UDC: 338.43(497.11)
658.114-053.6(497.11)
doi: 10.5937/AASer2560077C

Acta Agriculturae Serbica, 30 (60), 77–82, 2025

Publisher: Faculty of Agronomy Čačak

www.afc.kg.ac.rs

Predictors of agricultural entrepreneurship among high school graduates

Milivoje Ćosić[1], Miroljub Ivanović[2*]

[1] *Institute of Forestry, Kneza Višeslava 3, 11030 Belgrade, Serbia*
[2] *Serbian Academy of Innovation Sciences, Višnjička 91a, 11060 Belgrade, Serbia*

Corresponding author: miroljub.ivanovic@gmail.com

Received 9 June 2025; Accepted 20 June 2025

A B S T R A C T

The aim of this empirical research was to test the predictive intensity of experience and opinions in agriculture, rural areas, environmental support for farming, and socio-demographic indicators of farmers in predicting the variability of the construct of entrepreneurship in agriculture. The research was conducted on a pertinent sample of 175 graduates of agricultural schools in Valjevo and Šabac (M_{age} = 18.7, SD = 0.63). Individual Risk Preference Questionnaires (MPL) were applied. The tested predictors of the regression model, with adequate standard errors of the β coefficient, explain 48% of the total variance of the criterion – engaging in entrepreneurship in agriculture. The analysis of standardized regression beta coefficients shows that no predictor variable contributes to engaging in agricultural production, except for the variable "My experience with conducting agricultural activities" (β = 0.70, $p \leq 0.01$), which is statistically significant, suggesting that with increasing partial experience in agricultural production, the readiness of adolescents to engage in entrepreneurship in agriculture potentially increases. The obtained results are analyzed in the context of previous studies, but also guidelines for further research and practical implications on entrepreneurship readiness at the personal level. Finally, further longitudinal studies are needed to examine the validity of the psychometric properties of the questionnaires used in Serbian samples.

Keywords: adolescents, agricultural school, support, entrepreneur, rural environment

И З В О Д

Циљ овог емпиријског истраживања је био да се тестира предикторски интензитет искуства и мишљења у пољопривреди, руралног подручја, подршке околине за бављење пољопривредом и социо-демографских индикатора пољопривредника у предикцији варијабилитета конструкта бављење предузетништвом у аграру. Истраживање је спроведено на пригодном узорку од 175 матураната пољопривредних школа у Ваљеву и Шапцу (просечна старост $M_{године}$ = 18,7; СД = 0,63). Примењени су упитници преференције појединца према ризику (енгл. Multiple Price List – MPL). Тестирани предиктори регресионог модела, уз адекватне стандардне грешке β коефицијента, објашњавају 48% укупне варијансе критеријума – бављење предузетништвом у пољопривреди. Анализом стандардизованих регресионих бета коефицијената утврђено је да ниједна предикторска варијабла не доприноси бављењу пољопривредном производњом изузев варијабле „Моје искуство са спровођењем пољопривредних активности" (β = 0.70, $p \leq 0.01$), која је статистички значајна, што сугерише да се с повећањем парцијалног искуства у пољопривредној производњи потенцијално повећава спремност код адолесцената за бављење предузетништвом у аграру. Добијени резултати су анализирани у контексту досадашњих студија, али и смерница за даља истраживања и практичних импликација на припремљености за предузетништво на персоналном нивоу. Дефинитивно, потребне су даље лонгитудиналне студије ради испитивања валидности психометријских својстава коришћених упитника и на српским узорцима.

