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Tekst jest udostępniony do wykorzystania w ramach  
dozwolonego użytku.

**PIOTR BÓRAWSKI, JAMES W. DUNN, THEODORE R. ALTER**

# **EVALUATION OF HUMAN CAPITAL AND ITS IMPACT ON ECONOMIC RESULTS OF FARMS ENGAGED IN NON-AGRICULTURAL ACTIVITY IN POLAND**

**Summary:** The 2011 survey was conducted to evaluate the human capital of farms having alternative sources of income. The enterprises surveyed can be described as small and medium-sized entities. Most face strong market competition. That is why the knowledge and education of their owners is crucial in enterprise development. We have surveyed 354 enterprises located in following voivodeships: Warmińsko-Mazurskie, Podlaskie, Pomorskie, Zachodnio-Pomorskie, Lubuskie, Mazowieckie, Lubelskie and Łódzkie. They employ local inhabitants and family members. Most of the surveyed entrepreneurs had secondary education, and declared a knowledge of the Russian, German and English languages, however the knowledge of the languages was generally poor. Only 26.8% of entrepreneurs run different functions in rural areas.

**Key words:** human capital, enterprises, rural areas.

## **1. INTRODUCTION**

Intellectual capital describes knowledge, professional skills and experience of workers. Intellectual capital is divided into relational capital, organizational capital and human capital. Organizational capital includes the management techniques, qualifications and other non-material skills which have an impact on firm reputation. Relational capital is the knowledge in relations between enterprises and organizations<sup>1</sup>.

The most important is human capital which includes the entrepreneurial behavior of how farmers make plans, set goals, evaluate achievements and weigh the consequences of actions. Human capital is important in these actions. It is

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<sup>1</sup> A. Jaki, *Wycena i kształtowanie wartości przedsiębiorstwa*, Wolters Kluwer Polska sp. zo.o., Kraków 2008, s. 19.

responsible for efficiency of farms and integration of farmers<sup>2</sup>. Some authors claim that human capital is responsible for improving the competitiveness of enterprises operating in rural areas. The term of human capital can be described at micro and macro levels<sup>3</sup>. Human capital at the micro level is a source of future satisfaction, quality and value. The term human capital at the macro level refers to a source of knowledge, health, and vital energy included in society<sup>4</sup>. The investment in human capital is important for the development of technology and increases the demand for skilled and educated workers<sup>5</sup>.

There are at least three schools of human capital: post-Keynes, neoclassical, and endogenous growth theory<sup>6</sup>. In the post-Keynes theory “capital and labor are perfect complements to each other.” In neoclassical theory “capital and labor can be continuously substituted for each other.” In endogenous growth theory “human capital is a production factor, the presence of which can promote greater development in a given economy”.

The endogenous growth theory is focusing on factors of development. The model of endogenous growth explained factors of the development of U.S economy at the end of 80-ties. One of the element of economy development is human capital, which needs investments. Each employee is not equal to other. The productivity of human capital depends on education, experience, health and possibility of adjustment to new technologies. The human capital can be utilized in more or less effective way. If people do not have motivation to work their capital cannot be utilized for the development of enterprises.

The model of human capital was first elaborated by Lucas (1988), who introduced it to production function.<sup>7</sup> The changes of human capital are functions of people choices and their learning. Human capital does not mean just accumulated knowledge, buy people have to learn if they want to increase their capital<sup>8</sup>.

There is also social capital. It represents confidence, cooperation and connections between people creating organization which is working better if the relations between people are better<sup>9</sup>. Many authors point out barriers that prevent social capital development, which results in the decreasing of network creation.

<sup>2</sup> M. Kozera, *Kapitał ludzki jako składnik kapitału intelektualnego w rolnictwie*, „Problemy Rolnictwa Światowego” 2011, Tom 11 (XXVI), Zeszyt 1, s. 105–111.

<sup>3</sup> A. Marcysiak, A. Marcysiak, *Wpływ cech jakościowych kapitału ludzkiego na wyniki ekonomiczne gospodarstw rolniczych*, „Problemy Rolnictwa Światowego” 2011, Tom 11, zeszyt 4, s. 129–136.

<sup>4</sup> S.R. Domański, *Kapitał ludzki i wzrost gospodarczy*, Warszawa 1993.

<sup>5</sup> X. Song, *The effects of technology change on Life-cycle human capital investment*, “EEA-ESEM Conference” 2007, vol. 8.

