

# The Importance of Entrepreneurial Skills for the Success of Agricultural Entrepreneurs

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## Abstract:

Dynamic changes in the economy, new arrival of quick qualitative changes, development of information technologies, as well as financial, economic and technological turbulences keep influencing changes also in agriculture. Creation of proper conditions for career development and attracting young people into agriculture represent important milestones of its development. In addition to professional expertise and specific skills fundamental in agriculture, general entrepreneurial skills, adequate knowledge and skills in the area of information technologies together with the constant personal development of the entrepreneur and his co-workers are deemed necessary in the environment of small and medium-sized farms. The aim of the paper is to analyze the range of entrepreneurial activities in agriculture and explore the current situation in the area of further personal development of entrepreneurs as well as their co-workers in the sphere of small farms in Slovakia.

**Keywords:** agricultural entrepreneur; entrepreneurial skills; IT skills; personal development; development of co-workers.

**JEL Classification:** O13; O32; O52; Q01; Q12; R11.

## Introduction

The stabilization of the indigenous population, *i.e.* working-age individuals and especially the young generation below 25 years of age belongs among the most current challenges of the Slovak countryside. The article is based on the concept of agricultural policy of the Slovak Republic to increase the productivity of agricultural enterprises and to intensify the introduction of innovations by means of developing private farming and providing them with active supporting. A professional career in agriculture has lots of specifics and together with the increasingly competitive environment, it places many demands upon the entrepreneurs. The requirements do not include only professional skills needed in agriculture, but more and more general managerial and IT skills based on long-life education of both entrepreneurs and their employees.

## 1. Literature review

Numerous scientific publications discuss the topic extensively within the European Union (De Wolf and Schoorlemmer 2007, McElwee *et al.* 2005, McElwee 2006, 2008, Pyysiäinen *et al.* 2006, Rudmann *et al.* 2008, Vesala and Pyysiäinen 2008, Zondag *et al.* 2015, Zagata and Sutherland 2015), in individual European countries (Altalb and Filipek 2016 – Poland, Hakelius 1999 – Sweden, Hamilton *et al.* 2015 – England, Materia 2012 – Italy, Morgan *et al.* 2010 – Tuscany, Wales, Várallya and Herdon 2013 – Hungary, Seuneker *et al.* 2013 – Netherlands, Von Muchhausen and Haring 2012 – Germany, Rădoi and Șerban 2019 – Romania, Anokhina *et al.* 2018 –

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Russia), and also globally (Mukasheva *et al.* 2018, Atalb *et al.* 2015, Baig *et al.* 2013, Biratu 2008, Davis 2008, Katchova and Ahearn 2015, Schmidt *et al.* 1994).

In the European publications, McElwee and Bosworth (2010) McElwee and Robson (2005) Vesala and Pyysiäinen (2008), Rudmann, *et al.* (2008) study the diversification of agriculture and agricultural enterprises, while others deal with competitiveness of agricultural enterprises and the necessity of mastering both professional and entrepreneurial skills, *e.g.* Altalb and Filipek (2016), De Wolf and Schoorlemmer (2007), Rudmann *et al.* (2008) *etc.* Yet others, such as Kountios (2001), McElwee (2006), Pyysiäinen *et al.* (2006) Rudmann *et al.* (2008), emphasize the importance of education. Europe currently faces an unfavorable population trend which increases the difficulties in attracting and supporting young people to work in that segment, *e.g.* Hakelius (1999), Hamilton *et al.* (2015) Rudmann *et al.* (2008) and others.

In response to the issues surveyed in the abovementioned literature, we focused our attention at the following areas: necessary entrepreneurial skills, IT skills and development of human resources, within the legal forms of agricultural enterprises (private farmers), then professional agricultural skills and possible solutions of the problems specific for small-sized and young farmers. An overview of literature covering the particular areas of interest in the domestic and foreign literature is provided in Tables 1 and Table 2.

Table 1. An overview of foreign literature covering the researched topic

Author(s)/ Focus Area	Country	Typology & diversification of agricultural enterprises	Professional agricultural skills	Managerial skills	IT skills	Human resources (development & training)	Focus at small-sized & young farmers
Altalb and Filipek 2016	Poland		x	x			
Altalb <i>et al.</i> 2015	World		x				
Baig <i>et al.</i> 2013	Asia		x				
Biratu 2008	Ethiopia		x				
Davis 2008	Africa		x				x
De Wolf and Schoorlemmer 2007	EU	x		x			
Fairweather and Keating 1990	Europe	x					
Garforth 1994	Thailand		x				
Hafkin and Taggart 2001	Asia, Latin America, Middle East		x	x	x	x	
Hakelius 1999	Sweden		x	x	x		x
Hamilton <i>et al.</i> 2015	England		x	x			x
Haq 2012	Bangladesh		x	x			
Katchova and Ahearn 2015	USA	x		x		x	x
Kountios <i>et al.</i> 2011	Europe			x	x	x	x
Levchenko <i>et al.</i> , 2018	Ukraine					x	
Martin 1987	USA					x	x
Materia 2012	Italy		x				
McElwee 2006	EU	x		x		x	
McElwee 2008	EU	x					
McElwee and Bosworth 2010	EU, UK	x		x			x
McElwee and Robson 2005	EU	x					
McElwee <i>et al.</i> 2005	EU	x		x			
Morgan <i>et al.</i> 2010	Tuscany, Wales			x			x
Pyysiäinen <i>et al.</i> 2006	EU			x		x	
Rezai <i>et al.</i> 2011	Malaysia			x			x
Rudmann <i>et al.</i> 2008	EU	x	x	x	x	x	
Schmidt <i>et al.</i> 1994	USA				x	x	

