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TECHNOLOGY TRANSFER AS THE THIRD ACADEMIC MISSION OF THE ENTREPRENEURIAL UNIVERSITY

Summary

Currently, all the world universities are becoming drivers for development of high technologies and business. In addition to performing traditional (educational and research) functions of creating new knowledge and building competencies, universities play a significant role in development of innovative ecosystems and entrepreneurship, and transfer of technologies they have created. In the context of glocalization, the importance of universities as drivers of innovative development is growing, and their functions are changing radically. Today, universities are not only the leading actors in creation, storage and dissemination of knowledge, but they are also turning into a kind of 'technology brokers'. The universities are actively developing their third academic mission – the transfer of created innovations and technologies by providing services for business in the format of contract research; consulting, incubation and acceleration programmes; and formation and provision of platforms for information exchange and dissemination of knowledge.

Introduction

In modern conditions, the universities are facing significant challenges of the modern global post-industrial economy. It completely depends on their strategies whether the challenges will turn into threats or into motivation for innovative transformations of educational and research processes and entrepreneurial initiatives. The formation and dynamic development of third-generation universities in developed countries, especially the United States, is associated not only with their innovativeness, high level of flexibility and adaptation to new technological challenges, and expansion of R&D. Of particular importance is the transfer of technology through close interaction with business structures, creation of start-ups and other small innovative enterprises within the university, presence of organizational and economic mechanisms that can ensure the effective use of innovations created in the higher education segment. And although universities are in constant search for new mechanisms and ways of sustainable development based on various

criteria, in general, their activities are aimed at achieving a strategic benchmark for innovative development. The latter is associated with the commercialization of science, the entrepreneurial style of university management, various forms of integration (technopolises, research and production enterprises, intellectual property protection departments, technology transfer centers, etc.), which determine formation of a model of a project-oriented university. The innovation ecosystem includes three important components: market-driven university research; faculty constantly involved in innovation and cooperation with industrial enterprises at all stages; translational research improving technology transfer from universities to industry (through rapid and efficient innovation). An integrative feature of these components is an entrepreneurial culture built on a management system within the framework of the *Science to Business (S2B)* model – from science to business with its own organizational structure that combines traditional hierarchical relationships with constantly changing horizontal links between departments, and which ensures achieving a synergistic effect. Currently, nowhere does technological discovery play such a significant role in creation of a new venture as in 'third generation' universities (building on the already established base of 'second generation' universities), which are a modern fertile basis for technological innovation and its transfer.

Part 1. A retrospective survey of transformation of modern academic education

In our opinion, it is necessary to start the analysis of the transformation of the modern market of educational services with a retrospective survey which will allow both to determine the features of the academic identity of market entities and to fix the growing complication of the processes of identifying educational institutions and academic communities in the context of the globalization of the technological processes of Industry 4.0. Indeed, the traditional of the *triple helix concept* by H. Etzkowitz [1] which describes the interaction of universities, government and business in the innovation process, is largely supplemented with new content related to modern features of globalization in the field of research, innovation and technology transfer.

Initially, a classical university (University 0.0) used to be largely a research institution. A sign of academic identity and the core of this value pattern comprised the search for truth, commitment to discipline, autonomy, self-regulation of academic work, academic freedoms based on meritocracy which defined the framework for the existing competitive struggle in the academic environment. The head of the university carried all the values of the academic community, refracted through the prism of personal qualities. It was the academic identity at University 0.0 that determined the state of university management.

University 1.0, as a brainchild of the industrial age, was forced to tune in to translating existing academic knowledge and training personnel according to specified standards. The new conditions had led to a change in emphasis in academic activities and, consequently, transformation of academic identity through consolidation of separation of two independent sub-identities – research and educational activities on the one hand; on the other hand, through formation of the community of professional administrative bureaucracy of university management as a specific form of structural configuration of the organizational design of universities. The latter, over time, acquired the features of an oligarchy of highly qualified specialists, characteristic of an industrial society.

