

Development of Rural Areas in Poland in the Knowledge Economy

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Abstract: *The purpose of the article was to present the conditions of the development of rural areas based on knowledge. The paper presents review of the concept of knowledge-based economy in the context of the changes taking place in rural areas. Special attention is given to the system of education and innovation, as well as economic incentives and computerisation. The results indicated the spatial variation in the educational background of the rural population and its access to information technology. In the years 2002-2011, the share of the population with higher education increased from 4.2% to 9.9% and with secondary education - from 19.6% to 23.9%. Despite the positive changes taking place in rural areas, the overall level of education of the rural population is much lower than of the population of urban areas. Positive changes have also taken place in access of rural population to ICT. In 2008-2012, the share of rural households with the broadband Internet access increased from 24% to 61%.*

Keywords: *rural areas, knowledge economy, information society, innovation, progress.*

1. INTRODUCTION

Rural areas in Poland show profound social and economic disparities in relation to highly urbanised areas. The level and quality of life in many rural regions are much lower than in the city. The scale of the problem is demonstrated by the fact that rural areas account for 93% of the total surface of Poland and yet they generate much less revenue than other areas of the country. The current level of their socio-economic development has been affected by both modern-day economic factors and the historical factors associated with the specific political and economic past. Former partition borders are still visible in the contemporary countryside landscape (settlement patterns) and the agrarian structure (farm size structure), as well as farming culture and mentality of the rural society [1, 2, 3]. Rural development is therefore a complex process; the result of many factors related to the society and cultural heritage, entrepreneurship and agriculture, environment and investment attractiveness, educational opportunities, availability of public services and development centres as well as information and advanced communication technologies [2].

The new paradigm of sustainable development, based on knowledge, is gaining importance in the contemporary socio-economic development. The knowledge economy is the economy of the practical use of knowledge and information in the local and regional development [3]. The increase in the value of knowledge in the process of building the regional capacity stems from the development of computer and communication technologies, the growing importance of social and human capital, and increasing competitiveness [4]. According to U. Ziemiańczyk [5], knowledge has become "the main instrument of change." The knowledge development is directly connected to the development strategy 'Europe 2020', whose aim is "smart growth based on knowledge and innovation" [6], as well as to the third European Union Framework Programme on research and innovation 'Horizon 2020'. The program sets new social challenges for the EU in the near perspective, including resource and raw materials efficiency, and innovative and secure society. Due to the fact that 'knowledge' is becoming a major instrument of change in the modern world, it seems important to combine the slow processes of the socio-economic changes taking place in rural areas with modern concepts of development.

The aim of the article is the presentation of the socio-economic conditions determining the level of rural development in the conditions of the knowledge economy. These conditions include the education level and the use of information technology. This paper reviews the concepts of the knowledge economy in the context of the changes taking place in rural areas.

2. MATERIALS AND RESEARCH METHODS

The methodology of evaluating competitiveness and innovativeness as well as the knowledge economy is not clearly defined and there are no clearly defined measures [7]. In order to understand the processes of innovativeness and competitiveness, different levels of analysis - at the macro, meso and micro scale - should be considered. On the international front, an important role in the creation of the theory and methodology for measuring knowledge economy is currently played by the World Bank (OECD) and UNECE, as well as the Progressive Policy Institute and the Australia Bureau of Statistics. The examples of methodology for measuring innovativeness as well as a synthetic indicator of the knowledge economy (KEI – Knowledge Economy Index) are presented below (Tab. 1).

