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EDUCATION STATISTICS AND SOCIOLOGY

HISTORY OF EDUCATION

The Role of Flagship Universities in a Region: Transformation Models

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Abstract. Efforts in providing expert and methodological support for the implementation of flagship university development programs in 2016–2017 yielded a specific-purpose flagship university model and four generic flagship university transformation models: regional technology leader (RTL), regional comprehensive university (RCU), industry sector leader (industrial university) (IL), and trans-border region university (TBRU). The article provides distinctive features of the four models, analysis of the regions where specific types of models prevail, and the results of model testing.

As it has been found, flagship universities basically develop along two generic models, RCU (classical universities, nearly half of the project participants) and RTL (engineering universities, one third of the flagship universities). For most universities, the type of transformation model pursued is strongly related to their current status and external environment characteristics. However, a number of universities fall in between and cannot be classified neatly under any particular model due to some specific external and internal factors. In this case, universities may use elements of more than one transformation model at once, yet the choice of model should first of all be based on the regional factors that determine the position and role of the flagship university in terms of the priority areas of regional development.

Keywords: flagship university, regional development, target model, transformation model, higher education, development program.

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Translated from Russian by I. Zhuchkova.

Focus on the role and contributions of universities to regional development has been a major trend in Russian and international educational research over the past decade. A wide range of theoretical and applied studies have explored the impact of universities on the key aspects of regional development, innovations in the first place, seeking to foster an effective dialogue with different stakeholder groups and to devise methods of evaluating the contribution of universities to regional development [OECD 2007; Goddard, Vallance 2013; McAdam, Miller, McAdam 2016; Rucker Schaeffer 2018; Perfilyeva 2011; 2013; 2014; Leshukov et al. 2017]. A number of researchers have analyzed institutional diversity in higher education and developed approaches to university classification [Kuzminov, Semenov, Froumin 2013; Knyazev, Drantusova 2013; Platonova 2015]. This article benefits the most from the studies attempting to draw a typology of regional higher education systems in Russia, which are extremely heterogeneous due to the strikingly different economic and sociodemographic contexts of regional development across the federal subjects [Leshukov, Lisyutkin 2015; Froumin, Leshukov 2016].

Research in this field has been growing ever more relevant since the Russian system of higher education adopted the concept of regional flagship universities. A network of such universities is expected to be created[1] in response to the major challenges faced by the majority of Russian regions, notably the growing internal migration of students to megalopolises, the lack of strong regionally-focused research and development centers, the low involvement of regional universities in local socioeconomic processes and, as a consequence, weak ties with regional stakeholders [Arzhanova et al. 2017:11].

The distinctive feature of this new category of universities is that their development strategies positively foster orientation toward solving the issues of regional socioeconomic development, which has been reflected in the specific-purpose flagship university development model. The general model assumes that universities evolve into regional centers of talent attraction and retention, warrantors of high-quality education in a broad range of disciplines, regional research and innovation centers, and drivers of positive change in urban and regional environment. However, flagship universities make up a highly heterogeneous group, and the socioeconomic characteristics of their regions can be extremely different. For this reason, one of the research objectives under the project Improving Performance of Flagship Universities...[2] is to identify the generic models of flagship

[1] Federal Specific-purpose Education Development Program for 2016–2020 (approved by the Resolution of the Government of the Russian Federation No. 497 of May 23, 2015), p. 23.

[2] Improving Performance of Flagship Universities through the Development and Testing of New Integrated University Governance Models with Due Regard to the Implementation of Development Programs Oriented at the Key

university governance and development (transformation) whose design would reflect the specific aspects of university-region interaction and the differences in university contributions to regional development across the federal subjects. Meanwhile, the models suggested should describe not so much the current status of a flagship university and its position in the region but rather the vector of strategic development and transformation of the university as the main driver of change, in the context of the region's socioeconomic development strategy.

Among the multiple types of educational institutions classified as flagship universities, researchers identify the following four generic transformation models that reflect the university's relations with society, business environment and the government, grouping together universities with similar missions, strategies and organization patterns:

- regional technology leader (RTL);
- regional comprehensive university (RCU);
- industry sector leader (industrial university) (IL);
- trans-border region university (TBRU) [Arzhanova et al. 2017:13].

1. The Conceptual Framework of Model-Based Classification

The typology of flagship university transformation models is built around the concept of *regionally engaged university*, which matches the goals and objectives of flagship universities to the fullest extent. The concept allows researchers to "consider the specific characteristics of regions, classify all the diverse interactions between flagship university and local community, and assess the level of university cooperation with the major groups of regional stakeholders, encouraging the development of regional identity among universities and affecting their missions and institutional structures" [OECD 2007:13–14; Perfilyeva 2013:106].

The literature on universities' contributions to regional development is broad and diverse, including research on the concept of *regionally engaged university*, yet very few studies attempt to identify and describe the conceptual models of university contribution to regional evolution. One of such few papers identifies four models of university role in regional development based on the analysis of university functions and with due regard to the political and sociocultural characteristics of Great Britain, Sweden and Austria:

(a) *Entrepreneurial university* enjoys economic autonomy, transfers its industrial knowledge and contributes to regional prosperity by creating conditions for knowledge generation and utilization;

Industries of Regional Economies. Government Contract No. 05.015.11.0001 of February 18, 2016.

(b) The *regional innovation systems (RIS)* approach conceptualizes universities as having a fundamental role in knowledge production in the capacity of local network coordinators that bridge regional production, innovations and global knowledge to promote economic growth of the region;
(c) The *mode 2 university model* contributes to settlement of socioeconomic problems in the region by engaging numerous organizations in collaborative research and co-production of new, regionally applicable interdisciplinary knowledge;
(d) *Engaged university* adapts its functions to regional needs, focusing its research potential on interactions with local industries and communities and actively shaping regional identity [Trippl, Sinozic, Smith 2014].

The authors of this university typology observe that Great Britain, Sweden and Austria favor the entrepreneurial university and RIS models, even though neither approach is flawless [Ibid.:25]. In Russia, some regional universities, including those assigned the flagship university status, also opt for the entrepreneurial university model which facilitates successful overcoming of difficulties generated by cuts in government funding [Bodunkova, Niyazova, Chernaya 2016:108; Ershov 2017:84]. However, the problems faced by flagship universities would be better solved by the engaged university model that uses university's academic and research potential to solve a wide variety of economic, political, social and cultural problems in the region [Kranzeeva 2017:68]. This inference confirms the feasibility of using the concept of *regionally engaged university* as the basis for designing generic models of flagship university governance and transformation.

Qualitative analysis of university performance was used to measure institutional heterogeneity of flagship universities and identify the boundaries between the types of university transformation. This method allows using the model of multilevel and many-sided university engagement in regional development, which makes it possible to examine various aspects of regional university performance and assess the potential contributions of regional universities to regional prosperity by using in-depth analysis of university development programs, considering the major trends and strategies of regional socioeconomic evolution and defining the practices of university engagement with the key groups of regional stakeholders [Perfilyeva 2014:484].

Qualitative analysis enables researchers to pay special attention to internal and external factors of flagship university performance, which create (jointly as well as severally) the unique contexts for university existence and interactions and can affect the differentiation of flagship universities [Academy of Networking LANIT 2008:12].

The internal factors are derived from the university governance strategy, i. e. its mission statement, strategic objectives, development priorities, institutional profile, key business processes, product portfo-

lio, resource potential and competitive advantages as well as relations with different groups of external stakeholders. Treating stakeholders as an internal factor makes sense because having a system of interactions with external stakeholders normally results from the university's purposeful efforts and implementation of its development strategies, indicating its growing autonomy and independence.

External factors are determined by the political, economic, societal and technology processes that unfold at the national, regional and global levels. Although global and national factors apply to every region, their effects may differ as a function of specific regional variables, which is what shapes the global and national contexts of the development of flagship university contribution models.

However, university-region interactions are influenced most strongly by regional factors, which shape the scope of university activities and directly affect the choice of university development strategy. Some of the crucial regional factors include:

- Geographic location, in particular relative to the border (borderland/inland);
- Demographic situation, which affects current and future needs of the labor market as well as employment rates among regional university graduates and skilled migration rates;
- The level of socioeconomic and innovative development in the region and the strategic priorities for regional (urban) development, which are among the target goals of flagship universities;
- Region engagement in priority state-run programs and megaprojects designed to improve the country's competitiveness and promote the development of strategically important national industries;
- Institutional landscape and competitive power of the regional higher education system, which determine its opportunities and limitations in solving problems faced by the region; the flagship university's position and role in the regional higher education system (with due regard to competition, first of all on the part of the "leading" universities, i. e. federal universities, national research universities and the Project 5–100[3] participants).

In order to demarcate the boundaries among the flagship university transformation models, a number of studies have attempted to identify quantitative indicators reflecting the differences between the specific models. Characteristics of universities' academic activities and

[3] Project 5–100 is a special government-run program to develop major Russian universities, launched by the Russian Ministry of Education and Science on the basis of Presidential Decree on Measures for the Implementation of State Policy in the Field of Education and Science of May 7, 2012 (*Translator's note*).

their contribution to regional manpower wind up being the most relevant criteria of distinguishing between the models. Availability of a field of study with the highest proportion of students in total student population (normalized[4] student population) that indicates university specialization, was chosen to be the fundamental university characteristic [Platonova 2015:23]. The proportion of 50 percent of students (normalized student population) enrolled in one of the eight fields of study in higher education (estimated based on the data from the Monitoring of University Performance[5]) was set as a cut-off percentile. The following data was used as specifying indicators of differentiation:

- Proportion of university students in regional student population across different fields of study, which indicates the degree of flagship university's monopoly power in the regional system of higher education [Kuzminov, Semenov, Froumin 2013:46]);
- Proportions of students (normalized student population) in specific majors, which indicate the key trades in which skilled workers are trained for the regional labor market.

Analysis of the results obtained is presented in the section Differentiation of Flagship Universities by Specializations and Fields of Study.

Allowance made for the internal and external factors mentioned above, the generalized flagship university transformation model includes the following elements (Fig. 1):

- Scope of the model, i. e. description of the regions hosting flagship universities of a specific model, which takes into account geographic location of a region as well as the level of its socioeconomic and innovative development and primarily indicates the level of innovative development in the region determined on the basis of individual indices and rankings designed to assess the status and dynamics of innovative processes;
- Stakeholders and major groups of external partners, interaction with which is seen as mutually beneficial and as a top priority for the flagship university of a specific governance model type;
- The key parameters reflecting the current state of a flagship university, which can serve as the basis for classifying it under a specific governance model;
- flagship university governance model strategic toolkit:
  – Strategic goal of the university;

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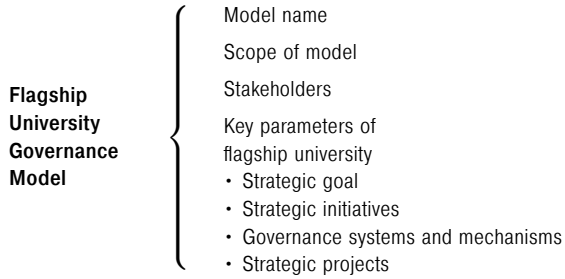
[4] *Normalized student population* is estimated using the formula Nn = Nft + 0.25Npt + 0.1Nd, where Nft is the number of full-time students, Npt is the number of part-time students, and Nd is the number of distance students (*TN*).

[5] Monitoring of University Performance, 2017. Available at: http://indicators.miccedu.ru/monitoring/?m=vpo

Figure 1. **Flagship University Governance Model Structure**



– Strategic initiatives, i. e. actions and/or action programs designed to implement the university development strategy;
– University governance systems and mechanisms;
– Strategic projects reflecting the top priorities of a flagship university of a specific model and taking into account the regional development strategy.

The generalized flagship university governance/transformation model was designed with due regard to the approved target flagship university model[6] and the predesigned generic models of regional flagship universities of particular specializations. A flagship university transformation model should describe the trajectory of strategic development of a flagship university as the central driver of change in the region. Analysis should therefore be focused on the external context and the key groups of stakeholders, which are considered by flagship university development strategies and the systemic changes within their frameworks.

2. Distinctive Features of Flagship University Transformation Models

Analysis of external regional contexts as well as current activities and development programs of 33 flagship universities allows identifying some generalized characteristics of the generic models of flagship university transformation.

[6] Regulations of the Ministry of Education and Science of the Russian Federation On the Procedure of Competitive Selection of Universities for Federal Funding of Federal State University Development Programs of October 16, 2015. Available at: https://минобрнауки.рф/новости/6469/файл/5402/FIN-Положение%20о%20конкурсном%20отборе.pdf

2.1. Regional Technology Leader (RTL)

RTL universities are located in industrially developed regions with pretty high levels of innovative activities, so their primary goal must consist in moving to the fore of regional innovations in order to solve the following strategic objectives that define the role of a flagship university:

- Improve the region's competitive performance at the national and international levels, in particular by participating in regional clusters in the prioritized industries;
- Develop centers of excellence to foster research and development in the top priority domains of regional development at the national level and globally; establish an innovation infrastructure on the basis of the university;
- Find and build effective mechanisms of interaction between the key elements of regional innovation systems—universities, industries and the government—within the framework of the "triple helix" model [Etzkowitz 2008]; transform the university into a center of efficient communication with and integration of regional stakeholders;
- Create an innovation-enhancing environment in the region to promote relevant motivations among active youth, the development of innovative entrepreneurial initiatives and the growth of the social class of technology entrepreneurs in the region;
- Develop a system of continuing engineering and technology education in the region to boost the prestige of engineering careers and shape the regional tech elite.

University transformation under the RTL model must include a whole range of systemic and structural changes affecting all the major areas of university activities.

First and foremost, a university must start developing an effective system of management support for innovations, which includes:

- Administrators' perception of innovations as a prerequisite for sustainable and successful university growth;
- A set of structural units to ensure support and administration of innovation projects at every stage;
- Shared governance mechanisms: co-participation of university and businesses—innovation cluster participants in the governing board; design of complementary development strategies for all innovation process participants in the region;
- An innovation environment and an entrepreneurial culture aimed at encouraging creative initiatives of faculty and students with innovative potential;
- A system for monitoring and predicting the demand of regional innovative businesses for human resources of various skills and backgrounds, including those with unique competencies, which

implies creating a unified register of cluster participant companies' manpower needs.

As part of establishing a system of continuing engineering and technology education, a flagship university must ensure a qualitatively new way of engineering training by networking with secondary and vocational schools. Successful implementation of the new philosophy of engineering and technology education is expected to feed new, innovative-minded engineers into the regional economy.

Efforts in reorganizing university activities with a view to build a relevant and efficient innovation system should foster innovative advancement of the region through the creation and commercialization of intellectual property, the development of new technology industries, businesses, markets and infrastructures, and, in particular, the participation in the National Technology Initiative program.

Pursuing new partnerships and building a communication platform to bring together all the innovation process participants becomes an important aspect of university governance. To ensure long-term collaboration with different groups of partners, first of all hi-tech businesses and industries, universities could develop industrial partnership programs that imply merging the intellectual potential as well as material, financial and corporate resources of all the partners. In shaping the regional innovation environment, a flagship university must act as to popularize the innovative path of modern production development and the advantages of knowledge-intensive and hi-tech industries. For this purpose, it should organize workshops, forums and conferences on science and business and set up entrepreneurship clubs as platforms for informal interactions between entrepreneurs and innovators in the region.

As a result, a flagship university choosing this transformation model should become a regional integrator of innovation and the center of the regional technology innovation environment[7].

2.2. Regional Comprehensive University (RCU)

The RCU model has been built to meet the needs of a fairly large group of regions of Russia characterized by relatively low rates of economic growth, average levels of innovations and, consequently, low socioeconomic performance indicators in general. Higher education systems of such regions have no universities from the "leading" league and are usually based around one big classical university (university complex), which serves as the center of education, science, culture and healthcare in the region. Under such circumstances, the flagship university

[7] Passport of Priority Project "Universities as Centers of the Innovation-Generating Environment" approved by the Presidium of the Presidential Council for Strategic Development and Priority Projects (Minutes No. 9 of October 25, 2016). Available at: http://legalacts.ru/doc/pasport-prioritetnogo-proekta-vuzy-kak-tsentry-prostranstva-sozdanija-innovatsii/

pursuing the RCU transformation model may assume the mission of a federal university—on the regional scale.

The distinctive feature of this model is that the university makes comprehensive contributions to regional development with a view to improve competitiveness of the prioritized industries and sectors by concentrating intellectual, human, methodological and technology resources around itself.

The priority areas of activity of universities in this category should include the following:

- Develop a regional system of priority continuing training and retraining in a broad range of disciplines and industries, making allowance for the regional labor market's needs;
- Prioritize the development of Master's and postgraduate studies in order to train and retain highly-skilled research and academic staff;
- Raise the new regional elite, i. e. senior executives of regional and municipal authorities and top managers of major enterprises and businesses in the region;
- Promote and capitalize breakthrough interdisciplinary research to improve the position of the university and the region as a whole at the national level as well as globally;
- Promote innovations in the region and shape an innovation environment, which suggests transformation of teacher education and integration of innovations into the learning process;
- Come up with innovative sociocultural initiatives to develop the region through social partnerships and the concentration of drivers of positive societal, economic and cultural change around the university.

A flagship university opting for this transformation model should become a network integrator of intellectual resources in the region, cooperating with a wide range of regional and trans-regional stakeholders in the selected priority areas.

2.3. Industry Sector Leader (Industrial University) (IL)

The IL model owes its existence to the important role that individual regions play in developing the innovation economy and improving national competitiveness. Achievement of these goals requires priority development of the strategic industries and sectors within the frameworks of major industrial infrastructure projects and national industrial programs, which normally unfold on the basis of specific regions[8]. In addition, an important priority of national and regional innovative de-

[8] Ministry of Economic Development of the Russian Federation (2013) Forecast for Long-Term Socioeconomic Development of the Russian Federation up to 2030. Available at: http://static.government.ru/media/files/41d457592e04b76338b7.pdf

velopment is to improve the quality of human potential through modernization of the social sector (non-manufacturing) industries, such as healthcare, tourism, culture or sports, whose development is also largely dependent on specialized regional universities.

The priority goal of "qualitative, quantitative and spatial optimization of the university network", stated in the national program Education Development for 2013–2020, includes the objective to form a specific group of universities—industry leaders contributing to technology and personnel modernization in various industries of the Russian economy[9]. Such universities should satisfy the demand for human resources of adequate quantity and quality as well as for research and development efforts in the core and strategically important industries. One of the policy tools to achieve this objective should consist in "increasing the role of specialized universities (or specialized schools within "broad universities") and ensuring their cooperation with businesses" [Kuzminov, Semenov, Froumin 2013:57].

As a consequence, the mission of a university using the IL transformation model should reflect the university's aspiration to become "the No. 1 university for corporations" that have plant assets deployed in the region in order to facilitate the Third Industrial Revolution by integrating science, education and manufacturing, while at the same time improving the region's competitiveness and living standards[10].

Flagship universities pursuing the IL transformation model face a whole lot of objectives:

- Develop an industrial system of continuing education tailored to increase the prestige of industrial education and supply the region with highly qualified professionals oriented towards innovations and improving the efficiency of industrial production;
- Enhance innovative potential and competitive power of the respective industry at the national and global levels, which includes creation of industrial innovation clusters in the region as well as development and integration of new technology solutions and science-intensive products;
- Establish an internationally competitive open system of industrial knowledge management as part of shaping the uniform industrial information and learning environment [Mitsuk, Khabarov, Volegzhanina 2016:482];
- Provide an efficient dialogue between industrial agencies and businesses, on the one hand, and regional authorities, on the oth-

[9] Education Development for 2013–2020, National Program of the Russian Federation. Resolution of the Government of the Russian Federation No. 792r of May 15, 2013. Available at: http://base.garant.ru/70643472/

[10] Flagship University Development Program for Tyumen Industrial University (Federal State Budgetary Institution of Higher Education). Available at: https://www.tyuiu.ru/university/programma-razvitija/

er, in terms of building effective interconnected strategies for industry and regional development (achieve an inter-institutional balance of interests);
- Foster active communication within the regional community on forecasting in science and technology, exchange of cutting-edge knowledge, and global problems in the sector of university specialization.

A flagship university using this transformation model should become a regional industrial integrator, initiator and active participant in the innovative development of the industry of its specialization, thereby contributing heavily to the socioeconomic evolution of the region.

2.4. Trans-Border Region University (TBRU)

Russia has the longest national border in the world and the highest number of bordering countries (16), so most regions in the country (49 federal subjects) are border-adjacent. Nowadays, trans-border cooperation is seen as a key factor of economic and sociocultural growth of Russia's regions. The experience of EU countries, the U.S., Canada and China has shown that trans-border cooperation is the most important factor of promoting international economic relations, and rational use of the benefits of border proximity may boost socioeconomic development of even the most seemingly unpromising borderland areas [Vagin 2013:24].

A flagship university pursuing the TBRU transformation model and striving to expand international cooperation and promote economic, academic and sociocultural integration with the neighboring countries may become the critical driver of socioeconomic development in the borderland region.

The priority areas of activity reflecting the specific aspects of this model should include the following:

- Strengthen the position and credibility of Russia on the global scene by using the academic relationships of universities in the borderland regions as public diplomacy tools to encourage the development of transnational bilateral relations with the neighboring countries;
- Provide an efficient cross-cultural and cross-national dialogue between the borderland regions and the neighboring countries to make the university a fundamental platform for all sorts of interactions;
- Actively promote the Russian language, Russian culture and Russian-language education in the neighboring countries;
- Create trans-border innovation clusters in the region as new forms of cooperation to ensure dynamic and sustainable development of borderland regions. Academic clusters appear to be a promising type of trans-border clusters, being useful for border-adjacent regions not only in terms of concentrating research and academic

resources but also in terms of providing active integration of Russian universities into the global sociocultural environment [Morozova, Dubrovskaya 2016: 2576].

One of the promising vectors of activities for universities using the TBRU model could be promoting education export[11]. Unlike in other federal subjects of Russia, education export efforts of universities in the borderland regions imply focusing on attracting foreign students from the neighboring countries and shaping a pool of international graduates loyal to the region and willing to engage in further cooperation. Not only does this type of activity help make the university more attractive and competitive in the global education market but it also provides an opportunity to achieve a number of socioeconomic development objectives in the region [Vashurina, Evdokimova 2017:43].

The choice of types and forms of university-region interactions under this model depends on the areas and strategies of trans-border cooperation in the region, the economic, academic and research potential of the neighboring countries' borderland regions, and the university's proper resources.

The flagship university transformation models described above differ in the ways and methods of building relationships with the external environment, the strategies of development, and the strategic tools used to implement them. Table 1 provides a brief description of the models' characteristics.