<sup>6</sup> I. L. Akócsi, T. Tóth, T. Csonka, *Humans, as a factor of competitiveness*, „Roczniki Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich” 2012, t. 99, z. 3, s. 7–20.

<sup>7</sup> R. E. Lucas, *On the Mechanics of Economic Development*, “Journal of Monetary Economics” 1988, vol. 22, s. 3–42.

<sup>8</sup> <http://www.econ2.jhu.edu/people/ccarroll/public/lecturenotes/Growth/LucasGrowthWeb/>

<sup>9</sup> F. Fukuyama, *Zaufanie: kapitał społeczny a droga do dobrobytu*, przekł. z ang. Anna i Leszek Śliwa. wyd. PWN, Warszawa/Wrocław 1997.

The most important problems include low level of awareness of entrepreneurs, poor competence in business activities and shallow understanding of company's goals by owners<sup>10</sup>.

Knowledge accumulation is represented by social capital that helps enterprises run and use information, including: transaction costs, resource dependence, industrial theory and other<sup>11</sup>. There is a close link between inter-organizational relationship and social capital because entrepreneurs can use useful information that enhances their knowledge<sup>12</sup>. Social capital development plays an important role in business culture<sup>13</sup>.

Kay, et al. (2008) point out that motivation, evaluation and training of personnel are essential skills. To ensure good employees, farmers must offer good working conditions. In a modern, competitive economy, farmers often use consultants and advisors to obtain new information to help them achieve success. Nowadays, the most valuable skills for employees are in machinery usage, marketing, and accountancy<sup>14</sup>. We consider human capital as an essential factor for non-agricultural economic activity development in rural areas and improved efficiency of farms.

Non-agricultural economic activity in rural areas is a possible solution to improve the economic situation of the rural population<sup>15</sup>. This includes the use of land, labor and capital to conduct additional activities that may or may not be related to agriculture. The significance of these activities is to gain alternative income and therefore better access to capital<sup>16</sup>. Non-agricultural economic activities in rural areas create opportunities in agriculture and outside agriculture for farm owners. It is particularly important in Poland, because the agricultural work force averages 11% of the total in Poland, while in the original EU 15 member states it is about 1.9%. According to data from the 2007 Agricultural Census, there were 2.26 million farms in Poland operating in agricultural and non-agricultural production, and in 2005 only 23.3% of these households performed services using their own equipment. Non-agricultural economic activity is beneficial to rural

<sup>10</sup> S. Prashantham, S. Young, *The Internet and the internationalization of small knowledge-intensive firms: Promises, problems and prospects*, "International Journal of Entrepreneurship and Small Business" 2004, vol. 1(1/2), s. 153–175.

<sup>11</sup> B. R. Barringer, J. S. Harrison, *Walking a tightrope: Creating value through inter organizational relationships*, "Journal of Management" 2000, vol. 26(3), s. 367–403.

<sup>12</sup> R. B. McNaughton, J. D. Bell, *Brokering networks of small firms to generate social capital for growth and internationalization*, "Research in Global Strategic Management" 1999, vol. 7, s. 63–82.

<sup>13</sup> M.A. Hitt, H-U. Lee, E. Yucel, *The importance of social capital to the management of multinational enterprises: Relational networks among Asian and Western Firms*, "Asia Pacific Journal of Management" 2002, vol. 19, s. 353–372.

<sup>14</sup> R.D. Kay, W.M. Edwards, P. A. Duffy, *Farm management sixth edition*, Mc-Graw-Hill 2008, p. 13.

<sup>15</sup> A. Nowak, *Podejmowanie dodatkowej działalności przez rolników jako przejaw innowacyjności*, Prace Naukowe nr 45 Innowacje i innowacyjność w sektorze Agrobiznesu, Katedra Polityki Agrarnej i Marketingu, SGGW, Warszawa 2008, s. 59–66.

