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Specialists training in the area of management accounting in the conditions of digital transformation of the economy (data from Russia)

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***Abstract*—The goal of the study is to identify prospects and limitations in the system of economists training for digital agriculture. A multidimensional study has been conducted in the context of several focus groups of respondents, which allowed assessing key competencies of accounting specialists compared with the competencies required by specialists of the agricultural sector in the conditions of digital transformation of the economy. It has been concluded that at present the training of specialists in management accounting in Russia is most influenced by such factors as: industry specificity, digital transformation of the economy, changes occurring in the context of the development of management accounting as a science. With the large-scale distribution of digital technologies, the development of information infrastructure, and the increasing requirements for a minimum set of digital competencies for employers in most areas of economic activity, it is an increasingly important task to train specialists who are able to work successfully in the new environment. Under these conditions, the system of training specialists in the field of economics in general and accounting in particular is undergoing a significant change.**

Keywords—digital economy, specialists training, agriculture, economist, accountant, specialists' competencies.

I. Introduction

The penetration of information technologies and digitization of economic processes have significantly changed the approaches to the modernization reforms in the traditional sectors of the economy and had a significant impact on the structure of consumption. New approaches to analytics, forecasting and management decision making have appeared. Today it is obvious that the spread of digital technologies to one degree or another will affect the functioning of all subjects of market relations. In addition, it is obvious that as a result of the digital transformation of the economy, new markets will appear, most of which will have a networked nature, with an increased focus on the individual as a final user by minimizing the distance between a producer and a consumer.

II. Research methods

The methodological base of the study was formed taking into account the results obtained by Russian and foreign authors in the study of the formation and development of management accounting. This study is a continuation of the earlier studies of the authors [1, 3].

To identify the main changes occurring in the system of personnel training, 5 focus-groups of respondents were formed (Table 1).

TABLE I. Characteristics of focus groups of respondents surveyed during the study

Focusgroup	Focus group members	Geographic region	Characteristics	Number of respondents surveyed	Goal of the study
First	Acting employees of accounting services	5 regions of southern Russia	Accountants from enterprises that use or implement a management accounting system	180	The study of the management accounting breadth. Identification of key objectives and competencies of specialists in management accounting
Second	Accounting Scientists and Lecturers	More than 10 regions, 12 universities of the Russian Federation	Employees of universities of the Russian Federation, who have academic degrees Candidate of Economic Sciences and Doctor of Economics, involved in the development of management accounting	75	

Third	Other Accounting Experts	More than 10 categories of users	Experts who use management accounting data for decision-making (company executives, business owners, investors, etc.)	45	
Fourth	Students	Stavropol Territory, Russia	Students of Stavropol State Agrarian University, "Economics" training program, profile "Accounting, Analysis and Audit"	169	Personnel training for agriculture in the conditions of digital transformation of the economy
Fifth	Representatives of top management of agrarian universities	34 agrarian universities of Russia	Academic teaching staff representing the management structures of agrarian universities (Vice Rectors, Heads of Research and Academic Departments)	34	

III. Results of the Study

A. *What competences a modern specialist in management accounting should possess (results of analysis of foreign experience in the development of accounting education).*

The question of studying the key competencies of a modern specialist in the field of accounting and management accounting is quite important for foreign researchers. Some researchers support the further development of traditional accounting competencies, while others are of the opinion that the digitalization of social life, gamification and the mosaic thinking of modern youth should be taken into account when forming the professional skills of specialists.

So, in the work of (Daff L., de Lange P., Jackling B. A (2012)) it is noted that the inclusion of general skills, such as communication and teamwork, in the accounting curriculum along with the development of emotional intelligence gives good results in terms of strategic decision making skills, teamwork, leadership and customer interaction. The authors conclude that basic professional skills should be combined with general skills and emotional intelligence. In the work of (Lawson R.A., Blocher E.J., Brewer P.C., Morris J.T., Stocks K.D., Sorensen J.E., Stout D.E., Wouters M.J.F. (2015)) the issue of core competencies integration and broad managerial competencies into the accounting curriculum is considered. The need for the development of additional competencies in addition to owning traditional management accounting tools is also indicated by the study [4-6].

Digital transformation of the economy leads not only to changes in requirements for specialists in the field of accounting, but also radically changes the approaches to the educational process, as the work of referred to the use of active forms of education in the training of specialists in management accounting; in turn, the study of showed the benefits of using technological advances in communications infrastructure, equipment, and online tools in training of accountants. It also noted that online video clips, students' video projects and video recordings of online lectures provided great perspectives for accounting education and significant pedagogical advantages since students were not limited to lecture hall walls and could interact with external experts in an interactive mode [7, 8].

The important role of online interactive learning systems in enhancing the academic performance of students in accounting education was also noted in the work of (the results of using the interactive learning system MarlinaLS™ were described), and also in the work of (Gaffney M.A., Ryan D., Wurst C. Do (2010)). In turn, the work of (Kohlmeyer J.M., Seese L.P., Sincich T. (2011)) showed that employers of small and large public accounting firms located in the south eastern United States more often preferred graduates who studied in traditional forms of education in the prejudice of online education. The same opinion was shared by the authors of the work of (Grossman A.M., Johnson L.R. (2017)) [9].

B. *What specialists, whose training is currently not of a mass character, are required for more efficient work of agriculture?*

As the scarcest personnel for agriculture in Russia, a geneticist-breeder, a programmer and applications developers have been identified (Table 2).