Table1. Measures to assess innovativeness and the knowledge economy

World Bank – OECD		Euro stat and European Commission	
Category	Measures	Category	Measures
Education and human resources	Adult literacy rate	Carriers of innovation	Participation of the 25-64 age cohort in lifelong learning
	Population with secondary education in the total school-age population		HE graduates per 1000 population of the 20-29 age cohort
	Population with higher education		Population with the tertiary education in the 25-64 age cohort
System of innovativeness	Number of researchers in the R&D sector	Creating knowledge	Public expenditure on R&D as % of GDP
	Granted patents per million population		Research projects in manufacturing industry
	Number of scientific and technical articles per million population		Expenditure on the R&D centres in HE financed by the business sector
Information technologies	Telephones per 1000 population	Innovations and entrepreneurship	Innovative small and medium businesses
	Computers per 1000 population		Expenditure of businesses on innovation
	Internet users per 10 000 population		Expenditure on information technologies
Economic and institutional stimuli	Quality of regulations	Intellectual property	New patents per million population
	Rule of law		New high-tech patents per million population

Source: authors' own based on Orębański [8], Korol [9], Piech [10], Markowska [11]

The methodology proposed by the World Bank is currently the most common methodology and accepted standard to measure innovativeness of companies. The methodology proposed by the European Commission and Euro stat is used in the context of the European Innovation Scoreboard (EIS) and allows the construction of a composite indicator for the evaluation of innovativeness and innovative efficiency of the EU Member States [11]. In this paper, the selection of indicators to evaluate innovativeness was driven by the availability of statistical data for rural areas in the Regional Data Bank of the Central Statistical Office and the National Population Census 2011.

3. THE CONCEPT OF KNOWLEDGE AND CONCEPTS OF THE KNOWLEDGE ECONOMY

Knowledge and implementation of innovations are important factors in the socio-economic development, conditioning the progress of civilisation and growing prosperity. The importance of knowledge in the process of development and socio-economic growth is based on the fact that it is inexhaustible [9]. According to the definition of M. Wegemann [12], knowledge is a personal ability, which is the product of information, experience and qualifications within a specified time. T. Clarke [13] distinguishes the following types of knowledge: to know 'What?' to know 'Why?', to know 'How?' and to know 'Who?' Both knowledge and economy are strongly interrelated. On the one hand, the development of science is moving towards reducing the gap between science and economy; on the other hand, the economy is becoming dependent on the knowledge in society, the results of current research and the efficiency of the education system [14]. The knowledge economy, known in the literature of the 'new economy', 'digital economy', 'information economy' or 'network economy', is the economy in which knowledge is created, transmitted and used more effectively by organisations, e.g. local government, individuals and communities, favouring rapid social and

economic development [9]. Such an understanding of the definition of the knowledge economy emphasises the role of a better coordination between the activities of the national and regional governments, the society and the private sector in order to accelerate the socio-economic development. The most important role in the knowledge economy is played by a continuous process of innovation and competition [15].

In the process of competition, market operators compete with each other in pursuit of their objectives. Competitiveness, as perceived by the European Commission, is the ability of regions, countries and transnational geographical areas to effectively compete in order to achieve relatively high levels of income and employment [16]. Regional units compete with each other by providing the best possible conditions for the success of the economic operators located in their territory. This means that the formation of the competitive potential of the region is a very important task, especially in the context of rural regions. High competitiveness of rural areas is based on the high quality of natural resources, modern and diversified economic structures, modern technical infrastructure, developed sector of small and medium enterprises, as well as good marketing of the goods produced in rural areas [1].

The objective of the innovation process is to implement a new or improved product or process, a new organisational method or a new marketing method in business practice [17]. Innovative activity in modern processes of development includes scientific and technical, organisational, financial and commercial projects [9]. The strategy 'Europe 2020' underlines that only basing the development of the economy on knowledge and innovation provides an opportunity for growth and increased international competitiveness. The concept of building competitiveness and innovativeness in rural areas is focused on knowledge management and finds its dimension in the model of sustainable and multifunctional development of rural areas and agriculture [18]. This model is being implemented by the EU through the policy of the socio-economic cohesion.

4. RESEARCH RESULTS

The development and prosperity in the knowledge economy depends on a large body of knowledge and skills of a particular society, which determines the growth of entrepreneurship, initiative and innovativeness. An important element, thus, is building the information society, which can easily cope with the realities of the modern economy. The development of scientific research stimulates competitiveness of the whole region. Economic knowledge and social skills play an important role in the development of competitive and efficient agriculture. The knowledge transfer promotes the development and modernisation of farms and the production cycle. Therefore, an important indicator of the development of competitiveness in rural areas is the level of education of the society.