Кључне речи: адолесценти, подршка, пољопривредна школа, предузетник, рурална средина

1. Introduction

Agricultural land is an extremely important natural resource, a fundamental component in maintaining the economic, ecological and social stability of a country. Through its activation and processing, it becomes a food generator and a relevant strategic position in the context of state agricultural policy (Kabato et al., 2025). Serbian agriculture is relevant for preserving food security in rural communities. The main characteristic of the agricultural sector is the aging of the rural population and the need for generational renewal. Small farms are closing down because there is no one to take over production, which generates long-term negative implications for rural development. Accordingly, it is most important to attract young educated people to the agricultural sector in order to preserve and improve its competitiveness and innovation. Agricultural school students, as future potential experts and carriers of agricultural production, have a primary role in this process (Ayni et al., 2025). Their expectation of entering the agricultural sector, their perception of risk and their motivation to engage in agriculture and entrepreneurship can greatly

influence the future of the agricultural sector in Serbia. Entrepreneurship is a major factor in agricultural development, as entrepreneurs with their competencies make decisions about what, how and for whom to create and sell on the market, combining labor and capital in order to obtain profit (Basilim et al., 2025). Young farmers face high initial difficulties and financing costs. Also, the perception of risk among young people is one of the key factors contributing to the decision to start an agricultural activity (Liu et al., 2025). Young farmers tend to accept new technologies, e.g. digitalization, which can increase productivity and reduce the negative impact of agricultural production on the natural environment. At the same time, young and educated students of agricultural schools bring new ideas that can respond to the challenges of current climate change. Identifying the preferences of the professional adolescent population towards risk is important for the development of incentive policies that can contribute to young people being more willing to engage in the agricultural sector. Therefore, in addition to the already existing support for young farmers, easier access to land and capital, as well as mentoring networks of agricultural advisory and professional services, it is necessary to create programs that will facilitate the entry of young people into the agricultural sector and start a business (Delci, 2025; Venturini, 2025).

Entrepreneurship today is faced with two relevant trends: on the one hand, the large increase in entrepreneurial activities in the 21st century caused by the development and increase in the intensity of application of information and communication technology, and on the other hand, the phenomenon of the knowledge economy based on the consumption, production and distribution of knowledge (Ali et al., 2025). Under the influence of changes in the global economy, the position of entrepreneurship is changing significantly, and it is increasingly perceived as a generator of economic growth. The exhaustion of most forms of economic and social protection in the economy of welfare states suggests that a period of searching for new solutions is beginning, usually focused on entrepreneurship and its function in economic growth and development of societies (Zainol et al., 2025). Understanding the importance of entrepreneurship for the economic growth of their economies, most countries have accepted entrepreneurship as a fundamental component of their development (Chiangnangam et al., 2025). Agricultural entrepreneurship is increasingly recognized as an important tool for promoting sustainable development and strengthening local communities, especially in rural areas facing demographic and economic challenges. It is characterized by the specific features of classical entrepreneurship with a social purpose, with an emphasis on solving social problems in the natural environment (Teasdale et al., 2023).

Family entrepreneurship is a specific form based on family ownership and management (Aldrich, 2023). It is characterized by the intertwining of relationships within the family's business and private life, with its advantages (tradition of business, emphasis on quality, care for individuals, encouragement of responsibility and togetherness in the family) and disadvantages (private and business life, potential lack of competence of individual family members, business risk and generational conflict). Agricultural family entrepreneurship, i.e. organic food and animal husbandry, is an increasingly relevant segment of modern Serbian agriculture and nutrition, as well as everyday life within the European Union. Given the characteristic context and conditions of such farming, there is a need for a transparent and efficient financial context that aims to facilitate and encourage farmers to abandon conventional production, which often results in minimal yields and more labor-intensive production (European Commission, 2023; Kansikas & Nevalainen, 2025).

Specifically, this empirical study aims to examine the preferences of predictor variables (intensity of experience and opinions in agriculture, rural area, environmental support for engaging in agriculture, and socio-demographic indicators of farmers) in explaining the variance of the construct of engaging in entrepreneurship in agriculture. Through the research, insight will be gained into the factors that influence engaging in agricultural entrepreneurship.

2. Materials and methods

2.1. Participants and procedure

The study was conducted on a pertinent sample of 175 agricultural school graduates from Valjevo and Šabac (M = 18.7, SD = 0.63). Before the start of the anonymous group survey, the participants were given brief information about the purpose of the study, the discussion, and the procedure for collecting and storing data, and were informed that they could withdraw from the study at any time they wished to do so, and not answer any questions if they did not want to do so for any reason. The average time required for the testing was approximately 30 minutes. The study was approved by the Scientific Council of the Serbian Academy of Innovation Sciences in Belgrade and was conducted in accordance with the ethical principles based on the Declaration of Helsinki. The study was conducted in May 2025.