3. The Scope of Models: Analysis

This study understands the scope of flagship university transformation models as the federal subjects of Russia where flagship universities have been created as a result of a two-stage selective competition[12]. Using the concept of *regionally engaged university* provides an important opportunity to identify types of university-region interactions as a function of external factors that create specific conditions for university performance and its interactions with the environment. As the next step, the proposed typology of flagship university transformation models will be matched against the priorities and vectors of socioeconomic development of the regions (federal subjects of Russia)

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[11] Passport of Priority Project "Development of the Export Potential of the Russian Education System" approved by the Presidium of the Presidential Council for Strategic Development and Priority Projects (Minutes No. 6 of May 30, 2017). Available at: http://d-russia.ru/wp-content/uploads/2017/06/education_export.pdf

[12] Minutes of the meeting of the Council for the Implementation of Development Programs for Flagship Universities Playing a Pivotal Role in the Industrial and Socioeconomic Development of the Subjects of the Russian Federation and the Ministry of Education and Science of the Russian Federation No.DL-26/05-pr of May 18, 2016; Minutes of the meeting of the Competition Committee on the procedure of a selective competition among univer-

Table 1. **Flagship University Transformation Models: The Fundamental Elements**

Model Element	Regional Technology Leader	Regional Comprehensive University	Industry Sector Leader (Industrial University)	Trans-Border Region University
Scope of Model	Industrially prosperous regions with high levels of innovations and growing hi-tech industries	Regions with relatively high levels of innovations and multi-industry economies	Regions, including mono-industrial regions and monotowns, which serve as the ground for unfolding large-scale industrial infrastructure projects and national industrial programs	Borderland regions oriented toward socioeconomic development of the region and promotion of socioeconomic relations with the bordering countries
Stakeholders	Innovation development institutions and investment companies; Industrial enterprises and organizations; Leading Russian and foreign universities and centers of scientific learning	A broad variety of regional and cross-regional academic and business stakeholders (in the prioritized areas)	Regional enterprises and businesses in the area of university specialization; Industrial academic partners (universities and research institutes); Industry-related ministries and agencies; Ministry of Education and Science of the Russian Federation	International partner universities; Regional borderland communities, including ethnic diasporas; Regional and foreign trans-border businesses and organizations
Key Parameters	University is an active participant in regional cluster development; A wide belt of innovative knowledge-intensive small businesses around the university; A high number and a broad variety of science and technology studies	Big multidisciplinary classical university; University is the center of education, science, culture and healthcare in the region; A wide range of areas of fundamental and applied research	University is the fundamental educational institution feeding human resources into the region's dominant industry; Pronounced industry-specific specialization and/or institutional (industrial) affiliation of the university; Prevalence of applied studies initiated by industrial partners	A broad array of programs and campaigns designed to promote international and trans-regional cooperation with universities of the bordering countries/regions; University is the center of education, science, culture and healthcare in the region
Strategic Mission	Integrate the potential of the university, regional businesses and regional authorities to help the region move to the fore of developing the national innovation system	Improve competitiveness of the prioritized industries and sectors in the region by concentrating intellectual, human, methodological and technology resources around the leading regional university	Provide continuing innovation-oriented education, breakthrough research and transfer of technology to develop hi-tech and backbone industries of the country and the region	Expand trans-border cooperation and promote international economic, academic and sociocultural integration to ensure dynamic and sustainable development of the region
Strategic Initiatives	Improve the prestige of engineering education; Industrial partnerships; Applied research; Technology entrepreneurship	Lifelong multidisciplinary learning; Intellectual network partnerships; Interdisciplinary research; Technology and social entrepreneurship	Industrial education; Industrial partnerships; Industrial research; Technology and social entrepreneurship	Expansion of cross-regional trans-border cooperation; Promotion of the Russian language; Social entrepreneurship
Governance System and Mechanisms	System of priority continuing education in engineering and technology; System of technology production and transfer to hi-tech industries; "Triple helix" model; Centers of excellence for research and development	Priority continuing education in a wide range of programs and fields; University is the center of integration and communication between authorities, businesses, academic community and society; Leadership in breakthrough research areas; University is the center of generation of sociocultural initiatives designed to foster regional development	Industrial system of continuing education; Development of strategic industries; Technology modernization of the industry; Regional industrial centers of excellence	Common trans-border research and academic environment; University is the center of promoting the Russian language, Russian culture and Russian-language education; Development of an innovation environment within the framework of trans-border cooperation; Platform for implementing sociocultural changes in the region
Strategic Projects[a]	Innovations; Industrial partnerships; Technology education; Applied research; Technology entrepreneurship	Innovations; Intellectual network partnerships; Lifelong learning; Interdisciplinary research; Technology and social entrepreneurship	Innovations; Industrial partnerships; Industrial education; Industrial research; Technology and social entrepreneurship	Innovations; Trans-border partnerships; Promotion of the Russian language; Public diplomacy; Social entrepreneurship

[a] The scopes of strategic projects correspond to the generalized priorities of socioeconomic development of the regions that make the scope of a specific model. These priorities are captured in the regional strategies and development programs (*Authors' note*).<FootnoteEnd:>

based on statistical analysis of their socioeconomic performance indicators and the current achievements in their strategic development.

Analysis of 32 subjects of the Russian Federation hosting flagship universities has allowed to identify the major external factors affecting the distribution of flagship universities within the typology proposed and indicating the scope of every specific model: geographic location of the region hosting the flagship university, its socioeconomic and innovative development indicators, and competitive landscape of the regional higher education system.

3.1. Geographic Location

The choice of flagship university governance model depends on university location in a particular federal district with its specific indicators of socioeconomic performance, demographic situation and regional labor market as well as on whether the region is adjacent to the border.

Current distribution of the flagship universities among the federal subjects looks as follows:

- Volga Federal District—8 universities;
- Northwestern Federal District—6 universities;
- Ural Federal District—2 universities;
- Central Federal District—6 universities;
- Southern Federal District—5 universities;
- Siberian Federal District—6 universities.

Volga Federal District has the highest number of flagship universities and thus experiences a considerably higher level of university competition than the other districts, both within and among the regions. No flagship universities have been created in North Caucasian and Far Eastern Federal Districts so far. Yet, it is crucial to envisage the creation of such universities, given the geopolitical and socioeconomic significance of these federal districts for national development and the implementation of a number of national programs involving the regions that are part of these two districts.

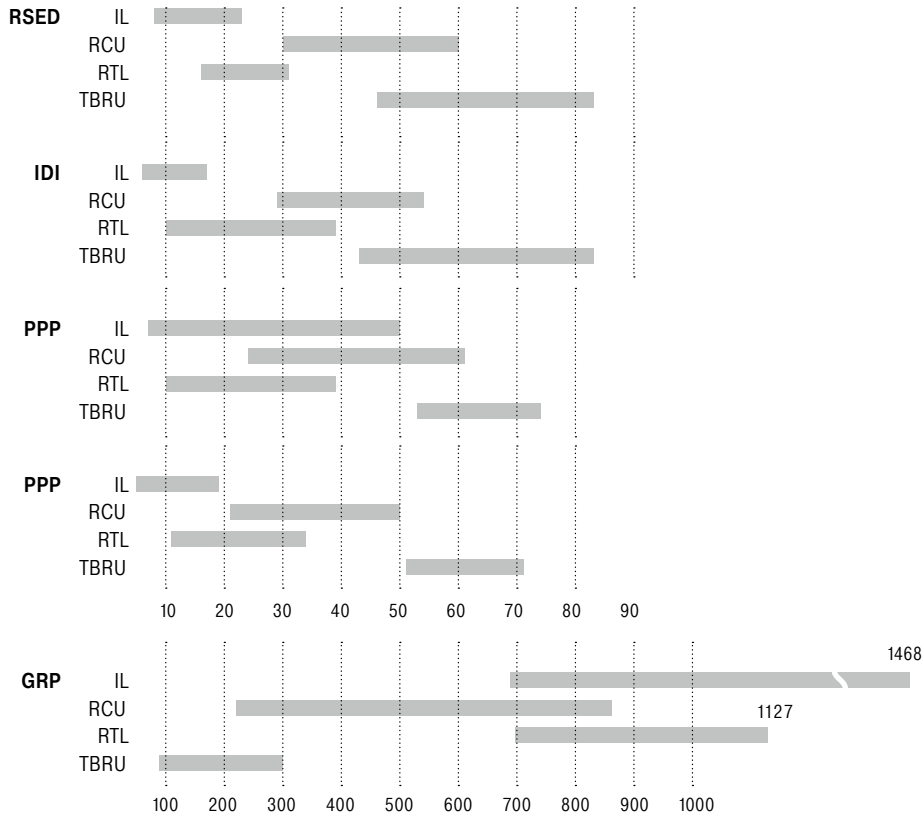
3.2. Socioeconomic Performance Indicators and the Level of Innovations

The choice of a flagship university transformation model is largely affected by the level of development, the scale (Gross Regional Product, GRP) and industry specialization of the regional economy (region's position in the ranking of socioeconomic development of the federal subjects of Russia, RSED)[13], and the level of development of the regional innovation system, which is assessed based on specific indices and rankings:

sities for federal funding of federal state university development programs in 2017–2019 No.OV-11/05-pr of April 17, 2017.

[13] RIA Survey and Ranking (2017) The Ranking of Socioeconomic Status of the Subjects of the Russian Federation: The 2016 Results. Available at: http://riarating.ru/

Figure 2. **Ranges of Values of Specific Indices and Regional Rankings for Different Transformation Models**



- The Ranking of Innovative Regions of Russia (Innovation Activities Index, IAI), which discriminates among five types of Russia's federal subjects to facilitate monitoring and governance: strong, medium-strong, medium, medium-weak and weak innovators [Association of Innovative Regions of Russia 2017];
- The HSE Russian Ranking of Regional Innovation Development (Innovation Development Index, IDI) [Gokhberg 2017:12];
- The Public-Private Partnership Ranking of Russian Regions (PPP Index) [PPP Development Center 2016], and more.

Each model is associated with a certain range of index values, the most reliable model-region relationships being observed for the indices of socioeconomic status, innovation activities and innovative development of the regions (Fig. 2).

The interrelation between the flagship university transformation models and the types of regions' innovation activities is shown in Ta-

ble 2: the RTL and IL models are mostly typical for industrially developed regions classified as strong or medium-strong innovators, while the RCU model is most often found in regions with moderately developed industries and low levels of innovations. Regions that form the scope of the TBRU transformation model also demonstrate rather low levels of innovation activities.

3.3. Competitive Landscapes of Regional Higher Education Systems

When there are universities from the "leading" league in a region, it can affect greatly the choice of flagship university transformation model, inducing intra-regional university competition for niches and spheres of influence, intellectual and financial resources, and target groups of consumers. In a situation like that, the flagship university must choose a transformation model that will boost its competitive advantage in the region, primarily by virtue of unique academic programs and diversification of product portfolio, methods and forms of interaction with external stakeholders.

Because the universities classified as "leading" pursue specific missions and goals set by the government and possess a strong research and academic potential as well as ample resources for development, they are normally oriented towards leadership at the national and international levels, building their governance models, internal processes and forms of interaction with the external environment accordingly. Striving to take the lead among the national universities and to obtain heavy subsidies from the federal government, such universities do not normally seek integration into regional processes [Smirnov 2013:105]. Therefore, even when there is a "leading" university in the region, the flagship university can move to the fore of the regional system of higher education, ramping up its effort to implement the regional development strategy and at the same time establishing effective partnership relationships with the "leading" university (cooperation instead of competition).

Which transformation model a flagship university will choose also depends on the type of regional higher education system determined based on functional and market orientation of regional universities. The typology discriminates among:

- Regions with "leading" universities;
- Regions with balanced systems of infrastructural[14] higher education;
- Regions with balanced systems of industrial higher education;
- Regions where infrastructural universities prevail;
- Regions with low-developed higher education systems [Leshukov, Lisyutkin 2015:33–34].

[14] In Russian literature, *infrastructural universities* are understood as universities feeding manpower into the soft and hard infrastructures of the region.

Table 2. **The Distribution of Flagship University Transformation Models across the Federal Subjects of Russia with Higher Education Systems of Different Types and Different Indices of Innovation Activities**

Strong Innovator	Medium-Strong Innovator	Medium Innovator	Medium-Weak Innovator	Weak Innovator
Regional System of Higher Education with "Leading" Universities				
Nizhny Novgorod Oblast Novosibirsk Oblast Samara Oblast	Rostov Oblast Chelyabinsk Oblast	Belgorod Oblast, Saratov Oblast		
Krasnoyarsk Krai Tomsk Oblast	Tyumen Oblast			
Regions with Balanced Systems of Infrastructural Higher Education				
	Tula Oblast	Vologda Oblast Kirov Oblast The Mari El Republic	Kemerovo Oblast Orlov Oblast	
Regions with Balanced Systems of Industrial Higher Education				
The Republic of Bashkortostan	Voronezh Oblast	Omsk Oblast	Volgograd Oblast	
	Altai Krai Ulyanovsk Oblast Yaroslavl Oblast	Krasnodar Krai Novgorod Oblast	Pskov Oblast	
Regions with Infrastructure Universities Prevail				
	Vladimir Oblast	Murmansk Oblast	Kostroma Oblast	The Republic of Kalmykia
			The Republic of Karelia	
Regions with Low-Developed Higher Education Systems				
			The Komi Republic	

RTL
RCU
IL
TBRU

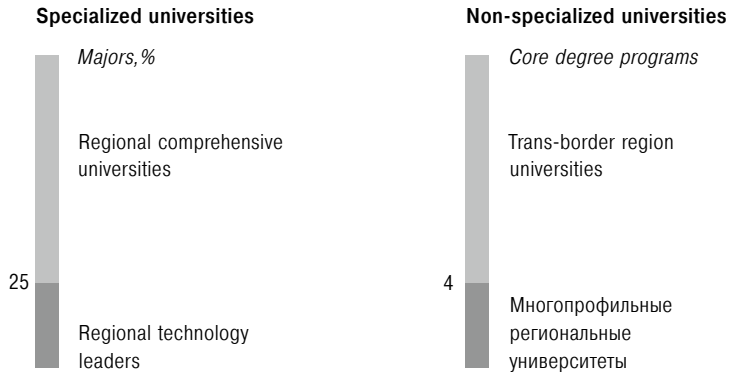
It has been observed, for instance, that the RTL and IL transformation models are preferred by flagship universities in the regions with "leading" universities and those with balanced systems of industrial higher education, while the RCU model is commonly pursued by flagship universities in the regions that have no other leading universities and where infrastructural universities prevail (Table 2).

4. Differentiation of Flagship Universities by Specializations and Fields of Study

As a key university characteristic, specialization is often used as a classification criterion in higher education [Froumin, Leshukov 2016:124;

Being regionally engaged, they are not involved in any large-scale research activities (*TN*).

Figure 3. **The Role of Flagship Universities in Regional Manpower Training (Specialization)**



Platonova 2015:22]. Analysis has been carried out to find out that flagship universities can be divided into two groups based on this criterion:

- Specialized, where over 50 percent of students (normalized student population) are in the same major;
- Non-specialized, where none of the majors accounts for at least 50 percent of total (normalized) student population.

The first group includes the universities pursuing the RTL and IL transformation models, while the RCU and TBRU universities naturally fall under the second one. The proportion of normalized student population enrolled in specific majors was used to discriminate between the models within the group of specialized flagship universities, while the models used by non-specialized ones were distinguished based on university contributions to regional manpower training. Figure 3 shows the distribution of the models by the status of university specialization.

Regional Technology Leaders. This model is pursued by specialized engineering and technology universities where the proportion of students enrolled in Engineering, Technology and Technical Sciences varies between 60 and 96 percent of total (normalized) enrollment, the average being around 77 percent. However, such universities cannot be considered as narrowly specialized as there is no major within their area of specialization that would account for more than 25 percent of enrollment, which means that universities of this type train workers for a wide range of industries.

Industry Sector Leaders (Industrial Universities). Such universities are highly specialized (the average proportion of students in the core major being 75 percent), offer a narrow spectrum of degree programs and mainly seek to meet the staffing demand in specific industries (like oil and gas) or public sectors (e. g. medical schools). For ex-

ample, engineering and technology flagship universities pursuing this model usually offer only one field of study to major in, which accounts for over 25 percent of their total enrollment.

Regional Comprehensive Universities. These offer a broad array of degree programs to feed manpower into the regional labor market and have no explicit specialization (none of degree programs accounting for more than 50 percent of total enrollment). The average proportion of students enrolled in such universities hovers around only 35 percent of total student population in the region, which is the result of heavy intra- and cross-regional competition among universities in such regions. Meanwhile, such universities hold the leading position in training skilled workers for the region in three trades on average (the proportion of students enrolled in the respective programs exceeding 90 percent of total same-major enrollment in the region).

Trans-Border Region Universities. Such universities have no specialization either. However, in contrast to the previous group, they enroll about 65 percent of all students in the region and have on average five or six degree programs which account for over 90 percent of total same-major enrollment in the region. That is to say, the flagship university dominates the regional education market, which is largely explained by low competition in higher education systems of borderland regions due to the small number of universities.

Heterogeneous data normalization method was used to identify clusters of flagship universities and define the boundaries between them. The following formula was used to calculate scores for heterogeneous indicators:

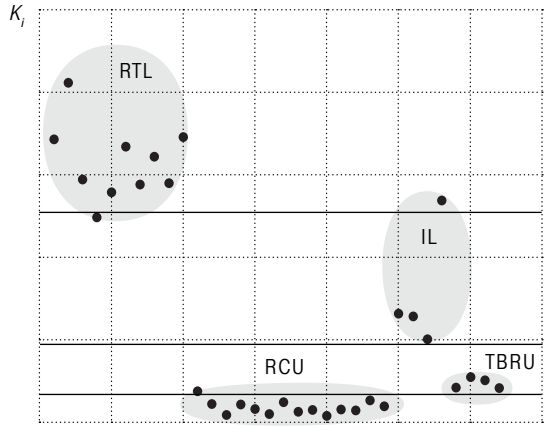
$$N_i = w_j \cdot \frac{I_j}{I_{jmean}},$$

where N_i is the number of scores assigned to a specific university for the *j*th indicator; w_j is the weight of the *j*th indicator; I_j is the value of the university's indicator; and I_{jmean} is the arithmetic mean of the indicator.

Weighted values have been calculated to be 75 for the IL model, 25 (major-based proportions) for the RTL model, 5 for the TBRU model, and 3 (number of degree programs) for the RCU. Evaluation involved all of the sample (all types of models) (Fig. 4).

Quantitative analysis of the selected characteristics of flagship universities has revealed clear boundaries among the clusters (models). A conclusion can thus be made that indicators describing university specialization and enrollment in specific degree programs can be used as fundamental criteria for identifying the transformation model and as the key guidelines for setting priority goals and developing policies to achieve them in terms of modernization of flagship university's educational activities.

Figure 4. **The Distribution of Flagship Universities by the Method of Heterogeneous Indicator Normalization**



5. Model Testing

A set of practical tools has been developed as part of the Development of a Network of Flagship Universities project to classify universities under one of the transformation models proposed. The toolset involves application software, evaluation sheets for collecting feedback from universities on the performance of individual components of the governance model being tested, and graphic models with descriptions. The main stages of choosing a transformation model are presented in Figure 5.

At the stage of determining priority areas of activities, universities are advised, first of all, to analyze the level of socioeconomic development and innovations in their region, the levels of human potential and entrepreneurial activity, the demand for educational services among the population, and the demand for graduates among businesses. It appears vital at this stage to outline the range of major stakeholders, interactions with which will largely define the vectors and paths of flagship university transformation. The following stages involve choosing the critical systemic governance mechanisms for the specific model with due account for the existing resources and applicable regulatory framework as well as determining the set of measures to modernize the core modules of flagship university activities in terms of the transformation model to be selected.

The key characteristics describing the specific fundamental organizational units and strategic tools for every model can be used by flagship universities to develop and adjust their development strategies so as to ensure successful transformation under the model selected (Fig. 6).

The online resource allows using the regional indices and rankings available, the descriptive model characteristics and the regions' pro-

Figure 5. **Stages in the Selection of a Flagship University Transformation Model**

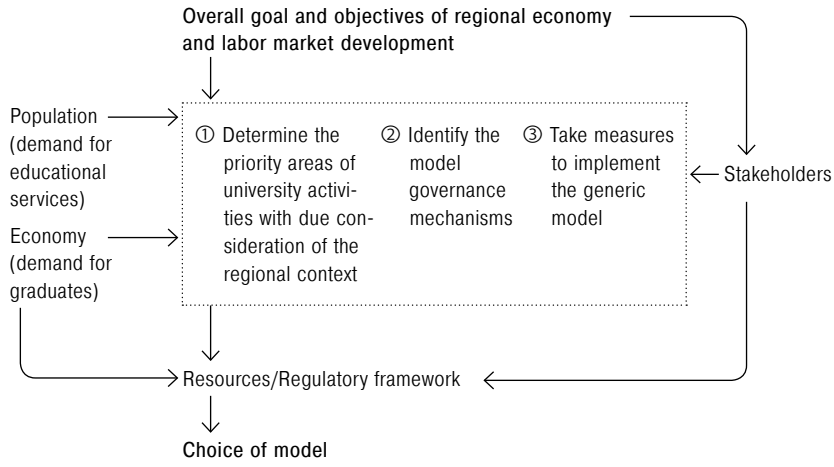
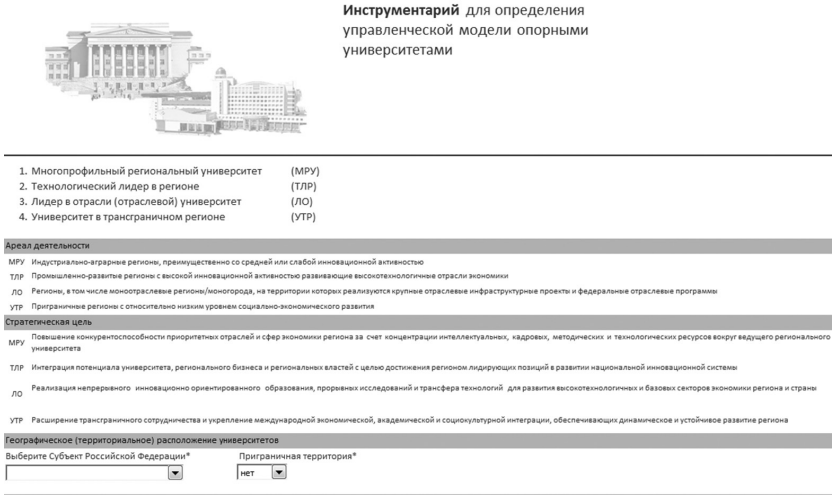
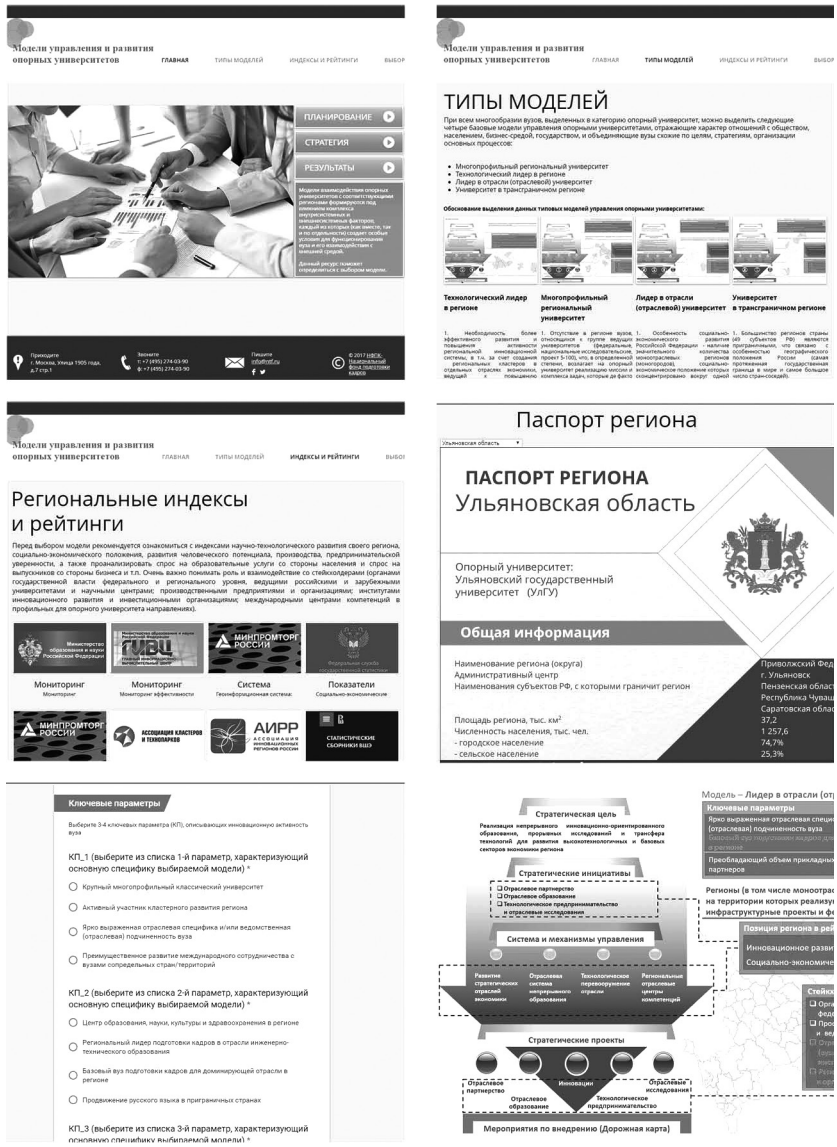


Figure 6. **Strategic Tools for Selecting a Flagship University Transformation Model**



files to consider the regional context in determining the priority areas of university activities, identifying the model governance mechanisms and defining the measures to modernize the flagship university's core activities (Fig. 7).

Figure 7. **The Online Resource for Selecting a Flagship University Transformation Model**



The toolset was designed using the ranking method and the combinatorial approach to quantitative data assessment. The following parameters are ranged:

- Scope of activities;
- Strategic goal;

- Geographic location of university;
- Key parameters (KP);
- Governance system and mechanisms (GSM);
- Priority areas of activity (PAA).

Scope of activities and *strategic goal* have permanent descriptive characteristics in each model. *Geographic location* is technically the indication of whether a university is located in a borderland region.

Key parameters were defined using the permanent characteristics of specific models, whose assigned (weighted) values were calculated using the formula below.

KP = KP1 (four characteristics) + KP2 (four characteristics) + + KP3 (four characteristics) + KP4 (four characteristics) + KP5 (one characteristic of choice). Selections of elements make the ranking of weighted values for each model.

The following formula was used to determine the quantitative values of the *governance system and mechanisms* variable:

GSM=GSM1 (four characteristics) + GSM2 (four characteristics) + + GSM3 (four characteristics) + GSM4 (four characteristics) + + GSM5 (two characteristics of choice). Similar to the procedure described above, various elements are picked out of this multitude and combined to provide a ranking of weighted values for each model.

