UDK 378.14:339.92 (075.8)
    339.92 (075.8)

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HIGHER EDUCATION VIRTUALIZATION SUBSTANTIATION FOR SUSTAINABLE NATIONAL ECONOMIC OUTLOOK

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ОБОСНОВАНИЕ НЕОБХОДИМОСТИ ВИРТУАЛИЗАЦИИ ВЫСШЕГО ОБРАЗОВАНИЯ ДЛЯ СТАБИЛИЗАЦИИ НАЦИОНАЛЬНОЙ ЭКОНОМИЧЕСКОЙ ПЕРСПЕКТИВЫ

The world economy of 21st century poses new questions and challenges to the players worldwide. The old classical rules of natural resource economy, although still existing, have lost its dominating and defining meaning for the development of competitive advantage. Moreover old mechanisms of world economic regulations have recently been proved insufficient and incompetent to protect global markets from repetition shock of year 2008. The leading economies have to face new conditions of operating and competing in the era of knowledge economy. Knowledge economy is seen as one strongly based on the intellectual activities of its core players where their intellectual capital and potential become the key resources to build upon. Therefore in regard to the national economic competitiveness the index of national intellectual potential has to be taken into account.

EDUCATIONAL VIRTUALISATION. HUMAN DEVELOPMENT INDEX. EDUCATION STAKEHOLDERS. VIRTUAL EDUCATION ENVIRONMENT.

Экономика 21-го века ставит новые вопросы и бросает новые вызовы игрокам глобального рынка. Классические правила экономики сырьевых ресурсов еще существуют, но уже потеряли доминирующее и определяющее значение для развития конкурентных преимуществ. Кроме того, старые механизмы регулирования мировой экономики показали свою неэффективность в ходе мирового экономического кризиса 2008 года. Ведущие мировые экономики столкнулись с новыми условиями функционирования и конкуренции в экономике знаний. Экономика знаний строится на интеллектуальной активности ее ключевых игроков, где их интеллектуальный капитал и потенциал становится основным ресурсом. Следовательно, индекс развития человеческого потенциала необходимо рассматривать, как показатель конкурентоспособности национальной экономики.

ВИРТУАЛИЗАЦИЯ ВЫСШЕГО ОБРАЗОВАНИЯ. ИНДЕКС ЧЕЛОВЕЧЕСКОГО РАЗВИТИЯ. ОСНОВНЫЕ ЗАИНТЕРЕСОВАННЫЕ ЛИЦА В ОБРАЗОВАНИИ. ВИРТУАЛЬНАЯ ОБРАЗОВАТЕЛЬНАЯ СРЕДА.

The recent Global Competitiveness Index 2012—2013 published for the annual World Economic Forum shows where Russian Federation stands in this regard. It has taken 67th place out of 144 possible positions in the overall competitiveness index, droping one place down from the previous year's 66th place. The country is situated in the upper half of the list which does not look too bad. However, the composition of individual factors does not look optimistic: «A sharp improvement in the macroeconomic environment—up from 44th to 22nd position because of low government debt and a government budget that has moved into surplus—has not been enough to allow the country to compensate for the poorer assessment of its already weak public institutions (133rd) and the innovation capacity of the country (85th this year, down from 57th in the 2010—2011 edition of the GCI). The country suffers from inefficiencies in the goods (134th), labor (84th), and financial (130th) markets, where the situation is deteriorating for the second year in a row. The weak level of competition (136th) — caused by inefficient anti- monopoly policies (124th) and high restrictions on trade and foreign ownership as well as the lack of trust in the financial system (134th) — contributes to this inefficient allocation of Russia's vast resources, hampering higher levels of productivity in the economy» [7]. The only

group of factors that provide for growth opportunity in the sphere of global competitiveness are educational enrollment, higher education and training. This tendency proves the fact that investment in the educational area is bound to bring a significant growth rate for the national economy.

Development of national intellectual potential is the key aim for the nation-wide intellectual index improvement. The core knowledge-hubs of any country are its institutes, universities and R&D centers. Therefore these institutions have to have knowledge multiplication and sharing as well as citizens' involvement into the educational area as their fundamental goals.