<sup>16</sup> W. Józwiak (red.), *Ewolucja gospodarstw rolnych w latach 1996–2002*, GUS, Warszawa 2003.

development and leads to better use of farm resources, including land<sup>17</sup>. Since rural Poland has low farm incomes and substandard living conditions, the development of entrepreneurship can improve local conditions<sup>18</sup>. Non-agricultural activities are also affected by spatial factors, such as the access to markets and cities, urban network, infrastructure and distance from border crossings<sup>19</sup>. Entrepreneurship is important in shaping the structure of countryside as it allows for greater land concentration<sup>20</sup>. Non-agricultural economic activity is essential for small farms that have limited opportunities to grow through agricultural production<sup>21</sup>. Broadly understood entrepreneurship in rural areas is a prerequisite for stimulating their development<sup>22</sup>. The development of rural areas and increased competitiveness is also a concern for the EU. One objective of the EU is to reduce economic differences between countries and regions in the EU<sup>23</sup>.

## 2. OBJECTIVE AND METHOD OF ANALYSIS

The aim of the study was to assess the human capital of individual owners of farms with alternative sources of income.

To develop the problem of human capital in farms having alternative sources of income the authors wanted to answer following questions:

- How high is the employment in surveyed farms?
- What is the education of surveyed farmers?
- How did the variables describing human capital affect agricultural income?
- What is the human capital index of surveyed farms?

The study was conducted in 2011 as part of the habilitation project “Factors differentiating the effectiveness of holdings with alternative sources of income with particular emphasis on the land’s resources.” The study used a questionnaire

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<sup>17</sup> A. Łapińska, *Przedsiębiorczość jako element wielofunkcyjnego rozwoju obszarów wiejskich*, „Roczniki Naukowe SERiA” 2008, tom X, zeszyt 2, s. 163–168.

<sup>18</sup> A. Łapińska, *Aktywność rolników w działalności pozarolniczej*, „Roczniki Naukowe SERiA” 2007, tom IX, zeszyt 2, s. 205–210.

<sup>19</sup> M. Drzewiecki, *Podstawy agroturystyki*, Oficyna Wydawnicza Ośrodka Postępu Organizacyjnego, Bydgoszcz 2002; P. Pięta, I. Pomianek, *Czynniki wpływające na podejmowanie działalności gospodarczej na obszarach wiejskich w wybranych gminach podregionu olsztyńskiego*, „Acta Scientiarum Polonorum seria Oeconomia” 2008, vol. 7(3), s. 89–97.

<sup>20</sup> A. Gozdalik, *Przesłanki poszukiwania alternatywnych źródeł dochodów w gospodarstwach rolniczych*, „Roczniki Naukowe SERiA” 2004, Tom VI, zeszyt 4, s. 56–61.

<sup>21</sup> P. Bórawski, *Pozarolnicza działalność gospodarza na obszarach wiejskich jako dodatkowe źródło dochodu rodzin rolniczych*, „Zeszyty Naukowe SGGW w Warszawie. Ekonomika i Organizacja Gospodarki Żywnościowej” 2009B, nr 75, s. 15–22.

<sup>22</sup> S. Makarski, *Adaptacja gospodarki chłopskiej i jej otoczenia do warunków rynkowych*. IRWIR OAN, Warszawa 1994.

<sup>23</sup> A. Łapińska, *Stan i perspektywy rozwoju działalności gospodarczej na obszarach wiejskich*, „Roczniki Naukowe SERiA” 2009, Tom XI, zeszyt 4, s. 182–187.

that included open and closed-ended questions. They related to issues of education, motivation, employment, and foreign languages. The study was conducted in households with alternative sources of income in the following regions: Podlaskie, Mazowieckie, Lubelskie, Lubuskie, Łódzkie, Warmińsko-Mazurskie, Pomorskie and Zachodnio-Pomorskie.

We have created the index of human capital. The diagram of the synthetic index of human consisted of four stages: verification types of alternative sources of income, the choice of variables to build the index, the validation checks accepted to build the index on the basis of merit and construction and presentation of the indicator.

$$HCI = \frac{HC+ROE+ULR}{3} \times 100\%$$

HC – human capital

ROE – return on equity

ULR – utilization of labor resources

In the first stage of a verification of alternative sources of income it was assumed that the synthetic human capital ratio will be calculated for farms having alternative non-agricultural sources of income.

In the second stage three components have been selected to build the indicator. Mainly: human capital, return on equity and utilization of labor resources.

The first component human capital included variables that are grouped into: education (numbers 1–4, 1-primary education, 2-secondary, 3-average, 4– higher), number of people employed (1–5), English knowledge (1–5, where: 1- very weak, 2-weak, 3-average, 4–good, 5-very good), Russian knowledge (1–5), German knowledge (1–5).

