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UNIVERSITY 3.0 – BETWEEN GLOBALIZATION AND CULTURE

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Abstract

The University 3.0 carrying out three missions – education, research and socio-economic development is a system-forming institution of the knowledge society. The problem of the University 3.0 as a key subject of socio-economic transformations and its effectiveness is at the center of the modern society modernization. The purpose of the study is an analysis of interactions between socio-economic prerequisites and cultural factors in the University 3.0 development at the national levels. It is shown that a world-class university has a culturally differentiated basis. Global factors underlying the cultural and historical genesis of the University 3.0 are studied. Based on parameters of the Global Competitiveness Index, the index of prerequisites for the University 3.0 development is designed and calculated. A comparative assessment of its potential in a sample of culturally differentiated countries is presented. Cultural factors influencing on the development of the third university mission are analyzed. Implementation of cultural opportunities and overcoming cultural constraints in the University 3.0 development are shown through practical examples.

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Keywords: Competitiveness, development index, knowledge society, third mission, university 3.0.



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1. Introduction

The University 3.0, carrying out three missions – education, research and socio-economic development, is a fundamental social problem and a system-forming institution of the knowledge society. The University 3.0 creates basic components of the knowledge society – new industries, innovative ecosystems, promising technological markets, economically leading regions, culturally enriched spaces (Lane, 2013). It brings up knowledge worker who possesses a set of key competencies and values to create culture, social structure, system of labor division inherent in the knowledge society (Karpov, 2017b). Its education includes priorities of social development and socio-cognitive growth of an individual (Etzkowitz, 2008). An employer indicates the ability to apply knowledge in real conditions as the most valuable learning outcomes that provide professional growth in the knowledge society (Hart Research Associates, 2015).

The University 3.0 not only changes a personality, but also globally changes the society. Indeed, the Cambridge University has transformed the county of Cambridgeshire into an innovative cluster. A key player in its mission is the Cambridge Enterprise founded in 2006 to "help students and staff to commercialize their expertise and ideas". Within five years the university ecosystem has given rise to 11 companies with a combined valuation of £1.3 billion (Cambridge Enterprise Limited, 2016). Alumni of the Massachusetts Institute of Technology (MIT) founded thirty thousand of operating companies. They have 4.6 million employees and \$1.9 trillion in annual revenue – GDP of the 10th largest economy in the world. The MIT Innovation Initiative (2013) among its strategic plans points to the support of innovative ecosystems all around the world, the creation and expansion of global innovation communities that "bring innovators, entrepreneurs, corporations, and policymakers together to focus on shared global challenges" (Massachusetts Institute of Technology, 2016). Cole (2010) believes that a very high proportion of the leading new industries in the United States, perhaps as many as 80 percent, are derived from discoveries at American universities.

Among leaders of the Global Competitiveness Index (GCI 2017-2018) are such dissimilar in culture countries as Switzerland, the USA, Singapore, Japan, Israel, the United Arab Emirates (World Economic Forum, 2017). A world-class university also has a culturally differentiated foundation. In 2017, the Top 100 of global university indexes – THE, QS, ARWU, covers 149 universities representing 5 out of 7 regions in the world according to the GCI version, except for South Asia and South Africa.

For evaluation of universities in implementation of classical missions – education and research, such global ratings are conventionally used as THE, QS, ARWU (Marhl & Pausits, 2011). We know ratings evaluating specific areas of University 3.0 activities, among them are the Reuters Top 100 of most innovative universities in Europe. In 2017, Germany, for example, had 23 representatives, Spain – 11, Belgium – 6, Ireland – 3, Poland – 1 (Ewalt, 2017). Various methodologies were developed for analysis of the third mission, in particular, "European Indicators and Ranking Methodology for University Third Mission" (2010-2012) under the "E3M" project. Its documents accentuate difficulties in assessment the third mission due to its ambiguous definition, diversity, complex structure, implicit forms, dependence on contextual factors, etc. (DG EAC of the European Commission, 2012). Nevertheless, this task is acute. Its general solution can be found in the way of creation and expansion of products that monitor complex areas of the University 3.0 activity and take into account its involvement in global and cultural systems of society.