The Human Development Index (HDI) which is being monitored by United Nations Development Program (UNDP) is being calculated based on three integral factors: national life expectancy, education index and income index. As one of the ways of increasing the national HDI we will look upon the education index. This factor is being in turn composed of two sub-indexes: mean years of schooling (MYSI) and expected years of schooling index (EYSI). The combined education index shows the average schooling years of the population above 15 years old. This will be the target group of our future study. The group is represented by higher and professional education receivers, i. e. students. The MYSI takes into the actual length of study of those who have already finished their education, whereas the EYSI represents the expected length of study of current students. MYSI is being calculated by the following formula: $MSYI = MSY / 13.2$; EYSI in turn equals $EYS/20.6$. The composite index looks as follows: $EI = \sqrt{MSYI \cdot EYSI} / 0.951$ [2]. As we now see the larger the number of citizens of older than 15 years and the longer the period of their education — the higher the composite index of education of Russian Federation. Therefore the ultimate goal of higher education development should be widening the group of higher education students as well as lengthening the years of their study.

The new societal and economic trends have to be quickly adopted by educational institutions. As such digitalization and virtualization of all the aspects of everyday lives has long been present in the routine of an individual. The digitalization on governmental level — e-government projects — has

only become part of national agenda in year 2007 when the concept of «electronic government» has been approved by the government of Russian Federation. The aim of this concept being provision of country's citizens with an easy online access to all the possible sorts of governmental services. The virtualization of governmental institutions have long been a worldwide trend together with the similar development direction in higher education.

Virtualization of higher education is defined by transfer of part or the whole of the educational process into the online sphere. Willoughby identifies three grounds for university education virtualization: *technological, geographical* and *organizational.* For the purpose of this paper under *technological* scope of virtualization we understand creation of a spectrum of technological solutions to provide full-scale educational services in the virtual environment. The technological need for virtualization appears when the educational institution authorities realize the need for new technological solutions to compete in the educational market. Technological virtualization can be divided into four major categories: virtual classrooms, technological communication platforms, multimedia means of education, e-libraries and databases. The «virtual classrooms» category is represented by highly-sophisticated technical solutions which allow users to share media and document files online, participate in one-to-one and one-to-all real-time online discussions, take part in and hold tests and exams, see the interim and final grading. This software category literary transfers the real classroom education experience into the online mode. The «technological communication platforms» are large scale software platforms that allow big data clusters such as lecture notes and literature, testing systems and real-time as well as regular communication bases to be combines in one system. The «multimedia means of communication» are include the all possible tools for making educational process more efficient and up-to-date, including the use of video-equipment for the close up of whiteboard writings, video-conferencing, as well as pure lecture-note storages and course participants management (such as Moodle). «E-libraries and databases» are the tool of modern ambitious researcher and student, that allow to access the most current as well as long-established classical research outcomes, industry information, science

field articles, statistics of the certain knowledge area, etc. This is an instrument no competitive university of 21st century could do without to ensure the highest quality of research and education.

The geographical scope of virtualization is being caused by the need of strong and efficient communication and information exchange between geographically spread university subsidiaries, cooperation partners, alumni and sponsors as well as the need for control function execution. The actual tools that could be used in this virtualization ground could partly repeat the ones mentioned in «technological virtualization» ground, but also include more efficient communication platforms as well as intranet systems that allow geographically spread subsidiaries and partners have a common virtual working environment that will compensate for the lack of face-to-face or direct communication.

Organizational virtualization has the easing of beaurocratic burden on administrative, professor and teaching stuff as well as students as its main goal. In the case of organizational virtualization ground the technological solutions that help manage the administrative functions of university authorities, faculty staff, students and outside stakeholders are being implemented and widely used.

As one can observe from the above the means and ways of educational virtualization differ by scope, goal and type. The reasoning for choosing a particular type of virtualization would be different for different interested parties. Therefore, to be able to efficiently choose the virtualization ground (or a combination of those) we need to identify core stakeholders of educational process. As higher education poses the main scope of this article, the stakeholders of university education are the students, the government and the business society. However there is another stakeholder to this — faculty staff, as their motivation to provide the highest quality educational services to the other three stakeholders is the ground for the educational system to work efficiently.