2.2. Participants and procedure

The task of the SMPP (Lugar, 2025) is to examine, on a scale from 0 to 10, i.e. on a scale of 11, the intention of adolescents to engage in agriculture, their experience in carrying out agricultural activities, and their readiness to start their own business and entrepreneurship.

2.3. Individual risk preference questionnaire (MPL)

The MPL is tested using the Multiple Price List method (Nainggolan & Rommel, 2023). The main goal of this measuring instrument is to assess a person's preference for risk based on a lottery experiment. The MPL list represents the probability of a phenomenon expressed in percentage and the financial amount expressed in euros. Each row in the MPL represents a choice between two lotteries, option A indicating the safer lottery, and option B indicating the riskier lottery. An example of an MPL list is shown in Table 1. For example, when a person switches from 4 options A in row N, this shows that the respondent prefers option A over option B in row (N-1) and prefers option B over option A in row N. It is identically mapped to the other series.

Table 1.
Individual risk preference

Row	Technology A		Technology B	
	30%	70%	10%	90%
1	40 din.	10 din.	68 din.	5 din.
2	40 din.	10 din.	75 din.	5 din.
3	40 din	10 din.	33 din.	5 din.
4	40 din.	10 din.	93 din	5 din.
5	40 din.	10 din.	106 din.	5 din.
6	40 din.	10 din.	125 din.	5 din.
7	40 din.	10 din	150 din.	5 din.
8	40 din.	10 din.	185 din.	5 din.
9	40 din.	10 din	220 din.	5 din.
10	40 din.	10 din.	300 din.	5 din.
11	40 din.	10 din.	400 din.	5 din.
12	40 din.	10 din.	600 din.	5 din.
13	40 din.	10 din.	1000 din.	5 din.
14	40 din	10 din	1700 din	5 din

When evaluating risk propensity, prospect theory or the expected utility theory (Vojinić, 2012), previous studies have shown that individuals do not experience gains and losses to the same extent, and therefore their behavior is not always rational (Kim et al., 2025; Shi et al., 2025). According to prospect theory, a loss has a lower absolute value than a gain of identical value; therefore, in the loss space the decision maker tends to take risks, while in the gain space the decision maker tends to avoid risks (Yadav & Dixit, 2025).

The significance levels of the mathematical function of the curvature of the value according to the parameter alpha are shown in Table 2. The mathematical function of the value of the parameter alpha is linear when $\alpha = 1$, while it has an inverse S shape when $\alpha \leq 1$. This suggests that respondents overestimate extreme gains when probabilities are minimal and underestimate extreme gains when probabilities are maximal. However, when the function $\alpha \geq 1$, then the uniform and appropriate probability distribution takes on an S-shape (Musekwa et al., 2025).

Table 2.
Risk propensity of respondents in relation to the sigma parameter (σ)

Parameter σ	Risk-taking tendency
$\sigma \geq 1$	Risk appetite
$\sigma = 1$	Risk neutral
$1 \geq \sigma \geq 0$	Risk aversion

σ - standard deviation, or a measure of variation; α - curvature of the function.

The prospect theory value function is S-shaped (concave for gains and convex for losses, steeper for losses, compared to gains. The order in which the respondent moves from option A to option B provides the definition of two parameters. The parameter sigma (σ) – the standard deviation, i.e. a measure of variability in a given data set, suggests risk-taking, while the parameter alpha (α) – the curvature of the value function – shows the mapping from one set to another, in which each element of the first set is associated with a unique element of the second set. The respondent is risk-neutral in circumstances where $\sigma = 1$, risk-prone when σ is greater than one, and when σ is less than one and greater than zero, the respondent has no tendency towards risk.

3. Results and Discussion

Table 3 presents descriptive statistics of respondents' intentions to engage in agriculture, their experience in conducting agricultural activities, and their willingness to start their own business and entrepreneurship.

