PROMOTING INNOVATIVE PRODUCTS IN THE AGRICULTURAL BUSINESS ENVIRONMENT AND EDUCATION FOR DIGITALIZATION: AN ANALYSIS OF THE CURRENT CONTEXT AND SOCIO-ECONOMIC IMPACT

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Abstract. The transition to digitalization is a current reality present in all areas of economic and social life, including education and the business environment. Agriculture, pillar of economic development, is facing the challenge of adopting the components of digitalization. This is a transition that involves the need for specialists. Current students in the field of agriculture are the future entrepreneurs on whom the adoption of modern technologies and innovative products in their future professional activity depends. This paper aims to outline the profile of future entrepreneurs in agricultural business, from the perspective of their openness to use the digitalization components, innovative products and high-performance technologies in the agricultural business environment. Depending on the profile, the market for the delivery of innovative agricultural products, modern technologies and digitalization components will promote programs so that the results are mutually beneficial. The basic research question is the following: what do future entrepreneurs in agriculture look like in terms of openness to digitalization and what are the determining factors of the adoption of innovative products in agricultural businesses. The research, of a quantitative-descriptive nature, uses as its basic method the ssurvey based on a questionnaire, respectively investigation and synthesis of specialized literature. The subjects, from whom 235 responses were collected, are students of agriculture. The results indicate a great openness towards the adoption of digitalization components, the basic motivations being very objective: costs, results, profit, emphasis on promotion through demonstrations in use, tests, certifications, experiences of other users and less

social media networks. In this way, a program can be developed to train and educate young people for the adoption of modern technologies and innovative, digitalized products in their future professional activity.

Keywords: agricultural business, digitalization, education, promotion, technologies, innovation.

JEL Classification: I25, O15, O33, Q13.

INTRODUCTION

The economic world and human society, in their evolutionary process, are in constant transformation. Currently, we are witnessing the transition - at a rapid pace - to digitalized systems usable in all specific areas of economic development, including agriculture. The current context of the adoption of digitalization indicates promises of performance and superior-level results, sustainable and capable of satisfying consumer needs that have become not only more numerous, but also more refined. All areas of socio-economic life are marked by a profound transformation in innovative and technological terms, and current generations are responsible for how to implement these changes. The transition is proving to be rapid and materialized in the adoption of ultra-modern, high-performance technologies based on digitalization, and the agricultural business environment is no exception to this transformation. For the national economy, it is vital that the implementation of high-performance technologies, digitalized systems and innovative products be supported not only financially, but also by well-trained human resources. Agriculture, a basic branch of the national economy is in the process of adapting because only in this way can it register performance and competitiveness. Innovative products are a more general concept that includes: digital technologies, digital agriculture systems, new inputs, equipment and machinery, modern agricultural practices.

The future entrepreneurs in the Romanian agricultural sector are the current students specializing in agriculture and related fields. This is a main argument for which it is required that they be prepared both in the field in which they have chosen to specialize, and in terms of the pace of adaptation and openness to the new elements offered by modern, innovative agricultural technologies and products. From the point of view of age, the current students and future entrepreneurs in agriculture belong to generation Z, which has a much different profile than previous generations. This is one of the reasons that led to the development of this work: knowing the profile of young people from generation Z, the future specialists who will decide on the adoption of new processes and technologies in the agricultural field, in the direction of ensuring the performance and results expected by the consumer market. The profile of the generation on which the future of sustainable, high-performance and digitalized agriculture depends should not be neglected, but known in detail.