Based on the results of the 2011 National Population Census, it is noted that in the years 2002-2011 in rural areas of Poland, the share of the population with higher education increased from 4.2% to 9.9%, and with secondary education from 19.6% to 23.9 % (Fig. 1). This means that the share of the population with higher education in rural areas increased by 5.7% and exceeded the level expected by demographers for 2020. Favourable changes also occurred in the group of people with primary education. In 2002, 40% of the rural population had only primary education, while by 2011 this share had fallen to 25.6%.

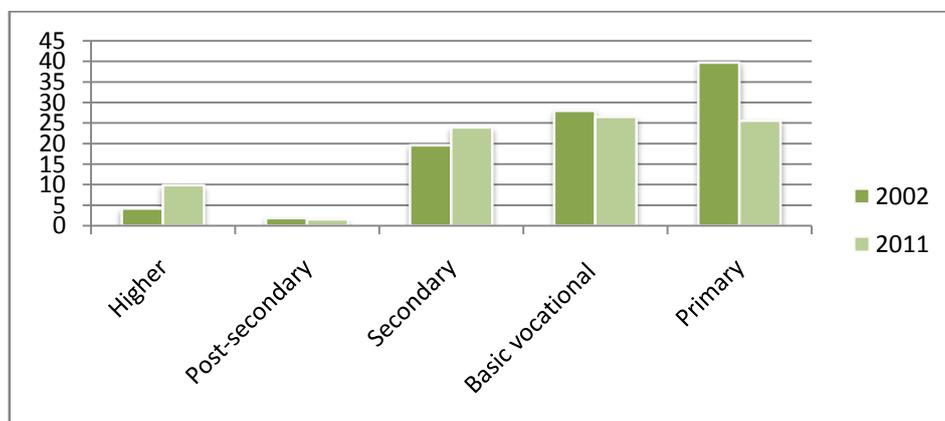


Fig1. Changes in the education level of the rural population in Poland (%)

Source: authors' own based on National Population Census 2011.

Despite the overall increase in education level of the rural population, it still shows a much lower proportion of rural population with higher education compared with the population in urban areas (21.4%). A similar situation is observed in terms of the population with secondary and post-secondary education (Fig. 2).

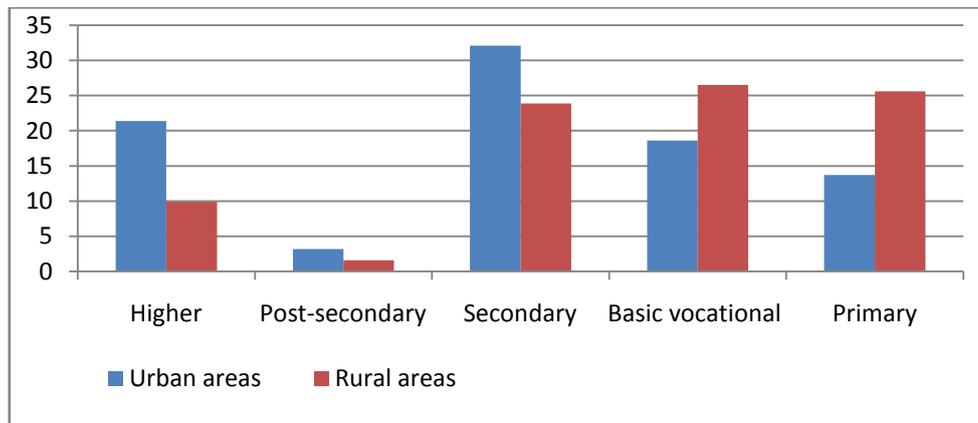


Fig2. Education structure of the population in urban and rural areas in Poland

Source: authors' own based on National Population Census 2011.

