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# MANAGING THE INTELLECTUAL POTENTIAL IN THE HIGHER EDUCATION SYSTEM

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*This paper focuses on the management and steering the intellectual potential in the system of vocational and higher education institutions (HEIs). It is quite apparent that more advanced intellectual potential in the system of higher education helps to improve the system's viability, competitiveness, and to increase its overall quality thus making a considerable contribution to the building the overall intellectual potential of a given country. Moreover, we argue that intellectual potential is important for building intellectual or human capital which is crucial for the economic and social development. The paper tackles the institutional building of the intellectual potential in higher education. In particular, it shows that the intellectual potential of HEIs represents a holistic system of all combined potentials of students, lecturers, employees, as well as the university administration. We focus on the issues of building intellectual capital in higher education, institutional building in science and education, management of the scientific educational networks,*

*and innovative process management in educational institutions. Our conclusions show that intellectual potential provides a more accurate blueprint for the future growth path. Furthermore, intellectual potential and its key components and indicators are capable of providing a clear view of the most important prerequisites for development. We argue that HEIs and universities in all countries around the world should focus on investing in building the human capital and intellectual potential. It is also important to identity the key areas and strategies for supporting and managing intellectual potential and to provide targeted support into the most promising areas that can achieve fastest growth.*

***Keywords:*** *intellectual potential; innovations; institutional change; vocational training; higher education*

***JEL classifications:*** *B52, I21, O10*

# УПРАВЛЕНИЕ ИНТЕЛЛЕКТУАЛЬНЫМ ПОТЕНЦИАЛОМ В СИСТЕМЕ ВЫСШЕГО ОБРАЗОВАНИЯ

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*Данная статья посвящена управлению интеллектуальным потенциалом в системе профессиональных и высших учебных заведений. Совершенно очевидно, что более продвинутый интеллектуальный потенциал в системе высшего образования помогает повысить жизнеспособность системы, ее конкурентоспособность, способствовать росту её качества в целом, внося значительный*

*вклад в наращивание совокупного интеллектуального потенциала любой страны. Кроме того, мы утверждаем, что интеллектуальный потенциал важен для создания интеллектуального или человеческого капитала, который имеет решающее значение для экономического и социального развития. В статье также рассматривается институциональный подход к построению интеллектуального потенциала в высшем образовании. В частности, мы показываем, что интеллектуальный потенциал вузов представляет собой целостную систему всех объединенных потенциалов студентов, преподавателей, сотрудников, а также администрации университета. Мы концентрируемся на вопросах формирования интеллектуального капитала в высшем образовании, институционального строительства в науке и образовании, управления научными образовательными сетями и управления инновационными процессами в образовательных учреждениях. Наши выводы показывают, что интеллектуальный потенциал обеспечивает более точную схему будущего пути роста. Кроме того, интеллектуальный потенциал, его ключевые компоненты и индикаторы способны дать четкое представление о наиболее важных предпосылках развития. Мы утверждаем, что вузы и университеты во всех странах мира должны сосредоточиться на инвестировании в развитие человеческого капитала и интеллектуального потенциала. Также весьма важно для них заранее определить ключевые области и стратегии для поддержки и управления интеллектуальным потенциалом и предоставить целевую поддержку в наиболее перспективных областях, которые могут достичь быстрого темпа роста.*

***Ключевые слова:*** *интеллектуальный потенциал; инновации; институциональные изменения; профессиональная подготовка; высшее образование*

**Introduction**

The state of the educational environment in any given country (e.g. those including kindergartens, primary and secondary school, higher education and postgraduate education) has a very clear and decisive impact on the intellection potential of this very country (Groves et al., 2018). Thence, fostering and managing intellectual potential in the system of vocational and higher education is a very desirable endeavour that requires many efforts and investments but also bears many valuable fruits that are important for the competitiveness and the growth of the economy (Vinichenko et al., 2018; Volchik et al., 2018; Choyubekova et al., 2019). This is a very important process for achieving leadership in all spheres of social life, business, as well as economics (Kocherbaeva et al., 2019; or Samaibekova, Kocherbaeva, 2019).