The maximum mean value is manifested in the variable of readiness to start a personal business and entrepreneurship, which indicates a greater interest of high school graduates in entrepreneurship, i.e. in starting their own business activities and their ambitions for independence and financial stability. The obtained standard deviations suggest that there is no statistically significant dispersion of the results from the arithmetic mean, because they include at least 1/3 arithmetic means. This is an excellent sign for further analysis, since there is reliability of the results. Also, the calculated standard errors of the arithmetic mean, as measures of the variation of the arithmetic mean of the sample around the true arithmetic mean, are numerically lower in comparison with the corresponding standard deviations. Based on this, it is concluded that the data are reliable, because the arithmetic means of the tested variables deviate minimally from their potential mean values (Gatinel et al., 2024).

To test the normality of the distribution, the coefficients of deviation were used: skewness and kurtosis. Since the absolute values of the skewness and kurtosis indices range from +/-2, this indicates that the distributions of the results are not extremely skewed, i.e. not U-shaped or bimodal, and further parametric analysis can be continued (Iacobucci et al., 2025).

Table 3.
Descriptive statistics

Variables	*Min*	Max	M	SD	SE	*Sk*	*Ku*
My readiness to start a personal business and become an entrepreneur	0	10	5. 54	1.96	0.30	0.54	1.10
My experience with conducting agricultural activities	0	10	4.85	1.73	0.03	0.21	0.97
My intention is to work as a farmer	0	10	5.23	1.89	0. 26	0.67	0.82

Min = minimum value; *Max* = maximum value; *M* = arithmetic mean; *SD* = standard deviation; *SE* = standard error of the arithmetic mean; *Sk* = skewness; *Ku* = kurtosis.

Table 4 shows the relative contribution of independent-predictor variables: personal experience with conducting agricultural activities, opinion about agriculture, support, rural area, and parent farmer, in explaining the prediction of criteria for high school graduates to engage in agriculture.

Table 4.
Criterion and predictor variables

Criterion/dependent variable
My intention is to work as a farmer.
Predictor/independent variables
Being a farmer is for people with low education. Being a farmer is a shameful job. Being a farmer is a very risky job. Being a farmer means having a hard life.
Gender
Male = 1 if the respondent is male, 0 = female
Rural area
1 = if the respondent comes from a rural area, 0 = other
Parent farmer
1= if at least one parent is a farmer, 0 = other 9

In Table 5, along with the variables of the predictor variable: experience in agriculture, opinion about agriculture, environmental support for farming and socio-demographic indicators, the criterion-dependent variable "Entrepreneurship in agriculture" was tested.

The examined predictors in the regression matrix model, with adequate standard errors of prediction, explain 48% of the total proportion of the variance of the criterion – engaging in entrepreneurship in agriculture. However, it is evident that more than ½ of the residual variability of the criterion variable remains unexplained, which means that there are some other factors that influence the involvement of high school graduates in agriculture, which are not included in this research (Omer & Ali, 2025).

Based on the regression analysis, it is concluded that no predictor variable contributes to engaging in agricultural production except for the variable "My experience with conducting agricultural activities" (β = 0.70, p ≤ 0.01). The variable is multiply significant from the aspect of analytical studies and implementation. The obtained positive value of the standard beta coefficient suggests that with increasing experience in agricultural production, the readiness of adolescents, future experts, to engage in entrepreneurship in agriculture increases.

Before conducting the regression analysis, multicollinearity was tested using the Variance Inflation Factor (VIF) and its reciprocal, the equivalent indicator – Tolerance (TOL). The assumption of no multicollinearity problems was met, as the VIF coefficients for all predictor variables were greater than 1 and less than 10, the reciprocal Tolerance values were below 0.2, and the coefficient of determination value was greater than 0.8.

Table 5.
Regression prediction model for engaging in entrepreneurship in agriculture

Variables	β	*SE* (β)
My experience with conducting agricultural activities	0.70**	0.12
Opinion on agriculture	0.05	0.24
Support	0.10	0.14
Rural area	0.08	0.46
Parent farmer	0.12	0.25
Constant	3.48	2.07
Risk preference	0.07	0.38
R = 0.56		
R^2 = 0.48		

β = standardized regression beta coefficient; *SE* = standard error of the β coefficient; *R* – coefficient of multiple correlation; R^2 – coefficient of multiple determination; $^{**}p \leq 0.01$. $^{*}p \leq 0.05$.