Author(s)/ Focus Area	Country	Typology & diversification of agricultural enterprises	Professional agricultural skills	Managerial skills	IT skills	Human resources (development & training)	Focus at small-sized & young farmers
Schmitzberger <i>et al.</i> 2005	Austria	x					
Seuneke <i>et al.</i> 2013	Netherlands		x	x	x	x	
Šikýř <i>et al.</i> 2018	Czech Republic, Russia					x	
Šimpachová Pechrová <i>et al.</i> 2018	Czech Republic	x					x
Văcărescu-Hobeanu, 2018	Romania					x	
Várallyaia and Herdon 2013	Hungary				x		
Vesala and Pyysiäinen 2008	EU	x		x			
Von Munchhausen and Haring 2012	Germany		x	x		x	
Walder <i>et al.</i> 2012	Europe	x					
Zagata and Sutherland 2015	Europe		x	x		x	x
Zondag <i>et al.</i> 2015	EU		x	x			x

Source: prepared by authors

Table 2. An overview of Slovak literature covering the researched topic

Autor (s)/Focus Area	Country	Typology & diversification of agricultural enterprises	Professional agricultural skills	Managerial skills	IT skills	Human resources (development & training)	Focus at small-sized & young farmers
Blaas 2003	Slovakia	x					X
Blaas <i>et al.</i> 2010	Slovakia		x	x			
Falt'an and Pašiak 2005	Slovakia	x					X
Jahnátek <i>et al.</i> 2013	Slovakia	x					X
Kapustová <i>et al.</i> 2017	Slovakia		x	x			
Kučera <i>et al.</i> 2005	Slovakia				x		
Látečková <i>et al.</i> 2018	Slovakia				x		
MARD SR 2013	Slovakia	x					
Commission Regulation (EC) No 1242/2008	EU	x					
Rozborilová 2012	Slovakia	x					X
Rumanovská, <i>et al.</i> 2018	Slovakia	x		x			X
Szabo <i>et al.</i> 2017	Slovakia				x		

Source: prepared by authors

As seen in Table 2, presenting the Slovak relevant sources, the studies published in Slovakia deal with specific agricultural topics or proposals and options for improvement of the economic results (Blaas *et al.* 2010, Kapustová *et al.* 2017). In addition to the already mentioned authors, Rumanovská *et al.* 2018, also researched entrepreneurial skills and Kučera *et al.* 2005, Szabo *et al.* 2017, Látečková *et al.* 2018, published the results of their research concerning the use of IT in agricultural enterprises.

Hitherto, information about human resources working in the legal form of a private farmer as well as human resources employed by them has been missing in the published studies and even The Farm Structure Census 2010 – Complex Results (Rozborilová 2012) does not tackle it either. The document deals with the category of private farmers only by dividing them according to regions and sums up their basic production factors and economic assets. The main reason for our research was the insufficient (in comparison with foreign literature) coverage of

entrepreneurial skills necessary for farmers, or their IT skills in Slovakia and the absence of any attention to the education of the farmers and their employees.

### 1.1. Characteristics of the chosen research topics

The position of farmers as entrepreneurs is both studied in the professional and scientific literature (Table 1), and supported in the European and national legislation. Various authors have proposed different typologies of farmers based on various perspectives. Fairweather and Keating (1990), published a study on "goals and success from the farmers' point of view", where they detected three distinct types or management styles (Dedicated Producer, Flexible Strategist and Life-styler). Schmitzberger *et al.* (2005) offer a detailed analysis of different farming styles with regard to their effects on biodiversity. They are Yield optimizer, Traditionalists, Innovative, Support Optimizer, Idealist, Part-time farmer, Forced farmer and the Social farmer.

McElwee (2008) presents four types of farmers based on their economic activities:

- Type I: farmer as a farmer – traditional land-based economic activity;
- Type II: farmer as an entrepreneur – innovative, opportunity oriented. Changing, flexible and diverse economic activities;
- Type III: farmer as a contractor – ownership of specific skills/expertise and experience coupled with possible ownership of „plant“;
- Type IV: rural entrepreneur, not a farmer – ownership of farm, land or business.