2. Problem Statement

The University 3.0 is a global actor in socio-economic development and, at the same time, an agent in national culture and an object of its influence. The phenomena described by the names "University 3.0" and "Third Mission" are, in essence, conceptual frameworks taking one or another form of implementation depending on cultural, social, and economic conditions of society, its historical memory, deep-seated attitudes of public consciousness. Along with national conditionality, these concepts define universal characteristics used to derive criteria and evaluative parameters for the University 3.0 identification.

The problem is the construction of an interrelated approach to the University 3.0 study with account of intricate relationships between national (cultural) and universal (global) factors in its development and activities.

3. Research Questions

The focal points that structure and determine the research process are the following:

- 1) What are the global factors that underlie the cultural and historical genesis of the University 3.0?
- 2) How can we define and measure national prerequisites for the University 3.0 development in the system of socio-economic relations that determine the global competitive capacity of countries?
- 3) How do cultural factors determine the main types of activities that are peculiar to the University 3.0, and how can they be taken into account in its development and activity?

4. Purpose of the Study

The purpose of study is analysis of interactions between socio-economic prerequisites and cultural factors in the University 3.0 development at the national level.

5. Research Methods

The research methodology is based on my approach to ontological analysis of the education phenomenon and its institutions. The object is studied in three fundamental and interrelated dimensions: universum – social, economic and cultural realities (context); generative-constituting – institutionality and activity; ontogenic – models, paradigms, universals. Reducing this scheme within the scope of the research purpose, I identify the following areas of the University3.0 study: cultural and historical genesis, basic types of activities, socially and culturally conditioned models.

In the cultural and historical genesis of the University 3.0, global factors that determined advancement of the third mission were studied. Methods of cultural-historical reconstruction, social modeling, economic analysis, theory of learning cognition were used.

Basic types of the University 3.0 activity were studied from the perspective of national prerequisites for its development. Methods of structural-functional analysis, theory of innovations, mathematical processing and data analysis were applied. When developing the index of prerequisites for the University 3.0 development, statistical information and structural indicators from the GCI were used. The rationale for selecting the GCI as a data source is the fact that the country's competitive capacity is one of the main tasks

of the third mission, and a considerable part of its parameters characterizes the prerequisites required for effective implementation of all three missions.

The study of the social and cultural conditionality of the University 3.0 model was based on the methods of anthropology, psychology of culture, theory of motivation, axiology. Analysis of cultural opportunities and constraints in implementation of the third mission was based on the experience of innovative activities of the Bauman University's Youth Scientific & Technical Company (1989-1991) founded and headed by me.

6. Findings

6.1. Global factors of the University 3.0 cultural and historical genesis

The University 3.0 model emerged in the process of transformation of national higher education systems in the second half of the XX century. Two time periods can be distinguished when this happened.

First period – the post-war period that was concurrent with modernization of national economies and emergence of mass higher education, that had been formed in the USA and the USSR by the 1960s, and in most of Europe – 20 years later (Trow, 1968). Here lies a deep cultural and economic break with the past. For example, back in the early 1940's, even top managers in large US companies rarely had higher education, and the IBM company hired their first manager with a college degree a year or two before the Second World War (Drucker, 2008). In 1958, the share of human resources in the American knowledge industry, with account of its potential student part, was 42.8%, and by 1970, it reached 53.1% (Machlup & Kronwinkler, 1975).

These events created prerequisites for differentiating the university's models. So, the US Legislative Act – the "GI Bill of Rights" (1944) – provided for a number of benefits for war veterans: cash payments for education at universities, schools, technical colleges (including accommodation expenses) and low-interest loans in order to start business. In 1946, two first venture companies were established in the United States – the American Corporation for Researches and Developments (ARDC) and J.H. Whitney & Company. The ARDC viewed its activities as charity and invested soldiers returning from war in start-up companies.