Priority areas of activity were determined based on the permanent characteristics of specific models, whose values were calculated using the formula:

PAA = PAA1 (four characteristics) + PAA2 (four characteristics) + + PAA3 (four characteristics) + PAA4 (four characteristics) + + PAA5 (three characteristics of choice).

Math computations using variously conditioned combinations allow defining the flagship university transformation model.

In its simplified version, the formula is reduced to summing up the quantitative values of all the selected characteristics.

Analysis carried out using the pre-developed tools shows that flagship universities mostly evolve under two generic models, namely *Regional Comprehensive University* (classical universities, nearly half of the project participants) and *Regional Technology Leader* (engineering universities, one third of the flagship universities). For most universities, the type of transformation model pursued is strongly related to their current status and external environment characteristics. However, a number of universities fall in between and cannot be classified neatly under any particular model due to some specific internal

and external factors. In this case, universities may use elements of more than one transformation model at once, yet the choice of model should first of all be based on the regional factors that determine the position and role of the flagship university in terms of the priority areas of regional development. For instance, a classical university located in a borderland region will benefit the most from pursuing the TBRU model, designed to solve geopolitical problems and promote economic, academic and sociocultural integration of the country and region in the global scene.

6. Conclusion

The generic flagship university transformation models proposed in this study mostly reflect the objectives that flagship universities face as drivers of regional socioeconomic development, allowing such universities to select their niche and trajectory of development.

The choice of a specific model has to do with a great deal of internal and external factors. Meanwhile, a number of flagship universities may have difficulties choosing a particular generic governance model due to the complexity of their organization. In this case, universities may be advised to select, having carried out necessary research, the model that meets the university's objectives most fully—as the basis, complementing it with elements of other governance models.

Naturally, all the models proposed represent ideal types of organization, but they nevertheless have not only theoretical but also practical potential, serving as tools for governing universities and allowing university administrators to consistently build their governance activities in terms of flagship university transformation.

The models described in this article and the model-specific strategic tools could also be used by potential participants in the competition for developing a network of flagship universities[15] to design university development programs.

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Publication Metrics as a Tool for Measuring Research Productivity and Their Relation to Motivation

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Abstract. The article presents an analytical review of literature on publication metrics as a tool of performance management in academia. Issues of quantitative research assessment are investigated in the light of modern views of motivation, in particular through the lens of self-determination theory (SDT). The article provides an insight into empirical studies on the effects of intrinsic and extrinsic motivation on publication productivity, research quality and subjective wellbeing. Accumulated international experience in performance management is used as a basis for developing recommendations on how to improve academic governance.

Keywords: intrinsic motivation, governance, science, performance management, publication performance measurement.

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Russian universities are committed to the ambitious goal of making it to prestigious international rankings. Achievement of this goal requires concentration of efforts on the priority growth areas, such as publication activities. Under the logic of performance management, goals should be transformed into a system of incentives to ensure maximum employee productivity. Publication performance measurement systems have been designed to provide quantitative assessment of research. This article suggests analyzing the potential effects of such systems from the perspective of self-determination theory. We provide a review of studies on how publication performance measurement affects motivation and productivity in academia.

Publication metrics are one of performance management tools, which are actively used in universities in Russia and beyond. The present-day doctrine of performance management has its roots in the classical works of Peter Drucker [Drucker 1954; 1964], which assert that such tools as merit pay and regular performance reviews serve to reconcile individual employee motivations with strategic goals of organizations. In theory, performance management tools are supposed to enhance employee motivation. However, evidence of their effects is rather equivocal, particularly in knowledge production, where performance is hard to measure explicitly [Kallio, Kallio 2014].

The extensive use of performance management tools has been inspired by the philosophy of new public management, which seeks to transfer managerial solutions developed in the private sector into the public domain [Dooren, Bouckaert, Halligan 2010]. Since universities with government-funded research activities are a special case of public sector organizations, they also experience the adverse effects of such transfer. Performance of public sector organizations is much more difficult to measure than that of private businesses. With some reservations, the main goal of businesses is to maximize profits, which can thus be used as a uniform measure of their performance (although it poses a number of problems, too). The public sector has no such uniform measure of performance. There have been numerous attempts to compensate for this deficiency by creating performance assessment systems based on various substitutes for what profits are in the private sector. In higher education, the role of such substitute is played by publication metrics.

This paper intends to examine the effects of applying performance management tools in universities on researchers' motivation. The article is structured as follows. In section one, we discuss the specific aspects of contemporary universities' organizational culture and Russia's academic market. Section two describes the theoretical foundations of the performance management doctrine, which manifests itself in the assessment of publication activities, and the accumulated experience in the field. As a next step, intrinsic motivation theory is used as a framework for discussing researchers' professional motives and investigating how they can be affected by performance measurement systems. Finally, an overview of empirical studies on the effects of using quantitative bibliometric indicators in universities around the world is followed by the conclusion and recommendations.

The analytical review of literature presented in the article makes no pretense to being exhaustive or consistent, yet we tried to include a large variety of publications on performance management systems, researchers' motivation and self-determination theory as well as recent empirical studies on the effects of introducing bibliographic indicators in western universities. The article makes use of both Russian and foreign publications.

1. University Culture and Managerialism

Traditionally, two types of university cultures coexisted, collegiate and bureaucratic [Melo, Sarrico, Radnor 2010]. Collegiate cultures were observed in academic communities where every member had an equal vote, while bureaucracy was typical of administrative staff playing subordinate roles. This traditional paradigm is undergoing a transformation in today's universities. Researchers are becoming managers who commit to performance and organize the work of their teams so as to make good on their commitments [Sousa, de Nijs, Hendriks 2010].

Integration of publication metrics in universities is one of the manifestations of managerialism, which swept over the academic world with the advent of new public management. Obsessive attention to the number of publications is not typical of conventional academic cultures. Under the new conditions, university has basically turned from the ivory tower to the academic assembly line [Barry, Chandler, Clark 2001]. There is a tendency towards proletarianization of academic labor [Wilson 1991] and commodification of research [Willmott 1995]. The phrase "academic corporation" is acquiring a new dimension today, corporation being understood not as a merger of equals but as a large manufacturing business [Kurakin, Filippov 2006].

As centralized performance assessment systems get introduced, they change the structure of researchers' accountabilities. Instead of being accountable to their colleagues, academics find themselves accountable to managers, i. e. university administrators. The traditional collegiality standards give way to managerial accountability [Melo, Sarrico, Radnor 2010]. Researchers preserve a certain degree of autonomy in choosing the method of meeting their commitments but have to satisfy the performance requirements imposed by university administrators, which may be perceived as loss of the much-prized academic freedom [Ibid.].

1.1. Academic Market

The Russian academic market is characterized by relatively low competition among universities. A small number of Russian universities possess oligopsony power (a state of the market being dominated by a very limited number of large buyers), thus capturing all of the demand for researchers. Konstantin Sonin calls the absence of an academic market the "weak spot" of Russian science [Sonin 2016]. In a situation like that, universities that seek to increase their publication counts are forced to rely on artificially created stimuli. A competitive labor market makes academics intrinsically motivated to produce more publications (in fact, such motivation is only partially intrinsic, being "foisted" by the external competitive environment). In Russia, universities find themselves in a situation where they have to use administrative leverage to stimulate publications. The ever more widespread publication metrics are one of such administrative levers, probably the most important one. This trend is intensified by Russian universities engaging actively in the ranking race and government funding programs, where assessment criteria derive from the logic of performance management.

2. Performance Management

2.1. Principal-Agent Theory

As a tool of new public management, performance management has its theoretical underpinnings in principal-agent theory, which centers on the conflict between the interests of agents (employees) and principals (managers). The fundamental premise is that their interests diverge and must be harmonized. Agents want to get maximum reward for minimum effort, whereas principals, on the contrary, want to make agents put in maximum effort for minimum reward. Principal-agent theory suggests that stricter monitoring improves efficiency of agents, simulating them to exert more work-related effort. Agents have been traditionally treated under this theory as shirkers who try to minimize their effort unless they are closely monitored [Tullock 2005]. It is suggested that agent efficiency can be improved by introducing a system of punishment and reward, which rewards achievement of results perceived as useful by the principal and punishes failure to achieve them. Principal-agent theory is focused on external pressure and extrinsic incentives. In respect to universities, integration of a performance management system is expected to enhance the efficiency of monitoring the performance of agents (researchers) by principals (university administrators).

Applying the principles of performance management to universities has resulted in using publication metrics to monitor research performance. There are two types of performance management systems used to increase the number of publications; one suggests financial incentives for publications, and the other sets minimum requirements on the number of publications as well as penalties for failure to meet them. Principal-agent theory proceeds from the premises of rational choice, meaning that rewards and punishments modify the ways agents calculate their utility, so that commitment to principals' interests becomes a subjectively more profitable choice.

2.2. Positive Effects of Performance Management

Performance evaluation and formalized systems of punishment and reward may have positive effects in different areas of management. Robert D. Behn [Behn 2003] discriminates among eight managerial purposes that performance measurement helps achieve (Table 1).

The results of performance measurement can serve the basis for managerial implications. The fact that one academic unit has more publications than another one may be the grounds for judging the former as high-performing and the latter as low-performing. The judgments may be then used in making decisions on budget allocation, evaluation of spending efficiency, rewards for high performers, and investments in training. Efficiency of such investments, in its turn, can be evaluated based on qualitative ROI. Otherwise speaking, performance measurement is a radical method of reducing administrative costs, which simplifies the view of the organization and provides a rational basis for many managerial decisions, thus reducing uncertainty that all managers face inevitably. It also facilitates the task of demonstrating the university's research output to external audiences, which

Table 1. **Eight Managerial Purposes of Performance Measurement [Behn 2003] (adapted)**

Managerial Purpose	What the performance measure can help find out
Evaluate	How well the agency is performing
Control	Whether subordinates are doing the right thing
Budget	On what programs the agency should spend
Motivate	How to motivate staff to improve performance
Promote	How to convince politicians and citizens that the agency is doing a good job
Celebrate	What accomplishments are worthy of celebrating success
Learn	Why something is working and something is not
Improve	What exactly and who should do differently to improve performance

include officials, students and employers. When the government stiffens accountability requirements, quantitative measures become a convenient mechanism for reducing all the diversity of university research down to communicable scientometric indicators.

The mechanism of performance assessment is congruent with the rationalistic perception of organization, which depict the working of an organization as a successive progression from planning to execution to feedback. It may be that the key to long-term success of performance management is in their ability to increase perceived rationality of decisions being made. Short-term benefits of performance management systems are manifest: performance metrics allow clarifying the organization's priorities and concentrating employee effort on those priorities. However, there is a flip side to such short-term benefits.

2.3. Unintended Consequences of Performance Management

Any performance assessment system has a number of unwanted effects that manifest themselves as undesired changes in agent behavior under the influence of the assessment system. One of such negative effects is called tunnel vision, i. e. concentration on aspects that are subject to formalized assessment to the exclusion of other important areas [Smith 1995]. In case of faculty members, selective attention to publication activities is accompanied by selective inattention to other important aspects, teaching in the first place [Taylor 2003].

Peter Smith [Smith 1995] identifies eight unintended consequences of performance management (Table 2), which are based on the assumption that the controlled agents may predict principals' steps and change their behavior accordingly. Attempts to adjust the assessment

Table 2. **Unintended Consequences of Performance Management (adapted from [Smith 1995]).**

Unintended Consequence	Description
Tunnel vision	Concentration on areas included in the performance evaluation scheme to the exclusion of other important unmeasured areas
Myopia	Concentration on short-term issues to the exclusion of long-term considerations which may only show up in performance measures in many years' time
Sub-optimization	Pursuit of narrow local objectives at the expense of the objectives of the organization as a whole
Measure fixation	Pursuit of success as measured rather than as intended
Misrepresentation	Deliberate manipulation of data so that reported behavior differs from actual behavior
Misinterpretation	Intentionally misleading inferences about performance on the part of the principal
Gaming	Altering behavior in order to boost performance
Ossification	Organizational paralysis due to an excessively rigid system of measurement

mechanisms result in new ways of evading control being invented and lead to an increase of control-associated costs.

Inadequate performance assessment systems may pervert the stimuli considerably, encouraging employees to maximize indicators at the expense of real output [Hood 2006; Smith 1995]. The impact of performance assessment systems on agent behavior depends on the structure of motivation lying at the heart of the management tools. The following section looks at the specific aspects of work motivation in the academic world.

3. The Psychology of Researcher Motivation

Over the past half-century, the focus in psychology of motivation has shifted from conventional drivers and specific stimuli toward the broader phenomena of choice, autonomy, and experience of freedom, or lack of freedom, in doing an activity.

The philosophy of performance management described above, which is widely applied today, is based on the assumption that an elaborate system of monitoring would promote employee productivity. Unmonitored agents are supposed to be inefficient, so (research) performance management basically comes down to quantitative control over explicit labor outcomes (publications). However, the contemporary psychology of motivation argues that such management sys-

tems will only be effective temporarily, up to a certain point, beyond which they stop increasing employee productivity.

3.1. Self-Determination Theory

Self-determination is autonomy in initiation of behaviors and making choices and decisions. Edward Deci and Richard Ryan have been working on Self-Determination Theory (SDT) for over three decades [Deci, Ryan 1985]. Self-determination means feeling independent from both external and internal powers [Leontiev 2000].

Taking Abraham Maslow's ideas further, the authors of SDT identify three basic needs that are innate and universal to all human beings. Autonomy is the need to have a choice, to feel oneself the author and master of one's own destiny. Competence is the ambition to achieve results and be efficient at work. Finally, psychological relatedness is the need to have a sense of belonging and connectedness. Satisfaction of the basic needs is a factor of psychological health and wellbeing, while frustration of such needs, conversely, leads to lower efficiency and affects physical health and self-development in negative ways [Gordeeva 2010].

Special emphasis is laid on autonomy, otherwise referred to as the need for self-determination. Satisfaction of this need is thwarted when an individual realizes that their activity is controlled from the outside. In a performance management system, intrusive external control will have adverse effects on motivation.

3.2. Intrinsic and Extrinsic Motivation

Depending on where the reward for activity comes from, motivation can be extrinsic or intrinsic. Extrinsic motivation occurs when an individual is motivated to gain an external reward, while intrinsic motivation implies that an activity has an inherent value [Kallio, Kallio 2014]. An intrinsically motivated person gains pleasure and satisfaction from actually engaging in activity. For example, games and creative activities are sources of satisfaction in themselves, so people engage in them for the sake of experience. According to Deci [Deci 1971], a person is intrinsically motivated if they perform an activity for no apparent reward except the activity itself. Robert Henri describes being intrinsically motivated as feeling part of something bigger than one's own existence [Henri 1923]. As for extrinsic motivation, it refers to the promise of reward for achieving a goal or the threat of being punished for failure to achieve it. In this regard, activity is perceived as a means of gaining that reward.

The impact of the two types of motivation on behavior can be described briefly using quotes by the proponents of SDT: "Intrinsic motivation energizes and sustains activities through the spontaneous satisfactions inherent in effective volitional action" [Deci, Koestner, Ryan 1999:658]. Conversely, "when people are rewarded for performing a task, they do the job to gain the reward, but nothing above what is expected. In other words, an extrinsically motivated person tends to minimize their effort and maximize the reward" [Deci, Ryan 1985:77].

So, what will be the consequences of using reward and punishment in measuring performance in academia? Performance metrics link research activities to extrinsic motives (success criteria, research evaluation, social comparison), ignoring the intrinsic ones (academic freedoms, personal research interests, new scientific discoveries). Performance assessment of this type is based on promoting extrinsic motivation in employees while suppressing natural, intrinsic motivation.

In the past, academic labor was driven and energized by contentment with research activity as such. However, since publication metrics were introduced, faculty has got hooked on research performance indicators. We leave for the moment the discussion of dubious publication performance criteria themselves[1]. What is important is that publication productivity has become overwhelmingly significant, not only having an impact on pay but often even being the decisive factor of holding down a job. Stated another way, academics have been put in a situation where their research activities are extrinsically motivated and strictly controlled.

Evidence from Deci's experiments and numerous other studies shows that extrinsic incentives and pressures tend to undermine intrinsic motivation [Deci 1971; 1975; Amabile 1997; Calder, Staw 1975; Deci, Koestner, Ryan 2001; Eisenberger, Rhoades, Cameron 1999; Hennessey, Amabile 1998; Ryan, Deci 1996; 2000a; 2000b; Weiner 1980].

Investigation of problems related to the undermining of intrinsic motivation by rewards and punishments has given rise to a number of different areas of research, one of them being Motivation Crowding Theory (MCT) [Frey, Jegen 2001]. MCT claims that tangible extrinsic rewards, such as financial incentives, may undermine intrinsic motivation, while informal rewards and verbal praise have a positive effect on it. This theory has been bolstered by an extensive review of studies [Deci, Koestner, Ryan 1999] and a recent meta-analysis of research findings [Cerasoli, Nicklin, Ford 2014]. Meanwhile, there is an alternative approach that discredits the very concept of intrinsic motivation [Cameron, Pierce 1994; Cameron, Banko, Pierce 2001].

Working on SDT in the Russian context, Tamara Gordeeva considers a particular, *controlled* type of extrinsic motivation that occurs as a result of external attempts to control labor activities [Gordeeva 2014; Osin, Ivanova, Gordeeva 2013]. Motivation of this type frustrates the needs for autonomy and respect since the purpose of activity is extrinsic to an individual, who does not perceive it as intended (e. g. universities need publication performance management to improve their

[1] For a critical discussion of the indicators and methodology of assessing research performance of individual researchers and institutions, see: [Abramo 2017].

rankings and other indicators, whereas the purpose of research can hardly be boiled down to publication metrics for academics). By contrast, intrinsic motivation is related to higher levels of wellbeing, and intrinsically motivated people tend to keep doing the task once the rewards have been removed and seek to advance their skills [Gordeeva, Sychev, Osin 2013].

The influence of extrinsic and intrinsic motivation on behavior has also been studied by economists [Festre, Garrouste 2015]. The issue has become especially salient with the rise of behavioral economics, which drew economists' attention to a variety of phenomena that used to be the province of psychologists. Economists of the 1970s were already concerned about how financial incentives affected altruistic behavior. In particular, Richard Titmuss maintained that paying for blood donations could undermine donors' intrinsic prosocial motivation to donate blood [Titmuss 1970]. The subject sparked the interest of major economists [Arrow 1972; Solow 1971], which has been sustained up to the present day, so there have been a lot of economic studies focusing on the "crowding-out" of intrinsic motivation by extrinsic rewards [Benabou, Tirole 2003; 2006; Falk, Gachter, Kovacs 1999; Frey, Oberholzer-Gee 1997; Gneezy, Meier, Rey-Biel 2011; James Jr 2005; Kunz, Pfaff 2002; Romaniuc 2017]. Eventually, the notion of "hidden costs of reward" [Kunz, Pfaff 2002] was introduced, meaning that incentives designed to get agents interested in performing their task (in terms of the principal-agent problem) may involve additional "costs" by undermining their intrinsic motivation. However, providing a review of this substantial body of literature is beyond the scope of this paper.

3.3. Rewards and Incentives in the Context of SDT

Deci and Ryan proposed a theoretical explanation of the observed influence of external stimuli on intrinsic motivation [Deci, Ryan 1985]. Rewards can be experienced as controllers of behavior or as affirmations of competence. In the former case, rewards are predicted to thwart satisfaction of the need for autonomy and thus undermine intrinsic motivation. In the latter case, however, where rewards are indicators of good performance, they are predicted to enhance intrinsic motivation. Therefore, the effects of extrinsic rewards depend on whether they are experienced primarily as controllers of behavior or primarily as affirmations of competence. This theoretical framework allows distinguishing among different types of rewards as a function of their effects on intrinsic motivation.

Ryan and his co-authors [Ryan, Mims, Koestner 1983] developed a typology of reward contingencies, which has become a standard and has been used in a number of empirical studies [Deci, Koestner, Ryan 1999]:

1) Task-noncontingent rewards, given without respect to the completion or quality of task activity, e. g. for participating in a survey;

2) Task-contingent rewards, given for engaging in or completing a task; these can be divided into
3) (a) engagement-contingent rewards; and
4) (b) completion-contingent rewards;
5) Performance-contingent rewards, given for a specified level of performance (relative to a set criterion).

Task-noncontingent rewards (1) do not affect the basic needs, so they should have no effect on intrinsic motivation. Engagement-contingent rewards (2a) are experienced as controllers of behavior but not as affirmations of competence: recipients engage in a task but do not receive affirmations of their effective performance. Such rewards thwart satisfaction of the needs for autonomy and competence and thus have a negative impact on intrinsic motivation. Completion-contingent rewards (2b) are experienced as even more controlling, as people have to complete the task to get the reward. Such rewards may also be secondarily perceived as indicators of competence in case the task requires skills and the individual wants to achieve good performance. To the extent that rewards do represent competence affirmation, such implicit positive feedback could offset some of the stronger control. Ryan and his co-authors [Ryan, Mims, Koestner 1983] claim that the effect of this type of rewards is comparable to that of the previous one. Finally, with performance-contingent rewards (3), there is even stronger control—people have to meet some standard in order to maximize their rewards. The need for autonomy is frustrated here more than with any other type of rewards. However, performance-contingent rewards can also convey substantial positive competence information, thus enhancing intrinsic motivation. As a result, the effect of such rewards will depend on whether they are experienced primarily as controllers of behavior or primarily as indicators of excellent performance.

Theoretically predicted effects of different types of rewards have been confirmed empirically, as shown in a meta-analysis of 128 studies [Deci, Koestner, Ryan 1999] looking at how different types of rewards affect intrinsic motivation.

A standard experimental measure of intrinsic motivation is the so-called free-choice measure [Wiechman, Gurland 2009]. After the main part of the experiment is over, participants are left to engage in any of several interesting tasks, including more of the target task, for a short period of time when they believe they are no longer being observed. A rewarded experimental group is compared to a no-reward control group, and undermining is in evidence if, on average, the rewarded group spends significantly less time than the control group engaging in the target activity during the free-choice period.

Meta-analysis reveals [Deci, Koestner, Ryan 1999] that engagement-contingent, completion-contingent and performance-contingent rewards significantly undermine free-choice intrinsic motivation

(d = –0.40,—0.36, and –0.28, respectively)[2], while positive verbal feedback has been found to increase intrinsic motivation (d = 0.33).

As put by Deci, "the rewards issue is merely a special case of a more general issue, namely the control versus self-determination of human behavior in social contexts" [Ibid.:658]. Apart from rewards, other factors such as deadlines [Amabile, Dejong, Lepper 1976] or externally mediated goal setting [Mossholder 1980] can also affect intrinsic motivation, as they represent external controllers of behavior. Satisfaction of the needs for autonomy and growth should be ensured to retain intrinsic motivation [Lawler, Hall 1970].

Analyzing how publication performance measurement systems affect researchers' self-perception of autonomy or subordination is a productive method of predicting researcher motivation. For example, different rewards and penalties may have different effects on the self-perception of autonomy or subordination depending on their mechanism, size and form. Apparently, intrinsic motivation of researchers can be increased by providing an organizational context conducive to satisfaction of their need for autonomy, and the reward scheme should be designed in a way to satisfy the need for competence. That is to say, rewards should be administered so that academics have an opportunity to earn peer and administrator approval as an affirmation of their competence, their freedoms remaining intact.

3.4. Effects of Financial Incentives on Intrinsic Motivation and Productivity

In addition to minimum required indicators, some publication performance measurement systems provide financial incentives for achieving a certain "level of success". Empirical research has shown that the effects of monetary rewards on intrinsic motivation are controversial and contingent on the subjective perceptions of such rewards.

An international comparison has not revealed any straightforward connection between financial incentives and the efficiency of university systems [Auranen, Nieminen 2010]. However, another study has shown that monetary incentives may undermine, and under different conditions strengthen, intrinsic motivation [Frey, Jegen 2001]. Any performance management system in the public sector that sets target criteria of success exhibits the so-called "threshold effect" [Smith 1995], when the effects of financial incentives on intrinsic motivation are positive for low performers (whose baseline performance was below the threshold) and negative for high performers (with baseline performance levels above the threshold). Agents who easily demonstrate above-average performance tend to minimize their effort to only achieve the target indicators when monetary rewards are introduced.

Beside that, individual perception of financial incentives plays a role. If they are perceived as controlling, they tend to decrease re-

[2] d is the standardized mean difference, corrected for sample size. This is one of the statistical effect sizes proposed for meta-analyses [Hedges, Olkin 1985].

searchers' work effort; but if they are perceived as supportive, they actually increase the number of publications [Andersen, Pallesen 2008]. Even small monetary rewards used as indicators of approval and support can boost motivation if they work as a clear manifestation of recognition by the academic community. Of course, the size of incentives matters, but of no less importance is how exactly they are given, since monetary rewards have a high symbolic value [Jiménez-Contreras, de Moya Anegón, López-Cózar 2003].