The University 2.0 concept of the post-industrial society of the late XX – early XXI century was formed in association with the decisive influence of technological revolutions focused on development and commercialization of scientific knowledge in the conditions of 'speeding up time' in all spheres of life under the influence of economic, cultural, structural driving forces from a high level uncertainties of the future. This, firstly, was reflected in the terms *high-speed society* and *high-speed university*, and also transformed management into its new form – managerialism.

Secondly, it transformed the conditions for the work of the university community, and defined new ways of building an academic identity, which was increasingly intertwined with elements that were not considered academic in the traditional sense until recently:

a) competition in academic and research activities;

b) the expanding professional role of a teacher in the field of people development and virtual teaching methods;

c) academic identity suggesting a certain community of 'professional managers' whose work is not characterized by academic freedom, self-regulation and autonomy, but by implementation and monitoring of institutional management.

'Universities 3.0', i.e. third-generation universities, are entrepreneurial universities. They are becoming leaders in relationships with business and government, and building a certain model of 'innovative behaviour' in the global ecosystem. The leading features of this model are its following characteristics – self-organization as a symbiosis of material resources (funds, equipment, facilities, etc.); human capital (students, teachers, employees, industry researchers, etc.); and entrepreneurial communities – a set of infrastructure elements (investors, venture funds, service companies, technology parks, technology transfer centers, and start-ups). In addition, there is a specific 'deformation' of the teacher's role. It is shifting from the position of an intellectual leader to the position of a facilitator, tutor, consultant, or instructor. The third-generation universities, including American ones, have a

very flexible organizational structure for commercialization of their scientific research. As a rule, it has a three-stage structure, which has proven its effectiveness in the field of knowledge and technology transfer. For example, the first level of the University of North Carolina is the Office of Technology Transfer, the second is the Technology Business Incubator, and the third is the Small Business and Technology Development Center. The main activity of the Center is business consulting: 1) conducting training seminars and programs, legal advice and assistance in finding finance for researchers engaged in applied development; 2) regular organization of 'ideas fairs' where leading venture investors are invited; 3) participation in implementation of federal programs SBIR and STTR; 4) publication of a large number of publications, manuals and guides on creation of start-up companies, intellectual property and the search for possible ways of financing [2].

According to OECD experts, every 10 years, approximately 80% of the technologies and equipment that are used now become obsolete, while more than 30% of the knowledge that teachers will teach in 10 years does not exist yet [3]. In the context of the formation and development of entrepreneurial universities, the organizational culture is being transformed – the values of academic collegiality are being replaced by the values of corporations and entrepreneurial-type organizations. At the same time, soft skills, or key competencies of the 21st century, are in no less demand by employers than special professional skills. We are talking about intellectual skills, such as: 1) solving complex problems, 2) imagination, 3) multimodal communication, 4) intercultural competence, 5) leadership.

As you know, the university is a very conservative institution slowly adapting to changes in the external environment. It is generally recognized that university models are transformed very rarely, while the effectiveness of a particular model can only be confirmed by educational practice. To date, the following main models of educational systems have developed in the world [4].

The *American* model includes junior high school – high school – senior high school – two-year college – four-year college in the structure of the university – graduate school – postgraduate school.

The *French* model includes a college – a technological, professional and general education lyceum – a university – a master's program – a doctorate course.

The *German* model includes a general school – a real school, a gymnasium and a basic school – an institute and a university – a postgraduate course.

The *English* model includes a comprehensive school – grammar and modern school – college – university – magistracy – postgraduate study.

In fact, the dominant research university model has given way to the entrepreneurial university model, and this model has entered its heyday. At the

same time, new proto-formats associated with the following features are appearing.