Meanwhile, the higher education in the USSR in this period was stuck in the industrial culture of the first half of the XX century. From 1940 to 1956, it was payable. The university worked as a provider of professional personnel, and a training tool for them was adaptive learning surviving to nowadays. This education was rigid to development of creative thinking making the basis of present-day professions. It was very similar to what Freire (1985) called "the nutritionist concept of education" in 1921, where learning cognition was organized as passive and "food" perception.

Second period – the economic crisis in 1970s – early 1980s.

During the crisis, the welfare state model was dismantled. Universities were deprived of an essential part of budgetary allocations. They were forced to make money in order to justify money receipts (Collini, 2012). This enforcement at the state level was formalized as a new institutional goal of the University – "the contribution to social and economic development". Universities responded to this challenge by transforming education and scientific researches into financing instruments. Unlike previous crises, now it became possible. First, an increase in coverage by education increased a demand for it and, as a result,

profitability of paid services rendered by the University. Secondly, science became capable to wide production of knowledge having a commercial potential and affording highly profitable applications; this knowledge had a growing practical demand for, e.g., in the field of biotechnology, nanotechnology, social management.

In such a way, the university third mission concept – the socio-economic development, and the University 3.0 model appeared.

6.2. National prerequisites for the University 3.0 development

The third mission, belonging to the University 3.0, includes two highly interrelated areas of activity: innovative-entrepreneurial and socio-cultural. The first, in particular, includes joint researches, contracts with industries, commercialization of intellectual property, regional development, corporate training, consultations and expertise. The second contains interactions of the University with diversified communities-civil, cultural, administrative-territorial, aimed, for example, at improvement of living standards, advancement of civil society, cultural enrichment of environment, support of traditional values and translation of new ones. Both spheres of the third mission are interrelated with the financial component of the University's activity, but it does not play a pivotal role in the latter.

Using the most sensitive GCI data, I designed the index of prerequisites for the University 3.0 development – the UDI (University Development Index), which for some countries characterizes the possibility of University 3.0 creation, and for others – the resource for its improvement (the "development" term is used herein this meanings). The UDI is a prognostic construct that links social, economic, cultural and institutional factors. It is calculated as an arithmetic mean of two secondary subindexes – complex (UDI/c) and parametric (UDI/p). Their structure is presented in Table 1. For calculation, the elements of those GCI subindexes are taken that are of crucial importance at stages of national development focused on efficiency and innovations.

Table 01. The structure of complex (UDI/c) and parametric (UDI/p) indexes of prerequisites for the University 3.0 development

GCI subindexes	Components of GCI subindexes, included in UDI/c	Indicators of GCI subindex components, included in UDI/p
B. Efficiency enhancers	5. Higher education and training	5.03 Quality of the educational system
		5.04 Quality of math and science education
	7. Labor market efficiency	7.08 Country capacity to retain talent
		7.09 Country capacity to attract talent
	8. Financial market development	8.01-8.05 Effectiveness of business financing instruments
		Arithmetic mean:
		8.01 Financial services meeting business needs
		8.02 Affordability of financial services
		8.03 Financing through local equity market
	9. Technological readiness	8.04 Ease of access to loans
8.05 Venture capital availability		
		9.01-9.03 Availability, absorption and transfer of technology

		Arithmetic mean:
		9.01 Availability of latest technologies
		9.02 Firm-level technology absorption
		9.03 FDI and technology transfer
C: Innovation and sophistication factors	12. R&D Innovation	12.01 Capacity for innovation
		12.03 Company spending on R&D
		12.04 University-industry collaboration in R&D
		12.08 (1.02) Intellectual property protection

The complex index (UDI/c) includes components of GCI subindexes being most relevant to the problem of cultivation of university's three missions. However, from this point of view their indicators are not equivalent. For example, the "Higher education and training" component takes into account the secondary and tertiary education enrollment rate, quality of management schools, Internet access in schools and a number of other indicators having only indirect impact on the University 3.0 development. The selection of directly acting indicators from the chosen components provides for more subtle estimates, which are included in the parametric index (UDI/p).