The second component of the synthetic human capital index was the return on equity, which is calculated by comparing the agricultural income and equity. Equity in the farm was calculated by deducting the value of assets (fixed and current) of long- and short-term.

The third component of the synthetic index was utilization of labor resources. To calculate this indicator uses two variables, namely the number of persons employed in the farm and the number of people living on the farm. If the number of people living on the farm was the same as the number of people employed, the rate was 1.

In the third stage of construction of the synthetic indicator variables was verified adopted to build the index on the basis of merit.

Due to the high diversity group of surveyed households synthetic human capital ratio was calculated for non-agricultural economic activities carried out by farmers and divided into three groups according to human capital index: weak, average, good. The weak capital group consisted 1,2% of the survey respondents average is 60,2%, and good is 38,6%.

In the last stage (the fourth) the indicator was built and analysed.

We have used regression analysis to measure the impact of human capital on farms' economic results according to the equation<sup>24</sup>:

$$\hat{Y} = F(X) = \beta_0 + \beta_x X + \varepsilon$$

where:

$\hat{Y}$  – theoretical value of regression function  $F(X)$  responsible for level of  $x$  variable,

$\beta_0, \beta_1$  – parameters of the structural function of the regression on  $Y$  according to  $X$ ,

$X$  – matrix of explanatory variables

$\varepsilon$  – residual or error term

We measured the impact of human capital on the following variables:  $Y_1$  (income per farm),  $Y_2$  (income per ha farmland),  $Y_3$  (income per employee),  $Y_4$  (income per hour). The variables describing human capital were:  $X_1$  (education of farmers),  $X_2$  (gender of farmers),  $X_3$  (farmer's age),  $X_4$  (number of people in the family) and  $X_5$  (number of employed people). We have put in the table the evaluation of regression, standard error, t test to evaluate the regression equation and the level of importance ( $p=0,05$  most important).

### 3. RESULTS

One measure of the size of the business is the number of employees. Most companies in Poland employ up to 9 people, so are micro-enterprises. In the survey, the business owners were asked about the average number of people employed. The research showed that on average the companies employed fewer than 10 people (table 1). This result demonstrates the tendency for small businesses. Most small companies operate in local markets and serve the local population. Despite their small size, these surveyed enterprises are important. The firms are sorted into three groups: micro sector (employing up to 9 employees), small (10–49 people) and medium (50–249) enterprises. Each is important for economic development, especially in rural areas. They are the principal places of employment for the rural population.

In addition, the creation of new enterprises in rural areas has a positive influence on agriculture, as well as to other sectors. Therefore this entrepreneurship promotes multifunctional development of rural areas. The results of our study confirmed the conditions in the general economy. The vast majority of the Polish entities employ fewer than 10 people. Unfortunately, small businesses often have limited opportunities to develop and limited money to invest, so they may be more focused on survival than on development.

<sup>24</sup> M. Sobczyk, *Statystyka*, PWN, Warszawa 2005.



**Table 1. Average number of employee**

Specification	n
Average in enterprise, including:	9.5
Permament workers	6.2
Family members	1.2
Sezonal	2.1

Source: own elaboration based on research.

Respondents were also asked to classify the type of employees. The responding companies employed many experts and specialists (table 2). This result proves the firms are actively striving to improve the quality of their products and services. Hiring professionals and experts also helps to improve the image of the company. However, professionals generally are paid more and have more opportunities to change jobs. By far the smallest cohorts of employees are young workers (0.2) (students) followed by family members (1.2). Research has shown that the micro enterprises in rural areas mainly hire local people and family members. The recruitment of students was associated with serving their training periods. Employing young workers provides them with professional development as they gain experience. Moreover, by hiring apprentices an employer gets employees that do not receive salaries. Also, an employer can screen the best apprentices to perhaps become regular employees.

**Table 2. Kind of employed workers**

Specification	n
Apprentices	0.2
Family member	1.2
Specialist	3.3
Other people	1.8

Source: own elaboration based on research.

The decisive factor in the development of human capital is motivation. Generally, this term means supporting and stimulating human activities in a certain direction to enable the achievement of planned objectives of the entrepreneurs. Motivation improves creativity, satisfaction and shapes efficiency<sup>25</sup>.