1. The changing the educational paradigm in the digital age. In the context of a gradual transition to distance learning, two important tasks of education have come to the fore. The growing demand for competencies in teaching design and digital didactics is stimulated by technologies that are transforming the landscape of modern education in the digital age and, above all, have an impact on the change in the educational paradigm. Lifelong learning and hutagogy (self-directed learning, self-education) contribute to the development of: 1) experimental educational design and *futures*-literacy, 2) advanced learning technologies using virtual and augmented reality, 3) adaptive technologies built on open educational resources and platform solutions. This motivates the redesign of university academic courses, which fixes a change in the teaching paradigm towards active, problem-based and collaborative learning [5]. On the one hand, gamification, designed to form and measure competencies through educational games, is a promising direction in the search for new educational solutions. On the other hand, the balance between traditional and innovative formats is becoming a determining factor in the digital age when it is important to maintain quality and fundamentality while using the phenomenal capabilities of modern technologies. At the same time, the eventful nature of university academic identity helps to overcome communication barriers in the new learning formats. As a result, the importance and demand for new educational roles (facilitation, moderation and coaching) in the digital educational reality is growing in conditions of institutional barriers in the formation of critical thinking, and the balance between ’soft’ and ’hard’ skills. Within the framework of ’third generation’ universities, artificial intelligence (AI) acts as a technological platform for formation of specified types of competence, and creates innovative platforms for bringing together professional teams to implement educational projects. At the same time, it is a futures-literacy tool to overcome the difficulties that arise between artificial, collective and individual intelligence.

2. Advanced technologies that transform learning. The accumulation and use of modern open educational resources and their integration into the educational process is taking place thanks to the ’One Window’ 2.0 platform where all online courses of national universities are collected; the universities can exchange with each other and integrate them into their curricula. The demand for massive open online courses, as well as for ready-made content for universities has been constantly growing round the world. This explains the sharply increased interest in the sites, which both accumulate requests from universities, society, corporations, and themselves formulate the requests of universities. Today, in the EU and the USA, such business entities of the educational services market as content aggregators are actively developing.

They help universities and corporations create open educational resources, post them on the net, and develop various complex methods of information retrieval. In this respect, the following are in special demand: 1) specialized microcontents (for example, EdTech) as one of the key tools in the context of individualization of educational trajectories and the use of edutainment (learning with entertainment), 2) 'new' educational practices of an active learning process (game/ problem/ project-based learning and its entrepreneurial orientation), 3) creation of synergistic teams / groups / communities of collective network learning, which serve both individual self-development and self-realization, and complete synchronization of individual and collective learning processes [6].

At the same time, the 'revolutionary potential' of new educational technologies is low today not because of the quality of these technologies, but because of the context of their application which is determined by the skills and practices of teachers and students, and the level of development of the infrastructural and socio-technical environment of the 'new'. Quite often, the collective energy and attention of 'educational innovators' is focused on the transformation of educational models of universities as 'educational centers' without taking into account other integrating entities that shape the educational landscape in the rapidly changing realities of Industry 4.0.

3. Training for the digital economy and AI. The actual demand for innovation in the field of instructional and curriculum design using international standards has increased significantly. This is linked with the fact that the IT sector is characterized by a significant shortage of project managers, technologists of the Internet of Things, virtual and augmented reality, and specialists in the use of adaptive educational platforms. The emphasis in data and AI methods has changed somewhat compared to previous years. Currently, the prospects for AI have faded into the insignificance and more and more problems occur, such as unpreparedness of the university infrastructure for processing and storing arrays of information, adherence to ethics when using students' personal data to predict academic performance, and organizing a personalized approach in education. At the same time, the sharply increased interest in advanced learning technologies has revealed the need for a more detailed study of the regulatory framework associated with the use of various technologies (from proctoring to a new generation LMS) with introduction of online courses and creation of full-fledged online master's programs [7].