Any secondary index is calculated as an arithmetic mean of values in it. At the same time, UDI/p contains two aggregative estimates – "Effectiveness of business financing instruments" and "Availability, absorption and transfer of technology" integrally characterizing the impact of constituent indicators and reducing the importance of their direct participation. Thus, in the total UDI structure, both components complement and compensate each other – the complex index brings a general context, the parametric index takes into account subtle effects.

Table 2 shows the calculated values of the index of prerequisites for the University 3.0 development for 21 countries (first three countries with best positions in the GCI in each of seven regional groups are taken). The picture of advantages and bottlenecks in prerequisites for University 3.0 development is shown by diagrams in Fig. 1 and Fig. 2. Countries with best positions in the GCI in first four regional groups are taken for comparison – Switzerland, Singapore, Israel, Chile, as well as the USA and Russia.

Table 02. Index of prerequisites for the University 3.0 development in the sample of leading countries in the regions in GCI 2017-2018

Region	Leaders in the regions in GCI 2017-2018	GCI 2017-2018		Index of the prerequisites for the University 3.0 development					
		Rank	Score	UDI		Complex UDI/c		Parametric UDI/p	
				Rank in the sample	Score	Rank in the sample	Score	Rank in the sample	Score
1	Switzerland	1	5.86	1	5.97	2	5.90	1	6.04
	United States	2	5.85	2	5.83	1	5.91	2	5.74
	Netherlands	4	5.66	4	5.51	4	5.54	4	5.48
2	Singapore	3	5.71	3	5.74	3	5.82	3	5.66
	Hong Kong SAR	6	5.53	6	5.31	5	5.50	8	5.12
	Japan	9	5.49	9	5.07	7	5.29	9	4.85
3	Israel	16	5.31	5	5.36	6	5.48	7	5.24
	United Arab Emirates	17	5.30	7	5.21	8	5.07	5	5.34
	Qatar	25	5.11	8	5.13	9	4.94	6	5.31

4	Chile	33	4.71	11	4.38	10	4.65	15	4.11
	Costa Rica	47	4.50	12	4.35	11	4.48	13	4.22
	Panama	50	4.44	15	4.17	15	4.19	14	4.14
5	Azerbaijan	35	4.69	10	4.44	12	4.37	11	4.50
	Russian Federation	38	4.64	18	3.98	14	4.20	20	3.75
	Kazakhstan	57	4.35	20	3.83	17	4.06	21	3.59
6	India	40	4.59	13	4.27	18	4.01	10	4.52
	Bhutan	82	4.10	19	3.91	20	3.84	17	3.98
	Sri Lanka	85	4.08	21	3.72	21	3.58	19	3.85
7	Mauritius	45	4.52	16	4.17	13	4.26	16	4.07
	Rwanda	58	4.35	14	4.18	19	4.00	12	4.36
	South Africa	61	4.32	17	4.05	16	4.15	18	3.94

As to Russia, the diagrams bring us to the following conclusions:

In the complex index (UDI/c), Russia lags behind the countries chosen for comparison in four components out of five – in higher education and training, labor market efficiency, technological readiness, financial market development; in R&D innovation, Russia is not far ahead of Chile (Figure 1).

