The university digital transformation as a tool for human capital development

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Abstract. The implementation of the “Digital transformation in the Russian Federation” program is a national goal, a powerful conglomerate for the development of the Russian economy and is aimed at understanding, formulating and implementing strategies and tactics for the development of education, business and society as a whole. In the situation of a high degree of uncertainty caused by external environment and internal problems, universities today, more than ever before, cannot fail to fill in the gaps between the needs of the labor market and the professional competencies formed in the university for it. The university has all the opportunities to increase the human capital of the region, which is defined as the structure of knowledge, skills, and intellectual potential with the ability to apply them in work to create added value and is formed, among other things, by the university education system. The article presents a look at the content of the multicomponent electronic educational environment of the Master’s training in the field of Applied Informatics, which is built on the principles of consistency, which takes into account all aspects of the modern educational process: personnel, technology, educational resources.

In the conditions of the Russian state modern development, the digital transformation of the economy and all spheres of society is clearly understood by everybody as a priority direction, where the use of digital technologies will increase the competitiveness of the entire country as a whole [1]. The Presidential Decree “On national goals of the Russian Federation development for the period up to 2030” dated 21.07.2020 defines 5 main national development goals of the Russian Federation for the period up to 2030 in order to implement breakthrough development of the state, increase the country’s population, improve the standard of citizens’ living, create comfortable living conditions for them, and reveal each person’s talent. These goals include the preservation of the population, health and well-being of people; opportunities for self-realization and development of talents; a comfortable and safe environment for life; decent, efficient work and successful entrepreneurship; digital transformation [2]. The Decree implementation determines that by this time period, key sectors of the economy and social sphere will have reached their “digital maturity”, which in turn indicates to the readiness and ability of key sectors of the economy and social sphere, including health and education, as well as public
administration to implement and successfully use new technologies. Moreover, such tools of Industry 4.0 as Big Data, Machine Learning, and IIoT will already act as methodological approaches to work organizing, which makes it possible to rethink the data-driven paradigm.

Today the Russian Government considers the full coverage of Russian households with broadband Internet to be the most important priority, and forms the plan of priority actions, strategic steps in all sectors of the economy, which will fully implement all components of the national programme “Digital economy of the Russian Federation”. Certainly, such intense changes will allow Russia to feel confident in top ten countries of the world in terms of education quality, amount of research and development; to create conditions for education of harmoniously developed and socially responsible personality, which actually is a component of human capital. In July 2020, the resources of the Roscongress Foundation and the Digital economy organization hosted a discussion on whether digital technologies will save the Russian economy. Speeches from representatives of business and government included a look at the introduction of digital technologies in various sectors of the economy. Colleagues spoke about the prospects for transforming the employment structure of the population, measures of state support for business, and raised the issue of the impact of using digital platforms and technologies on improving labor productivity. Issues of personnel changes related to robotics were discussed supposing that digital solutions will take over routine operations, and specialists will perform functions that require other competencies [4].

The Managing Director of the Competence center of human resources for the digital economy of the national program “Digital economy of the Russian Federation” Oleg Podolsky believes that today there is a personnel shortage in IT specialists in Russia. This issue was discussed during the expert session of the DIIR-2020 (Digital Industry of Industrial Russia) “Personnel for the digital economy: how to create a team of leaders in digital transformation”. Federal and regional authorities, businesses, and universities provided their opinions on this issue. Director of the Russian Association of electronic communications Sergey Plagotarenko noted that in order to become a digital state, the country’s universities need to produce about 220 thousand specialists a year. However, according to him, the education system does not have time to meet such challenges and requirements [5]. The authors of the research that was conducted by the Development Foundation of the Internet Initiatives “What challenges the digital economy poses to the Russian education system” call approximately the same figure and assume that the task of training professionals in this industry will be acute for the Russian education system, which now trains about 60 thousand IT specialists for the economy with secondary and higher professional education [6].

Based on the current trends, it is clear that the formation of human capital is necessary in all areas of the digital economy, and the university must act as a highly effective tool in the development of human capital to achieve a new life quality in the country. Therefore, it is especially important to focus on new technologies in the educational paradigm in the digital economy conditions, taking into account new trends in the labor market.

The Krasnoyarsk territory is a very complex socio-economic infrastructure, defined by the presence of a multi-industry industry, which generally determines the vectors of the education system in the training of qualified specialists in demand by the needs of the region’s industrial economy. It is logical that the mission of Siberian Federal University, which is located in the capital of the region, is “creating advanced education, research and innovation infrastructure, promotion of new knowledge and technology for socio-economic development of Siberian Federal District and the formation of personnel potential – competitive specialists on priority directions of development of Siberia and the Russian Federation, corresponding to the modern intellectual requirements and meeting international standards” [3].

Based on the mission of the university and considering the digital transformation as changes made by the external environment in the context of the development of the world picture, we believe that the conditions created here and now for the formation of human capital that can increase labor productivity in the digital economy are indisputable. We understand the necessity to form the internal ecosystem of
the university, focusing on digital changes that will lead to the updating of the competence model that graduates must meet in order to enter the labor market of the digital economy.

This is also indicated by public and professional discussions regarding the necessity to develop and implement programs for advanced training and professional retraining in the required competencies of the digital economy. Training of CDO-managers and teams in accordance with the requirements of the digital economy is rather relevant. In addition to professional competencies, we are also talking about the development of adaptive abilities of future personnel from among university graduates, the formation and development of digital competencies, a high degree of motivation, self-development, self-organization, and loyalty to companies in the region.