An important element in the development of the knowledge economy in rural areas is the availability of the ICT. Its use promotes universal access to expertise and information, giving equal opportunities to the rural society to a better education and instant information, which is important for the quality of social life. This is the essence of building the information society. The level of advancement of information society is determined on the basis of the number of households with computers and the infrastructure enabling communication over the Internet (Fig. 3).

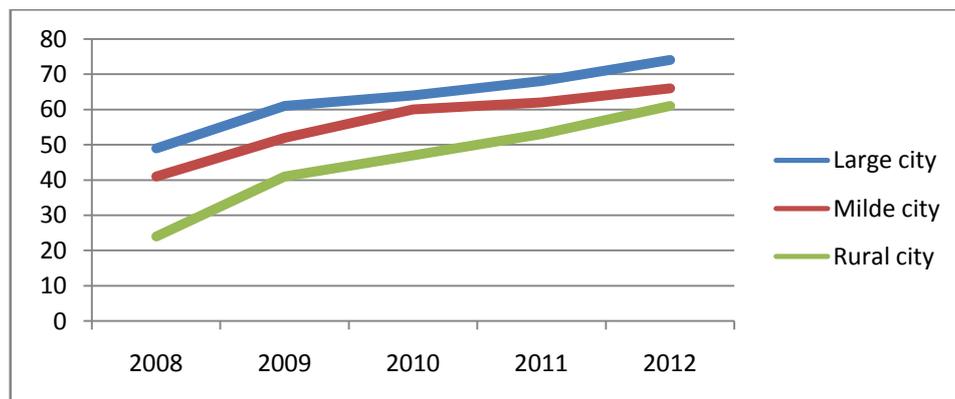


Fig3. Share of households with the broadband Internet access in Poland (%)

Source: authors' own based on National Population Census 2011

In 2008-2012, the share of households with broadband Internet access in rural areas increased from 24% to 61%. Compared to large and medium-sized cities, this share still remains the lowest but is gradually increasing, and the gap between rural areas and large cities decreased from 25% in 2008 to 13% in 2012.

The comparative analysis of the use of the ICT in rural and urban areas demonstrated large spatial diversity. In 2011, the share of households with a computer in rural areas was 69.4% and was lower than in urban areas only by 5.9%. However, there was a significant difference in terms of the household access to the Internet. The difference between rural and urban areas was 8.2% (Tab. 2). A similar relation was recorded for the household spending for the Internet services, where the participation of rural areas was 61.8%, while in urban areas 70.0%. The proportion of spending on computer equipment, however, was similar and amounted to 42.7% in rural areas and 46.9% in urban areas. In summary, it can be said that despite the ongoing construction of the infrastructure of information society there is still a gap between urban and rural areas. It is evidenced by the much lower average expenditure on the ICT per household in rural areas (PLN 63) than in the city (85 PLN).

Table2. *ICT use in households*

Households	Urban areas	Rural areas
• with a computer [%]	75.3	69.4
• with the Internet access [%]	71.0	62.8
Expenditure on the ICT [PLN]		
• hardware	46.9	42.7
• software	14.7	11.9
• Internet services	70.0	61.8
• average monthly expenses per household	85.0	63.0

Source: *authors' own based on National Population Census 2011*

5. CONCLUSION AND SUMMARY

In the contemporary socio-economic development the new paradigm of sustainable development, which the knowledge economy is becoming, is increasingly important. The concept of building competitiveness and innovativeness in rural areas is focused on the knowledge management and finds its dimension in the model of sustainable and multifunctional development of rural areas and agriculture. The knowledge transfer promotes the development and modernisation of farms. An important measure of the development of competitiveness in rural areas is the level of education of the society. In the years 2002-2011, the share of rural population with higher education increased from 4.2% to 9.9%, and with secondary education from 19.6% to 23.9%. In 2002, 40% of the rural population had only primary education, while by 2011 this share had fallen to 25.6%. An important element in the development of the knowledge economy in rural areas is the availability of the ICT. Its use promotes universal access to knowledge and information, giving equal opportunities to the rural society for a better education. In 2008-2012, the share of households with broadband Internet access in rural areas increased from 24% to 61%. Compared to large and medium-sized cities, this share still remains the lowest but is gradually increasing, and the gap between rural areas and large cities decreased from 25% in 2008 to 13% in 2012.