We are interested in this analysis primarily because the performance of the agricultural economy will depend on them, and today's young people must be prepared and trained to support a digitalized and modern agriculture. Therefore, this paper is dedicated to a topic of major interest for forecasting studies on the agriculture of the future, supported by digitalization and innovation. The subject proposed for analysis is: the professional profile of the generations that will work in agriculture, considering current students in specialized specializations. In pop-marketing terms, future employees in the agricultural sector will be recruited from two current generations: generation Z, i.e. people born between 1997 and 2012, and generation Alpha, i.e. people born between 2013 and 2020 (Chaney et al., 2017). Generation Z is characterized as being natively digital, accustomed to technology since childhood, focused on virtual identity and experts in rapid communication. The Alpha generation is represented by the children of the Millennials generation, the smallest category of the population, due to the decrease in the birth rate; this is the first generation that was born exclusively in the era of smart

technology and future artificial intelligence. The specialized literature will be supplemented with this topic, considering that the relationship between the profile of future entrepreneurs and digitalized agriculture deserves to be brought to the forefront.

The supporting question of the research is: what do future entrepreneurs look like in digitalized agriculture and what are the directions they adopt in the educational process of digitalization. The research started from the assumption that the profile of young agricultural students is appropriate for the transition to a modern agriculture, young people being prepared to adapt to the requirements of digitalization and eager to adopt innovation in future agricultural businesses. The relevance of the research is not only theoretical, but also has multiple practical facets.

The novelty of the work consists in bringing to the forefront the new and modern concept of digitalized agriculture, with an emphasis on agricultural innovation, considering one of the most accessed components of the marketing mix - promotion. It is already recognized that innovative products and technologies based on digitalization, usable in agriculture, need an appropriate and field-specific strategic promotion. The local literature on this subject is quite limited, although the current socio-economic context indicates major trends of accelerated orientation towards digitalization and re-technologizing. Especially on the topic of identifying connections between marketing strategies of digitalized agriculture and the profile of users of innovative agricultural products, deficiencies were noted in the specialized literature. The basic approaches in the literature mention that the availability of an innovation does not guarantee its adoption in practice (Rosario et al., 2022) and, even more so, in agriculture the decision to use new products is influenced by the perception of utility, costs, risks, compatibility with current activity, ease of use (Chiriacescu, 2024). Moreover, in the agricultural sector, direct experience, practical demonstration and assessment of economic consequences prevail, agriculture being a pragmatic and objective field (Nagel et. al, 2025; Fahmi, 2020), therefore the way in which a digitalized product is presented, through promotional actions, can significantly influence the willingness to consider it (Addorisio et al., 2025).

We argue the purpose of analyzing the profile of the future entrepreneur in digitalized agriculture including the fact that, based on the analysis of documentation from newly published informative materials on digitalization, confusions were noted between the use of devices or access to social media and the actual transition to digitalization, as the basis for supporting performance in agricultural entrepreneurship. In addition, very easy access to information does not guarantee the use of this information for productive purposes.

MAIN CONTENT

1. Materials and Methods

The relationship to digitalization and innovation has been and remains a purely practical, rational aspect, therefore the analysis of professional development in the digital era is a priority, including for the research environment. In a comprehensive study by Sofianu & Dumitru (2023), the following relevant aspects were highlighted regarding the preparation of future specialists for the adoption of digitalization in the fields of the economic environment:

- there is a significant gap between the skills held by the current labor market and those needed for the future entrepreneurial market;
- 23% of existing jobs will undergo substantial changes in the conditions of the rapid transition to the digitalized environment;

- it is estimated that by 2027, 6 out of 10 employees will need to retrain and improve their skills, so as to cope with the new requirements in the field;
- the categories of skills targeted for improvement are the skills already held and relatively easily usable, such as technical "hard" skills and digital skills, data analysis and foreign languages; to these are added the skills of "soft" area, namely critical thinking and emotional intelligence;
- skills that are in urgent and urgent need of improvement are those that have emerged recently, which are related to artificial intelligence given that only 35% of the current labor market is prepared, and only 25% of employees are prepared for new green technologies.