University faculty members in the conditions of high uncertainty, including the forced transition to distance learning, understand the inevitability of the digital educational environment development at all stages of its life cycle. It is clear that as a result, the process of education transformation is activated, which includes the diversification of its content and tools of educational activities. Thus, today the primary task of the education system is to understand and implement the basic concepts of digital transformation, to form thinking in the process-digital paradigm and the applied aspects of its implementation.

As a part of the grant implementation for faculty members of the Master’s course of Vladimir Potanin scholarship program, we developed the concept and content of the Master's program in the training direction 09.04.03 Applied Informatics, “Digital economy technologies”. The program is designed to meet the requirements of the Federal state educational standard of higher education 3++ [6] and is focused on the professional standard 06.014 “Information technology manager” [7]. The purpose of the Master’s program is to train highly qualified specialists in the field of Applied Informatics for the development, implementation and adaptation of industry-specific information systems in the digital economy and the formation of Russian and global digital markets. The program solves a number of tasks, including:

- research of applied and information processes, use and development of methods for formalization and algorithmization of information processes;
- analysis and generalization of research results using modern achievements of science and technology;
- research of promising areas of applied Informatics;
- analysis and development of information resource management methods;
- use of international information resources and knowledge management systems in information support of decision-making processes and organizational development;
- integration of IS (information system) components of automation and informatization objects based on functional and technological standards;
- making decisions in the process of operating the IS of enterprises and organizations to ensure the required quality and reliability of information security of its services.

An important aspect of the Master’s program is the professional standard that meets the real requirements of the economy, as one of the most important systemic measures in the field of human capital reproduction. Focusing on the 7th level of the professional standard (codes B/02.7 “IT-projects management”, B/03.7 “IT-services delivery model management”, B/04.7 “IT-services change management”, we have identified a number of professional competencies, which include (figure 1):

It should be noted that when developing the program concept, we investigated the target market and conducted a survey aimed at researching the required knowledge and skills, which later became the content of the curriculum disciplines. Academic leader and teaching team also aim at studying the needs of modern business, where in addition to the extremely popular professional competences such competences as high speed of non-standard tasks solving, generating and implementing new ideas are indispensable. All this was reflected in the creation of a training system, including retraining, since according to the results of marketing research, the program will be in demand among applicants with
higher education from other areas of training, which will be in great demand. We presented the training model as a set of organizational, educational and methodological, technological, spatial and informational components that require constant development and improvement. Let’s look at them in more detail.

**Figure 1.** Professional competencies of the Master’s program.

![Diagram of Professional Competences (PC1 – PC5)]

| Professional Competences (PC1 – PC5) |
|--------------------------------------|
| PC1 | Ability to use advanced methods for assessing the quality, reliability, and information security of IS in the process of operating applied IS |
| PC2 | Ability to use information services to automate application and information processes |
| PC3 | Ability to model and design information processes based on modern technologies |
| PC4 | Ability to develop and adapt business processes in accordance with IS capabilities |
| PC5 | Ability to use and develop research methods and tools in the field of design and management of information systems in applied fields |

So, the organizational component is represented by the analysis of the material and technical base of the university, including the presence of local regulations on the use of the electronic educational environment (EEE) at the university and the financial model of the Master’s program implementation. It should be noted that Siberian Federal University has a long tradition in EEE implementing, which is undoubtedly the university’s advantage and opens up many new opportunities. The university has a responsibility center that provides organizational and methodological support for the program, and operational management will be implemented at the Institute of economics and business process management, the program implementation process itself will be organized by the efforts of several university institutes and supervised by the Academic Council, which consists of employers and professors.

The educational and methodological component is aimed at interaction with the teaching staff, where the level of their information competence, readiness and equipment in the implementation of new educational formats, such as a blended learning model, distance technologies, plays an important role. In the same component, the educational and methodological support of disciplines is very important. It should be underlined that the content of the educational program curriculum is represented by a number of courses that are fully equipped with an electronic resource using distance learning technologies, whether it is knowledge in the field of methodology of science and technology, design of information systems, applied system analysis, econometrics, or features of human organizational behavior in the digital world. The academic team of teachers has an excellent experience in implementing online technologies, which will be used in conditions of time shortage due to the workload of students, including practical activities, territorial, geographical distances, etc.

The technological component is determined by the choice of software, services for video conferences, online meetings and distance learning, the purchase of equipment and the organization of technical support and assistance to faculty members and students in the daily educational process. Today, SFU uses several services for e-learning and student interaction, whether it is consultations,
practical classes, research seminars or conferences. These services provide an opportunity to implement the concept of an educational program in terms of using interactive forms of conducting classes, including flipped classes, case study analysis, training, and the use of simulators, which will generally increase the effectiveness of training.

The spatial component assumes the presence of a virtual space that hosts electronic educational resources offered by faculty members and the possibility of remote access to educational materials, the university library, which ensure the digitalization of the educational process.

The information component is due to the availability of digital resources, databases, electronic scientific journals online, presented on the university website in the “Library” section.

So, we have developed the Master’s program aimed at developing the human capital of the region, where the digital orientation of the university acts as the main tool. The program concept will allow graduates to develop the necessary professional and meta-professional competencies, a sense of social security, stable motivation to work, and an understanding of professional choice in favor of a profession that is in high demand in the labor market.

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