It is not only work productivity but also subjective wellbeing in the workplace that is driven by intrinsic motivation. Evidence of this has been demonstrated, in particular, by Russian researchers [Osin, Ivanova, Gordeeva 2013; Osin et al. 2015; 2017]. Findings show that satisfaction of the basic needs for autonomy, competence and relatedness affects subjective wellbeing of respondents. The researchers have proved the "positive role of intrinsic motivation that is related to positive employee perceptions of the organization and subjective wellbeing in the workplace" [Osin, Ivanova, Gordeeva 2013:23]. Meanwhile, the negative effects of financial incentives manifest themselves "in cases where extrinsic motivation prevails so that employees feel obligated to work and do it just for money" [Ibid.:24].

Merit pay may drive out informal types of recognition and thus negatively affect the motivation of people who do not regard money as the most important part of their job [Perry 1989]. A number of experiments have reported a negative impact of financial incentives on creativity. When using a monetary reward system, one should consider the risk of undermining intrinsic motivation, as orientation toward external compensation may be detrimental to the quality of work by impairing creativity [Amabile 1979; 1983].

Another threat presented by high-powered cash incentives is the risk of failure to maintain honesty and integrity in science. A large-scale bibliometric study demonstrates that countries where individual publication performance is rewarded with cash are more likely to produce retracted papers, which is interpreted as a predictor of scientific misconduct in pursuit of monetary rewards (unfortunately, Russia was not included in the study) [Fanelli, Costas, Larivière 2015].

Therefore, analysis of the methods to increase research productivity in the context of SDT reveals a certain degree of risk of overrating the potential of payment-based measures. The use of strong monetary incentives to achieve short-term goals may degrade the quality of performance in the long run [Frey, Jegen 2001].

3.5. The Relationship between Personality and Performance

Findings from theoretical studies and meta-analyses of empirical data justify the conclusion that extrinsic incentives can only increase the quantity of performance [Cerasoli, Nicklin, Ford 2014], while its quality is a function of intrinsic motivation [Cerasoli, Nicklin, Ford 2014; Deci, Koestner, Ryan 1999].

Research productivity is not characterized by motivation alone. Other, activity-related, characteristics include commitment, perseverance and self-discipline. Cognitive maturity is seen as a prerequisite for scientific success: a successful researcher must have, or at least seek to develop, a psychologically healthy personality. Abraham Maslow [1970] states that neurotics, who are dependent on other people's approval, absorbed by their own needs, fearful of the novel and unfamiliar, and avoiding personal growth, cannot be genuinely productive at work. Success in research is more likely to come to psychologically healthy people who can acknowledge and accept their weaknesses, compensate for their performance deficiencies, take risks, work committedly, and cooperate with colleagues. Employers can contribute to the quality of performance by taking care to improve social living conditions of their employees, enhance subjective well-being in the workplace, and raise pay to allow for relative freedom of creativity at work. Maslow also stresses the need to emancipate science and the learning process as such [Ibid.].

Current trends in motivation theory and recent empirical findings are casting doubt on efficiency of the existing academic governance policies, the methods of employee performance evaluation in particular. A fundamental revision is required in the light of new research findings and the challenges of today's world, considering that the type of motivation that prevails also affects the quality of performance. When researchers are guided by extrinsic incentives alone in planning their research activities, it will inevitably degrade the quality and creativity of research, the sense of purposefulness, and job satisfaction [Amabile 1979; 1982; Hennessey, Amabile 1998; Koestner et al. 1984].

4. Publication Performance as an Indicator of Research Quality

4.1. Publication Performance Measurement as a System of Pressure and Control

Performance management systems are primarily about exerting control and pressure over employees to improve their productivity. However, scientific performance is largely contingent on the thirst for new knowledge, creative self-expression, the need to serve something bigger than oneself—which is, again, intrinsic motivation. In many cases, close monitoring over creative activity may be detrimental to its quality.

A study devoted to the increased culture of evaluation in Australian universities is a powerful example. The active use of prescriptive management has resulted in a considerable increase in journal publication productivity (Australia's share of publications in the Science Citation Index (SCI) has increased by 25 percent in the past decade), yet there has been a significant decline in citation impact relative to other countries (Australia has dropped from sixth to 10th position in a ranking of 11 OECD countries). In other words, Australian researchers have increased their publication counts but have lost in the quality of research [Butler 2003]. These findings are consistent with the observations from psychological studies which demonstrate that per-

formance quality is affected by intrinsic motivation and performance quantity by extrinsic incentives [Cerasoli, Nicklin, Ford 2014]. However, quantity and quality are not always mutually exclusive as far as scientific papers are concerned. For instance, Abramo, D'Angelo, Di Costa [2010] use the example of Italian universities to show that papers of highly productive researchers are more likely to be of better quality.

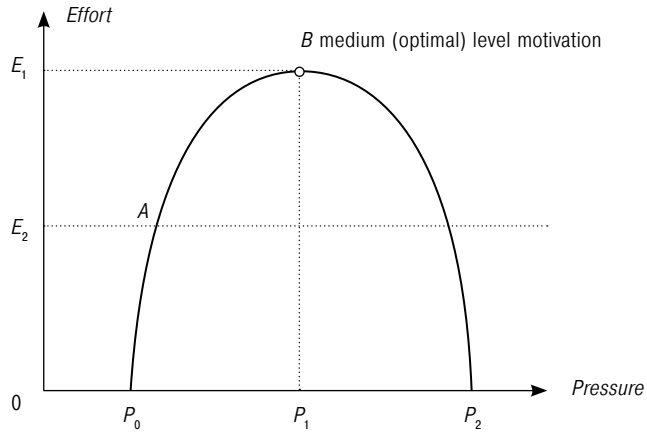
According to a study conducted across several Finnish universities [Kallio, Kallio 2014], most researchers prefer assessing their work in qualitative rather than quantitative terms, whereas formalized performance management systems are mostly based on quantitative measures. Only 15 percent of the respondents were found to be satisfied with how performance management systems at their universities worked, and many perceived them as "meaningless" [Ibid.:579]. Over 70 percent of the participants agreed that the need to meet quantitative criteria in reporting impaired the quality of work [Ibid.:582]. Over 40 percent pointed out that quantitative performance indicators had negative effects on their motivation and infringed on their academic freedom [Ibid.:583]—that is, frustrated their basic need for autonomy. In this regard, grant systems appear to be more motivating as they imply free choice of teams, foundations and research problems, freedom in planning and scheduling work efforts, etc. Autonomous choice entails assumption of responsibility for further efforts and their efficiency. Performance under grant obligations is measured upon execution of a content-based plan. By and large, attempts to control researcher productivity result in the subject of research being left out of the focus and basically come down to consideration of formal measures.

On the other hand, even when positive extrinsic incentives (such as sizeable pay rise based on publication performance) are used to motivate scientists, such additional pressure may ultimately decrease productivity. According to the Yerkes–Dodson law, formulated early in the 20th century, the relationship between pressure and performance is parabolic: performance increases with growing pressure but only up to a point—and decreases when the level of pressure becomes too high (Fig. 1). So, medium (optimal) level motivation intensity is most favorable for the quality of work being performed [Yerkes, Dodson 1908].

In some universities, failure to meet publication performance requirements may cost researchers their jobs. Jeannette Taylor and Ranald Taylor [Taylor, Taylor 2003] warn against exercising excessive pressure on academics in a bid to make them produce more publications, as effects may be reverse.

Being pressurized by controlling systems, researchers invent "survival strategies", preferring short-term studies, inflating the number of publications by slicing their findings "as thin as salami" [Lawrence 2003; Weingart 2005], and retreating into narrow subject areas [Ter Bogt, Scapens 2012]. As a respondent in the Finnish study said, "It is

Figure 1. **The Relationship Between Pressure and Effort (Performance)**



Source: [Taylor, Taylor, 2003].

only the number of publications that matters. That is why many have retired into their narrow fields of study. People have become more cynical" [Kallio, Kallio 2014:579].

Findings also show that excessive pressure results in some researchers starting to ignore all other aspects of their work (such as teaching and academic self-governance) and concentrate solely on publications [Ibid.:584]. The respondents in the same study believe that the reason for this is the degradation of working conditions at universities and, consequently, the growing risk of "free-rider problem", when academics disengage themselves from the university life. Besides, conditions for "organizational myopia" are engendering: researchers prefer focusing on the issues that allow them to quickly produce publications at the expense of the problems that are much more important. All of these negative trends manifest the universal challenges of performance management systems.

4.2. Publication Performance Measures as Indicators of Recognition

It is clear from what has been said above that publication performance measurement cannot be considered a perfect method of research quality assessment. Nevertheless, there is a positive aspect to it. It has been shown that when evaluation is perceived as recognition, it can actually have positive effects on motivation.

Dutch universities that introduced publication command systems saw an increase in the number of publications [Jacobsen, Andersen 2014]—but only as long as researchers perceived the new system as a means of support and approval, not as a controlling tool. An important contribution of this study is that it proves the importance of subjective perception of assessment systems over their objective stringency. The authors also point out that such subjective perceptions are largely shaped by middle managers who mediate the relations between facul-

ty and university administrators. It is through middle management that undesired effects of formal performance assessment can be reduced.

The fact that publication metrics may play an important symbolic role as indicators of academic recognition is also proved by findings from Australian universities [Taylor, Taylor 2003]. The significance of such recognition for research performance is easy to understand, peer praise being a powerful factor in the structure of researcher motivation [Baldwin, Krotseng 1985; Schuster 1985]. In addition, knowing how colleagues perform may create conditions for the spirit of competition, which is an informal source of additional motivation [Razina 2014]. The critical role of competition for the scientific ethos has been discussed by some classic sociologists of science [Hagstrom 1965; Merton 1973]. However, an overly competitive environment may be unfavorable for creativity [Amabile 1982]. Some relatively recent studies also demonstrate the potential harmfulness of excessive competition in science: "When competition is pervasive, such effects may jeopardize the progress, efficiency and integrity of science"[3] [Anderson et al. 2007:437].

4.3. Lessons Learned from International Experience in Performance Management

Extensive international experience has been built up in using performance management systems in various domains including the public sector. Scientific managers in Russia could benefit from this rich experience.

The policies of Tony Blair's government represent a bright page in the history of using performance management to improve performance of public organizations. Michael Barber, a key figure of that government, ranks the methods of improving performance in the public sector by flexibility and complexity [Barber 2007]. Prescriptive management is ranked the lowest, being the optimal choice in case the goal is to "put things in order" and raise quality from bad to satisfactory. Further improvements, however, require different methods to be used, as creativity and enthusiasm cannot be forced. Barber cites Joel Klein, chancellor of the New York City School System: "You cannot mandate greatness; it has to be unleashed" [Ibid.:337].

The patterns described by Barber also apply to performance management in universities. Coercive methods and punishments can help increase publication productivity from low to satisfactory. Threat of penalties can make scientists produce the required minimum of papers. However, there is no way this policy could work to improve the quality of publications or inspire interest and enthusiasm in researchers. Quite the opposite, a system of punishments perceived as discouraging academic freedom may undermine intrinsic motivation for research and degrade the quality of publications (or result in sneaky publication practices emerging as "survival strategies").

[3] We would like to thank the anonymous reviewer of *Educational Studies* for their reference to the article and translation of the quote.

The problem with prescriptive management is that it regards scientists as shirkers that should be persistently monitored and punished for lazy behavior. Control and penalties are fraught with considerable costs, both direct—related to performance assessment—and symbolic, when university and faculty cannot trust each other anymore.

Opportunities of prescriptive employee behavior management are limited. Agents endowed with wit and freedom of action will always find a way to circumvent the imposed rules, as the goals of organizations and employees rarely tend to be in complete congruence. Adam Smith already raised this problem in *The Theory of Moral Sentiments* [Smith 1997:230], discussing the possibility of rational government:

> "The man of system is apt to be very wise in his own conceit <…> He seems to imagine that he can arrange the members of a great society as easily as a hand arranges the pieces on a chess-board! He forgets that the chessmen's only source of motion is what the hand impresses on them, whereas in the great chess-board of human society every single piece has its own private source of motion, quite different from anything that the legislature might choose to impress on it."

A critical disadvantage of command and control is that outcomes achieved are not sustainable. As soon as pressure is relieved, the system returns to its previous state. Cooperation[4] in a scientific institution, as in any other type of organization, may be either prescribed from above or develop from below. Forced cooperation is unsustainable due to the fear of punishment, so it subsides as soon as the threat of punishment is removed. By contrast, cooperation initiated from below transpires to be sustainable and lasts irrespective of external forces, which has been observed by Elinor Ostrom, a Laureate of the Nobel Memorial Prizein Economic Sciences [Dietz, Ostrom, Stern 2003].

Command management works to the extent of securing a certain performance minimum, but it is useless for further development.

Scientists' attitudes towards research and publishing differ across universities and countries. Using the findings from a survey of faculty in several universities, Andrey Lovakov [2015:109] points out that "faculty members in Russia do not perceive publishing—hence, research activities as such—as an attractive part of their job and rather produce publications because they have to." Under such circumstances, control and command may increase publication performance of shirkers,

[4] Cooperation being understood as joint efforts to achieve organizational goals shared by all employees. Work efforts of employees in an organization constitute cooperation, i. e. co-directional activity. Ostrom uses the term "cooperation" in its broad sense. In the context of this study, we are talking about scientific cooperation as a team of researchers created to work on a scientific problem.

and yet to a limited degree. Margarita Kurbatova and Elena Kagan [2016] conducted a survey of faculty in over 40 Russian universities to demonstrate that increased control over faculty performance and integration of performance management mechanisms lead to higher incidence of shirking patterns and other negative forms of opportunistic behavior.

Meanwhile, it should not be denied that prescriptive management can be fairly efficient in specific contexts. The international bibliometric study mentioned above found no high rates of scientific misconduct (indicated by the number of retractions) in countries with strong pressures to publish [Fanelli, Costas, Larivière 2015]. Unfortunately, again, Russia did not participate in the study. The authors conclude that "policies to reduce pressures to publish might be, as currently conceived, ineffective, whereas establishing policies and structures to handle allegations of scientific misconduct, promoting transparency and mutual criticism between colleagues, and bolstering training and mentoring of young researchers might best protect the integrity of future science"[5] [Ibid.:14]. That is to say, pressure to publish may be a good policy in "immature" contexts.

In addition to the threat of punishment, monetary rewards can be used to motivate for research. However, stronger financial incentives are more likely to lead to unwanted behavioral change.

The advantage of financial incentives over prescriptive management in stimulating publication performance is that they do not impinge on the need for autonomy, while satisfying the need for competence. However, monetary rewards also have a number of drawbacks, such as high costs, the threshold effect [Smith 1995], unstable results, and substitution of extrinsic motivation for intrinsic.

The threshold effect consists in that agents do not always change their behaviors as desired when they have to achieve a certain target to gain a monetary reward. Low performers, indeed, try to improve their productivity and achieve the goal, but high performers are prompted to minimize their effort and settle for the common target indicators. This is typical of any system trying to motivate agents with extrinsic incentives.

As for the costs, using a system of high-powered incentives in the long run is very similar to developing a dependence on drugs. The costs of maintaining the level attained are getting higher and higher, while sources of self-sufficient development may never emerge. Productivity "boosted" that way may bounce back as soon as financial incentives are removed.

In a study of Russian universities, Yana Roshchina and Maria Yudkevich [2009] demonstrated the limited potential of incentive contracting in stimulating academic research. They also underline the

[5] We would like to thank the anonymous reviewer of *Educational Studies* for their reference to the article and translation of the quote.

importance of developing intra-university academic communities, encouraging horizontal researcher mobility and creating efficient scientific teams. Overdependence on quantitative bibliometric indicators could be offset by "parallel institutions of individual and collective reputations" [Yudkevich 2004:119].

In a review article on the position of Russian universities in global competition, Isak Froumin and Jamil Salmi [2007:37–38] accentuated the importance of "investing in the creation of an institutional academic environment that would be marked by academic freedom and intellectual resonance".

Notwithstanding all those calls to action from a decade ago, recent findings show that current university practices tend to "replace the incentives hinging on informal academic standards and reputation-based control mechanisms with the incentives dictated by a quasi-market trumped up by the government and by the respective mechanisms of external assessment and control" [Kurbatova, Kagan 2016:116]. Therefore, performance management mechanisms are continuing being actively propagated despite the repeated warnings about how dangerous their overuse can be.

5. Conclusion

Substituting extrinsic motivation for intrinsic may deprive research activities of their primary motive. Papers published under pressure will probably meet the quantity performance requirements but their quality may turn out to be low.

Prevalence of extrinsic incentives over intrinsic motivation may result in researchers choosing subject areas that offer the probability of quick publishing at the expense of problems that they are really interested in. In that case, the quality of publications and the sense of purposefulness in research may decrease significantly.

In the context of Russia, it is also the ratio of fixed and variable pay that matters. In a number of Russian universities, the base salaries of faculty are much lower than the variable components. Incentives thus acquire a strong controlling effect, making researchers feel obliged to publish in order to avoid penalties.

However, financial incentives do not only motivate scientists by the size of cash reward—they also play an important symbolic role as affirmations of approval and performance recognition (thus satisfying the need for competence). Employee surveys in the public and nonprofit sectors demonstrate that if employees are largely driven by intrinsic motivation and interest in what they are doing, even comparatively low monetary incentives may have positive effects on their motivation, being perceived as tangible indicators of their professionalism and competence being recognized.

To prevent motivation form being undermined by financial incentives, the latter should be structured so as to avoid the controlling effect and maximize the effect of affirming competence. Perhaps, aca-

demics should be given more freedom in determining the structure of their tangible incentives, being allowed to choose from a broad range of possible rewards, with the focus on reputation effects of such rewards.

If the only thing that university administrators want is to increase the number of publications, they may trade off researchers' wellbeing and let them evaluate their scientific contributions by yearly publication counts, journal quartile scores, etc. If, however, a university's ambition is to join the international community and contribute to global scientific development, in addition to caring about the rankings it should also invest money and effort in researcher wellbeing, which implies creating conditions to foster intrinsic motivation.

Formalized assessment systems, quantitative target values and payment by results replace intrinsic motivation for research with extrinsic incentives and pressure. Findings [Frey 2002] indicate that working under the pressure of extrinsic stimuli may inhibit creativity and degrade performance quality.

The scientific value of publications is extremely difficult to assess for an external observer. One example that went down the annals of history of science is Ludwik Fleck and the camp laboratory that he led as a Nazi prisoner during World War II. Under the guise of important research, the scientists were involved in the sabotage activities that were never detected by the bureaucratic management [Grzybowski, Ciesielska 2014].

A similar situation may be observed at universities today when scientific administrators want to coerce faculty into productive research activities. Instead of improving the quality of publications, administrative pressure may ultimately result in piles of low-quality papers devoted to problems of low importance.

6. Recommendations

A number of manifestos, including two international initiatives [DORA 2012; Hicks et al. 2015], have been designed around the world to provide recommendations on reducing the use of bibliometric indicators in measuring research productivity[6]. In Russian science, the problem was raised in the open message *Bibliometrics for the Good of Russian Science* of the Publication Ethics Board of the Association of Science Editors and Publishers[7]. These documents contain a number of specific recommendations on how to optimize the use of bibliometric indicators.

Below, we are trying to complement those recommendations as applicable to performance management policies pursued by universities. An array of specific recommendations has been developed based

[6] We would like to thank the anonymous reviewer of *Educational Studies* for their reference to the documents.

[7] https://rasep.ru/sovet-po-etike/bibliometriya-vo-blago-rossijskoj-nauki

on the fundamental provisions of self-development theory, formulated by Gordeeva [2016] as follows:

> "From the viewpoint of self-determination theory, it is recommended to support employees' need for autonomy by providing them with opportunity to show initiative, freedom of choice and action within a clearly defined area of responsibility, and non-controlling feedback that would allow them to have their say and feel themselves the source and subject—not object—of their own activity." [Gordeeva 2016:48]

The recommendations developed in this study can be grouped into three major categories: (i) minimizing the unintended consequences of performance management; (ii) development of the academic environment; and (iii) organizational policies.

6.1. Minimizing the Unintended Consequences of Performance Management

Measures to reduce the specific unintended consequences of performance management systems are proposed as part of the fine-tuning process that does not aim at disturbing the *status quo* in the distribution of power between the bureaucratic apparatus and accountable researchers. A set of typical measures was proposed by Peter Smith in the same article where he identified the eight major negative side effects [Smith 1995] (Table 3).

According to Smith, the first two strategies are, in fact, universal. Engaging employees in the development of measures and using such measures flexibly are useful strategies for minimizing any unwanted effect of performance management. In case of universities, scientists must be engaged in designing research assessment systems. This practice may promote the development of collegiate self-governance. With due regard to the high symbolic value of rewards and the effectiveness of healthy competition, the following recommendation can be made:

1. Delegate the development of complementary assessment systems to researchers.

The system is referred to as complementary since it is intended not to discredit the basic assessment model designed by the managers but rather to complement it. Such complementary assessment system could be decentralized and based on less "aggressive" rewards with high symbolic value instead of "high-powered" incentives and rigid criteria. Financial incentives of relatively small size, designed using a collegiate procedure, could offset and compensate for the indiscriminately imposed rigid indicators. A system like that could be more pliable and use the fourth strategy of reducing the unintended consequences, which is regular revisions in order to adjust to the changing needs and goals of employees. In addition, it could also include elements of the seventh strategy—that of introducing alterna-

Table 3. **Strategies for Reducing the Unintended Consequences of Performance Management [Smith 1995].**

Reduction Strategies	Unintended Consequences							
	TV	SO	M	MF	MR	MI	G	O
1. Engage employees in the development of measures	+	+	+	+	+	+	+	+
2. Maintain flexibility of use	+	+	+	+	+	+	+	+
3. Measure each and every goal	+		+	+			+	+
4. Review the assessment system on a regular basis	+	+		+	+		+	+
5. Encourage long-term career trajectories			+				-	
6. Use a small number of measures				-		+	-	-
7. Introduce independent alternative assessment criteria							+	

Note: "+"—the strategy helps reduce the effect; "–"—the strategy worsens the effect;
TV—tunnel vision; SO—sub-optimization; M—myopia; MF—measure fixation; MR—misrepresentation; MI—misinterpretation; G—gaming; O—ossification.

tive criteria—to provide independent qualitative assessment of research output and contributions in the organizational performance as a complement to quantitative bibliometric indicators. Complementary assessment system is consistent with the foundations of SDT, satisfying the basic psychological needs for autonomy, respect, recognition and competence (and relatedness, too—through the mechanism of collegiate discussion) [Gordeeva 2016:48]. On top of that, the feeling of being engaged in designing the assessment system and able to influence decision-making processes makes faculty members experience a deeper sense of freedom of choice, which not only drives their intrinsic motivation but also affects their wellbeing in a positive way.

The third strategy—measure each and every goal—seeks to prevent the priorities set by assessment criteria from being too narrow. Under the logic of performance management, the assessment system should embrace everything that its developers think matters for the organization. Meanwhile, faculty members often complain about the assessment system being publication-biased at the expense of teaching, self-governance and other activities. This strategy suggests complementing the assessment system with other aspects that are important for the university. However, mere extension of the list of obligatory indicators (like those measuring participation in teaching activities) probably makes no sense. Under the logic of SDT, such prescriptive measures only stiffen control, undermining intrinsic motivation. To sum up, the following recommendation can be made:

2. Include additional activities in the performance assessment system and allow researchers to choose configurations or sets of activities that are optimal for them.

In this case, the system of financial incentives could be diversified, and every researcher could choose a configuration to suit their specific needs. A system of this type is practiced in Great Britain, where academics are allowed to balance legitimately between publishing and teaching. A somewhat similar system can be observed at the Higher School of Economics, where faculty members can participate in the Best Teacher competition that implies monetary as well as symbolic rewards.

At least three free-choice mechanisms of varying flexibility and marketability can be envisaged in the development of an assessment system: (i) "tracks", which involve predetermined arrays of activities from which employees are free to choose; (ii) a merit point system, in which employees are allowed to create their personalized "menu" of activities with different point values, the lowest passing score being the predetermined component (not the "menu" composition); (iii) monetization, where the size of reward is expressed in cash instead of points, and employees make choices not from the required minimum perspective but on the basis of their individual perceptions of the cost–benefit ratio. For instance, faculty members who prefer teaching over publishing may focus on teaching activities in case they are satisfied with the income such activities can generate in the monetized assessment system.