One would probably agree with the fact that the intellectual potential of a higher education institution (HEI) represents a holistic system of interconnected and interdependent potentials of students, lecturers, employees, as well as the university administration (Bauer et al., 2018; Choyubekova et al., 2019).

Nowadays, in our highly globalized world which became smaller and yet so far apart thanks to the Internet and the spread of information and communication technologies (ICTs), the very form and definition of the intellectual abilities and competences are changing dramatically (Alba et al., 1997; or Litau, 2018). Several decades ago, intellect was comprised of learned and memorized information any individual obtained through the years of training and studying – first at the primary school, then at the secondary school, and finally at the university of other institution of higher education (e.g. a polytechnic or a vocational school). Nowadays, when all information can actually become instantly avail-

able at a click of a computer mouse or a smartphone cursor, the intellectual abilities are not measured by how much information an individual memorized during her or his studies and how quickly she or he can pull it up from the memory and find practical applications to it, but how quickly she or he can find the right information from all available sources (e.g. online or in some specialized databases), process it, analyse it and make some use of it. In another words, today's general intelligence is a universal ability to adapt to the new information while the theoretical intelligence is something that can be measured using verbal intelligence tests and it is becoming an outdated concept.

A good example of this are Austria's public universities which were the first universities in the world that are required to produce and disseminate intellectual capital reports (knowledge balance sheets). These reports (called "Intellectual Capital Report") aimed to assess the intangible assets of each university (Sánchez, Elena, 2006). The structure and design of the Intellectual Capital Report is governed by the disposition of the Intellectual Capital Report. Monitor intangible assets, organizational culture is considered as an important role. The need to manage intellectual capital in universities is being investigated by some scientists, such as Ramirez (2010). The aim of study was to provide a structural model of intellectual capital based on the organizational culture at the universities. The calculated index showed the direct influence of organizational culture on intellectual capital. In the model, culture is the core that connects the components of intellectual capital. Here organizational culture acts as part of the structural capacity through which implicit knowledge is formed. According to studies that highlighted the role of intellectual capitals in West Ontario universities, Bontis (2001) presented the model where organizational culture is a fundamental element in the formation of structural assets. The rate of the internal deferred variables of the intellectual capital management components was 0.86 for human capital, 0.96 for structural capital, and 0.90 for customer capital, the accumulation of which constitutes the variable for intellectual capital (Bontis, 2001). The variable of structural capital indicates the highest internal consistency in the internal latent variable. The calculated index shows the direct influence of organizational culture on Intellectual Capital Management (ICM).

Moreover, the efficient management of the intellectual capital is one of the ways how to achieve the maximum economic and social return of resources (Strielkowski et al., 2017). The initial methodological model seeks to create an inventory of intangibles for the company and seeks to assess the company's value creation capability.

European educational institutions and HEIs often apply the application of models of intellectual potential to manage their intangible assets and to report this information. The model begins by looking at the contextual conditions of the institution, analysing its strategic goals and mission, and incorporating the three categories: human capital, structural capital, and relational capital. At the heart of the model are the performance processes: research, education, training, marketing of research and knowledge transfer, which can be expanded or reduced depending on the university profile (art colleges, technical colleges or business schools naturally have different configurations and strategic goals and processes) (Leitner, 2004). Finally, the impact on different stakeholders (academia, government, industry, etc.) is analysed (Muscio et al., 2016). Universities are constantly demanding more information and transparency about the use of public funds from the outside (Heald, 2012) and are gaining more and more autonomy in terms of organization, management and budget allocation. They also provide an efficient way to identify, measure, manage and disseminate knowledge, that is, an appropriate way to improve internal management and transparency. In this sense, the work of Ramirez Corcoles et al. (2011) shows that universities incorporate intellectual capital information into their current accounting information system. Only building more universities and attracting more students to higher education will not create intellectual capital, unless the economy can provide graduates with relevant jobs or the environment for founding innovative businesses

(Sam, 2018). This is all about an opportunity to wait, about sustainability, thinking ahead and adding value. However, a combination of measurable indicators such as education, ICT infrastructure, market openness, and research provide valuable guidance.