We are talking about *firstly*, developing 'glocal' (global-local) educational ecosystems. They imply: 1) 'structural stability' (maximizing efficiency, circulating resources and creating 'ultimate value' – providing skills training on a scale comparable to higher quality/lower cost); 2) 'dynamic adaptability' (the ability to respond to the needs of students and changes in the institutional environment); 3) 'scalability' (from groups of students or specific educational

institutions to communities of the international educational environment). *Secondly*, we are talking about the change (development) of indicators of the success of training. Social-emotional intelligence, creativity, and ability to collaborate and co-create are the basis for determining the level of success of students. That is, the task of measuring these abilities as a metric of 'academic success' in such a new and dynamic way as 'creative profiles' describing a range of multimodal abilities is predominant. This is changing the nature of learning success metrics, encouraging the creation of platforms (including Application Programming Interfaces or APIs) that connect multiple areas of learning and experience across the spectrum of the learning model. Indeed, according to existing research findings, over the next 15–20 years, online learning (enhanced with mobile communications, gadgets and augmented reality technologies) is going to become a global form of education (separating the learning process from traditional places such as classrooms and universities) [8].

Part 2. Transfer of Knowledge and Technologies in Universities of the Future

By the beginning of the 21st century, the following global trends have developed and are clearly manifested in the world education system:

1) the general desire to democratize the education system is increasing, ensuring the availability of education for capable talented youth, regardless of their social origin and financial situation. Education is turning into a priority objective of financing in all developed countries of the world, and awareness of the prospects of investing in human capital is growing. The worldwide educational process in universities is characterized by a powerful ICT enrichment, wide inclusion in the Internet system with its richest information resources, and intensive development of distance learning for students. At the same time, the universalization of higher education and the processes of integrating all higher educational institutions into the system of leading national and world universities are intensifying, which leads to the emergence of powerful university complexes, scientific and educational megacities of national, interregional and continental significance. There is also a merger of universities with industrial complexes resulting in the formation of a base for scientific research with targeted training of unique specialists for modern firms and enterprises.

2) The gradual complication of vocational education systems, the creation and use of its new versions, most of which are designed for young people aged 18–23. In the field of education management, a reasonable compromise is being sought between the rigid centralization and standardization of education, on the one hand, and the complete autonomy of educational institutions, on the other. A multi-level system of education, which provides greater students'

mobility in the pace of learning and in the choice of future specialty, is being developed. It forms the students' ability and desire to master new specialties and professions on the basis of the university education received. At the same time, innovations while maintaining the established national traditions and national identity of countries and regions are widely spread. Because of this, the educational space becomes: 1) multicultural and socio-oriented towards human development, 2) more open to the formation of an international educational environment, 3) national in terms of culture and multinational in terms of knowledge.

3) Cooperation in the field of transdisciplinarity has become a new trend in the world of scientific research. The very *transdisciplinarity* of the educational curricula stimulated by the growth of the globalization of the world economy, the development of Industry 4.0 under the influence of information and communication technologies (ICT) is being formed as an appropriate direction that already fully deserves its own qualification as a science (for example, *Science & Technology Studies*, STS) [9]. As a system of placing interdisciplinary relations within a global structure without strict boundaries between disciplines, multi-, inter- and transdisciplinarity is a way of synthesizing resources within a particular cognitive model.

The developed OECD countries (especially the US and EU countries) have already come to understand that new breakthroughs in science and education are in most cases associated with transdisciplinary research. The latter is influenced by the new architecture of online education in the MOOC (*massive open online course*) format, virtualization and gamification of educational processes, as well as advances in cognitive psychology [10]. The task of creating a new transdisciplinary education is to maintain three areas of infrastructure that have the greatest impact on the transformation of education: 1) 'exchange infrastructure': the ICT area that affects all processes of creating and transmitting information; 2) 'infrastructure of production and consumption': financial and investment spheres which establish general rules for interaction in the economic system between production and education; 3) 'infrastructure of the body': an area that works (in a broad sense) with the body and mind where the number of solutions designed to increase productivity and expand behavioural opportunities is rapidly growing [11]. In turn, visualization as an augmented reality technology makes it possible to create highly specialized spaces, educational quests for joint creativity, simulators of learning systems in individual cases, while transforming the process of developing new products, projects and digital environments.