The very opportunity of choosing a personalized configuration is expected to have positive effects on the sense of autonomy and intrinsic motivation in researchers. Measures of this kind ensure free choice and at the same time determine the area of responsibility for the choices made. Such expansion of leverage opportunities might decrease frustration and anxiety, leading to higher levels of subjective wellbeing. In Russia, these three free-choice mechanisms have been applied in various combinations, for instance, at the Higher School of Economics.

To overcome myopia—concentration on short-term issues to the exclusion of long-term considerations which may only show up in performance measures in many years' time— temporal dimension may be introduced into the logic of free choice of "configurations" or "tracks". Myopia as a scientific strategy stems from the need to comply with short-term requirements, often at the expense of long-term results. Not infrequently, the existing assessment systems (whether based on minimum required criteria or financial incentives) have short-term horizons, compliance to minimum requirements being verified every year or two and performance incentive plans being also short-term. Scientists could experience more autonomy if they were allowed to determine individual time horizons of assessment, so that incentives are not paid out, say, within a year but are rather administered in smaller

increments during a five-year period and rewards for different sub-periods can overlap. In that case, researchers will be able to choose between the high-risk short-term and low-risk long-term incentive payout strategies. It is easy to imagine a situation where a scientist willing to work on a new topic or conceiving a book will opt for lower but stable rewards to secure longer-term compliance to the publication performance requirements. The third technical recommendation can thus be formulated as follows:

3. Introduce a "constructor" of incentive pay and rewards to allow scientists to customize the incentive schemes and schedules to suit their individual research trajectories.

Support for autonomy not only improves intrinsic motivation in this case but also expands employees' future time perspective (ability to consider a specific range of opportunities in long-term goal planning), which is a powerful predictor of life satisfaction [Zimbardo, Boyd 2010]. Putting the choice of "configurations" and "tracks" into the temporal perspective is also a way to implement the fifth strategy of dealing with the unintended consequences of performance management—encourage long-term career trajectories—because it allows for more flexible long-term planning.

The fourth strategy of using a small number of measures should be born in mind by anyone developing a performance assessment system. Uncontrolled proliferation of measures should be prevented to avoid priority dilution and excessive pressure.

6.2. Development of the Academic Environment

Academic environments differ across universities, university departments and even research teams. If we want to increase intrinsic motivation for research, effort should be invested in fostering particular aspects of the academic environment: collegiate academic self-governance to satisfy the faculty's need for autonomy, peer recognition mechanisms (not only (and not so much) institutional but also (and rather) within research teams) to satisfy the need for competence, and conditions for active communication and socialization of young researchers in particular—which are vital for developing a sense of relatedness.

A question can be asked, rephrasing John F. Kennedy's words: "What the university and scientists can do for each other?" The governance model where academic shirkers are coerced by bureaucratic managers breeds antagonism that inhibits productive scientific development. Administrators of contemporary Russian universities should probably shift their focus from requirements, criteria, standards and assessment to engagement, delegation, customization, dialogue and support. This, however, requires changing the way we think, since the model where lazy agents have to be closely monitored to avoid shirking has been deeply ingrained in the governance practices of Russian

universities. In the parlance of organizational theory, understanding of motivation should move from Theory X to Theory Y [MacGregor 1960].

Mechanisms to achieve such transformation may include the following:

4. Introduce feedback tools (employee surveys and interviews) into governance practices. Such surveys should not only assess employee satisfaction with different "tangible" aspects but also evaluate subjective wellbeing and measure the levels of motivation of different types.

Movement from punitive to supportive management could be started by measuring researcher wellbeing and making sure that those measures are considered by managers. A number of such measures have been developed by Russian researchers [Gordeeva, Sychev, Osin 2013; Osin, Leontiev 2008; Osin, Ivanova, Gordeeva 2013; Osin et al. 2015; 2017]. Under the logic of performance management, bureaucratic governance systems pursue the "what gets measured gets done" principle [Behn 2003; Wilson, Croxson, Atkinson 2006]. Only those aspects of organizational life are visible for the performance management system that are explicitly measured and evaluated. If wellbeing indicators begin to be used in intra-organizational monitoring, they can be expected to be taken into account when making monitoring-based decisions, providing an opportunity to invest and assess investments in wellbeing and re-channel the potential of performance management systems to increase intrinsic motivation of researchers.

6.3. Organizational Policies

Balance of fixed and variable pay is central to the organizational policies of universities. Russian universities are characterized by low fixed and high variable salary components. Under such circumstances, incentives for publication activities tend to have a strong controlling effect. Researchers have to publish yearly, as they often cannot afford being left without incentive payouts. In the perspective of self-determination theory, creation of such conditions for employees may be regarded as undermining their autonomy. For example, scientists find themselves unable to take a break and devote time to delving into a new topic, writing a book or conducting a new study. As a result, they retreat into narrow subject areas and tend to produce more and more same-type publications. Scientific inquiry becomes too risky and expensive. Increasing the share of fixed pay could probably have positive effects on intrinsic motivation for research by reducing the need to work "just for money" and releasing creative effort. This recommendation, however, may interfere with the fundamental perceptions of the structure of researcher motivation and the balance of power in organizational policies, which vary across universities. Changing those perceptions is a challenging and conflict-laden process that necessitates active involvement of the stakeholders. Empirical substantiation of the motivating role of variable pay in academia requires further in-depth

research and cannot be reduced to discussing the relationship between variable pay and the number of publications (see, for instance, [Pfeffer, Langton 1993]). This study can only refer to the findings in the paradigm of SDT that have shown that publication performance is decreased when financial incentives are experienced as controlling and increased when they are perceived as supportive [Andersen, Pallesen 2008; Frey, Oberholzer-Gee 1997].

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Who is Happy in Doctoral Programs:

The Connection between Employment and Learning Outcomes of PhD Students

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Abstract. Doctoral education in Russia has high dropout rates. Many experts have attributed this to the generally low amounts of financial aid afforded to PhD students, which prompts them to seek out employment while pursuing a doctorate. However, current discussion is largely anecdotal in nature as it is mostly based on expert conjectures that only reflect limited statistics or rather cursory evidence from individual cases. Drawing upon findings from a 2016 survey of PhD students at leading Russian universities, we assess the extent and types of employment of postgraduates, as well as the experiences of those PhD students who balance work and study and the main challenges that confront them. We explore how such factors as one's area of employment, the type of contract worked, and the nature of the job performed affect how PhD hopefuls conceive of the educational process alongside their specific learning outcomes and career prospects. We conclude that balancing work and study can benefit both the academic performance and professional experiences of PhD students, but only insofar as the topic of one's PhD thesis research is closely aligned with what they do in the workplace. The results of the study can be used when developing measures to reform doctoral education both at the institutional and nation-state levels.
Keywords: doctoral education in Russia, PhD students, employment, dropout rate, balancing work and study.

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Doctoral education in Russia has high dropout rates: Only about 60% of PhD students complete their track and only 13% defend their thesis during the expected period of study[1]. These levels are compara-

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[1] Russia in numbers. Statistical bulletin, Rosstat, 2017. http://www.gks.ru/free_doc/doc_2017/rusfig/rus17.pdf

ble with data recorded in a number of other nations. For example, the dropout rate in certain PhD programs is between 70 and 90% in Spain [Castello et al. 2017], it is about 30% in Australia [Bourke et al. 2004], and about 50% in the USA [Ali, Kohun 2006]. However, what clearly sets these countries apart from Russia is that they have increasingly emphasized researching into the factors that influence attrition among PhD students. By contrast, to date there have been few studies on the subject in Russia, so that the conceptions and judgements developed about the efficiency and outcomes of postgraduate education in this country have this far basically resided on expert conjectures rather than hard fact.

It is frequently the case for the public discourse to point out the need to juggle work and study as a major factor that harms the completion rates in Russian doctoral training [Reznik 2015; Balabanov et al. 2003]. Certainly, it would not be all that difficult to understand this assumed correlation between a student's employment and whether they can ultimately make it to the PhD finish line. This is specifically true insofar as a success with a doctorate inevitably implies ploughing a good deal of time and effort to handle the coursework and defend a thesis to complete the degree, while how much public scholarship is paid to Russian PhD students is reported to never exceed the minimum subsistence level in the country[2]. Furthermore, we should factor in that the vast majority of doctoral programs in Russia are full-time. Accordingly, unless one is at an advantage of having extra sources of income and does not need to provide for themselves, a PhD student just cannot but seek out employment, and hence a conflict between work and study may arise.

However, although this proposed link between student employment and dropout rates in programs of doctoral education seems to be obvious enough to be taken for granted, it does not always hold up to what empirical scrutiny suggests. For example, Balabanov et al. [2003] have found PhD students who work 20 or more hours per week to be able to successfully handle their doctoral thesis research. This may be viewed as evidence to further attest to the Warren theory [2002], which proposes that the extent of one's engagement in labor becomes a factor material for the student's doctoral performance only insofar as it transpires in conjunction with one's general lack of interest in learning. Studies have reported divergent findings for the link between working while studying for a PhD degree and the outcomes of doctoral education. Bair and Haworth [2004] have shown that doctoral hopefuls who dropped out from the track would typically indicate combining work and study as a factor that precluded their academic success, whereas those informants who made it to graduation were likely to see employment as positively influencing

[2] http://government.ru/docs/25763/, http://government.ru/docs/30552/

their progress with the doctorate. The authors point out that it is fairly common for doctoral students in certain fields of training to work nine to five, which often provides them with important hands-on exposures to underpin the theoretical groundwork they build while doing the coursework and independent thesis research [Ibid.]. Yet, we should note that a comparison of systems of doctoral education in Russia and other countries is limited by how they differ in terms of the overall organization of training, available public scholarships and other financial incentives, etc.

From what Russia's rather scarce body of research on the subject has suggested so far, we can only identify financial pressures and the need to earn an independent living as a major reason why a significant proportion of PhD students choose to work while pursuing their degree [Balabanov et al. 2003; Reznik 2015]. To date, there have been no studies to thoroughly look into how the factors of where Russian doctoral students are employed, what exactly they do for a living and how much they blend work and study influence their doctoral experiences and learning outcomes. Exploring these correlations is specifically relevant given the changes that doctoral schools in Russia and elsewhere across the globe have seen in terms of how PhD programs are structured and delivered, where more emphasis is placed on both the quality of independent research and how well one is able to master individual assignments, modules and dimensions of the mandatory coursework as envisaged by a particular doctoral program [Kehm 2006; Bednyi 2017; Bao, Kehm, Ma 2018].

In this paper, we analyze findings from surveying a cohort of students enrolled in PhD programs at leading Russian universities to gauge the extent to which they combine work and study as well as how various parameters of labor, such as the field where they are employed, the job position held, etc., are related to different facets of their experience in a doctoral track.

1. Data sources

The study is based on the survey of PhD students at 14 Russian universities (twelve universities are participants of the "5–100" Russian Academic Excellence Project and two more are federal universities) that was conducted in 2016. A total of 2,020 postgraduates took part in the survey, which translates into about a quarter of all doctoral enrollees at these universities. The response rate varied from 8 to 53%. The main characteristics of the student sample are presented in Table 1.

2. Limitations

Before we proceed to discuss the results of our survey, we should first remark on the limitations of this study that must be considered while interpreting and further applying the reported findings.

Our survey was limited solely to the stated cohort of students who at the time of this survey were enrolled in PhD programs at leading

Table 1. **The main characteristics of the PhD student sample**

Item	Sample split,%
Year of study	
First	39
Second	32
Third	20
Fourth	9
Major	
Mathematics and Science	30
Humanities	9
Engineering and Technology	30
Social Sciences	26
Education and Pedagogy	4

Item	Sample split,%
Gender	
Male	55
Female	45
Mode of study	
Full-time	88
Part-time	12
Mode of funding	
Public scholarship	85
Tuition-paying	15

Russian universities, as detailed in Section One above. Postgraduates at any other higher education institutions were beyond the scope of our analysis. Accordingly, the obtained results are relevant exclusively with respect to the specified group of PhD students.

Our study was framed as a one-time survey among PhD students across certain leading Russian universities. The respondents were asked for their motives to enter a doctoral program, a posteriori, and how they conceived of their prospective PhD defense and employment plans, a priori. It should be noted that the sourced recollections and anticipations of life events are evaluative in nature and therefore provide less accurate grounds for inference than firm facts, which were impossible to be obtained given the design framework chosen for this study. Carrying out a longitudinal panel could provide more plausible and representative results.

However, despite the limitations imposed by how this study has been designed, we believe that the data we have obtained about students' plans for PhD defense are reliable and suitable for making reasoned conclusions. Since the survey was conducted back in 2016, some of the respondents who at the time of this study were in senior years of their doctoral training already completed their programs by the moment this paper was being drafted. Insofar as there were personal survey links available, this has allowed us to supplement the data sourced for PhD students at one of the participating universities by factual information about what academic outcomes they ultimately had. There were only administrative records on 92 enrollees

who completed their PhD program (3+1 years of study) available in the university database, which limits our ability to come up with fully justified judgement. Nevertheless, we have found this sample to exhibit a correlation between one's reported plans regarding PhD defense and whether they have actually made it to the PhD hooding: There were significantly more students who received their doctorate among those who previously indicated they were inclined to go for PhD defense within the regular term of study ($\chi^2 = 11.444$, $p < 0.003$). This enables us to assume that the data we have obtained on whether and when one is looking to defend their PhD thesis can be reasonably deemed as valid and suitable to plausibly judge about the outcomes of doctoral training.

3. Results

Our survey has found that the vast majority (90%) of Russian doctoral students are employed. The most common mode of employment (34% of the respondents) is full-time work outside the university (see Figure 1).

Those who are employed at the higher education institution (HEI) where they study are the most likely to pursue academic jobs (58% are engaged in various kinds of research and another 43%, in teaching) as well as administrative positions (about a quarter of the informants)[3]. We have found the nature of the work that one is into to exhibit a correlation with the field of their doctoral pursuit. There are more researchers among those who study for a PhD in Math and Engineering (75 and 62%, respectively), while the majority of doctoral candidates in Education (70%) are employed in teaching and instruction. A significant portion of those who pursued a doctorate in Social Sciences (35%) and Humanities (38%) have reported to hold various administrative positions.

Of the PhD students who are employed outside their university, the largest share hold non-academic positions with corporate entities (38%). Only 17% of the respondents indicated that they pursued research jobs outside the academia.

In the course of our study, we found the status/type of employment to be correlated with a number of socio-demographic attributes of the PhD students, as detailed in Table 2 below.

In what follows, we focus on how factors of employment of PhD students are related to their choices and experiences along the course of doctoral study, from the moment they enter a PhD program and through how they conceive of their prospects for thesis defense and future career.

[3] The total exceeds 100% reflecting the respondents who indicated they were doing more than one job as of the time of the survey.

Figure 1. **The PhD student sample broken down by type of employment** (%)

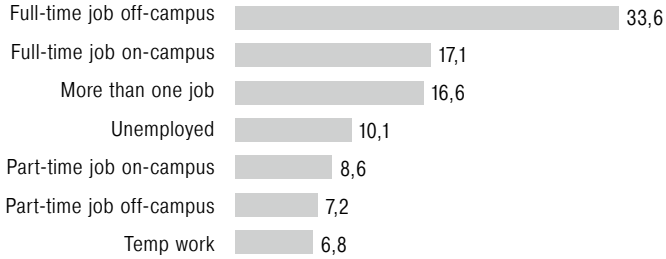


Table 2. **How socio-demographic features of the PhD student sample are related to the type of employment**

	Full-time job on-campus	Full-time job off-campus	Part-time job on-campus	Temp work	More than one job	Unemployed
Major	36% Engineering	22% Math	46% Math	17% Engineering	43% Engineering	18% Engineering
	22% Social	36% Social	24% Engineering	32% Social	15% Social	17% Humanities
			16% Social		4% Humanities	
Gender	55% Female				68% Male	
Income level		30% Low		50% Low		47% Low
		70% high		50% High		53% High
Year of study	33% First			49% First	34% First	46% First
				3% Fourth	24% Third	
Mode of study		21% Part-time				
Mode of funding	92% State-funded	76% State-funded	93% State-funded	90% State-funded		

Note: The table provides only statistically significant correlations, where a positive correlation is shaded and a negative correlation is no shaded.

3.1. Entering a PhD program

Our survey has found that a major proportion of PhD students choose to stay at their alma mater as they decide to continue into doctoral education (82%). Russian universities have traditionally seen high rates of academic inbreeding, which is a practice whereby graduates are recruited to pursue advanced training for doctoral credentials or offered

employment at the university where they earned their undergraduate degree [Altbach, Yudkevich, Rumbley 2015; Bekova et al. 2017].

When we analyze how the rates of inbreeding are distributed across our sample of PhD students as related to their status/type of employment, the following patterns can be noted. There are significantly more inbred doctoral students among those who are employed at the university; only 11% of PhD pursuers working at the university have reported that they completed their previous degree at another HEI. Of those who at the time of the survey were solely into their doctoral studies and had no employment, the proportion of inbound students was more than twice (26%) the rate recorded among the sub-group of students working at the university. Finally, among those who indicated that they were employed outside the university, about slightly less than a quarter (21%) were doctoral students who previously graduated whom a different HEI. The correlation between the rates of inbred students among doctoral pursuers and their status/type of employment is likely to be shaped by various factors including, inter alia: whether there are any barriers confronting those non-alumni who seek out employment at the university where they are now enrolled in a doctoral program; how the labor orientations of PhD students differ depending on whether they have chosen to continue into doctoral training at their alma mater or have opted for a different HEI to pursue a PhD degree at; etc. For one thing, there is reason to expect doctoral inbreds to enjoy extensive social and professional contacts at their alma mater, so that they are arguably better informed about their academic environment, job opportunities, etc., which should all bolster their chance of securing employment as desired. Also, PhD students may prefer to continue in a job that they took up earlier while training for their Bachelor's or Master's degree. At the same time, a university's policies may clearly favor hiring among its own graduates as a vehicle whereby recruitment challenges and risks can be alleviated, which in turn restrains employment opportunities for inbound doctoral corps.

Apart from the said factor of roadblocks that curb the prospects of PhD students to land a position at the HEI they are enrolled in, doctoral pursuers may choose to take up a job outside the university as feeling more inclined for a non-academic career. We can obtain a glimpse of how students' professional aspirations are shaped by looking at their motives for entering a program of doctoral education. Figure 2 presents statistically significant correlations between why the students chose to go for a doctorate and their status/type of employment. As the analysis shows, of those who at the time of the survey were employed at the university, nearly two-thirds (68%) have indicated pursuing an academic career as the main reason why they chose to study for a Ph D. At that, among those who have reported that they view a doctoral degree mostly as an added asset to help leverage their career in a non-academic environment, there is a substantially greater proportion of PhD students working outside the university.

Figure 2. **How student motivations to pursue a doctorate are related to the type of employment** (%)

By way of a recap, we can point out the following main conclusions that resulted from analyzing what essentially propelled the students to pursue a doctoral degree and how these motivations are linked with their status/type of employment and conceptions about future career. The vast majority of Russian PhD students opt to study for doctoral credentials at the HEI where they completed their previous degree. There are significantly more inbred students among those who work and study at the same university, and these students report they are unlikely to change the employer after they complete their Ph D. How doctoral pursuers who are the university's alumni and those who hold their basic degrees from other HEIs differ in what instigated them to go for a doctorate and the type of employment they have may speak to various entry barriers facing inbound student corps, the overall low rates of mobility and a hierarchical nature of the Russian academic environment.

3.2. Studying for PhD degree

Russian doctoral schools have been actively transitioning to a model where much more weight is attached to how a candidate performs across various study modules and dimensions of the core coursework, whose mastering is mandatory to make it to the PhD finish line. Naturally enough, it takes doctoral pursuers greater involvement and diligence to handle the program as the role and scope of curriculum routines have substantially increased [Bednyi 2017]. Consequently, students often find themselves confronted with a more challenging PhD environment where one is required to successfully juggle more in-person course load as well as their commitments for independent thesis research, writing papers, presenting at conferences, etc. Let us now take a closer look at how students' experiences of progressing along the PhD course of study under these new and often more demanding academic conditions are linked with their employment.

According to our survey, the vast majority of PhD students (73%) find themselves having hard times balancing their work and study. We have identified the students who work nine to five outside the university to be the most likely to report that they have difficulties combining job and doctoral education (89%). There was a lower proportion of those who responded so (65%) among the students working full-time at the university where they pursue their doctorate ($\chi^2 = 132.713$, $p < 0.000$). About half of all the informants have indicated that they lacked time and capacity to effectively handle their doctoral curriculum, of whom those who were employed full-time outside the university were the most frequent to report so (65%, $\chi^2 = 161.089$, $p < 0.000$).

Whether PhD students will experience more difficulty in balancing work and doctoral pursuit exhibits a correlation with to what extent the area and exact topic of their thesis project are in sync with the nature of their job. We have found those students whose work is barely related in its nature to the subject of their PhD research to be more frequent to report they were literally struggling to co-handle their workplace duties and doing a doctorate. Of this cohort, the PhD students who at the time of the survey were employed outside the university were more likely to indicate having major difficulties progressing along the curriculum (63%, $\chi^2 = 69.494$, $p < 0.000$) than their counterparts who worked at the university (45%, $\chi^2 = 46.798$, $p < 0.000$).

Among the students who pursue jobs with the HEI at which they are enrolled in a PhD program, it was primarily the holders of positions in administrative support and instruction who reported they were sorely lacking time and personal resource to manage it through their doctoral coursework and research project. More than half of the PhD students employed in administrative roles (58%, $\chi^2 = 85.048$, $p < 0.000$) have noted only a scarce connection between what they do in the workplace and the topic they are researching into, while the proportion of those reporting so among their peers who are university instructors was 34% ($\chi^2 = 49.296$, $p < 0.000$). By contrast, more than half of the PhD hopefuls who serve in research positions at their university (55%) have indicated that the subject of their PhD thesis is directly related to the nature of their work. Of the cohort of PhD pursuers who work and study at the same university, the share of those who found themselves having hard times balancing their employment and studies was 29% ($\chi^2 = 30.999$, $p < 0.000$) among the PhD students who are holders of research positions, it was 39% ($\chi^2 = 23.650$, $p < 0.000$) among those into teaching jobs, and it was 40% ($\chi^2 = 13.324$, $p < 0.004$) among the students employed as administrative staff.

Our analysis has found that those PhD students who pursue employment outside the HEI where they study for a doctorate are likely to be confronted with even more acute challenges of successfully balancing their work and study. Of this cohort, nearly half (46%, $\chi^2 = 14.642$, $p < 0.001$) have indicated that the subject of their PhD project had almost nothing to do with their work. Those who are con-

tingent employees who mainly pursue gig jobs of fixed-term project nature or alike were the most inclined to report a very poor connection between what they were doing for a living and what they were researching into on the PhD track (63%, $\chi^2 = 30.944$, $p < 0.000$). Naturally enough, there was a significantly higher share of PhD students who found themselves into major problems co-handling their work and study among those who at the time of the survey were employed outside the university (57%) than among their counterparts who were the HEI employees (31%, $\chi^2 = 244.321$, $p < 0.000$). Thus, PhD hopefuls who are employed at their university — and specifically those who are holders of research-centric positions — are less vulnerable to pressures of combining work and academics than their peers who pursue careers outside their university.

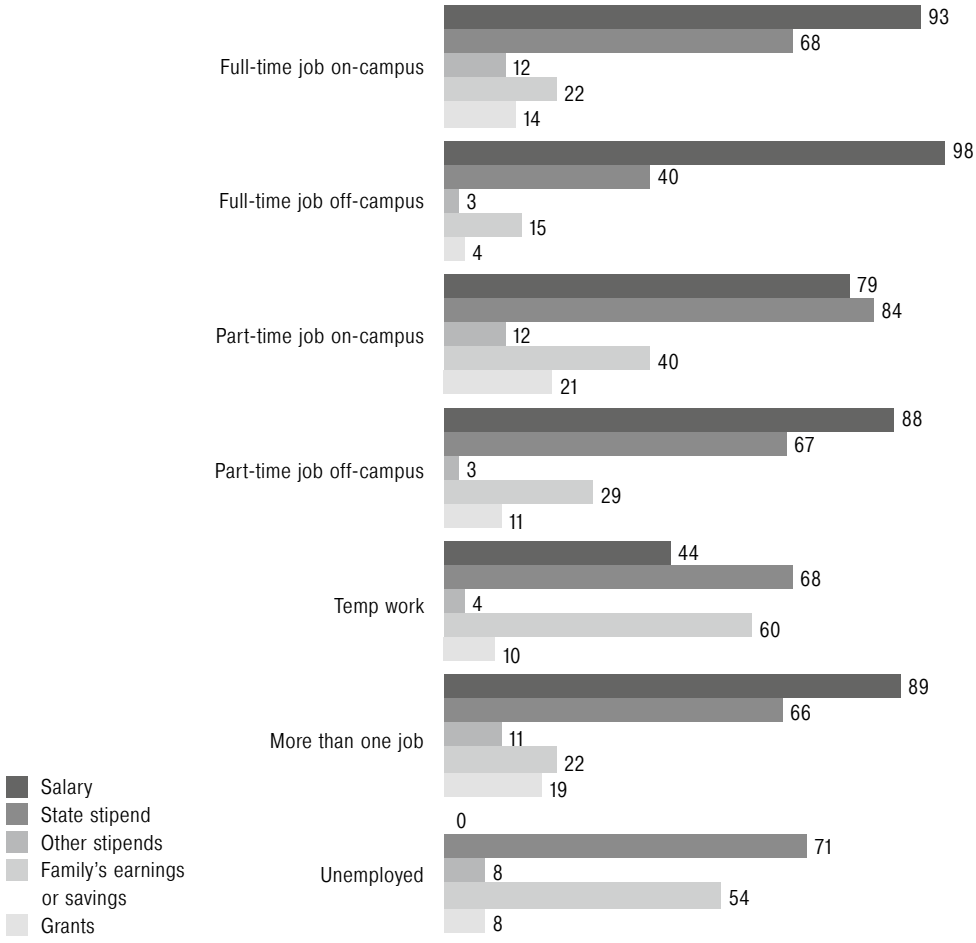
The respondents who study for a PhD and pursue a job at the same university are likely to report more positive experiences and assessments of their doctoral education. There was a greater proportion of doctoral students who were full-time university employees (57%) than of their counterparts working nine to five outside the HEI where they do a PhD degree (46%, $\chi^2 = 27.412$, $p < 0.007$) to evaluate their learning experience as of utility in their job.