Further aspects of the typology of farmers are specified in Walder *et al.* 2012. We included into our research agricultural entrepreneurs (small, family, young farmer) as defined in the current Slovak legislation (Jahnátek *et al.* 2013) with incorporated recommendations of the European Commission 2003/361/EC.

### 1.2. Skills of agricultural entrepreneurs

In the studied literature, several authors characterized the necessary skills of farmers from various perspectives. We chose some of them: McElwee and Bosworth 2010 included IT skills (tools for cooperation), skills in the area of marketing and trade, accountancy and finance (strategic awareness, opportunity recognition) and skills in the area of human resources management (entrepreneurial qualities and values, need for achievement, personal control, and alertness).

Pyysiäinen *et al.* 2006, characterizes 3 groups of skills:

- personal skills (innovation, initiative, risk-taking, ability to deal with the unknown with ease, accepting challenges, taking responsibility, seeking opportunities in change);
- interpersonal skills (interacting with others effectively, communicating effectively, negotiating, influencing, demonstrating leadership);
- process skills (ability to plan and organize, ability to analyze, synthesize and evaluate, ability to execute the plan).

The ESOF research - Entrepreneurial Skills and their Role in Enhancing the relative Independence of Farmers (Rudmann *et al.* 2008) studied 5 skill categories:

- professional skills: plant or animal production skills, technical skills;
- management skills: financial management and administration skills, human resources management skills, customer management skills, general planning skills;
- opportunity skills: recognizing business opportunities, market and customer orientation, awareness of threats, innovation skills, risk-management skills;
- strategic skills: skills to receive and make use of feedback, reflection skills, monitoring and evaluation skills, conceptual skills, strategic planning skills, strategic decision-making skills, goal setting skills;
- co-operation/networking skills: skills related to co-operation with other farmers and companies, networking skills, team-work skills, leadership skills.

We chose 3 out of the abovementioned groups and adapted them to the conditions of the farmers in Slovakia and included them into the research model. They are as follows: managerial skills, IT skills and human resources management (personal and employee development).

## 2. Methodology

The theoretical basis of our empirical research was founded on the opinions of various authors about the requirements concerning competencies necessary for the development of entrepreneurship, and conceptions and action plans for the development of agriculture in the SR published by the Ministry of Agriculture and Rural Development of the Slovak Republic. The subjects of the research were private farmers, their family members and

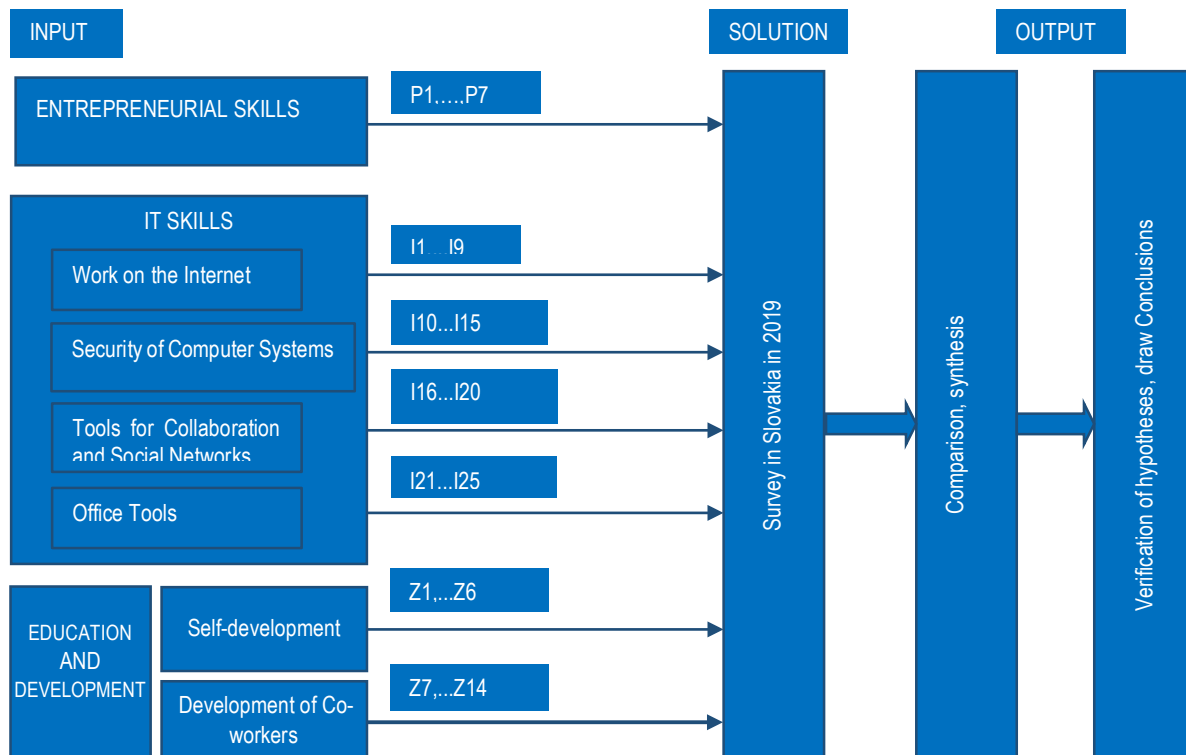
co-workers (employees). We did not take into consideration any other type of agricultural enterprises created since 1990, after the transformation of cooperatives and privatization of state-owned farms.