The four above mentioned stake holders have different interests in regard to educational virtualization. For instance, if faculty stuff is engaged into all of the scopes of virtualization grounds, students in majority would have a narrower interest in this case (the convenience of

educational process as well as the level of its current interest and personalization level). Apart from the virtualization *ground* we can also define the virtualization *scale.* Different scales of virtualization will be represented by different levels of technological solutions used and the final virtual services provided to the end user — student, lecturer, administrative staff, cooperation partner. For instance, the access to the e-library services are normally only provided to all levels of student and lecturer staff, whereas partners and administrative staff would normally not have the rights if use. Tyrtyi S. defines four types of university education virtualization: informational educational environment, distant learning system, electronic education environment (e-learning environment), virtual educational environment [5]. Trying to define the above mentioned terms will provide us with the information on the scale of virtual learning system. Informational education environment — serves the needs of basic academic information provision, i. e. «information» and not «knowledge». E-libraries and data-bases will be included into this level, however no direct contact to the knowledge-bearer will be possible here. The information including lecture notes and some course work is there to be uploaded and downloaded, but not communication means are possible. Whereas education is not possible in isolation, namely impossible without communication, the next scale level is presents by «distant learning systems». These systems do not necessarily include only online means of knowledge sharing and communication, but they do include both — sharing and dissemination of knowledge with the help of online and offline software and communication platforms. At this step the system gets a certain degree of interaction. The «E-learning environment» combines all the factors included into classical educational process, including virtual classrooms, technological means of communication, content sharing and knowledge control. The ideal model of large-scale «virtual education environment» does not only include all of the above mentioned technological and organizational solutions, but also provides its own communication centers, information channels, and is a fully functional software-communication environment with information storages, e-paperflow, and information support for any number and scale of users independent of their geographical position (See Fig. 1).
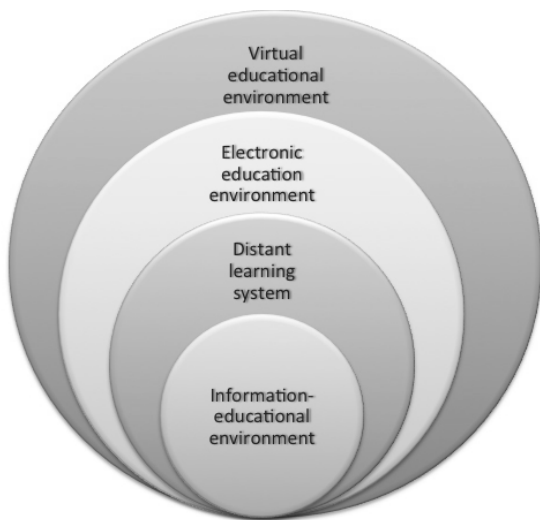
Fig. 1. The scale levels of educational virtualization

Basing on the scheme above we can define the spectrum of our core stakeholders interests. The two categories of student- and faculty-stakeholders will be active on all the scale levels of educational virtualization. Whereas business and government, as the key product consumers (future employers), will only be able to enter the system at the stage of e-learning environment as the vital strategic partners of the educational programs. Depending on the distant learning system technological solution being used it could be possible for the governmental and business stakeholders to take part in the educational process here as well.

Conclusions:

Our research shows that there are three major groups of grounds for educational virtualization.

Each of the grounds can be represented through a set of corresponding instruments to be used to accelerate the virtualization process.

As we now see, moving up from the lowest level of educational virtualization allows the education provider to reach out for larger groups of stakeholders involved in the educational process. The larger the amount of four core stakeholders groups (students, professional staff, partners from other universities, business and government) — the more competitive becomes the final product of the education provider and the higher the «installed-base effect».

For the national intellectual index as the core competitive factor in the changing world economies to become stronger and develop substantial potential, it needs to be heavily invested in. As the continuation of this study we will be looking upon the effect the virtualization of higher education of different scale can potentially have on the Human Development Index. As it has already been mentioned above the number of years spent in higher education has an impact on the MYS and EYS indexes, as well as the amount of population involved in the higher education process does. The concept of «life-long learning» implemented in a row of developed countries should also contribute to the HDI increase. The main hypothesis for our future study will be: the level of higher education virtualization has its indirect effect on HDI and as such sustainability of national economy. Investments into the virtualization of higher education with the regard to its scale and final stakeholders will be proof for the national economic growth in the future. The deeper research on the issue of educational virtualization outcomes has yet to follow.

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