Digital Transformation of Educational, Research and Business Activity of A University

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Abstract: In the context of the development of digital economy and the widespread adoption of digital technologies in various fields of life and activities of modern society, the digital transformation of the education system and research activities of the country's population becomes relevant. Universities, as the main links in this system, are entering a new stage, a model of their development in which the digitalization of all its activity fields plays a dominant role. The digital transformation of universities involves a comprehensive transformation of all the basic activities of the university and the infrastructure corresponding to the implementation of these types of activities.

Due to the rapid development and widespread use of digital technology, the universities have gained new perspectives and opportunities to improve the quality and convenience of the educational process. Due to the proliferation and widespread use of massive open online courses, the universities have become able to compete globally.

The widespread introduction of digital technology in the main areas of university activity is the main condition for accelerating innovative transformations in the preparation of bachelors and masters. Digital transformation is becoming a key mechanism for creating a university's competitive advantage in the global educational space.

The purpose of this work is to investigate methodological approaches to the digital transformation of the main types of university activities: educational, research and entrepreneurial.

Keywords: digital transformation of the university, digitalization of education, digitalization of university research activities, digitalization of university business activities.

I. INTRODUCTION

In 2016, the President of Russia approved the strategy of scientific and technological development of the Russian Federation [1, 2]. Over 3,000 experts and specialists from various fields of science, educational organizations and representatives of the most priority sectors of the economy worked on the document text. Vladimir Putin noted that "the scientists, state, and business worked out a consolidated position regarding priorities for science, as well as formulated goals for the near future as a result of a wide, open discussion of the Strategy" [3, 4]. The strategy implementation fell on the Government of the Russian Federation and leading scientific and educational organizations.

The main goal of this strategy is to formulate such technologies that will be able to meet the global challenges faced by Russia, increase the share of innovative goods and services, develop the sector of high technology and increase the effectiveness of scientific research [3]. The strategy implementation will increase the level of commercialization of the results of innovative activities of the universities in our country.

The main strategy directions are the development of digital economy, in particular, digital production technologies, improving systems for processing huge amounts of data [4, 5], developing artificial intelligence and machine learning, strengthening the sector of environmentally friendly and resource-saving energy sources and increasing their efficiency, as well as many other areas, on whose development the future of our country depends [3, 6, 7, 8, 9].

In the process of digital transformation, the university has to solve many new problems [10]. One of their most important tasks is to provide users with information about the main activities of the university: educational, research and entrepreneurial. Consideration of the prospects for digital transformation of these areas is presented in the results section.

II. LITERATURE REVIEW

In recent years, many authors pay increased attention in their studies to the digitalization of university activities. The effective and appropriate use of digital technology to work with the information resources is a necessary set of skills for living, learning and working in the digital age.

The digital literacy of a student implies that he/she has competencies, knowledge and skills for the safe, appropriate and effective use of digital technologies in solving professional and life tasks. The concept of digital literacy has appeared in connection with the growth of network communications technologies [11, 12, 13, 14].

The intensive growth of educational technologies, distance and mixed learning has led to an increase in the digital literacy of students. The volume of educational content of universities is growing rapidly. New types of educational resources and technologies are emerging. In order to skillfully navigate in the innovative educational space, the students need competencies in the field of digital technologies [13].

The digital economy requires the transformation of technology, which undoubtedly affects changes in the business environment. New human abilities in the field of digital technologies require the improvement of artificial intelligence and the knowledge industry.

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Hyper-personalization of a student is required according to his/her competencies and skills, bio-data, socio-economic conditions and family composition. The study of Perez Gama, J. A., Vega Vega, A., & Neira Aponte, M. (2018) presents the main and conceptual aspects, as well as methodological approaches to the assessment and application of digital technologies. Using some intelligent designs, they have developed and patented the latest digital technologies for higher education over the past 10 years [15]. Drumm, L. (2015) investigated the theoretical foundations of university teaching using digital technology and concluded that digital tools guarantee quality teaching and learning and can take education to a new development level. The author examines how theory can be used to understand the application of digital technology and determines the problems associated with the insufficient knowledge of this process. As digital technologies evolve and become more widespread in all spheres of people's lives and activities, it is important for the increased use of digital technologies in education to be supported by a scientific assessment of the educational and sociocultural theories behind these practices [16-27].

III. METHODS

The research methodology is based on a review of strategies, methods and experience in improving and digitally transforming the main areas of university activity (educational, research and entrepreneurial) that have proven their effectiveness in successful Russian and foreign universities.

One of the most important tasks today is to accelerate and increase the efficiency of the process of introducing the latest developments, inventions and concepts into practice. Technology translation should help this.

IV. RESULTS

The authors offer the concept of a comprehensive transformation of the educational, research and entrepreneurial activities of the university.

1. Digital transformation of educational activities.

The university role is changing in the modern digital economy. The university, in the new model, is no longer tied to a specific geographical location, and its importance in the Internet space is gradually increasing. Many universities have been implementing distance learning programs for several years. This allows the universities to train students from all over the world. The widespread use of digital technologies and massive open educational resources in the educational process has made it possible for many well-known universities to reach a wide audience in the global space and attract many students around the world to their courses [17, 18]. Thus, the university becomes a center for training students from around the world.

2. Digital transformation of university research activities.

The development and implementation of the portal of scientific and research projects will make it possible to keep track of all research projects, introduce a project approach to their implementation and analyze their results. The portal should display the status and progress of each scientific and research project, and record the scientific results. Thus, a knowledge base of scientific competencies will be formed.