We stipulated the following research hypotheses (formulated as null and alternate ones):

- 1<sup>st</sup> Hypothesis – an enquiry into entrepreneurial skills;
- 1H0 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income does not influence the level of entrepreneurial skills of the farmers;
- 1H1 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income influences the level of entrepreneurial skills of the farmers;
- 2<sup>nd</sup> Hypothesis - an enquiry into IT skills;
- 2H0 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income does not influence the level of IT skills of the farmers;
- 2H1 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income influences the level of IT skills of the farmers;
- 3<sup>rd</sup> Hypothesis – an enquiry into further education and development;
- 3H0 a, b, c, d, e, f, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income does not influence the level of further education and development of the farmers;
- 3H1 a, b, c, d, e, f, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income influences the level of further education and development of the farmers.

Description and justification of the research methods used. Normally, the methods will be selected from known and proven examples. In special cases the development of a method may be a key part of the research, but then this will have been described in Introduction section and reviewed in first one. We developed a research framework including a research model (Figure 1).

Figure 1. The research framework



Source: prepared by authors

## 2.1. Research model

The research model consists of parameters (Table 3) and 4 groups of research indicators (Table 4, Table 7). Parameters R1, R2, ..., R5 characterize the research sample and based on them, we evaluated the other groups of parameters in the research model. The 2<sup>nd</sup> group of parameters (P1, ..., P7) includes evaluations of the entrepreneurial skills of the farmers, the 3<sup>rd</sup> one (I1, ..., I25) refers to the use of information technologies and the 4<sup>th</sup> group (Z1, ..., Z14) is aimed at the evaluation of development of both entrepreneurs and their co-workers on the farm. We identified the parameters and research indicators based on researches published in the literature (Table 3).

Table 3. Identification of literature covering the elements of the research

Parameters		Literature
R1	Respondent's gender	Hafkin and Taggart (2001), McElwee <i>et al.</i> (2005), Rudmann <i>et al.</i> (2008);
R2	Respondent's age	Hakelius (1999), Rudmann <i>et al.</i> (2008), Haq (2012);
R3	Respondent's education	Martin (1987), Hakelius (1999), Hafkin and Taggart (2001), Rudmann <i>et al.</i> (2008), Haq (2012);
R4	Number of employees (in 2018)	Commission Regulation (EC) No. 1242/2008
R5	Agriculture as a source of income	Blaas 2003; Schmitzberger <i>et al.</i> 2005; Walder <i>et al.</i> 2012
P1, ... P7	Entrepreneurial skills	5 <sup>th</sup> column Table 1 a Table 2
I1, ... I25	IT skills	6 <sup>th</sup> column Table 1 a Table 2
Z1, ... Z14	Human resources	7 <sup>th</sup> column Table 1

Source: prepared by authors

## 3. Case study

To verify the hypotheses, we carried out a survey in the form of a questionnaire among the small farms in Slovakia. The survey was executed in two stages, first, we completed a pre-research in the form of interviews which served as a starting point for the development of the research model used in the main stage of the research. The questionnaire survey was carried out from May to October 2019, the respondents were 121 agricultural entrepreneurs, *i.e.* private farmers (young, small and family farmers). We ensured a proportional regional representation by a purposeful selection of respondents. The particular parameters were assessed by the respondents using a 7 – point Likert scale from 0 to 6 with the following meaning: 0 – disagree, 1 – somewhat agree, ..., 6 – strongly agree.

Various statistical methods (descriptive statistics, reliability analysis, and linear regression) were implemented to evaluate the results of the survey and to verify their statistical significance. The PSPP program was implemented for processing. (Hanák 2016).

### 3.1. Results and discussion

We provide the results according to the following structure: a) reliability of the research tool; b) evaluation of the research sample based on the chosen parameters; c) descriptive statistics and description of extreme values of the results; d) linear regression.