Our survey has found the lack of finances to confront the vast majority of PhD students (73%). Those doctoral pursuers who at the time of the survey did not have permanent employment were the most likely to remark they were experiencing financial difficulties (81%), whereas their peers who worked full-time outside the university were the least inclined to report so (68%, $\chi^2 = 244.321$, $p < 0.000$). Of this latter sub-group, the majority have responded that the salary they received under their full-time contract accounted for the bulk in their total earnings, while the remainder of the sample would most typically report a more diversified structure of income sources (see Figure 3). At that, a significant proportion of those PhD students who indicated having more than one source of income would still note that they found themselves exposed to financial pressures.

To conclude, doctoral students who work nine to five outside the academia are likely to enjoy a more secure financial position, albeit often to the detriment of how well they are able to handle their PhD curriculum. Contrariwise, those students who work at the university or do temporary jobs will typically report more positive and fulfilling doctoral experiences, however they are likely to be facing more financial pressure.

How combining work and study may affect the capacity of a PhD student to interact with their supervisor is another important dimension in exploring the learning experiences and outcomes of doctoral pursuers. Despite the aforementioned departure of modern doctoral programs from the supervision-centric model, we can still hardly overestimate the role that the academic supervisor plays in steering a candidate toward a PhD degree. There have been multiple studies to sug-

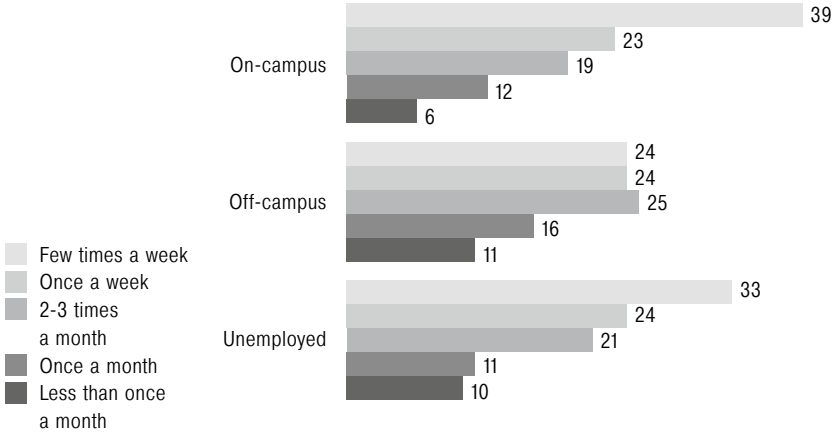
Figure 3. **Main sources of income by type of employment** (%)



gest that how frequently and effectively one is able to interact with their assigned academic lead is a major factor of doctoral success [Hockey 1991; Lipschutz 1993; Zhao, Golde, McCormick 2007; Balabanov, Bednyi, Mironos 2007; Mainhard et al. 2009; Erstein 2011]. It is not only that the PhD supervisor guides a hopeful along the research and thesis writing process, but he or she also plays a pivotal role in facilitating important networking conduits whereby the doctoral candidate gradually becomes an integral part of the HEI's academic environment and beyond [Girves, Wemmerus 1988].

Our survey has found 90% of the PhD students to hold consultations with the academic supervisor on topics pertinent to their thesis research at least once a month. Those who work and study for a doctorate at the same university have reported they typically had aca-

Figure 4. **How frequently PhD students with different types of employment are able to interact with their academic supervisor** (%)



demic consultations on a more frequent basis (see Figure 4). Furthermore, nine in every ten doctoral students who worked at the university (90%) have responded that they also interacted with their supervisors on topics other than those directly related to the PhD project, whereas the share of students who reported so among the sub-group of doctoral pursuers employed outside the university was only roughly half as large.

Provided that holding regular consultations with the academic supervisor is still very important for successfully making it to the PhD finish line, there is reason to assume that students who fall short of opportunity to interact with their PhD project lead may be exposed to greater risks of academic failure.

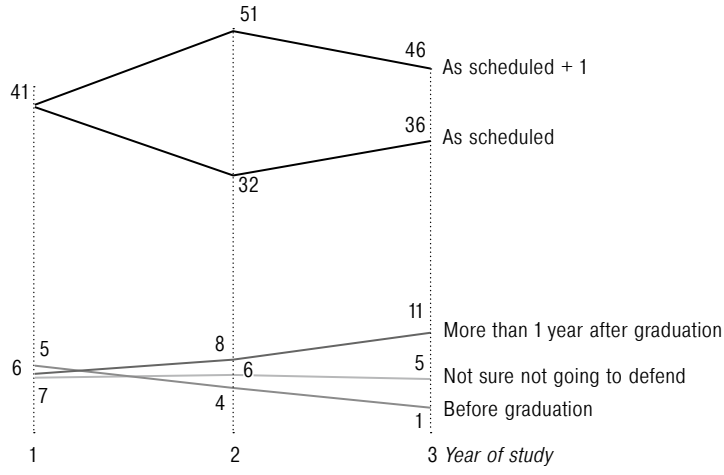
3.3. Outcomes of PhD education

Within the framework of this study, we have considered students' plans regarding PhD thesis defense and how they conceive of their career, including the desired field of employment, any inclination for academic work and any challenges likely to confront them in building a fulfilling career, as the main outcomes of their doctoral pursuit.

3.3.1. Prospects for thesis defense

The overwhelming majority of PhD students (83%) have reported that they expected to defend their doctoral thesis within the policy term of study or within a timeframe of up to one year following the completion of their program. Yet, we should still point to a certain degree of variation in how students with different employment status conceive of the most likely timing of the upcoming doctoral defense. Namely, half of the students who at the time of the survey had no employment and were entirely focused on their PhD pursuit have indicated that they expected to proceed to their thesis defense within the regular term of

Figure 5. **When PhD students in different years of study expect to proceed to thesis defense**



study. Insofar as PhD freshmen account for as much as almost half (46%) of those who have reported they did not combine their study with any kind of employment, it is perhaps no surprise that more optimistic perceptions about the likely timing of their doctoral defense have been recorded in this very sub-group of PhD pursuers. Figure 5 gives a visual idea of when doctoral students in different years of study expect to take their PhD defense.

Those PhD hopefuls who at the time of the survey were employed at the university have indicated that they were going to take a doctoral defense a year after completion of study or later. This assessment of the likely timing of PhD defense may reflect how much students in this sub-group are involved in their academic environment.

Among all the students surveyed, there was only a small proportion of those to report that they were uncertain of whether they would be able to make it to the PhD defense or that they were not going to defend a thesis at all. At that, students who worked a full-time contract outside the university were by a wide margin the most likely to respond one such way (7%). Here we should note that once they are asked about the likely timing of their PhD defense, and specifically when confronted with the "I will not proceed to thesis defense" option on the survey questionnaire, students are willy-nilly exposed to significant emotional distress, which just cannot but affect to a certain degree the results that we are able to obtain. Since the student is in fact prompted to admit their academic failure when he or she chooses to tick out the "I will not proceed to thesis defense" option, there is reason to deem the resulting indication for how many students of the entire sample will ultimately fail to make it to the PhD defense to be bi-

ased downwards. These considerations also suggest that working a full-time contract outside the university while studying for a doctorate is a factor that can materially harm one's prospects for PhD success.

3.3.2. Career preferences

The career path that a student is looking to embark on after completing their PhD credentials is an important aspect of exploring the learning experiences and outcomes of doctoral students. When a PhD graduate is found to be disposed to continue into academic work, this may be viewed as testimony to the effectiveness of doctoral education insofar as one of its main institutional and economic goals, which consists in ensuring the reproduction of qualified academic staff, is fulfilled in this case [Bednyi 2017]. For all that, studying for a doctorate may be also considered as a period when one's professional conceptions and mindsets are being actively shaped. Accordingly, if we take this angle of view, we can note that the vast heterogeneity in prospective career choices of doctoral students may be an indication that the essential imperatives and the content of PhD education need to be revised in many cases.

Where PhD students work while studying for doctoral credentials is the most significant factor in determining one's longer-term career plans. Those students who at the time of the survey had full-time or part-time employment at the university have been found to be the most inclined for a future career in academia. Overall, among the entire student sample there was a significant proportion of those who have reported that they would like to continue into a university career after the PhD hooding, irrespective of their type/status of employment as of the moment of our survey (see Figure 6).

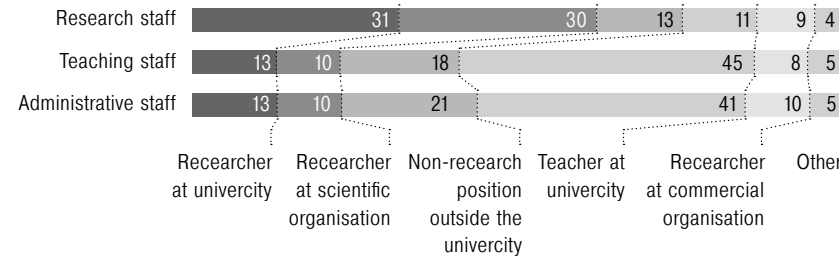
However, of the PhD students who combined their doctoral pursuit with employment outside the university, there was a much lower share of those to indicate intent for taking up an academic career. This observation only further confirms the preference pattern that was discovered when analyzing students' motivations for enrolling in a doctoral course: There was a substantially greater proportion of PhD pursuers employed outside academia than of their counterparts working at the university to report that they viewed a doctoral degree as primarily an added asset to bolster their prospects for a good job in a non-academic field. More than a third of PhD students who as of the moment of the survey were employed outside the university have indicated no plans of seeking out academic employment at any time in future. Of this sub-cohort, those who worked a full-time contract have been found to be the least inclined to pursue an academic career (63% of this group reported no such plans; see Figure 7).

What exactly a PhD student does for a living (i. e., the nature of the job that one performs while pursuing a doctorate) is yet another factor that plays a major part in shaping orientations for a future career. The vast bulk of PhD hopefuls who at the time of the survey worked at the HEI where they were studying for a doctorate have expressed no

Figure 6. **How students' career preferences are distributed depending on the type/status of employment**

Figure 7. **How students' career preferences are distributed depending on the type of employment and contract worked**

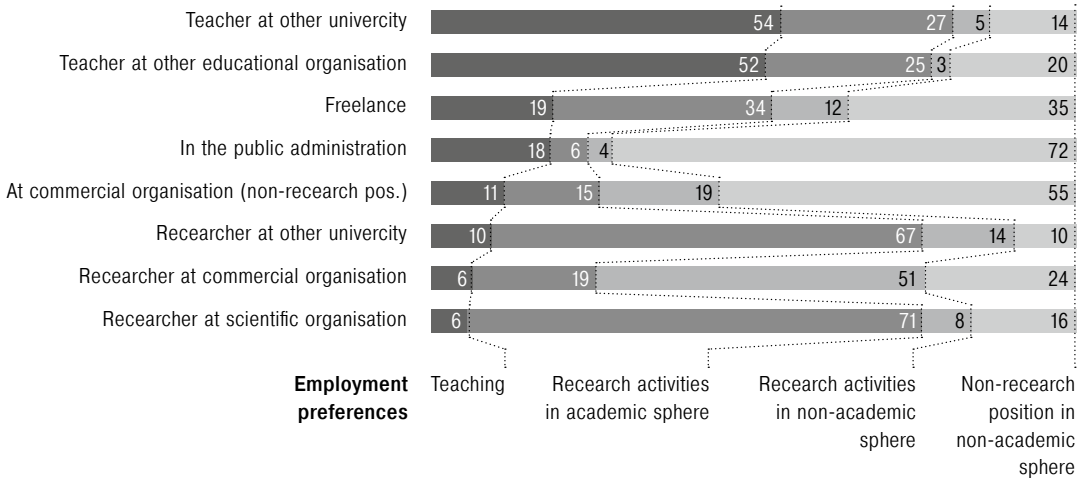
Figure **8. How career preferences of the students that are employed at the university are distributed depending on the nature of their job**



plans of changing their employer after they complete their program of study. Nevertheless, we should note that this proportion is slightly lower among students in research positions (80%) than among their peers who serve as instructors (87%) or hold auxiliary administrative roles (89%). This variation in how the likely career choices are distributed depending on the nature of the job one is into while studying for a PhD is arguably attributable to the fact that those students who are holders of research positions may opt to continue their career in R&D along a relatively wide spectrum of pathways with either another institution, a business organization, etc.

Nearly half (45%) of the PhD students who at the time of the survey were holders of instructional positions at the university have indi-

Figure 9. **How career preferences of the students working outside the university are distributed depending on the type of employment and the nature of the job performed**



cated that they were likely to stay in teaching upon completing their doctorate (see Figure 8). Among the respondents who were employed in various administrative roles, 41% have pointed out plans to move into teaching while another 13% have expressed their intent to take up a research career at the HEI where they were enrolled in a PhD program.

There was a greater percentage of PhD students among those into instruction or administrative support than among their peers who at the time of the survey were holders of research positions to indicate that they may be quitting the university following their PhD defense to enter a non-academic career (18% and 21%, respectively).

Thus, our analysis has revealed the following patterns in how the reported career preferences are distributed among the PhD students employed at the university depending on what kind of job they were into while pursuing a doctorate. For one thing, those working in research positions have exhibited strong determination to continue their career in R&D, albeit they may be considering finding employment outside the academia once they defend their doctorate. At that, PhD students who are instructors or administrative staff have been found to be generally inclined to continue working at the university, however many of them would like to change what exactly they do in the workplace.

Those PhD students who at the time of the survey were employed outside the university have mostly reported that they were unlikely to change their sector of employment or the nature of the work performed after completing their doctoral education (see Figure 9).

Finally, those PhD students who at the time of the survey were contingent employees doing casual jobs or had no employment have been identified to be the least certain about their professional future. More than a quarter of the respondents in these sub-groups (26 and 30%, respectively; $\chi^2 = 93.370$, $p < 0.000$) reported that they had not yet settled upon their career path, which, in their opinion, represented a serious challenge. For comparison, the PhD students who worked a full-time contract either at or outside the university were by a significant margin more likely to express well-defined professional plans: About half of them indicated that they had already decided upon their career. This may suggest that what the PhD students in this latter subgroup have opted to do for a living during the term of their doctoral pursuit can be viewed as a conscious choice that is largely in line with the professional conceptions and mindsets that they have developed.

Thus, we can conclude that those students who choose to work while being enrolled in a program of doctoral education are likely to exhibit much more clear-cut orientations for their future career. At that, the cohorts of PhD hopefuls who are employed at and outside the university tend to report starkly polarized career plans.

4. Discussion

The survey results have shown that the vast 90% of postgraduates combine study with work[4]. At the same time, the students' employment characteristics vary and relate differently to students' perceptions of the study process and their career plans.

The current place of employment has a significant correlation with postgraduates' career prospects. There are more PhD students pursuing an academic career among those who have a full or part time job at a university. These students' initial motivation for postgraduate studies is to build a career at university; they plan to work in academia and value the opportunities offered by their programmes. This might indicate the doctoral education in Russia at its current state better corresponds to the interest of academically oriented postgraduates, since the doctoral education is still perceived as a place to train professional academic staff [Bednyi 2017]. The rigidity of doctoral education and its focus on academically oriented postgraduates can be a significant limitation for its development. An increase in employment options for doctoral graduates is a worldwide trend [Nerad 2006; Mangematin 2000; Lee, Miozzo, Laredo 2010] determined by the limited academic labor market which should inevitably push out specialists with a PhD degree to other markets. Researches have shown that the distribution of postgraduates between academic and non-aca-

[4] At the same time, according to the Russian Monitoring of the Economic Situation and Public Health conducted by National Research University Higher School of Economics, the proportion of the unemployed within the youth cohort between ages 22 and 27 is much higher (42%).

demic professional spheres is not the same in different countries, but employment outside the university often prevails. To illustrate, among the French 1986–1994 doctoral graduates in Engineering there were half whose initial motivation for a postgraduate study was to work in a non-academic sphere upon graduation [Mangematin, 2000]. An academic career is not a priority for graduates with a doctorate in Engineering and exact sciences in the UK as well: less than 20% of graduates are employed in permanent positions in academia [Lee et al. 2010]. The situation is similar in other fields: Bednyi, Gurbatov and Ostapenko [2013] have found that the majority of the Humanities and Social Sciences doctoral graduates at one university are employed in the non-academic sphere.

On one hand, the predominant employment of postgraduates outside the academia may indicate a surplus of highly qualified academic staff. Researchers pose a question — is a PhD degree necessary to develop a non-academic career [Manathunga, Lant 2006; Gaeta et al. 2016]? On the other hand, such situation with the postgraduate employment challenges the value of doctoral education in its current state. Does the doctoral education really provide the unique skills necessary for research jobs outside the academic sphere or does the PhD degree rather have a symbolic value for its holders and represent a signal for employers? In any case, the orientation of postgraduate education towards careers in academia is reasonable only if it corresponds to the labor market demand. If there are more graduates with the PhD degree than academic institutions may offer, or if some of PhD students initially intend to pursue a non-academic career, it may be worth revising the postgraduate training system, taking into account the global trend of expanding career opportunities for PhD graduates.

The doctoral study is the most comfortable for full-time university employees. Regardless of their overall workload, they do not consider as a challenge neither the need to combine work and study, nor the study load, nor the forthcoming employment. This group of respondents continued to study at the same university where they obtained their previous level of education and they not consider other universities, which is typical for Russian postgraduates. However, according our research, the percentage of academic inbreds is higher among those employed at university and they do not intend to change the place of employment after graduation. The closed nature of doctoral education conditioned by the low academic mobility and hierarchical structure of academic society in Russia becomes apparent already during the study period. The consequences of inbreeding are controversial. While some researchers have not found any effect of academic inbreeding on scientific productivity, others have found that less mobile scientists are less effective in their research. They have fewer publications in general and specifically in international journals; they are more focused on communication within the university which

may limit their academic horizons [Yudkevich, Gorelova 2015]. The negative consequences go beyond personal and institutional losses and reach the national level. Of course, the presence of academically oriented postgraduates who successfully combine study with full-time employment and are satisfied with doctoral education organizational structure can be considered as strength of doctoral education, however, this group constitutes less than one fifth of all postgraduates.

The most common type of postgraduate's employment is full-time work outside the university. Usually there is little connection between such jobs and students' thesis topics which can negatively affect the doctoral education outcomes. This group of postgraduates report difficulties in combining work with study. After graduation, their plan is to pursue a non-academic career.

The vast majority of postgraduate students experience financial difficulties. Foreign studies have shown that the postgraduate's academic success (usually measured by the fact of thesis defense or time to degree) is correlated with the type of financial support: foreign postgraduates who receive full funding or are employed as research fellows generally complete doctoral programs more often. They also receive the degree faster in comparison to those who do not have such financial support and must provide for themselves [Abedi, Benkin 1987; Baird 1990; Ehrenberg, Mavros 1995; Lovitts 2001; Stock, Siegfried 2006; van der Haert et al. 2013; Spronken-Smith, Cameron, Quigg 2018]. In the Russian context, the most similar is the situation when a postgraduate works and studies at the same institution.

Foreign studies have also shown that PhD students with off-campus jobs are less involved in the life of their departments and are less likely to become a part of the research and teaching team as compared to research fellows, which ultimately affects their progress [Girves, Wemmerus 1988]. Our data have also shown that those who employed full time outside the university are the most at risk. Universities usually lose this group of students, as they are already less focused on studying than on theirs job, planning to work in a non-academic sphere, less involved in the education process, experiencing the most difficulties. There is also the highest rate of those who are not planning to defend their thesis among this group. Of course, the cross-sectional study design limits the use of the data, which could be solved by using long-term studies showing the connection of type of employment with various educational effectiveness indicators at the doctorate level. However, the clear distinction between postgraduates with different types of employment and their relation to the different financial support options can be already stated based on the existing data analysis.

Of course, the mode of funding is a complex characteristic that reflects not only the study conditions, but also a postgraduate's level of training or academic motivation. In any case, the absence or insufficient financial support of postgraduates is a risk factor for the doc-

toral education effectiveness, especially if a postgraduate works outside the university, when his or her work duties do not correspond to the thesis topic. The survey was conducted at the leading Russian universities whose financial capabilities are much higher than those of other universities. Therefore, if postgraduates face financial difficulties here, then the scale of this problem in other universities may be even greater.

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Employment of Vocational Graduates: Still a Slough or Already a Ford?

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Abstract. The study is devoted to employment of recent vocational graduates. The proportion of middle-school graduates in vocational enrollment has increased essentially over the past decade, which indicates that the choice of vocational trajectories, on average, is now made at lower age. It was established based on the Monitoring of Education Markets and Organizations that on average 44 percent of students combined work and study in 2010–2015. Vocational students mostly combine work and study because of financial constraints, their employment rarely being related to their field of study. Later on, when making a transition from education to the labor market, vocational graduates have to accept one of the first job offers as they cannot afford a longer job search. The second part of the study draws upon the findings from the 2010–2015 sampling survey of graduate employment administered by the Federal State Statistics Service (Rosstat). It is shown that combining work and study has positive effects on employability of graduates as well as on the size of their starting salaries. In addition, self-funded students and those who combine study with major-related work are more likely to get employed in their field of study after graduation. Education-job mismatch among graduates is found to entail income "penalties".

Keywords: vocational education and training, study-to-work transition, labor market, starting salary, combining work and study.

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Employment after graduation from vocational schools is a critical time in the life of young people when they acquire a new socioeconomic status. Study-to-work transition may be considered successful when a fresh graduate gets a job corresponding to their qualifications and skills and is satisfied with the working conditions, work schedule, sal-

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ary, job security, and opportunities for career growth and creative self-expression [Roshchin 2006].

Russia is anticipating a birth rate decline, which is expected to cause a steep decrease in working age population in the ten to fifteen years to come[1] and lends a specific urgency to the problem of employment of vocational graduates. As the flow of youth into the labor market is shrinking, the cost of mistake in study-to-work transition is rising, the early career stage playing a great role in career development and future earnings [Robst 2007; Zhang 2008]. Besides, recent graduates are much more vulnerable in the labor market than older workers as a result of lacking work experience, having little idea of the labor market mechanisms, and being less protected against dismissal in a volatile economy [Ryan 2001; Rudakov 2015]—all of which contributes to the urgency of the problem of vocational graduate employment.

Education-occupation mismatch has negative effects not only for graduates but also for society as a whole. Research shows that graduates who fail to find a job matching their field of study tend to earn less and underuse their competencies [Gimpelson et al. 2009; Nordin, Persson, Rooth 2010]. Therefore, successful transition of students and graduates to the labor market has been traditionally regarded as a key indicator of efficiency of any professional education system, vocational training being no exception. Analysis of vocational graduate employment data allows assessing the efficiency of education policy in workforce training. Employment statistics are considered to be one of the indicators of how well vocational education systems meet labor market demands[2].