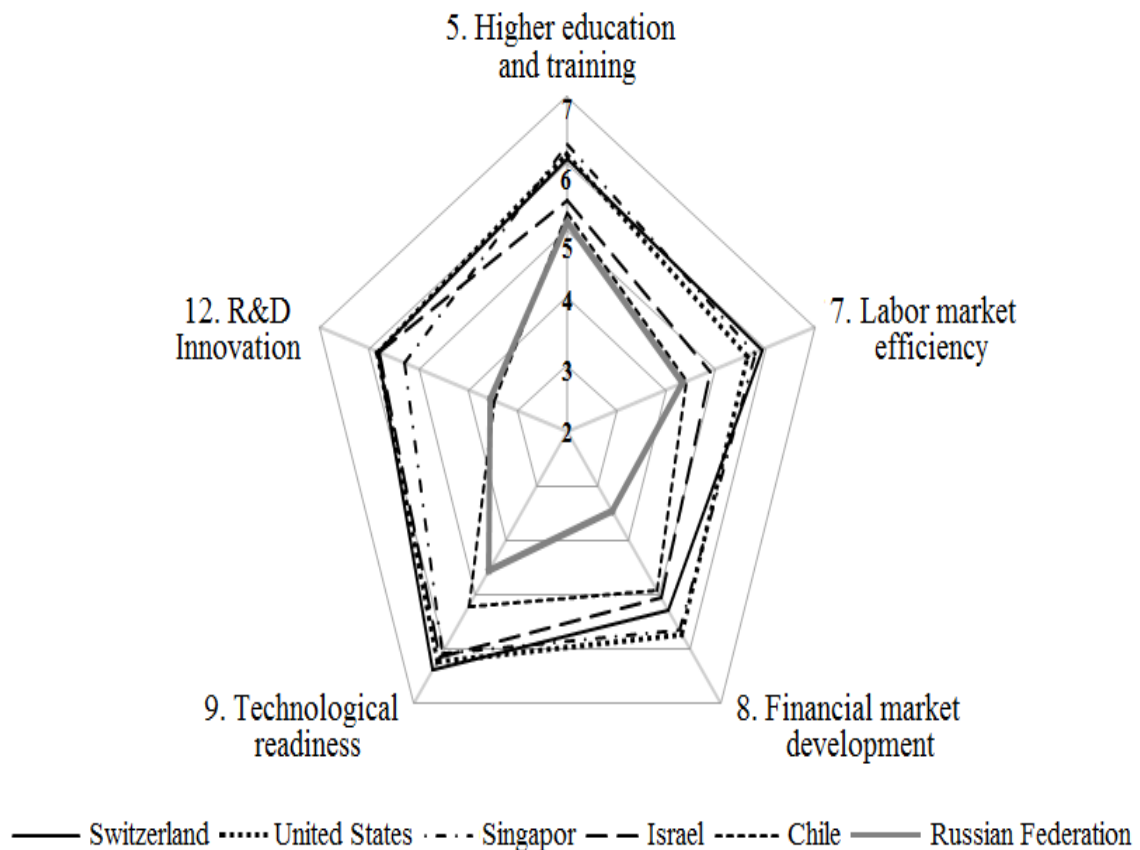


Figure 01. Components of GCI 2017-2018 key subindexes included in UDI/c for different countries – the first leaders in regions in terms of competitiveness, as well as the USA and Russia

In the subtle parametric index (UDI/p), Russia in five indicators out of ten is far behind these countries (Figure 2). Among them are such sensitive indicators as country capacity to retain and attract talents; availability, absorption and transfer of technology. In four indicators, Russia surpasses only Chile – in terms of quality of the educational system, math and science education, university-industry collaboration in R&D and company spending on R&D. In one indicator – the capacity for innovation, Russia is almost identical to Chile.