Considering the fact that in this study none of the predictor variables influenced engagement in agricultural entrepreneurship, except for the variable "My experience with conducting agricultural activities," the rationale for retaining the non-significant predictors in the final model is as follows: Given that the correlation in the analyzed regression model is stochastic, the second part of the equation is manifested, which suggests a deviation of the criterion/dependent variable from the functional relationship. This indicates that the criterion variable (engagement in agricultural entrepreneurship) is

generated by multiple factors; that is, it is not influenced solely by the use of predictor variables, but also by other factors that are not tested in this research. Additionally, the stochastic part of the regression equation may result from measuring errors or the random effect of a third variable.

In comparing the results (Abasilim et al, 2025), differences and similarities are observed in the attitudes of young people towards agriculture. A more significant differentiation is observed in the willingness to start a personal business and become entrepreneurs, with high school graduates being more inclined to become entrepreneurs than farmers, while in terms of experience with carrying out agricultural activities, graduates have a lower arithmetic mean value compared to adult farmers.

4. Conclusions

Therefore, this empirical research analyzed the risk propensity and preparedness of high school graduates with an agricultural profile in the Kolubara and Mačva districts to engage in agricultural activities. The study applied the multiple price list method to evaluate the risk perception of the respondents. The findings suggest a manifest risk aversion of high school students, despite a positive attitude towards agriculture. This risk aversion is likely the result of various factors, as well as personal experience, social environment and the perception of agriculture as a challenging and unprofitable career.

In the context of challenges, e.g. climate change and population aging, which Serbian agriculture is facing, it is important to understand the point of the collected data. In order to ensure their acceptance, it is proposed to develop distinctive incentives, including financial support and educational programs that can motivate adolescents to become more actively involved in agriculture. These programs, oriented towards intensifying the knowledge and skills needed for success in modern agriculture, should be presented for the sake of sustainable and innovative practices.

Finally, this study emphasizes the relevance of understanding youth risk preferences in order to shape and develop effective strategies for attracting high school graduates to agriculture. The proactive involvement of young professionals can influence the further development and competitiveness of the Serbian agricultural sector, thus ensuring an optimistic future for new generations and sustainable agricultural production.

Declaration of competing interests

The authors declare that they have no conflict of interest.

References

Abasilim, C. F., Onyewuchi, I. V., Inya, M. U. (2025). Exploring the nexus of agripreneurial mindset, education, and passion in Nigerian agricultural science students. *Covenant Journal of Entrepreneurship*, 9(1), 23–32.

Aldrich, H. (2023). Entrepreneurship in family firms: What's next? Multilevel embeddedness and individuals' cognition. *Journal of family business strategy,* 14(3), 100583. https://doi.org/10.1016/j.jfbs.2023.100583

Ali, J., Affandi, H., Rehmani, A. A. (2025). Fostering agri-preneurship: Exploring the role of startup ecosystems in transforming agricultural innovation and sustainability. *Dialogue Social Science Review (DSSR)*, 3(2), 294–318.

Ayni, N., Pauzi, M., Mustaza, S. M., Zainal, N., Hairi, M., Zaman, M., Moubark, A. M. (2025). Artificial intelligence in precision agriculture: A review. *Jurnal Kejuruteraan* 37(2), 1025-1047. https://doi.org/10.17576/jkukm8

Basilim , C. F., Onyewuchi, I. V., Inya, M. U. (2025). Exploring the Nexus of Agripreneurial Mindset, Education, and Passion in Nigerian Agricultural Science Students. Covenant *Journal of Entrepreneurship*, 9(1), 23–32.