**Intellectual capital in higher education**

Overall, it can be observed that intellectual potential is a similar concept to the intellectual capital. Both can be viewed from the managerial and economic points of view and both are related to the human capital of knowledge spill-over. Table 1 that follows lists some criteria for assessing intellectual capital at HEIs. The methodology is based on the methodology developed in Denmark by the local agency for trade and industry (see Bukh, Kjærgaard, 2008) for more details). Nevertheless, our framework employs other categories and criteria that are applicable to the higher education and the output and outcomes it might produce and yield.

**Table 1**

**Criteria for assessing intellectual capital at HEIs**

| Categories | Resources | Actions | Outcomes |
|---|---|---|---|
| Intellectual capital | Researchers ratio<br>Age<br>Gender balance<br>Fluctuation | Employees costs<br>ICT costs<br>In-house schooling | Acquisitions<br>Staff turnover<br>Employees' satisfaction<br>Publication output |
| Structural capital | Management gender balance<br>Organisational structure<br>Employment balance<br>IT supplies | Investment in R&D<br>Grants and funding<br>International projects<br>International conferences | International students<br>International staff<br>International rankings<br>Student satisfaction |

**Source:** Own results based on Bukh, Kjærgaard, 2008.

There are numerous studies on intellectual capital and its impact on organizational performance. For example, Youndt, Snell (2004) conducted a study on the relationship between intellectual capital and organizational performance. Alcalde, Nagel (2016) studied the relationship between learning and student performance, while Aldieri et al. (2017) focused on the academic performance. Furthermore, Swart (2006) assessed intellectual capital and found that intangible assets are important in creating a competitive advantage. Human capital is seen as the foundation of intellectual capital and is a key component of the performance of intellectual capital. Moreover, Joia (2007) shows that human capital is usually the most important growth driver for a company. Proper management of human capital could help to generate other intellectual assets in a company. Common methods for defining and describing intellectual capital include creating value and increasing the competitive advantage and success of an organization (Čábelková et al., 2015). Intellectual capital helps to create wealth and produce other esteemed assets. The intellectual capital of a company encompasses the wealth of ideas and the ability to innovate that decisively shape the future business. Moreover, it is an important part of the labour force and its values (Kalyugina et al., 2015; Strielkowski et al., 2016; Orazbayev, 2017; Fursov et al., 2018).

Some cross-country comparison is available. For example, World Bank measures the Human Capital Index (HCI) which allows to assess the potential of some countries, among other things in their higher education and scientific research. Figure 1 that follows lists the values of HCI in selected EU countries, United States, Russian Federation, Georgia, Kazakhstan, and the Kyrgyz Republic.

In general, the assessment from the point of view of intellectual capital and knowledge assets takes into account not only financial but also human and structural factors (Stewart, 1997). Some of the compelling reasons for assessing and measuring intellectual capital and knowledge capacity include understanding where the value is in the company and in the sectors of the economy, and developing metrics to assess the success and growth of companies and economies.