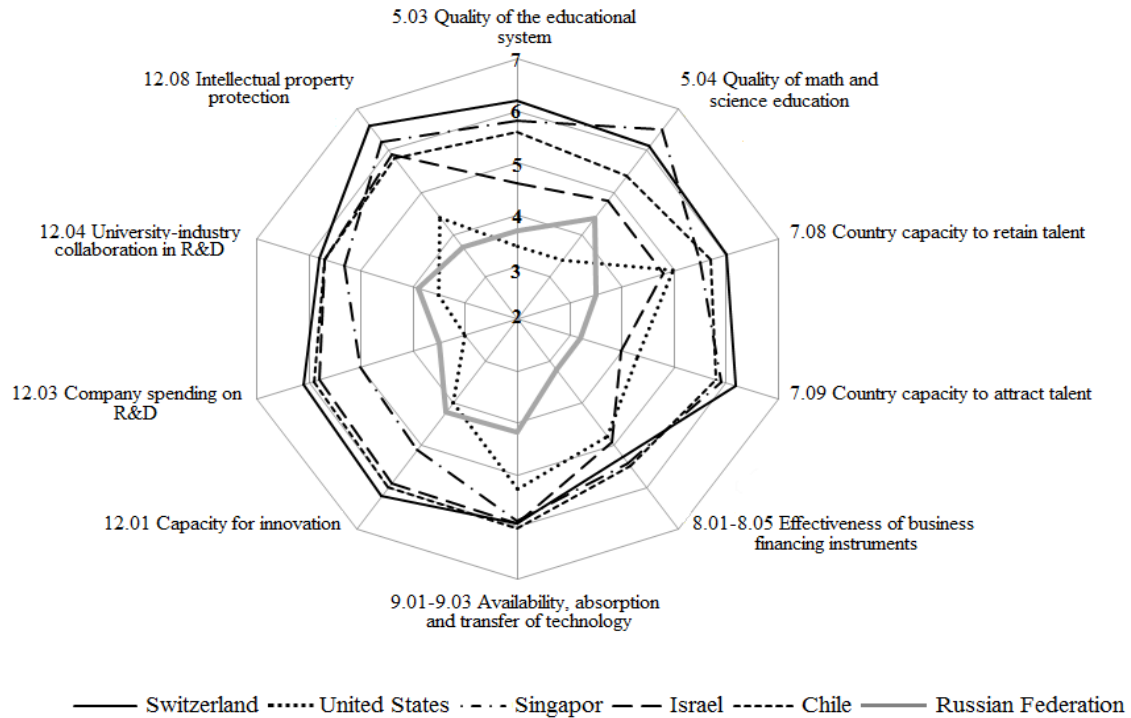


Figure 02. Indicators of GCI 2017-2018 key subindex components included in UDI/p for different countries – the first leaders in regions in terms of competitiveness, as well as the USA and Russia

6.3. University 3.0 Socio-Cultural Determinants

Each of the basic types of activities that are specific to the University 3.0 – educational, scientific-innovative, socio-economic, is a culturally sensitive phenomenon. This triple complexity calls for creation of anthropological models of its development, taking into account the specificity of social and cultural capitals of society. The benchmark for their implementation should be dynamics of universal indicators that characterize selected areas of institutional changes - educational, scientific, entrepreneurial, etc., rather than standardized patterns and rules carried over from other cultures and societies.

Thus, the Association of European Universities (EUA) in response to the communiqué of the EU Commission "The role of the universities in Europe of knowledge" called for considering the existing diversity as strength. It made a strict request for development a special European approach to education, its own educational structure, and a model for efficient activities of universities (European University Association, 2003). Two largest international engineering and educational communities – SEFI and IGIP – in their joint communiqué issued for a regular conference of Ministers of Education of European countries

stated that everything should be done so that the Bologna reforms should be implemented with account of peculiarities of national cultures (Bolonskij process i inzhenernoe obrazovanie [Bologna Process and Engineering Education], 2009).

The report of the US Department of Commerce underlines that the US innovative and entrepreneurial culture is one of the greatest national advantages in conditions of increasingly competitive world, and the diversity of university approaches and programs for development of innovation and entrepreneurship depends on local culture and history (U.S. Department of Commerce, 2013). At the same time, traditions of Asian (including Russian) upbringing play the role of a cultural barrier to implementation of active learning models (Joanne & Lateef, 2014). In these societies, learners prefer to follow the initiative of teachers and feel comfortable in structured learning situations, and teachers see themselves as absolute experts and interpret an intellectual disagreement as a personal disloyalty (Hofstede, 1986).

Studies of cultural parameters derived by Hofstede show their influence on functioning of social institutions. The growth rate of innovations and entrepreneurship is promoted by cultures distinguished by a high level of individualism, low levels of uncertainty avoidance and power distance (Shane, 1993). Individualism, for example, exerts a noticeable positive impact on venture capital availability, while uncertainty avoidance has a negative impact (Antonczyk & Salzmann, 2012). In individualistic cultures, startups have stronger legal protection, and administrative costs associated with them are decreased at a low level of uncertainty avoidance (Baughn & Neupert, 2003). Such social capital as trust is in positive relation with investments and economic growth (Zak & Knack, 2001).