Another topic of real interest connected to the profile of future entrepreneurs prepared to adopt digitalization in professional fields is that of transformative artificial intelligence, which is considered not to lead to the disappearance of jobs, but to their reinvention (World Economic Forum, 3035). In this context, skills necessary in the future to cope with artificial intelligence in conditions of performance and success are: critical and analytical thinking, flexibility and the ability to select information. Romania is in a position to accelerate the transition to digitalization by ensuring and improving skills, which is a solid reason for young people to be prepared so that digitalization is not confused only with easy access to devices and virtual social networks. According to European Commission data (2023), in Romania basic digital skills are valid for only 28% of the active population, compared to 83% in the Netherlands and 82% in Finland. The expectations of young students, future employees or entrepreneurs who will build and maintain the business environment, are to develop professionally and advance in their careers, to explore new fields of activity, but also to develop personally. The motivations for these aspirations are: the interest in acquiring new professional skills, career advancement, access to secure and profitable fields of activity. The factors that influence the adoption of digitalization components in the agricultural business environment in Romania are: economic-financial, cognitive-informational and social-educational.

The main purpose of the paper is to analyze the openness and interest of current students for the components of digitalization that they will use in their future activity. Given that promotion is connected to the profile of the consumer segment, we used criteria to identify this profile. The objectives of this paper are: O1. Identifying the profile of future specialists in agriculture based on digitalization; O2. Highlighting the role of promotion in the successful transition to digitalized agriculture; O3. Identifying the directions that must be followed in the education process in order to best prepare future entrepreneurs who will work in the agricultural field connected to digitalization.

The research is quantitative in nature, and the basic method used is the survey conducted with the questionnaire instrument that was applied to a sample of 235 respondents. The research universe is limited to students in the field of agriculture. The working variables that supported the questions in survey are: decision-making factors in digitalization in the future profession, factors influencing the decision to use innovative products in agricultural businesses, mentality regarding digitalization, perceived advantages as a result of using digitalization in the future profession, openness to learning and accumulating new information regarding digitalized agriculture. The variables were supported by confirmatory pivots such as: previous experience in working with modern technologies, information sources used to learn about digitalization, trust in new technologies, openness to using digitalized tools, motivation, risks. The questionnaire was structured, with questions grouped into sections: framing the profile of future entrepreneurs in agriculture, perceptions regarding digitalized agriculture, behaviors towards education for digitalization.

2. Results and Discussion

In order to identify the profile of future entrepreneurs in agricultural businesses, considering students preparing for this purpose, the survey followed several parameters, the results of the responses of which will be presented below. The main reference parameters are: the specialization in which the young people study (Figure 1), experience in agricultural business, availability for education for digitalization, motivation for adopting and using digitalization components, perception of information sources about the products and technologies they will use in the future, preferred and appreciated innovative and digitalized products, attitude towards the risk of using these digitalized technologies and trust in promotional programs to stimulate the use of these innovative products and technologies.

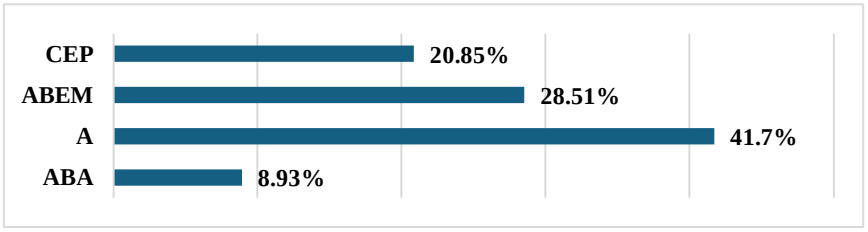


Figure 1. Subject specialization – students in the field of agriculture
Source: *processing of survey database*

It can be seen that most participants (41.7%) are from the Agriculture (A) specialization and the fewest (8.93%) from the Master of Agricultural Business Administration (ABA). In a balanced proportions are the participants from Agricultural Business Engineering and Management (ABEM) and Consumer and Environmental Protection (CEP) of 28.51% and 20.85%, respectively. The survey also indicated the following proportions of experience with agricultural businesses: 66.80% come from families with agricultural businesses, and 33.19% did not have such experience or involvement.

The answers related to the openness to digitalization in agriculture are presented in Figure 2.

