funded or private ambulatory and stationary rehabilitation services - which institutions provide such rehabilitation, the queues for the services, how many days of rehabilitation is ensured, how much does it cost, what are the special requirements etc., (c) that explains specially adapted exercises for stroke survivors that can be done at home, (d) that explains what is psychological state of a stroke survivor and how to communicate with stroke survivor, (e) that explains what psychological support services are available for stroke survivors and their caregivers. A special website for stroke related information has to be created by public authorities including all the necessary information about stroke - the disease, stroke phases, rehabilitation, treatment, and lifestyle requirements etc. - to ensure people that they do not have to find it by themselves.

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