Chiangnangam, S., Manorom, P., Chansanam, W. (2024). Integrating management and marketing strategies in organic farming: A topic modeling analysis of sustainable development and entrepreneurship. *International Review of Management and Marketing*, 15(1), 61–70. https://doi.org/10.32479/irmm.17559

Delci, C. A. M. (2025). The effectiveness of last planner system (lps) in infrastructure project management. *Revista Sistemática,* 15(2), 133–139. https://doi.org/10.56238/rcsv15n2-009

European Commission (2023). Organic farming in the EU – A decade of organic growth. European Commission, DG Agriculture and Rural Development, Brussels. Available at https://agriculture.ec.europa.eu/media/news/organic-farming-eu-decade-growth-2023-01-18_en

Gatinel, D., Debellemanière, G., Saad;A., Rampat; R., Wallerstein, A., Gauvin; M., J. (2024). A new method to minimize the standard deviation and root mean square of the prediction error of single-optimized IOL power formulas. *Translational Vision Science & Technology*, 13(2), 1–9. https://doi.org/10.1167/tvst.13.6.7

Iacobucci, D., Román, S., Moon, S., Rouziès, D. (2025). A tutorial on what to do with skewness, kurtosis, and outliers: New insights to help scholars conduct and defend their research. *Psychology & Marketing,* 42, 1398–1414. https://doi.org/10.1002/mar.22187

Lugar, I. (2025). *Sklonost riziku i spremnost na poduzetništvo u poljoprivredi studenata Agronomskog fakulteta u Zagrebu*. Master rad. Zagreb: Sveučilište u Zagrebu, Agronomski fakultet.

Kabato, W., Getnet, G. T., Sinore, T., Nemeth, A., Molnár, Z. (2025). Towards climate-smart agriculture: strategies for sustainable agricultural production, food security, and greenhouse gas reduction. *Agronomy*, 15(3), 565. https://doi.org/10.3390/agronomy15030565

Kim, B. S., Kim, W., & Min, J. H. (2025). Estimating different value functions of the prospect theory according to individual decision-making styles. *Applied Cognitive Psychology*, 39(1), e70027. https://doi.org/10.1002/acp.70027

Liu, G., Lia, Y., Xu, D. (2025). How does financial literacy affect farmers' agricultural investments? A study from the perspectives of risk preferences and time preferences. *Applied Economics,* 57(14), 1527–1541. https://doi.org/10.1080/00036846.2024.2313596

Nainggolan, L. B., i Rommel, J. (2023). An experiment on the link between risk preferences and the willingness to become a farmer. *Journal of Agricultural Economics*, 2(4), 686–702. https://doi.org/10.1002/jaa2.85

Omer, A. W., Ali, T. H. (2025). Dealing with the outlier problem in multivariate linear regression analysis using the hampel filter. *Kurdistan Journal of Abdominal Radiology*, 10(1), 1–17. https://doi.org/10.24017/science.2025.1.1

Shi, F., Wang, X., Zixian Guo, Y., Zhou, H. (2025). The behavioral economics of water pollution supervision: An evolutionary game analysis with prospect theory and mental accounting. *Polish Journal Of Environmental Studies, in press*. https://doi.org/10.15244/pjoes/195977

Teasdale, S., Bellazzecca, E., de Bruin, A., Roy, M. J. (2023). The (R)evolution of the social entrepreneurship concept: A critical historical review. *Nonprofit and Voluntary Sector Quarterly*, 52(1 _suppl), 212S–240S. https://doi.org/10.1177/08997640221130691

Venturini, R. E. (2025). Technological innovations in agriculture: the application of blockchain and artificial intelligence for grain traceability and protection. *Brazilian Journal of Development*, 11(3), e78100. https://doi.org/10.34117/bjdv11n3-007

Vojinić, P. (2012). Stav prema riziku menadžera zaposlenih u Hrvatskim hotelskim poduzećima. *Review of Contemporary Entrepreneurship, Business, and Economic Issues,* XXV(2), 326–338.

Zainol, R. M., Rahim, N. (2025). Issues and challenges faced by social entrepreneurs in sustaining the agricultural sector. *International Research Journal of Multidisciplinary Scope (IRJMS), 6*(1), 460–471. https://doi.org/10.47857/irjms.2025.v06i01.02829

Yadav, M., Dixit, G. (2025). Asymmetric dependence between the prospect theory value and stock returns in India: a quantile regression approach. *Managerial Finance*, 51(2), 236–261. https://doi.org/10.1108/MF-10-2023-0628