An essential component of the development of transdisciplinary relations is the increasing importance of additional services, such as consultations and certification of students by employers, employment of successful students by leading world companies that are partners of universities, etc. The content

projects of the world's leading universities are already being implemented in this direction, such as *Coursera* (led by Stanford University and bringing together more than 100 universities), and *Edx* (initiated by Harvard University and MIT for 50 leading universities and organizations), which implement the best international experts in their respective subjects. It is also expected that in the medium term, the online education market will centralize the services of mega-providers and create 10-15 large alliances around the world's leading providers claiming the entire global (cross-country) education market. They will take over, firstly, both the bulk of online students and a significant proportion of students grouped around the online projects of world leaders in the field of offline education that provide basic content; secondly, the process of forming standards, principles and values of online students that are associated with a very narrow group of providers [12]. We are talking about the transition from analytical to algorithmic models, since, unlike classical physics, which describes a mathematical law expressed in differential equations, complex socio-economic systems are associated with agents that interact far from simple rules. In fact, digital models and 'virtual worlds' are turning into new laboratories that contribute, firstly, to the development of 'reusable' simulations for conducting various economic experiments – from *in vitro* (availability of special equipment and drugs) to *in silico* (the need for only computational models); secondly, the creation of new algorithms for processing large amounts of data in the framework of the 'dialogue' between data collection systems and analytical systems [13].

4) Project-based learning as a component of a new transdisciplinary educational paradigm. Transdisciplinary connections imply a multi-level approach based on the concept that specifically cognitive skills gradually develop into corresponding professionally significant competencies. Project thinking, as an innovative and creative type of thinking, is problem-oriented in nature and involves implementation of an organized set of activities that are closely related to each other, but dispersed in time and space. The main paradigm of project activity consists in: 1) identifying the design of the project in accordance with the predictive trend and the market interaction environment; 2) coordinating different approaches, methodological strategies, technologies and resources; 3) correlation with its organizational and managerial component (group formation and time management). And since today the emphasis is gradually shifting from the product to the purpose and design environment, the dominant is the social and humanitarian trend in the development of project thinking and activity [14]. The degree of practical orientation of the project approach is determined by different kinds of intelligence (visual-effective, visual-figurative, verbal-logical, etc), however, effective business decisions are made on the basis of a productive type of professional project management thinking. The implementation of project thinking involves: a) generating non-

competing ideas in the brainstorming mode, b) using incoming information not as a value in itself, but as a means of obtaining the optimal result, c) alienation from authoritative opinions, d) self-criticism when comparing and choosing the most appropriate and productive options from the existing components, e) search start, f) the ability to generate ideas, g) the search for non-standard approaches.

The leading universities create knowledge and organize its international transfer, transferring both explicit, formalized (*know-that*) and implicit, implicit (*know-how*) knowledge. They use a high 'combination ability' (the ability to synthesize and apply past and current knowledge) and, based on this, provide tangible and stable competitive advantages that turn into the basis for formation and development of a global innovation system, and a post-industrial society of the 21st century. In a knowledge-based economy, on the one hand, such new terms as: team leadership, collective decision-making, interactive professionalism, distributed management, and action research are actively used. On the other hand, such categories as intellectual capital, human capital, innovation, innovative activity, etc. closely interweaved. In this regard, the importance of such relatively new fields of activity of universities is growing:

– innovative scouting, that is, the search for 'complementary' teaching technologies, sometimes located 'on the sidelines' of the areas of core activity. At the same time, the proposed ideas initially considered weak or predominantly exploratory, subsequently prove their promise, and sometimes even their value, gaining their significance only after merging with other projects;

– educational benchmarking is the process of searching for and introducing new processes and projects into the practice of universities and their departments, the continuous process of developing strategies to improve the quality of educational services, and the emergence of educational and scientific products (the use of educational platforms);

– digital marketing (including digital libraries and digital university campuses) is the use of the entire modern range of digital communication channels, monitoring of research results and social networks, implementation of preventive and reactive measures to develop future projects based on the analysis of data from various sources [15].