The study tried to understand the actions taken to motivate employees (table 3). The highest percentage of business owners motivated their workers through salary (52%). In a competitive economy, most businesses used a mixed form of

<sup>25</sup> R. Walkowiak, *Kształtowanie zachowań i motywowanie pracowników*, [w:] E. Niedzielski (red.), *Wybrane zagadnienia z podstaw zarządzania*, Wyd. UWM, Olsztyn 2008.



wages, tying the compensation to the desired results. Another frequently used method of motivation in research companies were cash prizes and bonuses. These are the most effective form of motivation. However, the negative sides of them are the reactions of people that do not receive any bonus. Financial motivators help meet the needs of the workers. However, they do involve additional costs for the employer.

Another type of motivation in the surveyed enterprises is non-wage incentives, such as recognition, praise and encouragement. This form of motivation is particularly appreciated by those for whom the prize money is less significant. Only 12.4% of respondents used training. Investment in training improves the quality of human capital in companies and is the most effective way of motivation. The fewest respondents used travel and business trips (0.8%). This form of promotion provides opportunities for interesting leisure activities, but does not improve the efficiency of the company. It does however improve the working environment, builds professional stability, reflects respect, and supports the team.

Another component of human capital is age. Research shows that most respondents are in the ranges of 36–45 and 46–55 years. While a younger person may be more likely to develop the company, typically, the companies run by middle-aged and young people have a better situation than the entities operated by very young owners (to 25 years) and older owners (over 55 years).

One measure of the quality of human capital is the level of education. Schooling and training of human capital enables exchange current earnings for higher future wages. Training is responsible for improving job-specific skills while schooling enhances human capital (Taber 2002). Investment in human capital will determine the pace of technology development because people are essential input in the production process. Education is the most important component of human capital. Our research shows that 18.4% of the surveyed respondents had higher education. A higher level of education helps entrepreneurs better understand market processes, as well as to adjust to the requirements of the single market. The highest percentage of owners of the surveyed companies had secondary education (50.8%). Only a very low percentage of owners in surveyed companies had only in primary education (1.7%).

Respondents were asked to indicate their involvement in the local community. Often the owners of the surveyed companies help in local governance. The largest percentage of respondents act as a councilor (10.2%) and the mayor in local government (5.6%). Other respondents hold positions as members of the local government (4.8%) and District Fire Department (5.1%). However, over 73% of respondents stated that they did not serve in any social leadership role (table 6). This may demonstrate a lack of time for entrepreneurs to engage in activities not related to their business.

Foreign languages are an important component of human capital. Knowledge of foreign languages by the surveyed companies plays a particularly important role in improving sales and marketing. It is also helpful in overcoming disparities between countries because it allows better flow of capital and labor. In addition,

**Table 3. Description of human capital of surveyed farms**

Specification	n	%
<b>Kinds of employee's motivation</b>		
Salary addictive effects of work	184	52.0
Financial rewards	110	31.1
Recognition, praise, encouragement	67	18.9
Training	44	12.4
Toursand travel	3	0.8
<b>Structure of respondents' age</b>		
To 25	10	2.8
26–35	50	14.1
36–45	145	41.0
46–55	128	36.2
Above 55	21	5.9
<b>Education of firms' owners</b>		
Higher	65	18.4
Secondary	180	50.8
Vocational	103	29.1
Primary	6	1.7
<b>Social functions of farms owners</b>		
Local government	20	5.6
Councilor	36	10.2
Member of the local organization	17	4.8
Country club	4	1.1
Member of District Fire Department	18	5.1
None	259	73.2
<b>Percentage of respondents declaring foreign languages knowledge</b>		
English	253	71.5
German	263	74.3
Russian	321	90.7

Source: own elaboration based on research.

knowledge of the language can help reduce delays in development between the member states of the European Union. In addition, knowledge of another language can help immigrants find a better job and also allows better communication and cooperation with other employees. The research shows that the largest percentage of respondents claimed knowledge of Russian (90.7%) and German (74.3%) and the fewest English (71.5%). A good knowledge of foreign languages helps in establishing business contacts with foreign partners. Good command of foreign languages relates positively to the ability of the owners of the enterprises to prepare for changes in the business environment.

#### 4. ECONOMIC RESULTS OF FARMS HAVING ALTERNATIVE INCOMES

Human capital helps improve agricultural productivity by influencing the use of inputs. It enables the adoption of technology to different requirements of the market. Human capital plays an important role in the development of businesses. The skills of heads of households and firms help determine success in a competitive market in the era of integration. One of the most important factors of human capital is education. The more educated entrepreneurs and agricultural producers manage resources more effectively, and are market leaders.