- The reliability of the results was tested by means of Cronbach's alpha receiving the following results:  $\alpha = 0.957$  in total,  $\alpha = 0.923$  for parameters P1, ..., P7,  $\alpha = 0.964$  for parameters I1, ..., I25,  $\alpha = 0.773$  for parameters Z1, ..., Z14. The presented scores (all higher than 0.7) prove the high reliability of the questionnaire (Hanák 2016).
- Evaluation of the parameters for the research sample (Table 4)

Table 4. Parameters characterizing the research sample

Parameters		Attributes	% occurrence
R1	Gender	Male	84.40%
		Female	15.60%
R2	Respondent's age	21 – 30	6.60%
		31 – 40	39.30%
		41 – 50	33.60%
		51 – 60	20.50%

Parameters		Attributes	% occurrence
R3	Respondent's education	Primary	54.10%
		Secondary	36.90%
		Tertiary level, Bachelor's degree	3.30%
		Tertiary level Master's degree	5.70%
		Tertiary level Doctorate	0.00%
R4	Number of employees (in 2018)	Less than 5	4.90%
		5 to 10	38.50%
		10 to 20	51.60%
		More than 20	4.90%
R5	Agriculture as a source of income	Main	73.77%
		Supplementary	26.23%

Source: prepared by authors

- c) Selected descriptive statistics of the particular groups of parameters (Table 5, Table 6, Table 7, the highest scores are highlighted in grey and the lowest ones printed in boldface)

Table 5. Indicators of the farmers' entrepreneurial skills - descriptive statistics

Level of the farmer's entrepreneurial skills		Mean	STDEV	N
P1	Administrative skills (writing on a typewriter, computer, writing letters, reports...)	2.11	1.60	121
P2	Mathematical and statistical skills (calculate my economic results, average results etc.)	1.40	1.53	121
P3	Numeric skills for the planning of the economic year (SWOT analysis)	1.24	1.52	121
P4	Professional economic and communicative skills needed for communication with governmental institutions (social insurance agency, tax office...)	3.17	1.77	121
P5	Professional economic and communicative skills needed for communication with the financial community (investors, banks, financial institutions...)	2.48	1.74	121
P6	Presentation and communication skills needed for communication with clients, public or media	1.95	1.63	121
P7	Communicative skills needed for communication with customers and suppliers (of products, raw materials, technology...)	4.14	1.78	121

Source: prepared by authors

Table 6. IT utilization parameters – descriptive statistics

Use of Information Technology		Mean	STDEV	N
Work with Internet				
I1	Acquisition of current news connected with work (current exchange rates, tax returns, weather information, pollen information, ...)	2.86	1.54	121
I2	Using information from published price lists of products and services	2.43	1.44	121
I3	Return of online forms for governmental and public institutions (health insurance company, social insurance agency, ...)	3.72	1.69	121
I4	Using information from maps and navigation	2.28	1.32	121
I5	Using information published by government agents and institutions (government, ministries, statistical office, tax office, social insurance agency, health insurance companies, ...)	2.63	1.76	121
I6	Using data from publicly accessible portals (Land Register Portal, Trade Register, Business Register, FINSTAT ...)	2.23	1.71	121
I7	Using publicly available published data from the internet (Open data)	1.38	1.23	121
I8	Using data from commercial databases (Albertina, Datamax, European Databank, Kompass, Golden Pages, ...)	1.47	1.23	121
I9	Using online marketing	2.27	1.99	121
Security and Computer Systems				
I10	I use the appropriate and current internet browser, e.g. Internet Explorer, Google Chrome, Mozilla Firefox, Opera	4.70	1.99	121

Use of Information Technology		Mean	STDEV	N
I11	I use efficient antivirus protection	2.97	1.70	121
I12	I regularly backup important data	2.98	1.93	121
I13	I understand the meaning of http cookies	1.34	1.59	121
I14	To protect myself from phishing sensitive information, I always verify the safety of the connection to web pages when uploading sensitive information	2.11	1.77	121
I15	If an e-mail demands a password check or any other sensitive information I always verify the authenticity of the sender	2.07	1.86	121
Tools for Collaboration and Social Networks				
I16	We use MS Outlook for collaboration	<b>0.90</b>	<b>1.61</b>	121
I17	We use Google Calendar for collaboration	<b>0.45</b>	<b>0.97</b>	121
I18	We use MS Exchange for collaboration	<b>0.23</b>	<b>0.70</b>	121
I19	We share files through Google disk for collaboration	<b>0.27</b>	<b>0.60</b>	121
I20	We use social networks (Facebook) for collaboration	2.74	2.27	121
Office Tools				
I21	We use MS Office for work	2.87	1.63	121
I22	We use MS Excel for carrying out calculations and creating graphs	1.57	1.30	121
I23	We use MS Word for administrative work	2.57	1.68	121
I24	We use MS PowerPoint for presentations	0.94	1.04	121
I25	We use other office software for work	1.90	1.56	121

Source: prepared by authors

Table 7. Parameters of further development of the entrepreneur and his co-workers – descriptive statistics