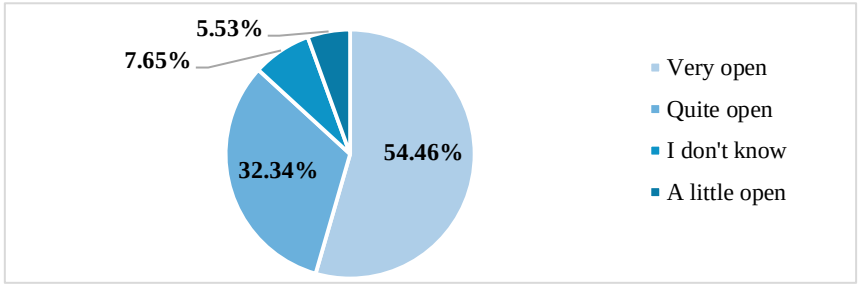


Figure 2. Readiness and openness to adopting digitalization in agricultural businesses
Source: *processing of survey database*

It can be noted that over half of the student respondents (54.46%) declare themselves very open to adopting innovative technologies and products in their future profession involving agricultural business. Just as many, over 32%, declare themselves quite open, so a high degree of openness towards new technologies, digitalization and innovative products in agriculture is for 86.8% of the respondents. Those who declare themselves a little open are only 5.53%, an aspect correlated with the profile of generation Z (curious, with initiative, with native skills in the field of digitalization and technology), while 7.65% declare that they "don't know", this indecision can be interpreted as insecurity, distrust, lack of knowledge of the field or it may be a lack of interest.

Figure 3 indicates the results regarding the motivation to adopt digitalization components in their future agricultural businesses.

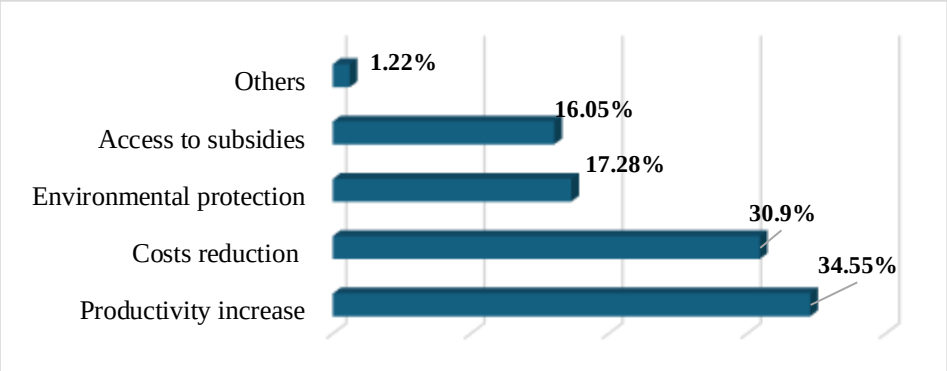


Figure 3. The motivation for adopting various components of digitalization in agriculture
Source: *processing of survey database*

From Figure 3 it can be noted that most respondents, 34.55%, are motivated by increasing productivity and just as many, 30.9%, by reducing costs. These answers indicate the pragmatism and objectivity that respondents demonstrate when deciding to adopt new technologies, innovative products and digitalization in agriculture. Relatively high percentages, but still in second place, are given by motivations such as environmental protection (17.28%) and access to subsidies (16.05%).

Regarding the attitude towards risk in adopting the components of digitalization of agriculture, 51.16% declare that "I don't know", a rational aspect given that the risk should be analyzed in a specific context, namely because these components are not yet fully and concretely known. 17.44% say they feel they risk “a lot”, almost 6% say they risk a lot, and 21.51% say they risk “a little”, while 4.06% say they “do not risk at all”.

For the appreciation of the usefulness of digitalization components in Romanian agriculture, 77.30% are supporters of digitalized agriculture, and 5.81% are rather reserved about these, considering that it is possible to work well without them.

Figures 4 and 5 show the sources of information and promotional content that respondents appreciate, trust and feel influenced by in terms of adopting innovative and digitalized agriculture.