Future studies are still forming and establishing their methodology. Although the Association of Professional Futurists has been founded [16] and the foresight competency model has been formulated [17], today it is obvious that the *University of the Future* model is still more futuristic than realistic. However, at the same time, the prospects for creating, *firstly*, *Platform Universities* as a concept of an open self-organizing community of teachers and students, which are formed, on the one hand, on the basis of flexible curricula

of certain educational content by consumers themselves, are being actively discussed today. Learning there takes place throughout life and at any time under emerging global challenges and needs.

Secondly, a system of highly specialized *Microcolleges* within universities based on a symbiosis of educational and research foundations, and the curriculum and subject focus are determined by the educational mission of individual professional professors. The latter give lectures and conduct research with the participation of students, and a significant part of the curriculum is mastered through independent online learning. The main advantages of microcolleges are narrow profile and autonomous learning, combination of learning with research activities, very high requirements for the professionalism of teachers and minimal administrative regulation. The ’pioneers’ in realizing such advantages are the US microcolleges which have grown out of the trend of transition to home education (for example, *Deep Springs College* in California) [18].

Thirdly, international university project teams, consisting of teaching practitioners from different countries – ’independent contractors’ for implementing of certain projects and dispersing after their completion. They form the basis of the gig-economy model, or the economy of ’general earnings’ [19], in which ’nomads’ professing the philosophy of ’education everywhere’ implement educational and commercial projects according to requests and proposals from corporations, non-governmental organizations, cultural institutions and others organizations. For example, *MINERVA University* (USA), opened as an educational startup in 2015 (also called Harvard in the world of online learning), which has undergraduate programs in a wide range of specialties and prepares students "for the world of the future and the professions of the future". The courses are based on the following concepts: a) the city as a campus (students annually move to a new city – Berlin, San Francisco, Buenos Aires, Istanbul whose infrastructure, acts as an educational campus); b) travel as an educational experience; c) project-based learning. This way, students develop a breadth of knowledge that was previously unattainable in studying in a traditional environment. And although universal skills are formed within the framework of the main chosen specialties, training is focused not on content, but on mastering thinking [20].

Fourth, specialized *Centers for Advanced Play* where gamification is seen as the highest form of learning (’learning through game’), far superior to the usual production and acquisition of knowledge. Today, the effectiveness of game learning is no longer in doubt, and its elements are present in all areas of education (from preschool to corporate). Gamification itself, as the principle of using game mechanics and game thinking, is turning into an important factor in solving real problems and involving participants in the process of creating useful value. The presence of a huge amount of information and the inability to

manage it with the natural abilities of a person is compensated by laboratory simulation games using AI. At the same time, students participate in generative creativity (imagination, curiosity, improvisation) and explore novelty through imagining what does not exist (virtual reality), creating random connections and receiving unexpected answers in the process of searching for truth. Game participants design the behaviour of objects and subjects in the future based on the theories of chaos and complexity, systems thinking and scenario building, which are the core of training and development of the talent ecosystem. To predict trends and identify possible futures, they use the following techniques: a) scanning the environment, b) analysis of cross-impacts, c) analysis and extrapolation of trends, d) discussion of the successes and mistakes of past decisions with extrapolation of the acquired knowledge to the present and future. Prototypes of similar spaces of professional communities already exist in modern corporations, for example, the ’Google time’ platform where employees spend part of their time playing games and experiments without any end goal [21].

What are the trajectories for the further development of ’ Universities 3.0’ in the context of their entrepreneurial component? Interesting is the research of D. Staley based on the symbiosis of historical methodology, digital history, philosophy of entrepreneurship and the future of higher education. He has published a number of works in the field of "intersection of technology and the humanities" [22; 23]. However, the ways of development of higher education and new alternative models of *universities of the future*, whose prototypes have already begun to form, were formulated by him only in his latest study [24]. With his work, D. Staley stimulated an active discussion in scientific circles, firstly, about the role of national scientific foundations in improving the efficiency of research activities and creating tools to overcome the Matthew effect in terms of funding university science [25; 26]. Secondly, the formation of technology transfer centers (or offices of innovation and commercialization) based on universities, functioning on the basis of science parks, incubators and other platforms for interaction between investors and developers.