Self-development and Development of Co-workers		Mean	STDEV	N
Self-development of the Entrepreneur				
Z1	I engage in knowledge acquisition (laws, rules, regulations) only when I realize that I lack them	3.74	1.51	121
Z2	I prefer self-study (of professional literature)	<b>2.93</b>	<b>1.67</b>	121
Z3	I prefer courses in educational institutions (schools)	<b>1.04</b>	<b>3.74</b>	121
Z4	I regularly improve my knowledge and skills	1.03	1.38	121
Z5	I do not have time for further education	1.42	1.86	121
Z6	I perceive education as very important and I wish to pursue it systematically	1.84	1.84	121
Professional Training of Co-workers				
Z7	They complete only training required by law (Occupational Safety and Health Training, driving license for agricultural vehicles and machines etc.)	4.48	1.34	121
Z8	They complete only training needed for new technologies, changes in law etc.	3.48	1.70	121
Z9	Regular training to ensure improvements in the workplace	3.57	2.10	121
Z10	Regular training to ensure improvements outside the workplace	<b>0.66</b>	<b>0.92</b>	121
Z11	We do not engage in any training	<b>0.71</b>	<b>1.52</b>	121
Z12	We would like to engage in it, but we do not have time and finances	1.84	1.46	121
Z13	Lack of training opportunities	2.10	1.59	121
Z14	The only time for training is bad weather	2.38	2.00	121

Source: prepared by authors

#### d) Linear regression

We studied the impact of the separate parameters R1, R2, R3, R4, R5, R6 (independent variables) on the level of entrepreneurial skills, IT skills and further development of farmers (dependent variables) by means of multiple regression analysis. Each indicator of the research model was studied separately with the assumption that the overall impact is caused by the partial ones. The results of the linear regression analysis are summarized in the following tables (Table 8, Table 9, Table 10).



Table 8. Regression model for the level of entrepreneurial skills of farmers

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
Dependent variables	P1	0.14* (0.29)	0.12* (0.01)	0.74*** (0.04)	-0.03 (0.02)	-0.17*** (0.23)	0.65	45.83***	121
	P2	0.04 (0.27)	0.21*** (0.01)	0.79*** (0.04)	-0.09 (0.02)	-0.08 (0.21)	0.66	48.81***	
	P3	-0.04 (0.27)	0.19** (0.01)	0.83*** (0.04)	-0.09 (0.02)	-0.03 (0.22)	0.65	45.41***	
	P4	0.14 (0.37)	0.10 (0.01)	0.60*** (0.05)	0.16* (0.02)	-0.21** (0.29)	0.51	26.43***	
	P5	0.18* (0.36)	0.17* (0.01)	0.58*** (0.05)	0.20** (0.02)	-0.15* (0.28)*	0.54	29.73***	
	P6	0.16 (0.39)	0.07 (0.01)	0.52*** (0.05)	0.13 (0.02)	-0.08 (0.31)	0.37	5.48***	
	P7	0.21* (0.48)	-0.17* (0.02)	0.10 (0.06)	0.24* (0.03)	-0.26** (0.38)	0.20	6.92***	

Note: Values: Standardized Beta, Standard error in parentheses; \*p<0.05, \*\*p<0.01, \*\*\*p<0.001  
Source: Prepared by authors

We can state, based on Table 8 that the model is statistically significant, while more than 50% of the variability is due to the majority of variables. We consider education (predicts P1, P2, P3, P4, P5, P6), age (P1, P2, P3, P5, P7) and source of income to be statistically significant predictors.

Table 9 indicates that the regression model is statistically significant, while more than 25% of variability is due to 19 out of 25 indicators. Education is the only statistically significant predictor (22 out of 25 indicators).

Table 9. Regression model for IT skills

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
Dependent variables	I1	-0.15 (0.33)	0.18* (0.12)	0.78*** (0.15)	-0.19* (0.18)	-0.24** (0.28)	0.48	23.89***	121
	I2	0.07 (0.34)	0.06 (0.12)	0.62*** (0.15)	-0.02 (0.18)	-0.18* (0.28)	0.40	17.03***	
	I3	0.14 (0.38)	0.05 (0.14)	0.57*** (0.17)	0.10 (0.21)	-0.22** (0.32)	0.43	19.38***	
	I4	0.09 (0.36)	-0.20* (0.13)	-0.07 (0.16)	0.27** (0.20)	-0.24* (0.30)	0.16	5.78***	
	I5	0.20* (0.42)	0.17* (0.15)	0.51*** (0.19)	-0.09 (0.23)	-0.19* (0.35)	0.38	15.54***	
	I6	0.17 (0.41)	0.11 (0.15)	0.54*** (0.18)	-0.06 (0.22)	-0.23** (0.34)	0.38	15.75***	
	I7	0.24* (0.30)	0.07 (0.11)	0.45*** (0.14)	0.04 (0.17)	-0.12 (0.25)	0.32	12.52***	
	I8	0.37*** (0.30)	-0.05 (0.11)	0.31** (0.14)	0.08 (0.17)	-0.12 (0.25)	0.33	12.67***	
	I9	0.13 (0.53)	-0.24** (0.19)	0.22* (0.24)	0.29** (0.29)	-0.07 (0.45)	0.20	7.07***	
	I10	0.05 (0.29)	0.01 (0.10)	0.45*** (0.13)	0.01 (0.16)	-0.09 (0.24)	0.19	6.69***	
	I11	0.24* (0.43)	0.05 (0.16)	0.38*** (0.19)	0.05 (0.24)	-0.22 (0.36)	0.27	10.09***	
	I12	0.23** (0.47)	0.10 (0.17)	0.43*** (0.21)	0.10 (0.26)	-0.21* (0.39)	0.34	13.73***	
	I13	0.09 (0.38)	0.30*** (0.13)	0.55*** (0.17)	-0.09 (0.21)	-0.03 (0.31)	0.38	5.69***	
	I14	0.18 (0.44)	0.10 (0.16)	0.49*** (0.20)	-0.06 (0.24)	-0.20* (0.37)	0.38	12.45***	