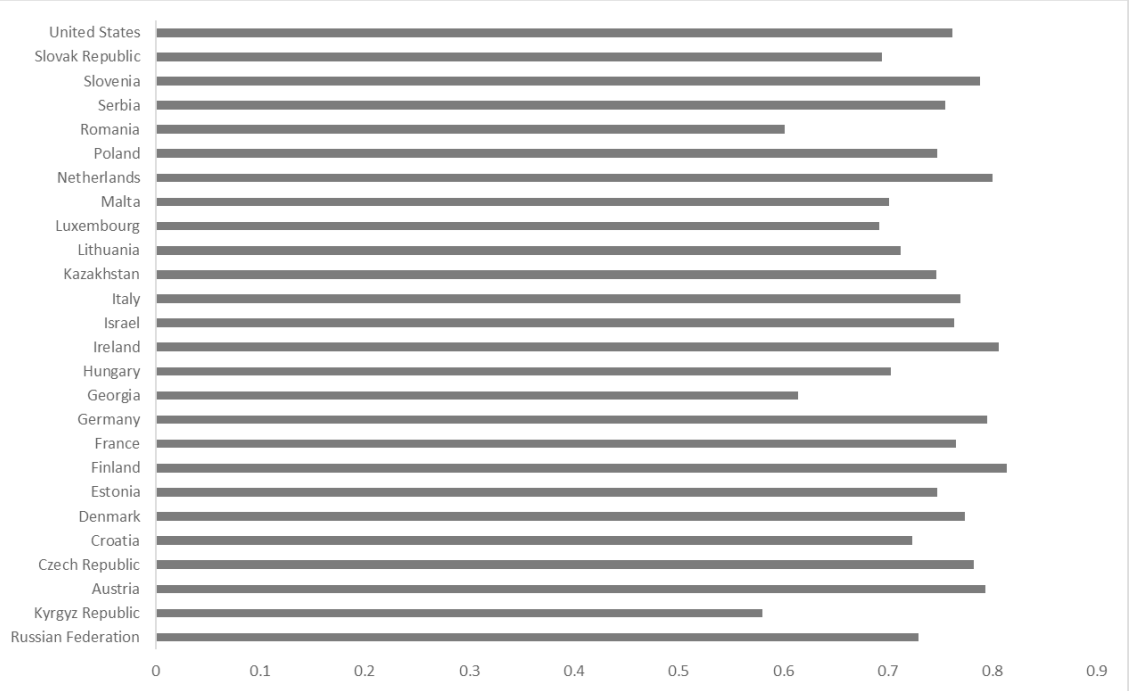


**Fig. 1.** Human Capital Index values in the selected countries, 2017
**Source:** World Bank, 2019.

Universities and HEIs nowadays also insert automatic clauses on institutional ownership into standard sponsored research agreements with industrial and private foundations and claim title and administrative rights for all faculty inventions created under the agreement, even if the sponsor does not require such an institutional interest. Many current university policies distinguish between faculty intellectual property that can be protected by copyright and patentable intellectual property, with universities usually claiming only intellectual property that is patentable. The arguments underlying the faculty's compulsory transfer of intellectual property to the university's employers (which are being furthered by various university associations such as the Association of Technology Managers of Universities, the Association of American Universities, and many university administrations) are based on the assumption that that faculty members do not distinguish company employees who owe their employers the fruits of their labours. In attempting to transfer to the institution's ownership of the inventions (of any kind of intangible assets in any form), university administrators effectively argue that faculty members lose academic freedom as soon as they become inventors, and at that time their scientific autonomy disappears and they are mere employees. The argument goes back to a claim of employer control beyond faculty research, including the dissemination and possible future use of findings and outcomes of academic research.

In addition, there is an issue of international students that is becoming more popular all around the world. The contact between universities and international student clients could be activated at various levels, from the enrolment of individual students from different countries through cooperation with other institutions (universities or companies)

to cooperation with governments, international companies and intergovernmental organizations. The main principles of the education system should be the priority of human values, the national culture as the basis of education, humanism, the sense of ecological purpose, the scientific basis, democracy, the support of gifted students and so on. Any country should be effectively looking for ways to develop innovative training to improve technical education and competitiveness if it wants to be effectively integrated into the world economy.

**Institutional building in science and education**

Effective support of intellectual potential in vocational and higher education often requires effective reforms. Any higher education reform should take account national peculiarities without excluding traditions and historical experiences. Neglecting those implications might lead to adverse institutional effects such as the reforms of higher educations in many transition economies and most notably Russia, where institutional changes resulted in negative effects for the quality of higher education (Kuzmin, Barbakov, 2015; Jiroudková et al., 2015; Volchik, Maslyukova, 2019a; 2019b). Russian case was a good example how the stakeholders responsible for the reforms of higher education attempted to raise the positions of HEIs in international rankings by pursuing such indicators as the publishing in international journals indexed in Web of Science or Scopus databases which triggered off many ethical and methodological issues (Strielkowski, 2017; Volchik, Maslyukova, 2018; or Volchik, 2018).