A system for monitoring the quality of workforce training was created in 2015 in Russia under the Measures to Develop Vocational Education and Training Initiative[3]. Statistics on employment, salaries and distribution of vocational graduates among the federal subjects of Russia are supplied by the Pension Fund of the Russian Federation. Collecting high-quality raw data and working to ensure its validity and reliability are important but not the only prerequisites for effective managerial decisions concerning employment of vocational graduates. We believe that of no less importance to the development of pol-

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[1] Russian Federal State Statistics Service (Rosstat). Population Projections for the Period of up to 2035. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/demography/#

[2] Education Development for 2013–2020, a national program of the Russian Federation, envisaged a 60-percent increase in the proportion of last-year vocational graduates employed in their field of study by 2020. https://минобрнауки.рф/проекты/438/файл/3039/Государственная%20программа%20Российской%20Федерации.pdf

[3] Measures to Enhance the System of Vocational Education and Training in 2015–2020, approved by the Order of the Government of the Russian Federation No. 349-r of March 3, 2015. Available at: http://asi.ru/upload/iblock/61e/cWukCnDBv5U.pdf

icies in this domain is understanding the context-related factors that can either foster successful employment and high earnings of vocational graduates or, alternatively, reduce their competitive edge in the labor market and increase the risk of winding up unemployed.

This paper seeks to examine how employment of vocational graduates is affected by their sociodemographic characteristics and specific aspects of their student life, namely:

- How combining work and study is related to success in vocational graduate employment, in particular to the match or mismatch between education and job;
- To what extent education-job mismatch affects vocational graduates' income;
- Whether self-funding of education affects the size of future salary.

Analysis of transition between the education system and the labor market requires understanding the background behind the specific study-to-work trajectory of vocational students. For this reason, the first part of the article focuses on the conditions that shape the choice of vocational trajectories and the motives for such choice. The second part of the article is dedicated to an analysis of the transition from vocational education to the labor market.

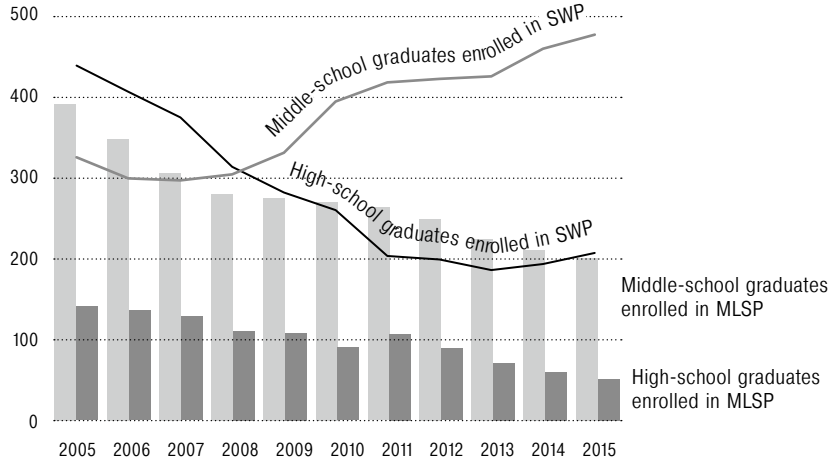
Empirical basis for the first stage of the study included official statistics and data from sociological surveys conducted under the Monitoring of Education Markets and Organizations (MEMO)[4]. The MEMO was designed to supply public authorities with information necessary to make policy decisions in education; it has been administered annually since 2002 by the Higher School of Economics under the aegis of the Ministry of Education and Science of the Russian Federation. The MEMO was selected to be the source of data for analysis because the sociological surveys within its structure include items on choice motivations, preferences and strategies of education market participants. In addition, the MEMO provides information on the socioeconomic characteristics of respondents' families. Having this data at hand makes it possible to analyze the specific characteristics of vocational students and the broad contexts of their decision-making processes, allowing for correct interpretation of their post-graduation employment patterns. Findings from 2010–2015 vocational student surveys, with around 1,800 respondents yearly, were used in this analysis.

As for the second part of the study, its empirical basis is represented by the National Statistical Sampling Survey of Graduate Employment administered by Rosstat[5]. The survey was carried out from April

[4] For more details on the methodology and questionnaires, visit https://memo.hse.ru/met

[5] http://www.gks.ru/free_doc/new_site/population/trud/itog_trudoustr/index.html

Figure 1. **Vocational Enrollment in Mid-Level Specialist Programs (MLSP) and Skilled-Worker Programs (SWP)**(1,000 students)



Source: Rosstat.

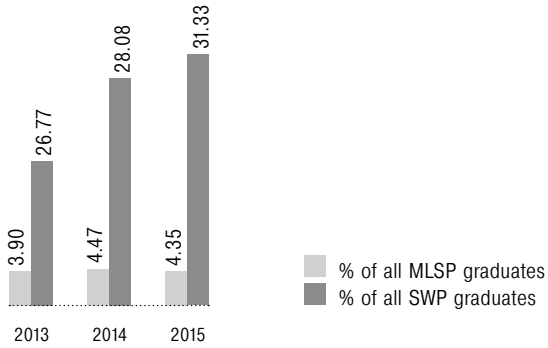
to September 2016 on a sample of 36,000 respondents (0.3 percent of all graduates in higher and vocational education, including former basic vocational training). The estimates obtained were extrapolated to the general population with the same characteristics. The survey is built around the statistics on job search and placements among graduates, including respondents' current position in the labor market.

The Background of Study-to-Work Transition among Vocational Graduates

The average age of vocational students has been declining rapidly over the past decade. Since the Unified State Examination (USE) was introduced, high school has become more selective [Dudyrev, Shabalin 2015]. As a result, more and more middle school graduates opt for vocational schools, where they obtain general secondary education in addition to learning trade-specific skills. Figure 1 illustrates how rapidly the age structure of vocational students became younger in 2005–2015: the proportion of middle school graduates in vocational enrollment increased by one third to make 75 percent by the end of the decade. This tendency manifests itself most prominently among students enrolled in mid-level specialist programs (MLSP)[6], the best part

[6] Federal Law No. 273-FZ On Education in the Russian Federation of December 29, 2012 merged the levels of initial and secondary vocational education and training, vocational programs being divided into skilled-worker programs (SWP) and mid-level specialist programs (MLSP). Due to differences in the levels of competencies and socioeconomic characteristics among students enrolled in these two basic types of vocational programs, they will

Figure 2. **The Proportion of Vocational Graduates Enrolling in College the Same Year They Graduate from Vocational Schools**



Sources: Rosstat, Ministry of Education and Science of the Russian Federation. Forms for Federal Statistical Monitoring in Higher Professional Education

of whom today are graduates from middle school—not high school, as it used to be.

One of the reasons behind this change is that students choosing vocational training are normally less academically successful than their peers at secondary school. Research shows that students intending to proceed to high school have an average math score of 566 in TIMSS, as compared to only 500 among prospective vocational students [Bessudnov, Malik 2016].

Most middle-school graduates who opt for vocational training would hardly have their USE scores accepted by colleges. With a certificate of vocational education, however, those young people obtain access to higher education. Colleges with low admission requirements are ready to accept MLSP and SWP graduates, who do not even have to take the USE. As we can see, the motives for opting for vocational training have changed. Formerly, vocational schools were regarded as educational institutions that provided quick access to the labor market; today, however, vocational education is often used as a transition stage, the "springboard" for college. According to MEMO data, in 2010–2015 on average 37 percent of MLSP students and 60 percent of SWP students reported planning to enroll in college as soon as they finished vocational studies. According to Rosstat statistics, the percentage that actually makes direct transition from vocational school to college is somewhat lower but still significant (Fig. 2).

Lower average performance of vocational students as compared to high-school students is largely due to the effects of socioeconomic inequality. Findings show that parental education and socioeconom-

be analyzed not only jointly as a single category but also separately as subcategories.

ic status are important predictors of student achievement [Sirin 2005; Ermisch, Pronzato 2010]. Vocational students usually come from lower-educated and poorer backgrounds than their high-school and college peers. In the course of MEMO sociological surveys, only 10.7 percent of MLSP and 23 percent of SWP students reported that their father (step father) had a college degree, as compared to the rate of 43.4 percent among college students[7]. A similar distribution is observed in students' responses about mother (step mother)'s education: 18.7% in MLSP, 31% in SWP, and 53.7% in college. The MEMO data also reveals lower incomes in vocational students' households. About 34 percent of MLSP students report having spent their school years in families classified under the three least advantaged respondent groups (Fig. 3). The proportion is slightly lower among SWP students but still accounts for no less than 25 percent. As for higher education, only 16 percent of college students were raised in families that could not always afford to buy clothes or food.

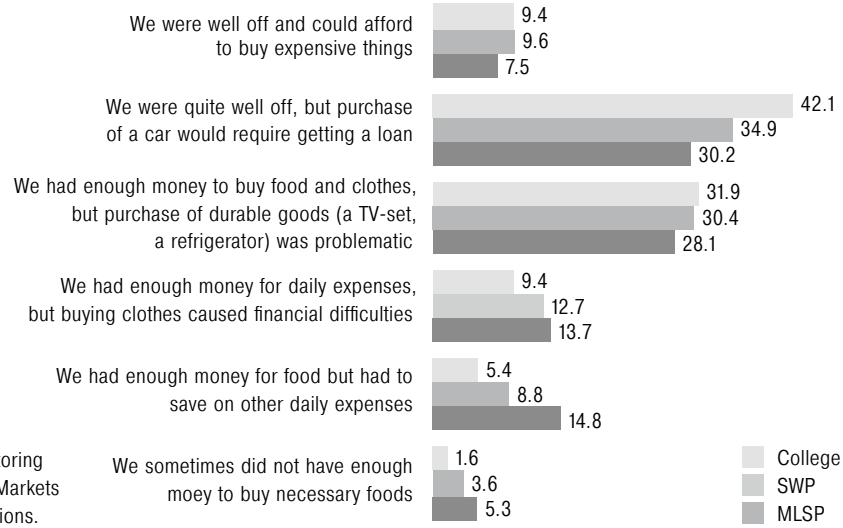
As vocational students largely come from relatively low-income families, they often look for a job which can help to overcome their financial constraints. According to MEMO findings, on average 44 percent of vocational students combined work and study in 2010–2015. However, salaried jobs of MLSP and SWP students were in most cases not related with their field of study (Fig. 4). Combining work and study is slightly more common—55.3 percent on average—among college students, who are older and thus have better chances for employment.

College students are often ready to work for less wages or even for free, provided that the job allows them to develop professional competencies relevant to their future profession [Apokin, Yudkevich 2008]. Such students are primarily motivated by gaining work experience that will later be appreciated by employers [Roshchin, Rudakov 2014]. Both college and vocational students attach a lot of importance to the opportunity for extra earnings when looking for a part-time job. As reported in the MEMO, financial constraints were the number one reason to combine work and study for 70 percent of vocational students in 2015.

The overwhelming majority of MLSP and SWP students have their vocational training funded by regional governments. On the one hand, vocational education programs are quite affordable, and on the other, low income does not allow families to consider self-funding options. As a result, students normally have to choose public-funded educational programs over those of their particular interest. Under such circumstances, cases of opting for tuition-based programs indicate deep commitment to a specific profession or field of study. According to the MEMO, only 1.9 percent of MLSP students and 17.9 percent of SWP students on average paid tuition in 2010–2015.

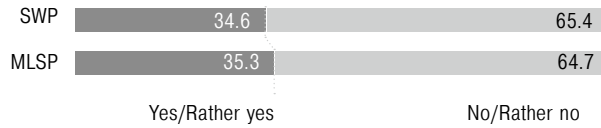
[7] Arithmetic mean for the five-year observation period, from 2010 to 2015.

Figure 3. **College and Vocational Students' Perceptions of Their Family's Financial Standing during School Years, arithmetic mean for 2010–2015**



Source: Monitoring of Education Markets and Organizations.

Figure 4. **Vocational Students' Perceptions of Relatedness between Part-Time Job and Current Major, 2015**



Source: Monitoring of Education Markets and Organizations.

Therefore, statistics and the results of MEMO sociological surveys allow identifying the factors affecting transition of vocational graduates from study to work. On the one hand, the decline in average student age increases the risk of unrealistic expectations about the selected profession/specialization in young people. This is likely to inflate the proportion of graduates getting jobs that mismatch their skills. Moreover, younger age of vocational students can be regarded as a factor increasing the likelihood of engaging in higher education instead of entering the labor market after graduation. Students often treat vocational education as a way to help themselves get into college, not as training to get a job.

On the other hand, as many vocational students come from low-income families, they often have to enter the labor force. Not in-

frequently, such students tend to focus on salaries rather than education-occupation match when looking for a job. It remains an open question whether any type of work-study job increases their competitive edge in the labor market or whether combining study with unrelated work becomes a barrier to academic achievement and entails "penalties" in subsequent employment.

Low financial standing normally reduces the range of education programs available, making prospective vocational students choose from public-funded options. Cases where relatively low-income households decide to pay for education themselves indicate deep interest in a specific profession or occupation. The second part of this study will test the hypothesis that tuition-based vocational training is a good predictor of education-job match.

In addition to socioeconomic family characteristics and the demographic situation, the national policy designed to provide successful study-to-work transition is another significant factor determining the procedure and results of vocational graduate employment. In particular, development of employer-sponsored education to offer job placement guarantees for graduates reduces greatly the probability of unemployment among vocational graduates, increasing their chances for getting a job matching their professional qualifications. However, sponsorship agreements oblige employers to incur extra costs by providing social support measures, so they might want to compensate for those costs by underpaying fresh graduates during the agreed required probation period. The second part of this article will test the hypotheses that employer-sponsored education increases employability of vocational graduates and that employers pay lower salaries to such graduates during the agreed required probation period.

2. Employment of Vocational Graduates

This section of the article uses data of the National Statistical Sampling Survey of Graduate Employment (SGE) conducted by Rosstat in 2016. It includes information on the 2010–2015 graduates with college (Bachelor's, Specialist's, Master's) and vocational (including former basic vocational education) degrees. For the purpose of this study, only information on vocational graduates will be used. The sample includes respondents aged 18–29. Sampling survey of graduate employment has three specific advantages that are critical to this study:

(i) Access to information on educational attainment, including cases of combining work and study and sources of education funding;
(ii) Information on employment is complemented by data on graduates' earnings, which is one of the key characteristics of the labor market (this is what differentiates SGE from other Rosstat-administered surveys, including that of labor force);
(iii) This survey is representative for the population group analyzed and the sample is large enough to allow statistical analysis.

Table 1. **Descriptive Statistics**

	SWP	MLSP
N of observations (people)	9123	4047
Weighted N of observations (1,000 people)	2790.8	1105,2
Professions/Fields of Study		
Natural Science	0.2	0
Humanities	4.9	0
Social Science	23.5	34,2
Education and Teaching	7.8	0
Healthcare	13.5	0
Culture and Arts	2.8	2,5
Engineering, Technology and Technology Science	43.6	57,7
Agriculture and Fishing	3.7	5,6

	SWP	MLSP
Percentage of males (%)	48.9	62,6
Average age (years)	23.6	22,9
Percentage of graduates continuing to college (%)	15	4,5
Combining work and study (%)		
None	76.1	83,2
Unrelated work experience	12.1	9,1
Related work experience	11.8	7,7
Population structure (%)		
Employed	79.9	78,3
Unemployed	7.4	9
Economically inactive	12.7	12,7

Среди занятых выпускников системы СПО

N of employed population (people)	7202	3086
Weighted N of employed population (1,000 people)	2231.0	865.3
Professional status (%)		
Administrators	2	0.9
High-skilled workers	13.9	1.0
Middle-skilled workers	34.6	5.7
Information professionals	3.8	3.4
Pink-collar workers	17.8	30
Skilled agriculturals	1.5	1.7
Skilled workers	12.3	28.8
Mechanics, operators, etc.	10.1	19.2
Unskilled workers	4.2	9.3
Living in a city (%)	77.3	72.6
Education-job match* (%)	61.8	56.5
Average salary (rubles)	20200.4	19704.9

Participation in further education in the past 12 months (%)	16.4	10.8
Industry (%)		
Agriculture	3.2	5.6
Fishing	0.2	0.2
Mining	2.5	3.7
Manufacturing	12.5	17.8
Water-energy nexus	2.3	2.0
Construction	5.9	11.3
Wholesale and resale	20.1	20.5
Hospitality	3.3	9.0
Transport and communication	8.9	11.4
Finance	3.4	0.3
Tertiary sector	4.6	3.7
Public administration	7.7	3.4
Education	7.9	3.1
Healthcare	12.7	1.4
Utilities and social infrastructure	5.1	6.6

* Based on respondents' self-assessment. Question: "Is your career related to your education / field of study?".
Source: SGE, Rosstat, 2016

Table 1 provides descriptive statistics on MLSP and SWP graduates. The proportion of graduates who gained at least some work experience as students turns out to be only 24 percent among MLSP graduates and about 17 percent among SWP graduates, which is lower than reported by the MEMO statistics referred to in the first part of the article (44%). And then, only half of them combined study with jobs related to their field of study. At the moment of the survey (April–September 2016), 79 percent of 2010–2015 vocational graduates were employed, about 8 percent had no job, and 13 percent were economically inactive.

Data on employment of graduates is classified by the major occupation categories based on the Russian National Classifier of Occupations[8]. The majority of SWP graduates are employed as middle-qualified workers (34.6%). The major occupations among SWP graduates include mid-level practitioners and retailers (7.8 and 7.5 percent, respectively). MLSP graduates mostly fill pink-collar and skilled worker jobs (approximately 30 percent in each category). The most widespread occupations among MLSP graduates include shop assistants (9.6%), agricultural mechanics and service technicians (7.3%), and food preparers (7.1%). Every one vocational graduate out of five works for a trading company. Manufacturing is the second most popular industry, accounting for 12.5 percent of SWP graduates and 17.8 percent of MLSP graduates. About 30 percent of SWP graduates are employed in industries traditionally associated with the public sector, i. e. public administration, education and healthcare.

At the moment of the survey, only a small percentage of vocational graduates who had been willing to find a job could be classified as unemployed (8.5 percent of economically active SWP graduates and 10.3 percent of MLSP graduates). The unemployment rate among vocational graduates is above the national average by nearly half (5.5%[9]), approaching the rate among youth aged 15–19 (9.9%), as reported by Rosstat[10]. Figure 1 presents data on unemployment among European youth aged 15–29 with levels of educational attainment corresponding to ISCED levels 3 and 4. Statistics on Russia include MLSP graduates (ISCED levels 3 and 4) and SWP graduates (ISCED levels 3 and 5) aged 15–29[11], the unemployment rate among

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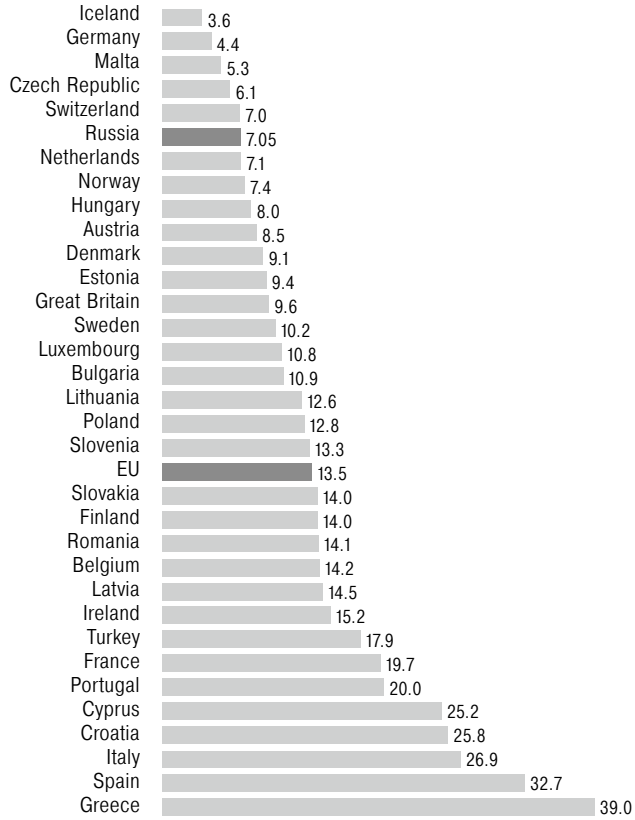
[8] http://www.consultant.ru/document/cons_doc_LAW_115767/

[9] Rosstat. Labor Force Resources. Available at: http://www.gks.ru/free_doc/new_site/population/trud/trud6.xls

[10] Rosstat. Based on a Survey of Labor Force. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1140097038766

[11] The unemployment rate among MLSP graduates only, whose level of education corresponds more to the EU sample, is 7.5 percent. Rosstat. Based on a Survey of Labor Force. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1140097038766

Figure 5. **Unemployment Rates in EU Countries among Youth Aged 15–29 with Levels of Educational Attainment Corresponding to ISCED Levels 3 and 4 (%)**



Source: Eurostat & Rosstat, 2016.

them being 7.1 percent. As we can see, the situation in Russia is one of the most favorable in Europe, given that the average EU unemployment rate in this cohort is 13.5 percent, being higher in southern Europe and reaching 27, 33 and 39 percent in Italy, Spain and Greece, respectively.

The unemployment rate in Russia is lower than in the EU countries across all population groups. This is explained by the Russian model of labor market: rather low minimum monthly wage and scant government assistance for the unemployed (unemployment benefits and access to them) basically push young workers to enter the labor market as soon as possible, accepting one of the first job offers[12]. As a result, about 40 percent of vocational graduates are mismatched to their

[12] For more details on the Russian model of labor market and international labor market comparisons, see, for example, [Gimpelson, Kapelyushnikov 2015; Gimpelson, Kapelyushnikov, Roshchin 2017].

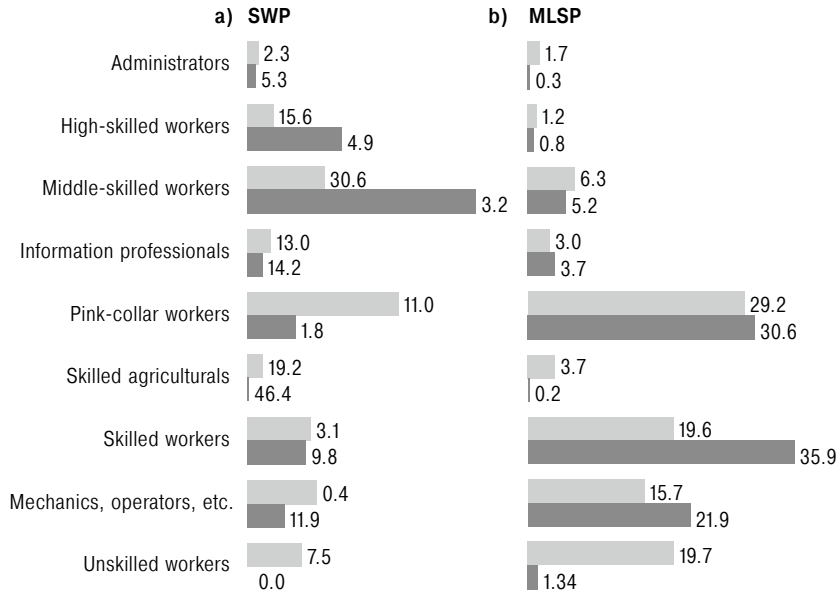
jobs (Table 1). According to findings, education-job mismatch is typical of nearly 70 percent of vocational graduates of all ages represented in the Russian labor market. The situation is slightly better among college graduates, where the job mismatch rate hovers around 50 percent [Gimpelson et al. 2009]. In the United States, mismatch between education and occupation is observed for only 20 percent of university and college graduates [Robst 2007], and the same is true for Sweden [Nordin, Persson, Rooth 2010].

When prospective vocational students are choosing their future profession or occupation as ninth-graders, they have no clear idea of the labor market situation, so their career preferences are likely to change over time. Besides, technology, market demand and other external factors in today's world modify very rapidly the structure of economy and its demand for specific occupations and qualifications, making workers adapt by learning new skills or even professions. Quite expectedly therefore, recent graduates have to try various options to find a job that will suit them the most. Such search does not entail negative consequences for the economy as long as graduates are able to find jobs where they can use and improve their knowledge and skills and be paid accordingly. However, judging by the distribution of 2010–2015 vocational graduates among occupations, most employed SWP graduates whose jobs match their education occupy positions of middle- and high-skilled workers (46 and 19 percent, respectively), while nearly one third of SWP graduates mismatched to their jobs are employed as pink-collar workers at positions that require lower levels of skills (Fig. 6a). As for MLSP graduates (Fig. 6b), those with matching jobs are mostly employed as blue-collar workers, and one out of five MLSP graduates who changed their occupation has an unskilled job, while the rest are employed in the same occupations as graduates who remained loyal to their field of study. On the whole, jobs that are filled by MLSP graduates do not require a high level of skills and thus have low entry barriers even for those with no relevant education or professional competencies. Vocational graduates mismatched to their jobs are less likely to continue to college (7 percent as compared to 11 percent in the job-match group) and participate in further education (9 as compared to 16 percent, respectively).

In order to identify the factors that can affect[13] the probability of employment and education-job match among vocational graduates, a series of econometric models will be estimated below. In Table 2, Specifications 1–3 present the results of evaluating logistic regression for different subsamples: all vocational graduates (1), SWP graduates (2), and MLSP graduates (3). In all the specifications, unemployed

[13] Due to possible interactions between the dependent and some of the explanatory variables, all the regression analysis results in this study should be interpreted in terms of conditional correlation.