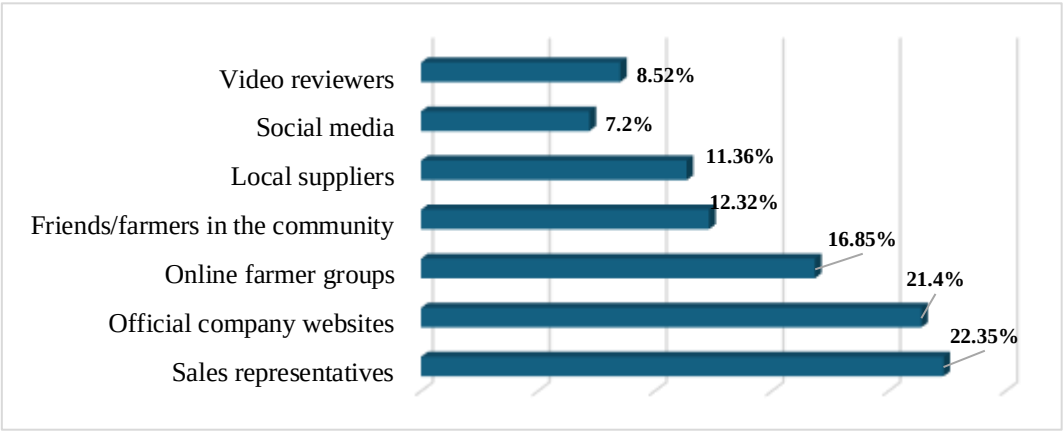


Figure 4. Agreed sources of information regarding the adoption of innovative technologies
Source: *processing of survey database*

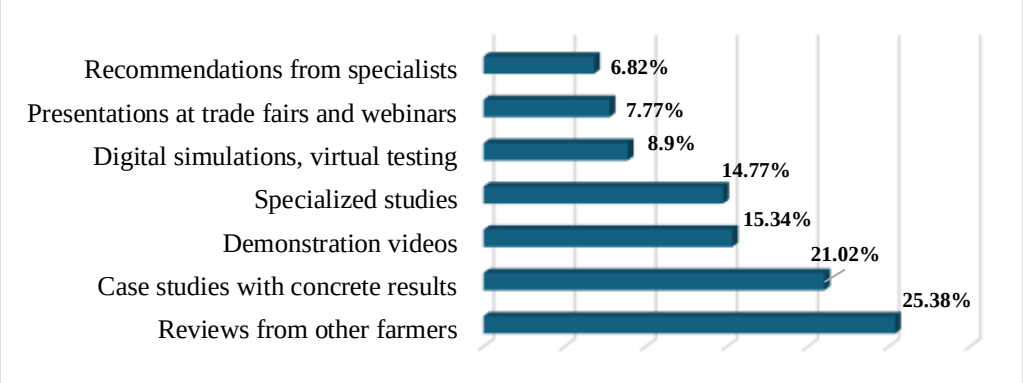


Figure 5. Promotional content that influence the decision to adopt digitalized agriculture
Source: *processing of survey database*

Regarding the probability that in the future of agricultural businesses in which they will be involved, to adopt and use new innovative, digitalized products and technologies, almost half of the respondents, 48.08%, say that it is very likely, 37.02% say that it is probably, 11.06% do not know and 3.82% unlikely.

The types of digitalization components that future entrepreneurs in agriculture like, these are shown in Figure 6.