The long-term adaptive formation of entrepreneurial universities requires not only understanding of the current global challenges and prospects for the future development of education, but also recognition of technology transfer as a force that is the driver of future changes. Today, the key trends of the 4^{th} industrial revolution, development of academic entrepreneurship and digital evolution in general are emotionally intelligent interfaces and hyper-intuitive cognitive abilities that are qualitatively changing business in a truly unpredictable way. Indeed, the transformation of universities into trend makers and marketplaces of new trends occurs in an environment where it is difficult to find a generalized and universal model of technology transfer that would accurately reflect the subtleties of how knowledge and technology are transferred in practice.

The traditional technology transfer process models are widely described in literature, but for the most part these models are oversimplified and limited to the linear knowledge flow assumption. At the same time, technology transfer is widely perceived today as the *third academic mission* of entrepreneurial universities, along with research and teaching [27].

In the university model of technology transfer, a special balance of three key factors influencing the successful commercialization of scientific developments is required. Firstly, a clear definition of the entrepreneurial obligations of university teachers in the process of commercialization of high-tech inventions which requires both systematized (codified) and implicit knowledge, as well as patent protection practices. Secondly, the ability of technologies to transfer and focus on the key features of technology transfer, including close connection with the subjects of the existing network of 'surrogate' entrepreneurship, business incubation and non-profit organizations. Thirdly, the opportunity cost which allows assessing the impact of technology transfer on other possible ways of using resources (costs/benefits), which allows assessing the impact of technology transfer on the further growth of opportunities for conducting and using research. In this regard, the corresponding triumvirate of its characteristics is being formed within the framework of the university technology transfer center (TTC) [28]:

1) the highest possible narrowing of the scope of 'information gaps' (low customer awareness of the services offered; interaction of scientific and faculty researchers with the university management; financial and institutional support of a higher level);

2) creating conditions for working in an interdisciplinary environment that allows you to better understand what is required to commercialize high-level inventions and conduct business;

3) eliminating bureaucratic barriers and minimization of bureaucratic procedures related to commercialization issues.

One of the leading conditions for the successful and efficient functioning of the university TTC is the formation of a qualified team where the key resource is people who will interact with stakeholders and researchers. At the same time, when forming a team, it is necessary to be guided not so much by the regulation of the number of employees as by its competence diversity (entrepreneurial, administrative, creative, disciplinary and managerial competencies). An important component is also the formation of a network of contacts and partnerships with high-tech companies to remove obstacles and create alternative approaches in the process of mastering innovations and their market capitalization.

Conclusions

The third academic mission of the modern entrepreneurial 'world-class university' of this decade involves: 1) high concentration of talent (teachers and students); 2) optimal resource management without bureaucratic obstacles; 3) implementation of advanced scientific research based on strategic vision, innovation and decision-making flexibility; 4) universal competitiveness, that is, the ability to integrate various educational programs, implementation of corporate training opportunities, 'export' of educational services and technologies; 5) a modern training infrastructure, including information technology and organizational and communication components, as well as distance learning, 6) the use of special, instrumental and technological knowledge based on 'holistic managed educational technologies' – the concept is more capacious than 'teaching technologies' and responsible (unlike methods) to three requirements: they describe the algorithm of actions, are reproduced in various conditions and provide a guaranteed result. Indeed, the evolution of university education in the 21st century will take place against the backdrop of further growth in intellectual and science intensity in the context of overcoming the 'complexity barrier'. As for their third academic mission, they turn into carriers of the leading idea of controlled socio-natural harmony based on social and educational intelligence – the only model of sustainable development of the modern globalized post-industrial economy. Since the leading universities are characterized by rapid interpenetration of classical and non-classical styles of education based on interdisciplinarity and dialogism, they are considered as an environment for the formation and development of a successful individual capable of constructing a personal identity.

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