The role of higher education as a leading factor in human capital formation is growing significantly in the market environment. The study of the development of the professional performance of graduates as a basis for the formation of intellectual potential is becoming more important due to the growing demands for higher vocational training. Changes in modern society are accompanied by changes in the demands of the education system in general. It is the level of development of higher education in the country that determines the intellectual potential of society and the related scientific, technological, economic and cultural progress. The process of preparing experts with university education and all other processes must be managed. To implement key management functions such as planning, organization, control, and regulation, you must first have the tools to assess the current level of efficiency of the process. Almost every second student with a university education is guided by the desire to obtain a diploma from this university. This implies the determination to complete a university education at the university of his choice. It is also important that higher institutions prepare competitive professionals. The professional competence and the potential are required for the successful implementation of the professional activity in the future work of the graduate. Many studies anonymously agree that practical training, the introduction into the educational process of IWS (independent work of the student) and IWSL (independent work of the student with the lecturer) has an effect on the training of professional performance. Education system includes educational and research institutions that apply uniform standards and rules in the processes of teaching, management, assessment and research. Training in public institutions is free for students who have passed the admission competition.

Strong mentoring, student participation in (or understanding of) a full scholarly inquiry, links between research and student work, and a broader understanding of the nature of collaborative research are key to the success of a research experience in apprenticeship training. The demand of students for special research experiences often exceeds the capacity of educational institutions.

Historical challenges included inadequate infrastructure for managing scholarships, high staff utilization, low inclusion of research productivity in the terms of office and promotion, and the lack of graduate programs, and therefore of graduate assistants and postdoctoral researchers, to increase productivity. Students were involved in mentoring

communities to gain experience and resources for career development. Building research capacity in an emerging research institution also requires the assessment of research management practices and the identification of transition practices to further the development of the research agenda.

Throughout the history, various efficiency measures, decentralization of powers to institutions and performance objectives have been used to improve higher education institutions. As a result, much of the planning and budgeting process has been standardized in response to specific needs. Management by objective has been implemented to redefine the relationship between the state and universities. In Sweden as well as in Norway, higher education reforms have only touched the surface: studies show that much of the behaviour remained unchanged at faculty and faculty level (Kogan et al., 2012). The way how universities, schools or colleges tackle challenges and organizational change can be very different. Therefore, studies on trends in policy implementation must focus more on institutional, departmental and individual levels. In a sense, the world of higher education policy and change strategies is becoming more global and local.

In fact, any organizational change is likely due to institutional efforts towards academic reform. These changes affect students' academic progress, and students of sports remain qualified for high-calibre sports competitions. Future studies of actual sports program practices can shed light on how organizational change is taking place in specific university environments. Most importantly, these results should be a signal to coaches that failure to comply with reforms can lead to future disadvantages in athletic competition and that discipline outside the field can lead to discipline and field victories. The findings show that institutional requirements affect both types of programs and that students and lecturers respond to similar institutional requirements. The full impact of reforms on programs for which no academic problems have been identified is supported by an institutional statement. In particular, from a purely economic point of view, it makes little sense for smaller institutions to seek an improvement in the effective annual return, since only a few programs make a profit.

**Management of the scientific educational networks**

Scientific educational networks also constitute a great benefit for the formation and management of intellectual potential. In reality, networking strengthens professional and personal development, and successful networkers join forces with colleagues, mentors, and professionals with diverse professional backgrounds to develop relationships that also function as professional support systems. Teaching is a rewarding and demanding profession, and maintaining a professional teaching network facilitates professional and personal development. Setting up a professional learning network for teachers is particularly important as it helps educators to extend their influence beyond class, share curricula and learn new teaching strategies. Similarly, educational innovation affects all stakeholders: learners, parents, teachers, education administrators, researchers and policymakers. They require their active participation and support.

It is unlikely that the development of educational modules on dual-use topics will be effective without a parallel professional development of the faculty. In addition, it can be shown that demonstrating the effectiveness of active learning education alone is not enough to change the teaching methods of the faculties (Henderson et al., 2011). At the local level, teaching and learning centres offer the opportunity to engage the faculty in learning effective teaching practices and in promoting the implementation of new pedagogies.

The general objective of any research project is to gain a better understanding of and management of research and education networks by developing a model that supports such management. Further information on research and research questions can be found in the research proposal. A research and education network management model to be

developed during research is based on the general theoretical approach to management, control and maintenance (MCM) of information systems. This becomes an important part of the national information infrastructure and a place where new technologies are tested and implemented. Building new and expanding existing networks requires both technical and managerial skills (organizational, economic, financial, political and legal). Up-to-date information on the management of research and education networks is presented through various operational and organizational models, usually in the form of a simple description of specific experiences and existing practices.