REFERENCES

- [1] Ziemiańczyk U, Krakowiak-Bal A, Mięka B (2013) Knowledge management in the process of rural development, infrastructure and Rural Environment. In: Polish Academy of Sciences, Rural Infrastructure Technical Committee in Krakow. No 3/IV/2013, p. 353–369.
- [2] Jezierska-Thöle A (2013) rural development models in theory. In: M Wojcik (ed.), the regional dimension of transformation of the Polish countryside - spatial aspects of economic rural studies. *Warsaw: Rural Studies, Vol. 24*, p. 23-39.
- [3] Rudnicki R (2010) spatial variations in the use of EU funds by farms in Poland in years 2004-2006. *Poznan: Scientific Publishers*, p. 391.
- [4] *OECD-World Bank Institute, Korea and the Knowledge Based Econom.* (2000) Paris: Making the Transition.
- [5] *Innovation Union Scoreboard: Research and Innovation Union scoreboard.* (2011), PRO INNO Europe.
- [6] *Europa 2020, Strategia na rzecz inteligentnego i zrównoważonego rozwoju sprzyjającego włączeniu społecznemu*, 2010, Komisja Europejska, Bruksela.
- [7] Jezierska-Thöle A, Biczowski M (2013) the importance and determinants of innovation in agriculture in Poland. In: Scientific Papers Series, No 2, Warsaw, Poznan, Szczecin.
- [8] Orębski M (2006) Meters regional development. In: D. Strahl (ed.), *Methods of assessment of regional development.* University of Economics in Wrocław, Wrocław.
- [9] Korol J, Szczuciński P (2009) Economic modeling of the regional economy based on knowledge. Ed. Marszałek, Torun: 39, p. 85.
- [10] Piech K (2008) *Knowledge and Innovation Processes in Central and East European Economics.* The Knowledge and Innovation Institute, Warsaw.
- [11] Markowska M (2007) Innovation Polish regions against regions of the EU. In: S Pangsy-Kania (ed.) *Knowledge and innovation in the development of Polish regions: driving forces and barriers.* Foundation for the Development of the University of Gdańsk, Gdańsk.

- [12] Weggeman M (1997) *Kennismanagment, Irichting en besturing van kennisintensive, organisatie.*, Schiedam, p. 56.
- [13] Clarke Th (2001) *the knowledge economy*. Education and Training. No 4/5.
- [14] Świtalski W (2005) Innovation and competitiveness. Publishing, University of Warsaw, Warsaw: p. 57-59.
- [15] Olechnicka A Gorzelak G (2007) The Information Society in the space of Europe. Regional and Local Studies, No. 1 (27), 50-73.
- [16] *Sixth Periodic Report on the Social and Economic Situation and development of the Regions of the European Union. (1999)* Bruxelles-Luxembourg: p.32-39.
- [17] Science and technology in Poland in 2008. (2010) Warsaw: GUS, p. 104.
- [18] Jezierska-Thöle a Goraj S (2014) Sustainable development of rural areas of Northern and Western Polish and East Germany. In: A. Jezierska-Thöle, Biczkowski M. (ed.) Integrated rural development policy in the light of the Union European Ed. Nicolaus Copernicus University, Torun: pp. 69-82.

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She works as an academic researcher in the department of Spatial Planning and Tourism at the Nikolaus Copernicus University of Torun. She is the author of about 80 publications. She is a specialist in the field of spatial and socio-economic geography. She deals with socio-economic changes in rural areas in Poland and Germany. Important parts of her research are contemporary theories, concepts and models of economic development.