Our aim was to learn if the educational level of entrepreneurs had a positive impact on the economic results of farms. We have found that entrepreneurs having primary education achieved the weakest economic results. That is why we can conclude that education had impact on economic results of farms. Entrepreneurs having higher education achieved the highest income per employee and income per hour (table 4).

**Table 4. Economic results of farms (PLN) according to education of firms' owners**

Education	Income per farm	Income per 1 ha farmland	Income per 1 employee	Income per 1 hour
Primary	27 437.9	2 743.7	13 718.9	13.4
Vacational	99 780.0	4 102.0	54 535.0	64.7
Average	196 636.5	4 643.5	63 133.4	32.1
Higher	175 173.9	3 245.6	102 415.8	84.7

*Source:* own elaboration based on research.

We have analyzed human capital according to human capital index. We have created three groups of entrepreneurs having weak, average and good human capital. This analysis delivers some interesting information (table 5).

First, we analyzed the average number of employed people. It increased with a higher human capital index. Enterprises classified as having good human capital employed more people.

Second, the average age of entrepreneurs was lower as entrepreneurs had a higher human capital index. It means that the companies are run by people in average age and have possibilities to development. Younger enterprises owners give hope for better condition of analyzed firms.

What is interesting we discovered the differences in the education of human capital according to human capital index. The percentage of enterprises owners having the secondary and higher education was the highest in enterprises classified as having good human capital index.

We also analyzed the economic results according to human capital index. We found that the group of enterprises classified as having good human capital achieved the higher income per farm and income per 1 hour. But, the income per 1 ha farmland and 1 employee were highest in enterprises with average human capital index.

**Table 5. Differentiating of human capital and economic results according to human capital index**

Specification	weak	average	good
Average number of employed people (number)	1	1,8	2,7
Average age of entrepreneur (number)	49	44,2	41,7
Percentage of respondents having higher education (%)	-	8,0	15,6
Percentage of respondents having average education (%)	-	36,0	46,9
Income per farm (PLN)	6 609.2	104 530.7	185 802.7
Income per 1 ha farm land (PLN)	2 286.9	4 074.2	2 634.7
Income per 1 employee (PLN)	6 609.2	64 945.0	37 129.5
Income per 1 hour (PLN)	2.8	48.2	54.2

Source: calculations based on own survey.

We wanted to recognize if there is a correlation between variables (tab. 6). We have found big correlation between analyzed variables. That is why we decided to analyze individual impact of variables on economic results of farms. We cannot measure the impact of all variables together on economic results of farms.

**Table 6. Correlation analysis of surveyed farms**

Variables	Standard deviation	Variables				
		X <sub>1</sub> (education of farmers)	X <sub>2</sub> (gender of farmers)	X <sub>3</sub> (farmer's age)	X <sub>4</sub> (number of people in the family)	X <sub>5</sub> (number of employed people)
X <sub>1</sub> (education of farmers)	10.950	1.000	0.997	0.544	0.987	0.991
X <sub>2</sub> (gender of farmers),	11.135	0.997	1.000	0.560	0.990	0.993
X <sub>3</sub> (farmer's age)	11.230	0.544	0.560	1.000	0.531	0.535
X <sub>4</sub> (number of people in the family)	10.795	0.987	0.991	0.531	1.000	0.991
X <sub>5</sub> (number of employed people)	11.042	0.990	0.993	0.535	0.991	1.000

Source: calculations based on own survey.

We have used regression analysis to measure the impact of individual variables of human capital on economic results. We have found that some variables were important in the analysis of income per farm and income per one hour. The variables did not have impact on income per one ha farmland and income per one

employee. Two variables had significant impact on income per farm. These were number of people in family and number of people employed in farm (tab. 7).

We have found that three variables had impact on income per one hour. These were: education, number of people in the family and number of people employed in farm. That is why we can confirm present considerations about positive impact of human capital on economic results of farms. But the employment additional workers decreased the income per one hour.