Taking into account the culture factor, the modernization formula includes a social shift in behavioral attitudes and purposeful use of elements of tradition that can give a modernization effect. Due to high conservatism of inherited social and cultural attitudes, the first calls for decades of efforts and focused policy. The second can be implemented through formation of local modernization trends with account of national specifics, cultural benefits and instruments limiting the impact of obstacles.

As an example, let's look at how cultural factors can be taken into account in the University 3.0 development in Russia.

The reality of Russian society and education system is not contributing to the University 3.0 formation. The analysis of performance indicators for 40 elite Russian universities showed an absolute failure in their innovation-entrepreneurial activities (Karpov, 2017a). Measurements of behavioral attitudes show that the bottleneck in the University 3.0 formation in Russia is high levels of uncertainty avoidance, a power distance, and low levels of trust and individualism that impede entrepreneurship, and the first three are not beneficial to innovations.

My practical experience in innovative activities and implementation in the industry shows the following opportunities for their overcoming.

Start-ups in Russia can get widespread in the form of contract researches and developments. Unlike self-initiated products put on the market without aid, their implementation is much more predictable. To promote initiative start-ups, I suggested they should be supported by scientists and university's specialists who possessed high professional authority among potential customers – industry, social institutions, governmental agencies. As a tool for implementing these ideas, a business model of university's technological consortium was developed, acting in the form of an engineering platform for technology

transfer (Karpov, 2012). This approach considerably decreases the uncertainty level and the power distance, raises the level of trust, including in activities, and builds up the powerful social capital. It has aroused interest among high-tech companies and innovative development institutions.

Along with this, the level of individualism is increased by a special organization of business processes aimed at reducing overhead costs down to 3-5%. Its idea is a deep interpenetration of functions of different employees, where developers play the role of leading managers, the management is involved in scientific activities and technological process, and marketing penetrates all levels of production chains. Developing in this way, the cognitive mobility increases individual responsibility and decreases an uncertainty in achievement high results of professional activity.

Cultural features may suggest a way to move towards the University 3.0. For example, sociological studies of specifics in behavior of Russians employed in the innovation sector in Germany, the USA and Russia, revealed their high creativity (Auzan, 2013). In the NCI&E-model of University 3.0 developed by me, one of its three basic components is the creative university (Karpov, 2016). Consequently, the creative university model built in Russia can give a foothold and open the way to realization of three modern missions, i.e. to the University 3.0 creation. The basic structure of the creative university is composed of a set of creative spaces of a process-environmental type. Each of them is a specialized cognitive-generative system that stimulates demonstration of creativity and development processes in a creative function of thinking by combining the cognitive activity with the epistemic-active environment (Karpov, 2018).

Because of an overall high level of uncertainty avoidance, training in entrepreneurship at a Russian university is meaningless to make wide-sweeping, because fear of a knowledge application object will, at best, lead to formal uptake of content. Training in entrepreneurship should be focused on students who have scientific and technological developments, i.e. who have realistic ideas on productive scientific-innovative activity and clear active attitudes towards it.

7. Conclusion

The emergence of the University's third mission coincides in time with the development of globalization process. Unlike education and research missions on the basis of mental activities, the mission of socio-economic development is specified to a much greater extent by cultural capabilities and constraints. Thus, culture sets the limit for global unification of the University 3.0, which development depends much more on the national basis as compared with universities of classical missions.

At the same time, the possibility of the third mission implementation, as well as the mission itself, along with cultural specifics, is characterized by universal socio-economic indicators reflecting the global character of the University 3.0 nature. Prognostic schemes that assess the possibility and effectiveness of types of socio-economic activities belonging to the third mission can be implemented on this basis. This paper proposes the index of prerequisites for the University 3.0 development, constructed using data from the Global Competitiveness Index (GCI) that enables to define factors hindering its growth. The completed research work shows that the challenge of the University 3.0 development due to its extreme complexity should be solved, first and foremost, as a scientific problem, and not only on the basis of a top-down organizational approach.

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