The development of such a portal will facilitate the integration of the scientific and research activities of the university and the real sector of the economy. The portal will become a virtual platform not only for the teachers, implementing research projects, but also for graduate and doctoral students [19-26]. The information environment will make it possible to support the integration of the university's research activities and requests for innovative solutions from the enterprises and organizations (Fig. 1).
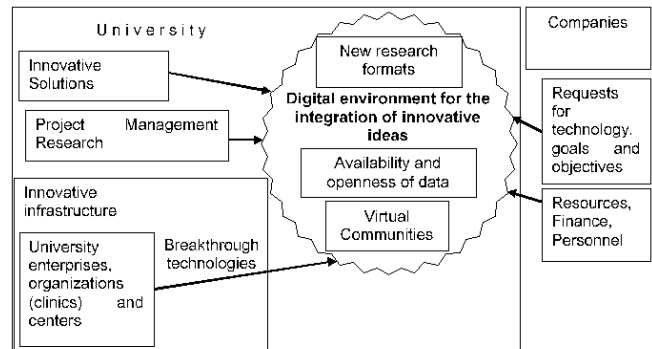

Fig. 1. Transformation model of the scientific and research activities of a university in the context of open innovation

This way of organizing research will allow the university to be on the frontier of new technologies, and remain the owner of research results. Conducting joint research with leading industry companies will significantly increase the competitiveness of the university.

3. Digital transformation of the university business activities.

In order to remain a technological leader, the university needs to determine the spectrum of the most popular technologies and strive to develop research and production centers (laboratories and enterprises) in its infrastructure aimed at promising developments in the field of latest technologies. New university enterprises should be able to design and market products of new, sought-after technologies. For this purpose, the university needs to develop new units in its structure for the development of new activity areas. It is required a qualified personnel, who shall have entrepreneurial competencies and successful experience in developing startups. A university professor shall be a leader, an entrepreneur and act on the frontier of new practices, and a teacher shall be a navigator, a tutor for the students. The activity of the university personnel should be mainly design, entrepreneurial, and innovative. A student is a subject of test activity, becoming a metaprofessional.

The society and people are changing in the context of digital transformation. It becomes personalized, reflective, mobile and arbitrary in relation to its own identity. The consciousness of students becomes dynamic, playful, an active picture of the world prevails in it. In such conditions, such values as openness, sociability, and willingness to work with the problems become important for the university personnel.

V. DISCUSSION

Currently, 70% of leading companies have strong digitally competent personnel. 40% of them use digital technology and artificial intelligence in the management of business processes. Despite the timely and rapid spread of digital technologies in production, the universities have not yet been able to get ahead of them. Only a small part of Colombian universities tackled the competitiveness problem in higher education, and tried to face the 4th industrial revolution and make a quantum leap, but experienced great disappointment due to the obsolescence of higher education. The university should play an important role in narrowing the digital divide between education and practice, and even more, it shall develop new educational programs that are aimed at creating the most important digital competencies that the graduates need to work (for example, professional cyber programmers), which is necessary in modern digital era, otherwise we will be among the lagging behind and catching up ones [15].

The use of digital technologies in modern higher education has proven its effectiveness and promise [20, 21]. Moreover, digital technologies are restructuring the way the students read and think, thereby transforming mental processes, accelerating and improving the process of understanding and perception of educational material and the assimilation of new knowledge. However, there are also possible negative phenomena: the ability of students to deeply think and understand the material studied is reduced, these abilities can atrophy as a result of changes in the student nervous system. The presence of such suspicions regarding the new "digital divide" that arises in the educational process gives teachers a timely opportunity to think not only about how the modern students learn and think, but also about what and how they teach [22-28].

The introduction of digital technology in the main areas of the university is widespread.

The researchers Kryukov, V., & Gorin, A. (2017) analyzed the use of innovative digital educational technologies, and developed a multi-level model for assessing the university readiness for digital transformation based on the analysis. The model includes three interrelated criteria for determining the level of digital readiness of the university: organizational, methodological, technological and professional. Based on the model proposed by the authors, it becomes possible to develop quantitative indicators characterizing the digitalization potential of the universities. The authors share their experience in using digital technologies at the Vladivostok State University of Economics and Service [23-29].

VI. SUMMARY

Modern conditions for the development of society, digital economy, globalization processes and the fourth industrial revolution have affected the need for digital transformation of the entire higher education system and the universities as its most important elements. The need for digital transformation leads to the manifestation of new qualitative features of the university:

1. Transformation of educational activities. The production of export-oriented scientific and educational products is becoming relevant. The universities began to focus on training applicants from other countries. This provides unlimited opportunities for expanding the infrastructure, geographical coverage and territorial representation of the university.

2. Transformation of scientific and research activities. The university shall conduct joint research with leading companies in various advanced and high-tech industries. Integration with leading companies through the application of the achievements of the digital economy (digital integration) will allow the university to be in the ecosystem of the latest technological breakthroughs and developments. The result of such integrations shall be represented by a joint product or production technology patented by the university.

3. Transformation of entrepreneurial activity and its management mechanisms. Under the influence of globalization processes, the universities research and borrow the best experience and management models from the multinational companies, thereby striving to be competitive in the global market [24, 25].

The digital transformation of universities will create the conditions for integration of technological production and scientific research into its digital platform, thereby significantly reducing the speed of turning an innovative idea into a finished product. At the same time, the integration of external users into the platform will allow achieving maximum compliance of new products with the consumer preferences.

VII. CONCLUSION

The digital transformation of universities opens up many new opportunities and development prospects for the external and internal users. The competitiveness of not only the university, but also its students, graduates and faculty is increasing. There are opportunities for cooperation and research with leading enterprises in the industry, regardless of their location. The educational opportunities of the university are expanding significantly, allowing the students from different countries to be trained through digital educational technologies, thereby significantly increasing the number of students and the quality of educational services provided.

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