**Table 7. Regression analysis of surveyed farms**

Variables	Variables				
	X <sub>1</sub> (education of farmers)	X <sub>2</sub> (gender of farmers)	X <sub>3</sub> (farmer's age)	X <sub>4</sub> (number of people in the family)	X <sub>5</sub> (number of employed people)
Income per farm Y <sub>1</sub>					
Coefficient	0.054	0.048	0.035	0.292	0.577
Standard deviation	0.113	0.113	0.113	0.108	0.093
T statistics	0.481	0.424	0.305	2.699	0.623
R <sup>2</sup>	0.003	0.002	0.001	0.085	0.332
P value	0.631	0.672	0.760	<b>0.009</b>	<b>0.000</b>
Income per one hour Y <sub>4</sub>					
Coefficient	0.242	-0.088	0.144	-0.223	-0.272
Standard deviation	0.110	0.113	0.112	0.110	0.109
T statistics	2.207	-0.781	1.293	-2.024	-2.496
R <sup>2</sup>	0.005	0.008	0.021	0.050	0.074
P value	<b>0.030</b>	0.437	0.200	<b>0.046</b>	<b>0.015</b>

Source: calculations based on own survey.

## 5. CONCLUSIONS

Research shows that most companies' owners had secondary education (50.8%) and only 18.4% had higher education. Low levels of education of the respondents demonstrate a lack of the use of continuing education and a focus on survival rather than on development and investment. The research shows that most companies can count on a group of micro-enterprises, employing up to 9 people. Small operations have a lack of investment and limited growth opportunities. However, such entities account for over 50% of Poland's GDP.

Companies run by farmers can be enhanced by foreign languages. Most respondents said they knew Russian and German. Further development of human capital in rural areas in households with alternative sources of income requires investment in education, courses, training, and knowledge of foreign languages, by both business owners and employees.

We have also analyzed the human capital and economic situation of enterprises according to a human capital index. We found that enterprises classified as having good human capital achieved the best incomes calculated by farm and per 1 hour. We can conclude that the efficiency of work was the best what means that the utilization of human capital was most effective.

Enterprises classified as having good human capital employed the biggest number of people what means that they have the best possibilities of development. The average age of enterprises owners was the youngest in the group of good human capital. Such a situation means that they have good possibilities of development.

Statistical analyzes found no effects of following variables: gender and age on the level of agricultural income calculated per farm. It is difficult to explain the lack of impact of age and gender of respondents to the level of income. It may be a regularity that the decision on the functioning of the farm shall take the farmers together with other family members.

Finally, we have confirmed that human capital has an impact on economic results of farms engaged in non-agricultural activity. The studies show great importance of education, number of people employed and number of people in the family on income calculated by an hour. However, to improve conditions in farms it is required to improve qualification of farmers by trainings, for example in terms of land management and farming and animal husbandry. The study group of farmers, performs better education in comparison to the total number of agricultural producers in the country, but further increase of their knowledge makes it possible to achieve a competitive advantage in the Common Market. Better care of education of surveyed farms having alternative sources of income would help in use of EU funds and direct payments and the Rural Development Programme. In a competitive market in the European Union farm owners pursue their goals through better use of EU funds, better cooperation with institutions such as ARMA, ODR, AMA and others.

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## **OCENA KAPITAŁU LUDZKIEGO I JEGO WPŁYWU NA WYNIKI EKONOMICZNE GOSPODARSTW PROWADZĄCYCH POZAROLNICZĄ DZIAŁALNOŚĆ GOSPODARCZĄ W POLSCE**

**Streszczenie:** Badania przeprowadzono w 2011 roku. Celem badań była ocena kapitału ludzkiego w gospodarstwach posiadających alternatywne źródła dochodów. Badane przedsiębiorstwa można scharakteryzować jako mikro, małe i średnie podmioty. Większość z nich boryka się z rynkową konkurencją. Dlatego wiedza i edukacja są ważnymi czynnikami rozwoju przedsiębiorstw. Zbadano 354 przedsiębiorstwa zlokalizowane w następujących województwach: Warmińsko-Mazurskie, Podlaskie, Pomorskie, Zachodnio-Pomorskie, Lubuskie, Mazowieckie, Lubelskie i Łódzkie. Większość przedsiębiorstw zatrudniała lokalną ludność lub członków rodziny oraz posiadała średnie wykształcenie oraz zadeklarowała znajomość języka rosyjskiego, niemieckiego i angielskiego chociaż poziom znajomości był dość słaby. Tylko 26.8% przedsiębiorców pełniło różne funkcje na obszarach wiejskich.

**Słowa kluczowe:** kapitał ludzki, przedsiębiorstwa, obszary wiejskie.

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