TABLE II. The scarcest personnel, the training of which is currently not of a mass character

Scarce specialists	mean score	Scarce specialists	mean score
Remote taxation specialist	6.0	Programmer and applications developer	8.2
Zootechnician on pedigree work	7.5	Marketing specialist	7.0
Technician for the storage and processing of crops	7.3	Public Relations Specialists	5.7
Geneticist-breeder	8.3	Engineering Specialists	7.8
Specialist and expert in the field of alternative energy	7.1	Operator of automated agricultural equipment	8.4
Nanotechnology Specialists	6.8	Operator and technologist of automated technological systems	7.8
Financial Consultant	6.8	Agroinformation scientist / agro-cyberneticist	7.4
Market analyst	7.1	GMO agronomist	5.8
Agricultural Ecologist	7.5	City farmer	6.1
Accounting Analytics	7.2	Agronomist-economist	7.6
Food Industry Specialist	7.4		

Among the rare professions whose preparation is carried out fragmentary, the following professions were identified by

the heads of agricultural enterprises: zootechnician on pedigree work, accounting analysts, geneticist-breeder, and technician for the storage and processing of crops. The smallest share in assessing new professions was given in favour of the following specialists: specialist and expert in the field of alternative energy, public relations specialist, marketing specialist, engineering specialist.

C. *What competences of specialists in the field of management accounting are in demand in Russia?*

Our study (Table 3) has shown that among such competencies stand out: 1) Have knowledge of cost accounting and output cost determination methods (15.9% of the total number of points awarded); 2) ability to form an effective planning system (budgeting) (14.6 %); 3) data collection and analysis for decision making (14.2 %).

TABLE III. DISTRIBUTION OF OPINIONS ON THE COMPETENCE OF A SPECIALIST IN MANAGEMENT ACCOUNTING (% OF THE TOTAL NUMBER OF POINTS AWARDED)

Questionnaire parameter	Focus group			Total
	First	*Second*	*Third*	
Have knowledge of cost accounting and output cost determination methods	14.2	16.0	19.4	15.9
Data collection and analysis for decision making	12.4	15.3	13.6	14.2
Working out of recommendations for the development of the economic entity	12.9	12.3	11.7	12.4
Ability to effectively present the level of development of the economic entity (results of a specific business process management)	5.3	5.8	5.8	5.7
Have knowledge of risk management tools	8.0	8.5	7.8	8.2
Identification of the most promising areas of business development in the future	10.2	9.4	8.7	9.6
Have strategic accounting skills	13.3	9.7	9.7	10.8
Ability to form an effective planning system	13.8	14.3	17.5	14.6
Performance of information that reduces the impact on the business unit of stagnant and depressive processes in the economy	9.8	8.7	5.8	8.6

D. *What trends affect the change in tools and objectives of management accounting and what changes need to be made in the training system?*

First, in the research process it has been found that the most important competences for specialists of the agrarian sector in the conditions of digital transformation of the economy from the point of view of both students and the academic staff of agrarian universities of Russia are: the ability to identify the most important in the flow of information and use special techniques to expand thinking capabilities and flexibility of thinking (Table 4).

TABLE IV. COMPETENCES REQUIRED BY THE SPECIALISTS OF THE AGRARIAN SECTOR IN THE CONDITIONS OF THE DIGITAL TRANSFORMATION OF THE ECONOMY (AVERAGE SCORE)

Competences	Fourth	Fifth
Transdisciplinarity	7.4	8.2
Knowledge of programming techniques	7.8	6.4
Flexibility of thinking	8.7	9.2
Social intelligence	8.3	7.9
Computational thinking	8.1	8.3
Ability to work in virtual teams	7.6	8.5
Ability to identify the most important in the flow of information and use special techniques to expand thinking capabilities	8.8	9.6
Other	-	1.0

At the same time, according to both focus groups, economics and accounting have the highest potential for digital transformation in comparison with traditional areas of training in an agrarian university. (9.5 and 10 possible points according to the fifth focus group, 8.8 points according to the fourth focus group).

Thus, the study has revealed a number of important patterns: 1) At present, several processes simultaneously affect the system of personnel training in the field of management accounting in Russia. First of all, these are the growing processes of digitization of the financial and economic activities of enterprises, which require specialists to have new competencies. 2) Over time, management accounting targets have been changing significantly. 3) In world practice, online education is becoming more common.

IV. CONCLUSIONS:

- Digital technology is a dynamic and rapidly growing sphere, in which the emergence, obsolescence and change of technology occurs extremely quickly. In turn, the process of forming educational standards is not so dynamic and often lags behind the constantly changing demands of the economy.
- The tasks of modern accountants often go beyond the scope of exclusively accounting work, the demand for the development of multidisciplinary competencies increases, which, in turn, requires constant adaptation of educational programs in accordance with the requirements of the real economy. Under these conditions, online education acquires a special role, which is capable of giving students more and more in-demand “short” competencies in the context of rapid technology changes. In Russia, the online education system has been developing rather inert (not enough courses in Russian are available in open platforms). While global experience shows the increasing spread of online education, promoting the development of cross-functional qualities of a specialist and the transition to lifelong learning with an effective combination of education and professional activities.
- An analysis of existing Educational Standards has shown that competencies in the development of digital literacy among students of the “Economics” training program, the profile “Accounting, Analysis and Audit” are formed fragmentarily. In this regard, we believe that a system is needed to form continuous interconnected competences of having knowledge of digital technologies at all levels of education: first of all, it is required to have basic computer competencies, including standard and/or specialized information databases; Bachelor’s degree graduate should have competencies that allow to use digital technology to perform labour functions; Master Degree graduate should have competencies that allow to manage processes using digital technology; Post Graduate program students should have competencies

that allow to enable information retrieval and to use digital analysis technology in research activities.

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