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
I	I15	0.14 (0.46)	0.11 (0.17)	0.50*** (0.21)	-0.09 (0.25)	-0.22* (0.39)	0.31	11.81***	121
	I16	-0.12 (0.42)	0.18* (0.15)	0.51*** (0.19)	0.18 (0.23)	0.01 (0.35)	0.26	9.52***	
	I17	-0.02 (0.25)	0.04 (0.09)	0.40*** (0.11)	0.34** (0.14)	0.00 (0.21)	0.25	9.02***	
	I18	0.00 (0.20)	0.05 (0.07)	0.29** (0.09)	0.17 (0.11)	0.01 (0.17)	0.08	3.08***	
	I19	0.06 (0.18)	0.07 (0.06)	0.03 (0.08)	0.25* (0.10)	0.08 (0.15)	0.02	1.44	
	I20	0.27* (0.64)	0.05 (0.23)	0.06 (0.29)	0.33** (0.35)	0.16 (0.53)	0.13	4.54***	
	I21	0.03 (0.40)	0.18* (0.14)	0.57*** (0.18)	-0.12 (0.22)	-0.07 (0.34)	0.33	12.69***	
	I22	0.09 (0.33)	-0.10 (0.12)	0.47*** (0.15)	0.06 (0.18)	-0.22* (0.28)	0.27	10.13***	
	I23	0.15 (0.43)	0.16 (0.16)	0.40*** (0.19)	0.05 (0.24)	-0.23* (0.36)	0.26	9.46***	
	I24	0.33*** (0.26)	-0.15 (0.09)	0.26** (0.12)	0.24** (0.14)	-0.09 (0.22)	0.32	12.16***	
	I25	0.10 (0.35)	0.10 (0.13)	0.63*** (0.16)	-0.06 (0.19)	-0.22* (0.29)	0.44	19.74***	

Note: Values: Standardized Beta, Standard error in parentheses; \*p<0.05, \*\*p<0.01, \*\*\*p<0.001  
 Source: Prepared by authors

Table 10. Regression model for the level of education and further development

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
Dependent variables	Z1	0.19* (0.35)	0.06 (0.12)	0.54** (0.15)	0.03 (0.19)	-0.25** (0.29)	0.42	18.36***	121
	Z2	0.27** (0.37)	-0.13 (0.13)	0.46*** (0.16)	0.19* (0.20)	-0.19* (0.31)	0.46	21.73***	
	Z3	0.38*** (0.34)	-0.05 (0.12)	0.17 (0.15)	0.23* (0.19)	-0.05 (0.29)	0.25	8.94***	
	Z4	0.28** (0.33)	0.05 (0.12)	0.42*** (0.15)	0.20* (0.18)	0.08 (0.27)	0.38	15.72***	
	Z5	0.00 (0.56)	0.12 (0.20)	-0.02 (0.25)	-0.11 (0.31)	0.12 (0.47)	0.00	1.09	
	Z6	0.09 (0.49)	0.12 (0.17)	0.42*** (0.22)	0.14 (0.27)	0.11 (0.41)	0.23	8.07***	
	Z7	0.14 (0.33)	0.09 (0.12)	0.38*** (0.15)	0.19* (0.18)	-0.28** (0.28)	0.31	12.06***	
	Z8	0.12 (0.42)	-0.20* (0.15)	0.28** (0.19)	0.35*** (0.23)	-0.24* (0.35)	0.34	13.25***	
	Z9	0.24* (0.55)	-0.25** (0.20)	-0.14 (0.25)	-0.47*** (0.30)	-0.09 (0.46)	0.27	9.97***	
	Z10	0.27** (0.25)	-0.01 (0.09)	-0.00 (0.11)	0.40*** (0.14)	-0.09 (0.21)	0.20	7.00***	
	Z11	-0.10 (0.41)	0.30** (0.15)**	0.18 (0.18)	-0.39*** (0.22)	0.07 (0.34)	0.20	7.14***	
	Z12	-0.06 (0.43)	-0.06 (0.15)	0.21 (0.19)	0.08 (0.24)	0.16 (0.36)	0.03	1.72	
	Z13	0.01 (0.47)	-0.05 (0.17)	0.07 (0.21)	0.24* (0.26)	0.28* (0.39)	0.04	2.03	
	Z14	-0.14 (0.60)	-0.02 (0.21)	0.01 (0.27)	0.21 (0.33)	0.09 (0.50)	0.01	1.31	

Note: Values: Standardized Beta, Standard error in parentheses; \*p<0.05, \*\*p<0.01, \*\*\*p<0.001; Source: Prepared by authors

The regression model accounts for more than 20% of variability due to 10 out of 14 indicators. Only the number of employees (8 out of 14 indicators) can be considered to be a statistically significant predictor.