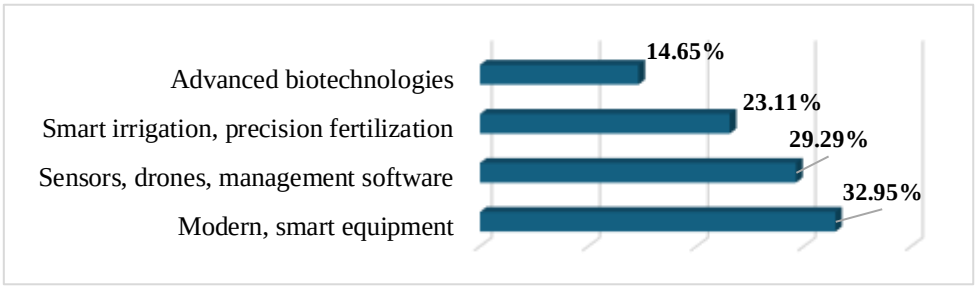


Figure 6. Components of digitalized agriculture agreed and appreciated by respondents
Source: *processing of survey database*

Regarding trust in marketing programs that promote new digitalized technologies and innovative products for agriculture, the results indicate the following opinions of the respondents: most, 26.57%, trust practical demonstrations and prior testing, respectively 20.73% trust testimonials and evaluations of other users. A very high percentage, 19.44% appreciate product certifications, respectively 17.49% appreciate details with technical data of innovative products and technologies. 15.76% of respondents trust in the economic results already obtained by other users.

In general, from the analysis of the results presented above, it can be observed that predominantly young students, future entrepreneurs in agriculture, are as open as possible to the idea of digitalized agriculture and are excited by the means of promoting innovative products and technologies that would bring benefits and high-performance results. Regarding the motivation for using the components that support the digitalization of agriculture, it is observed that the respondents are pragmatic, objective and focused on concrete and quantifiable aspects such as productivity and implementation costs.

Regarding risks, it seems that, not knowing these components in detail, they cannot express the degree of risk or perhaps cannot establish it only based on assumptions. Regarding information sources, it is very interesting that here too they are very anchored in concrete elements, they are

circumspect, that is, they prefer reliable, official and professional sources. It is very interesting to note that they are not very influenced by online promotion or are not impressed by it, and a very high degree of pragmatism is noted for promotional content.

They are not very impressed by social media advertisements, which indicates a high degree of objectivity or selectivity of information. They also do not express great trust in digital applications, which correlates with questions that emphasize information, clarity, source of information, so if they do not know the situation well, they do not express themselves because they do not have a concrete framework for orientation.

CONCLUSIONS

The state and evolution of Romanian agriculture are topics of real interest for the analysis of the transition to digitalization, as they represent basic pillars in supporting the current and future national economy. Currently, Romanian agriculture operates in a framework marked by some gaps in the modernization and adaptation process to digitalized agriculture, based on innovative products and high-performance technologies. In principle, with some exceptions, the pace of adoption of new technologies and digitalization is relatively slow in Romanian agriculture. That is why it is extremely important to monitor who the future entrepreneurs in national agriculture are and what their profile is, considering the current generations of students in the field.

Through the research carried out and the results obtained, the paper contributes to bringing to the forefront the profile of the generation of agricultural students from multiple perspectives: openness to digitalization, risk-taking, objectives pursued, intentions to adopt innovation in agriculture, position towards financial investments in relation to the results obtained.

The general profile indicates openness, caution, focus on objective results, attention to investment costs by reporting to expected results, limited trust in uncertain information sources and risk taking only under conditions of certainty or possibility of controlling the situation.

Considering a set of assumptions in accordance with which young people from Generation Z are less attentive to the details of their future profession, these are contradicted by the results of the survey. Even if there are major gaps in the critical analysis regarding the selection of information usable in professional activity, young people can be directed in this direction through complex education programs for digitalization. We recognize that the economy of the future depends on investment in digitalization and access to innovative products, and performance and progress depend greatly on marketing strategies that promote digitalization and innovation in agriculture.

Promotion is a widely used concept, but not always in the right sense. In terms of promoting the products that are part of digitalization, the results indicate that young people are prepared to receive messages and promotional actions that demonstrate the usefulness of the investment, reduce uncertainty or illusion, and confirm the practical validity of the results of implementing digitalized technologies in agriculture. Young people expect credibility, results, and unintended risks.

Therefore, it is necessary to give due consideration to the intended purpose, the profile of future entrepreneurs in agriculture and how they are prepared, an aspect that can be implemented by creating educational projects for this purpose.

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