Today, modern universities and institutions of higher education remove the barriers to distance, schedules, location, culture or other social obstacles by providing quality education through the use of modern technology. To facilitate this rapprochement with the business world, our faculty of education consists of graduate students and respected academics and business executives. Modern universities tend to have many cooperation agreements with major national and multinational companies that allow our students to supplement their educational routes with internship programs. They attempt to develop a broad range of market-oriented academic programs for undergraduate and graduate students and to train many individuals who would hold middle and top management positions in both the public and private sectors.

**Innovative process management in educational institutions**

Education is indispensable as a social institution serving the needs of society so that society can survive and thrive (Kreuzer, Weber, 2018). Here we present a systematic discussion on educational innovations, identify barriers to innovation, and outline possible directions for effective innovation.

As examples of innovation in education, we will highlight online learning and the time efficiency of learning with accelerated and intensive approaches (Galaso, Kovařík, 2018). The best way to achieve superior education is to create a new culture of education. Innovation can be modelled in the context of its impact on the quality of teaching and learning in a vocational and social culture education environment, quite similar to the concept of innovations in business and economics (Batkovskiy et al., 2016; Smirnov et al., 2017; Matinaro, Liu, 2017; Lambert et al., 2018; Ponomarev, Petrov, 2019). While recognizing that the technological revolution is unstoppable, we educators must do everything we can to sustain the main task of education, reflected in a humanistic approach aimed at the whole person, making an effort to be free to develop independent education. Critical thinking, active and effective thinkers, doers, citizens and workers. Developing clear and effective education quality measures is an important place for future innovative research. Social support for innovative education and building a new culture of education, which has priority both inside and outside the education system, is crucial to its success. Bruner (1996) suggests considering education in a broader context of what society wants to achieve through its educational investments in young people. Similarly, educational innovation affects all stakeholders: learners, parents, teachers, education administrators, researchers and policymakers. They require their active participation and support.

Therefore, it is expected that educational institutions would provide an optimal academic environment, as well as materials and conditions for achieving excellent learning outcomes for each student (program content, course format, institutional culture, research, funding, resources, infrastructure, administration, and support). The national education system relies on the commitment and responsibility of the entire society for effective functioning. Therefore, the involvement of parents, together with strong community and community support, is critical to success. Because integrating technology into education is in many ways comparable to integrating technology into every business, it makes sense to evaluate technology applications based on changes in learning productivity and quality. What some education researchers write about technology in education helps uncover

the inherent problem. The foundation of all this work, as these authors write, are resources, infrastructure, quality standards, best practices and innovation.

**Conclusions and discussions**

There are innovations in the recruitment, preparation, and remuneration of teachers. Innovation may focus on progress in one, several or all aspects of the education system: theory and practice, curriculum, teaching and learning, politics, technology, institutions and administration, institutional culture and teacher education. There are many exciting examples from which educators in many countries can learn and develop innovations that they can implement and adapt to HEIs effectively.

In fact, the generalization of management practices such as outsourcing and networking reduces the social ties between individuals and organizations and therefore creates a major problem for the creation and exploitation of knowledge assets (intellectual capital). At least in the Western context, therefore, the individual perspective dominates compared to the (collective) company perspective. Therefore, it is important to consider building an individual's intellectual capital as a political perspective to increase its use and liquidity.

The distinction between financial capital and intellectual capital (potential) has to be underlined to indicate that the former reflects the past progress and achievements of the country, but the latter provides a more accurate picture of future growth and performance. In addition, by focusing on intellectual potential and its key components and indicators, key areas in which the country has potential for growth are put into better perspective and can be viewed from all possible angles.

With regard to the above, HEIs and universities in every country should invest in building the human capital and intellectual potential. However, before doing that, key areas need to be identified and the right strategies and steps need to be envisaged and carefully planned. With all that, higher education can become a very important factor in creating and building intellectual potential of any country.

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