Results of hypotheses verification:

- Based on the results presented in Table 8, we accept the partial hypotheses 1H0a, 1H1b, 1H1c, 1H0d, 1H0e, and reject the partial hypotheses 1H1a, 1H0b, 1H0c, 1H1d, 1H0e.
- Based on the results presented in Table 9 we accept the partial hypotheses 2H0a, 2H0b, 2H1c, 2H0d, 2H0e, and reject the partial hypotheses 2H1a, 2H1b, 2H0c, 2H1d, 2H1e.
- Based on the results presented in Table 10 we accept the partial hypotheses 3H0a, 3H0b, 3H0c, 3H1d, 3H0e, and reject the partial hypotheses 3H1a, 3H1b, 3H1c, 3H0d, 3H1e.

## Conclusion

Our research was based on the idea that educated private farmers would facilitate the development of the countryside and contribute to increased employment in rural area and support for private farmers could solve the problem of a generational shift in agriculture.

The aim of our paper was to search for options and suggest measures based on both research of domestic and foreign literature and our own research for reviving the interest of young people in settling down in the countryside and to identify spheres with potential for their employment and life in the countryside which would meet the current standards of life. If agriculture is to become one of the key branches of economy, it requires flexible, highly effective and professionally adaptable human resources not just in the agricultural enterprises but also among agricultural entrepreneurs (private farmers).

The findings of our research show that agricultural entrepreneurs naturally prefer professional agricultural activities and they develop any other entrepreneurial skills much less. Therefore, we registered the highest scores in - Communication skills needed for communication with suppliers and customers and - Duties towards state and financial institutions resulting from their daily activities. Among the less valued knowledge and skills belong mostly mathematical, statistical and analytical (SWOT) ones compensable by outsourcing to professional consultancies used especially for the creation of new projects and investment acquisition. Such services are offered by *e.g.* experts from the local territorial administration and lecturers from specialized educational institutions.

In the area of IT, agricultural entrepreneurs use the internet mostly for filing on-line forms for governmental and public institutions (health insurance company, social insurance agency, ...). Active use of office software is mostly limited to MS Word used for administrative work. Presentation and collaboration software are rarely used. There are still great deficiencies in presenting the work and products of agricultural entrepreneurs. Electronic collaboration would be also very useful for sharing and exchanging information, experience and skills in the professional community.

The personal development of the entrepreneurs is clearly subordinated to farming. They collect new information only when they realize they lack them, usually concerning new regulations. Only a few entrepreneurs study on a regular basis. The professional development is focused on the education required by law (Occupational Safety and Health Training, driving license for agricultural vehicles and machines, ...).

We assumed that the evaluation of entrepreneurial skills, IT skills, and additional education would be statistically significant depending on the respondents' gender, age and education, the residence of the agricultural enterprise, number of employees and whether the agricultural activities, present the main or supplementary source of income of the entrepreneur. But, the results confirmed that the level of entrepreneurial skills is predicted by age, education and main or supplementary source of income, while IT skills are predicted only by education and the level of further education by the number of employees. As for the remaining parameters.

The results of the research proved that agricultural primary sector is not attractive in Slovakia for young people to build a career (but neither is in Europe, according to the sources). Keeping the population in the countryside and especially young people could be possible by means of diversification of activities including non-agricultural ones. Small farmers play a dominant role in the development of small villages. To ensure architectural and urban development of the countryside, to protect their values and develop the identity and community of the rural population, educational and advisory activities appear to be very important with special focus at agricultural consultancy but also consultancy in discovering new opportunities for the development of the countryside and raising employment in the rural areas. Educational activities must follow the latest trends in entrepreneurship, in the development of entrepreneurial and managerial skills and IT skills. Based on the research, educational activities can be planned in rural settlements creating opportunities for local institutions or educational centers set up by the local administration. These could become the basis of the development of the countryside and could support the small entrepreneurs (private farmers) engaged in agricultural and non-agricultural activities.

### Limitations of the research

We consider the lack of interest among the agricultural entrepreneurs in participating and supplying information as one of the main limitations of the research. This resulted in a smaller research sample than originally planned. Another limitation could be a possibly subjective self-assessment of the respondents.

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