Figures 6. **The Distribution of Vocational Graduates Across Occupations** (%)



Source: SGE, Rosstat, 2016.

and economically inactive population serves as the reference category[14]. Specifications 4 and 5 assess the probability of education-job match using multiple logistic regression independently for the subsamples of SWP and MLSP graduates.

When the probability of employment as such as assessed, MLSP graduates are found to have more difficulty getting a job than SWP graduates, all other things being equal. The fact of education being funded by students (or their parents) shows no statistically significant relationship with the probability of employment but increases the

[14] Of course, the unemployed and economically inactive population are two heterogeneous groups. However, we find it possible to join them into one reference group when evaluating the model here because the critical study on labor force transitions in Russia [Gimpelson, Sharunina 2015] shows that most individuals enter the labor market by jumping from economic inactivity directly into employment, omitting the unemployment state. The modern concept of labor force stipulated by the International Labor Organization and approved by Rosstat Order No. 680 of December 31, 2015 suggests new terminology to describe labor force, expanding the category of the unemployed so that part of economically inactive population is now treated as potential labor force. In SGE, which served the empirical basis for this study, Rosstat maintains the former definition of labor force, so we have to regard unemployed and economically inactive people as a single category to analyze employability.

Table 2. **Logistic Regression Results: Modelling Employability of Vocational Graduates, Marginal Effects**

	1	2	3	4		5	
				SWP		MLSP	
Model Specification	All Vocational Graduates	SWP	MLSP	Education and Job Match	Education and Job Mismatch	Education and Job Match	Education and Job Mismatch
Education level ("0" for SWP, "1" for MLSP)	−0.016***						
Self-funding	−0.012	−0.012	−0.02	0.027***	−0.015**	0.097***	−0.123***
Employer sponsorship	0.048**	0.027*	0.09	0.170***	−0.161***	0.202***	−0.122***
Years after graduation from vocational school	0.017***	0.017***	0.015***	−0.006***	0.023***	−0.014***	0.030***
Currently pursuing higher education	−0.117***	−0.116***	−0.122***	−0.045***	−0.069***	−0.080***	−0.042
Professions/Fields of study (*Social Science being the reference variable*)							
Natural Science	0.113	0.158		0.041	0.074		
Humanities	−0.026**	−0.024**		−0.084***	0.060*		
Teacher Education	0.018	0.019		0.135***	−0.118***		
Healthcare	0.038***	0.039**		0.281***	−0.250***		
Culture and Arts	−0.008	0.012	−0.377***	0.054	−0.042	−0.372***	0.069
Engineering, Technology & Technology Science	−0.018***	−0.015***	−0.038***	−0.024	0.008	−0.058***	0.019
Agriculture & Fishing	−0.044**	−0.032	−0.091***	−0.163***	0.126***	−0.051	−0.039*
Combining work and study (*"No" being the reference variable*)							
Yes, related work experience	0.110***	0.143***	0.080**	0.237***	−0.119***	0.213***	−0.133***
Yes, unrelated work experience	0.071***	0.096***	0.02	−0.103***	0.186***	−0.072*	0.098***
Sociodemographic characteristics							
Age	0.019***	0.019***	0.021***	0.022***	−0.003	0.023***	−0.002
Sex ("1" for male)	0.091***	0.070***	0.153***	0.025	0.044***	0.091**	0.063***
Living in a city	0.002	−0.004	0.01	0.023***	−0.027***	0.067**	−0.053***
N of observations/Population size	11015/ 3 294 820	7489/ 2 317 669	3319/ 920 098	7489/ 2 317 669		3319/ 920 098	

Notes: 1. Additional control variables included federal subjects of Russia, health status, marital status, and parental status.
2. ***—significance level of 0.01, **—significance level of 0.05, *—significance level of 0.10.
3. Marginal effects are used instead of coefficients.
4. Standard errors were obtained using the robust method when estimating logit models and the delta method when estimating marginal effects.
Source: SGE, Rosstat, 2016.

probability of education-job match substantially. By deciding to invest their own funds or the funds of their family into education, candidates will most likely be more careful in making their career choices, which are sometimes affected by education costs already incurred. With employer-sponsored education, where graduates are obliged to work for a specific employer for an agreed period of time after graduation, the probability of employment as such is higher for SWP graduates, while the probability of education-job match increases considerably for all vocational graduates.

Employability is also related to the type of education or profession acquired by vocational graduates, being the highest among medics and lower or statistically indistinguishable from the reference value (the social science group) in all the other professions. As far as education-job match among SWP graduates is concerned, advantage is also enjoyed by teacher education graduates. In MLSP, agricultural education is found to produce the highest probability of graduates being mismatched to their jobs.

Earlier studies based on Russian data revealed a relation of combining work and study to the probability of post-graduation employment [Roshchin 2006]. This study confirms the variation in graduate employability as a function of combining work and study and specifies the nature of such function, which is that post-graduation employment probability is affected by relatedness of major to work-study job. For instance, combining study with related work increases employability of both SWP and MLSP graduates as compared to those who did not combine work and study at all. However, combining study with unrelated work has no significant impact on the probability of getting employed for MLSP graduates. The probability of post-graduation education-job match depends on the type of work that was combined with study, being higher if such work matched the skills being acquired and lower if it did not. The situation with education-job mismatch is just the opposite.

In addition to the fact of employment, it is also the quality of jobs filled by vocational graduates that matters. The effects of different factors upon the size of vocational graduates' salaries as one of the key job characteristics will be measured using a modified Mincer equation estimated using the method of least squares (MLS) for the weighted sample of employed vocational graduates. Table 3 contains estimates for all vocational graduates as well as separately for SWP and MLSP graduates.

All other factors held constant, MLSP graduates tend to be paid lower than SWP graduates. According to studies that assessed the returns to education in all age cohorts, initial vocational training provides almost no statistically important advantage over high school education, whereas secondary vocational training yields positive returns, however lower than returns to higher education [Denisova, Kartseva 2007; Gimpelson, Kapelyushnikov 2011]. Research on young work-

Table 3. **Least-Squares Regression Analysis Results (logarithm of monthly earnings being the dependent variable)**

	All Vocational Graduates	SWP	MLSP
	Coef.	Coef.	Coef.
Education characteristics			
Education level ("0" for SWP, "1" for MLSP)	–0.059**		
Self-funding	0.037***	0.026**	0.060***
Employer sponsorship	0.050	0.042	0.069
Years after graduation from vocational school	0.009***	0.008**	0.010*
Currently pursuing higher education	–0.020*	–0.031***	0.073
Professions/Fields of study (Social Science being the reference variable)			
Natural Science	0.017*	0.013*	
Humanities	–0.009	–0.022	
Teacher Education	0.034*	0.037*	
Healthcare	0.080**	0.050*	
Culture and Arts	–0.024*	–0.022*	–0.160***
Engineering, Technology & Technology Science	0.055***	0.037***	0.102***
Agriculture & Fishing	0.012	0.009	0.037
Combining work and study ("No" being the reference variable)			
Yes, related work experience	0.057***	0.057***	0.097**
Yes, unrelated work experience	0.045***	0.042**	0.046**
Sociodemographic characteristics			
Age	0.015***	0.015***	0.015***
Sex ("1" for male)	0.174***	0.182***	0.152***
Living in a city	0.039**	0.039***	0.028**
Workplace characteristics			
Education-job match	0.052***	0.043***	0.049***
Logarithm of working hours	0.335***	0.307***	0.400***
N of observations / Population size	6,734 / 2,022,823	4,714 / 1,449,367	2,020 / 572,964

Notes: 1. Additional control variables included federal subjects of Russia, workplace characteristics (type of economic activity and occupation), health status, marital status, and parental status. 2. ***—significance level of 0.01, **—significance level of 0.05, *—significance level of 0.10. 3. Standard errors were obtained using the robust method.
Source: SGE, Rosstat, 2016.

ers' salaries revealed returns for graduates in secondary vocational education but no returns to basic vocational training [Roshchin 2006]. Other studies have found no difference in returns to education between high school graduates and workers of all categories, except those who later engaged in higher education [Rudakov 2015].

As for sources of education funding, employer sponsorship has no statistically significant influence on graduates' earnings. In other words, no support has been found for the hypothesis that sponsor employers try to compensate for their expenses by underpaying sponsored graduates.

In Russia's contemporary labor market, graduates who obtained engineering education in basic and secondary vocational schools experience positive returns to education [Denisova, Kartseva 2007]. Findings of this study also provide evidence of returns to medical and engineering education.

One of the key findings in this study is that education-job match provides wage return to all recent vocational graduates. Among graduates employed in the same professions and industries, those who combined study with major-related work tend to be paid more. Probably, when students decide to gain work experience in their field of study, they get access to more attractive jobs. At the same time, most graduates whose employment does not match their qualifications fill jobs that require lower levels of competencies. Returns to combining study and major-related work are higher than returns to unrelated work experience. However, any combination of work and study has positive effects on vocational graduates' salaries at the early career stage. Obviously, graduates who gain work experience by the time they complete their studies acquire additional knowledge and competencies sought by employers.

Summing up, the findings of this study confirm the model of study-to-work transition described by Sergey Roshchin [2006], which implies that combining work and study has positive returns by increasing employability and starting salaries of graduates. The data used in this study only allows evaluating the short-term effects of combining work and study. It is not implausible that in the long run more success will come to students who chose to focus on learning instead of working during their spare time or even at the expense of learning. It has been established, however, that students combining work and study wind up having better soft skills, i. e. being better at time management, taking responsibility, and other competencies that are in high demand in the labor market [Vasilyev, Roshchin, Maltseva 2015]. In addition, a successful career start just after graduation yields considerable returns at subsequent career stages, too [Robst 2007; Zhang 2008]. Further research is necessary to explore the long-term returns to education as a function of different characteristics of the learning process.

Conclusion

Transition from study to work is one of the milestones in any career. If someone cannot find a job for too long a period of time or has to accept unskilled labor jobs during that period, it will have an impact on the rest of their career. In Russia, peak earnings occur pretty early in life, and the peak earning age has decreased even more over the past decade, dropping to 30–35 years in 2015. In most developed countries, earnings peak at older age cohorts [Gimpelson, Kapelyushnikov, Roshchin 2017]. Given that youth population has declined over the past decade [Dudyrev et al. 2017], the cost of early career mistake is growing for young workers as well as for the whole economy.

The Russian model of study-to-work transition suggests that successful employment of graduates should be promoted through student employment. Lots of students combine work and study, mostly in the form of part-time jobs. The most common motivations of such students are the need to earn a living and the desire to gain work experience that will help them develop necessary skills and competencies and add to their competitive edge in the labor market later on [Roshchin 2006].

Successful employment of vocational graduates is a critical indicator of education performance. However, it is not only the very fact of employment but also the levels of salary and the quality of jobs filled by workers that should be considered in assessing effectiveness of study-to-work transition. Otherwise, national policy measures and relevant reporting requirements will describe not the effort results but simply the natural processes typical of the Russian labor market.

The findings confirm feasibility of employer-sponsored education as a relevant national policy measure to increase effectiveness of study-to-work transition among vocational graduates. First, employer-sponsored education is positively related to higher probability of education-job match. Second, employers do not seek to compensate for education-related expenses by underpaying graduates during the required employment period. In this case, transition from education to the labor market is effective not only in terms of graduate placement but also in terms of employment conditions. It appears vital to promote further spread of employer-sponsored education practices and create the conditions to encourage business engagement.

As compared to the situation of 1995–2003 described by Roshchin [2006], nowadays study-to-work transition of vocational graduates looks more like a “ford” than an “slough”. Most graduates find jobs within a short period of time. On average, starting salaries of recent graduates constitute 75 percent of the salaries of vocational graduates of all ages[15]. Yet, some graduates wind up in an “slough” when they get employed as unskilled workers. They may do so out of

[15] Rosstat. Average Gross Payroll by Levels of Educational Attainment. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/wages/labour_costs/#

despair, being unable to afford a longer job search, or as a result of lacking information about the labor market—what salaries they may expect, how to do a successful job search, how to write a résumé, and how to behave in job interviews.

About 40 percent of vocational graduates are mismatched to their jobs. They largely fill positions that require lower levels of competencies than they have acquired and receive lower salaries than they could expect. It could be assumed that graduates with education-job mismatch will invest in themselves more actively to compensate for the lack of knowledge and skills in the profession. However, that is not the case. Graduates mismatched to their jobs are considerably less likely to go to college and hardly ever participate in further education.

From the perspective of education policy, a high degree of education-job mismatch among recent graduates indicates that resources are used ineffectively, meaning that such graduates do not make full use of the skills that they invested into and thus do not receive the expected economic returns.

The results obtained in this study reveal a positive relationship between combining work and study and employability of graduates. Students who combine study with major-related work are more likely to fill matching jobs after graduation. Conversely, when work combined with study is unrelated to the major, graduates are more likely to be mismatched to their jobs. Work experience gained in a particular field translates to specific human capital that yields returns in the form of earnings. It may be that vocational graduates find it hard to refuse from the benefits of staying with the same employer they engaged with as students and start a new career from scratch, even though it would match their skills more. At the same time, students who combined study with major-related work may be initially more motivated to pursue careers in their field of study—that is the reason why they ignored more profitable part-time jobs that would not help them enhance their skills in the selected profession.

A considerable part of the problems associated with study-to-work transition of vocational graduates could be tackled by developing and improving the system of professional orientation in middle school. This is especially important now that more and more vocational students are middle school graduates. Employment of graduates to education-matching jobs can also be promoted by strengthening the relations between vocational schools and employers to provide students with salaried part-time job opportunities related to their majors.

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Academic Leadership Through the Prism of Managerialism: The Relationship Between University Development and Rector's Specialization

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Abstract

The article explores the relationship between rectors' professional backgrounds and the development of the universities governed by them. The basic hypothesis that universities governed by rectors with managerial experience are relatively more successful in their development is tested using a pre-developed classification of rectors' background. Development of universities was assessed by exploring how their academic, research and financial indicators changed over time. The universities were grouped into clusters so that dynamics of indicators were compared for universities with similar performance profiles. The study uses the data on performance of Russian (public and private) universities in 2013 and 2016 which they submitted for the Monitoring of University Effectiveness. Rectors' biographical data was collected from a number of publicly available sources. In addition to the main analysis, the article also presents the demographic characteristics of Russian university rectors.

Keywords

universities, university performance, university effectiveness, new managerialism, rectors, managerial experience.

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SPOCs in University Education: European Experience

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Abstract. The study suggests broadening the taxonomy of MOOC models and provides evidence for the prevalence of Small Private Online Courses (SPOC) among open education models in the post-MOOC era. A systemic literature review[1] is performed to analyze research publications of 2013–2018 on using SPOCs in European university education. It has been found that SPOCs combine well with formal university education in European Bachelor's degree programs when using pedagogical models like blended learning, flipped classroom and collaborative learning. We recommend spreading SPOC practices in Russian higher education to improve the learning motivation of students.

Keywords: massive open online courses, taxonomy, small private online course, European university education, systematic literature review, blended learning, flipped classroom, learning motivation, collaborative learning.

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Over the past decade, open education has engendered a promising yet debatable model of *e*-learning, Massive Open Online Courses (MOOCs). As reported by MOOCWatch, over 2,800 MOOCs existed as of February 2015, being offered by 437 universities and colleges [Mutawa 2016:1652]. MOOC providers—Coursera and EdX—attracted 15 and 5 million users and 130 and 70 corporate partners in 2013–2016, respectively [Croft 2017:876]. The leading MOOC platforms provide courses in the English language. At the same time, the MOOC market is developing in other languages, too. In Europe, it is represented by EU-wide MOOC platforms (iversity and ECO MOOC Project), national projects, such as iMooX in Austria, FUN and MOOC Francophone in France, Miríada X, UNED COMA, COLMENIA and iMOOC in Spain, mooc.HOUSE, OpenHPI and openSAP in Germany, as well as independent university-based platforms.

Research interest in MOOCs and MOOC-related issues manifests itself in a great number of publications, which include books, articles in peer-reviewed journals, and reports at international scientif-

Translated from Russian by I. Zhuchkova.

[1] We would like to thank the authors of the selected studies who provided access to the full texts of their articles.

ic forums. This study uses a sample of studies containing the search terms "MOOC*" or "Massive* Open Online Course*" in their title, indexed in Scopus and Web of Science (WoS) or published in the digital libraries IEEE Xplore DL, ACM DL, Springer Link and Science Direct (accessed May 19, 2018). A total of 3,449 publications with unique titles was sampled. MOOC studies have been *synthesized* in a number of systematic literature reviews (SLR) focusing on the institutional [Sa'don, Alias, Ohshima 2014], psychological [Hakami, White, Chakaveh 2017] and technological [Sanchez-Gordon, Luján-Mora 2017] aspects of using MOOCs.

Metadata of 345 MOOC-related studies contained information on the pedagogical models used in MOOCs, namely adaptive learning, blended learning, collaborative learning, cooperative learning, hybrid learning, micro learning, mobile learning, problem-based learning, self-regulated learning, and flipped classroom. This information was indicated in the titles of 213 articles. Geographic distribution of the publications reflects the leading positions of European researchers in MOOC pedagogy, 73 studies (34.27%) coming from European universities, 64 (30.05%) from Asia, 57 (26.76%) from America, 11 (5.16%) from Australia, and 8 (3.76%) from Africa.

When MOOCs were enjoying a boom in popularity, educators used learning analytics to find solid evidence of MOOC disadvantages [Guo 2017:5965], the key one being the lack of learners' motivation to complete a course, which results in high dropout rates. Another MOOC disadvantage, from the perspective of organization of formal university education, is the difficulty (or, in most cases, impossibility) of incorporating MOOCs into university curricula [Kulik, Kidimova 2017:126].

The aim of this article is to identify and analyze a MOOC model that would counterbalance such disadvantages when being used in higher education.

Scope and Objectives of Research Problem

The focus of theoretical studies has begun to shift from MOOC to other open education models[2], such as LOOC (Little Open Online Course) [Chauhan 2014:10], SPOC (Small Private Online Course) [Datsun, Urazaeva 2016:196; Chauhan 2014:11; Fox 2013], SMOC (Synchronous Massive Open Online Course) [Chauhan 2014:11], and others—designed to reduce the negative effects of MOOCs.

The concept of Small Private Online Course was introduced in pedagogy in 2013 by Armando Fox "as a supplement to classroom teaching rather than <...> a replacement for it" [Fox 2013:38]. Although SPOCs inherit some of MOOC characteristics, they also have unique properties of their own. "SPOCs offer some solution in that students

[2] Regulations on the National Russian Competition of Open Online Courses. Edcrunch Award 2017 (Integrated nomination): http://2017.edcrunch.ru/files/rules_ed_crunch_award_2017–1.pdf?t=1512126099

are selected, which limits numbers of participants, and ensures they satisfy some entry requirements for the course"[3].

The scope of this study includes models of open university education in the post-MOOC era, and the subject is limited to SPOC as a model of open education with the characteristics necessary for integration into formal university education, which are more suitable than those of MOOCs and capable of increasing student motivation.

To analyze how widespread SPOCs are in the learning process, we carried out a systematic review of literature on the experience of using SPOCs in university education by the European academic community that was published between 2013 and 2018.

Research Methodology

The methodology of systematic literature review suggests that sources are searched, selected and analyzed and the results are synthesized as a logical succession of procedures. Any preceding phase in this process serves as a source of inputs for any subsequent stage [Kitchenham 2007:6].

The first phase (planning the review) involved formulation of research hypotheses.

RH1: SPOC is the most widespread model in the post-MOOC era of university education.

RH2: European universities hold the leading position in using and studying SPOCs within the models of open learning in higher education.

Research questions were specified and a review protocol was developed to verify the hypotheses. The body of selected studies is used to evaluate the landscape of SPOC literature, i. e. geography of research teams, subject fields, and levels of educational attainment for which research was performed. Besides, a literature review allows identifying the pedagogical strategies pursued by the European academic community in using SPOC models.

A review protocol specifies the strategy that will be used to search for primary studies as well as study selection criteria. The search strategy for this SLR sets the publishing time frame from 2013 to 2018 (last accessed date May 19, 2018). The search for publications on producing and using SPOCs was performed in scientometric databases and digital libraries: Scopus, WoS, ACM DL, IEEE Xplore DL, Springer Link, Science Direct, and Google Scholar (GS). The search term to look for in the titles was "SPOC*" or "Small Private Online Course*". Studies in the subject field "education" are considered relevant in this review. Inclusion and exclusion criteria are applied to relevant studies

[3] Financial Times Lexicon: http://lexicon.ft.com/Term?term=small-private-online-course-SPOC

Table 1. **Numbers of Studies According to the Review Protocol**

Studies	WoS	Scopus	IEEE Xplore	Science Direct	Springer Link	ACM DL	GS	Total
Found	113	103	31	30	15	14	109	415
Unique	33	40	26	17	14	7	59	196
Relevant	48	23	23	1	11	5	38	149
Primary	3	6	2	1	4	1	10	27

to obtain a set of primary studies. The inclusion criteria suggest selecting the studies produced by European universities and published in scientific journals or proceedings of conferences on higher education. The exclusion criteria serve to exclude literature reviews, technical reports, theses, presentations, poster presentations, and publications of less than three pages.

Research Data

In the second phase (conducting the review), 415 studies are found using the search strategy. The distribution of the studies across digital data storages is shown in Table 1.

Next, 196 unique studies were selected from what was found, of which 149 were kept as relevant. After applying the inclusion and exclusion criteria, a list of 27 primary studies was obtained, which is presented in Table 2. Seventeen publications (63%) were selected from scientometric databases and digital libraries, which ensures a fairly high scientific level of the pool of primary studies.

Next step in this phase, data extraction was performed in accordance with the research questions.

Metadata of the primary studies (publication year and source, authors' countries and institutions) were analyzed to answer the research questions. Disciplines and levels of education programs supported by the SPOC model were identified in the abstracts and/or full texts of the articles. Clustering of pedagogical models was performed across the abstracts (keys: *learning, teaching, instruction*).

Results

This section presents the results of the third phase of SLR.

Table 3 shows the geographic distribution of relevant studies, including those on using SPOCs in university education and on the pedagogical models when using SPOC in higher education.

The distribution of relevant and primary studies by years of publication and publication channels is shown in Table 4.

Tables 5 and 6 systematize the publication channels and show the distribution of the primary studies among them.

Table 2. **The List of Primary Studies Included in the Review**

ID	Bibliographic Details
W1	Alario-Hoyos C., Estévez-Ayres I., Kloos D. C., Villena-Román J. (2017) From MOOCs to SPOCs... and from SPOCs to flipped classroom / 12th European Conference on Technology Enhanced Learning (EC-TEL '17) (Tallinn, 12–15 September 2017). P. 347–354.
W2	Albó Pérez L., Gelpí Arroyo C. (2017) From a FutureLearn MOOC to a blended SPOC: The experience of a Catalan Sign Language course / HybridEd Workshop: Blended Learning (HybridEd '17) (Leganés, 24 May 2017). P. 1–4.
W3	Alvarez-Gil M. J., Montes-Sancho M. J., Tachizawa E. M. (2017) A first approximation to the SPOCs-FC in the context of the Supply Chain Management// WPOM-Working Papers on Operations Management. Vol. 8. Sp. Issue. P. 151–163.
W4	Balaguer R.C., García F. C., de Pinedo Echevarría N. F., González J. P.S. (2016) Aprendizaje autónomo a partir de SPOC's en las asignaturas de Historia Económica / M.A.B. Gutiérrez et al. (eds) Nuevas perspectivas en la investigación docente de la historia económica. Santander: Editorial de la Universidad de Cantabria. P. 197–211.
W5	Croft I. (2017) Using marginal gains to improve MOOCs and SPOCs / International Technology, Education and Development Conference (INTED '17) (Valencia, 6–8 March 2017). P. 876–879.
W6	Ferrari Golinelli G., Santiago Gómez G., Redondo Duarte S., Sánchez Mena A. A. (2015) Desarrollo de competencias transversales en estudiantes de postgrado de la Universidad Europea a través de un Small Private Online Course / XII Jornadas Internacionales de Innovación Universitaria Educar para transformar (JIIUE '15) (Villaviciosa de Odón, 20–21 July 2015). P. 497–505.
W7	Ferreira A. (2015) Du MOOC au SPOC: Classe inversée en langue de spécialité / Colloque Questions de Pédagogie dans l'Enseignement Supérieur (QPES '15) (Brest, 16–19 June 2015). P. 546–553.
W8	Filius R., Verdonk N. (2017) SPOCs in the Spotlight// Opleiding & Ontwikkeling (Op & On). Vol. 1. P. 12–17.
W9	Filius R.M., De Kleijn R. A.M., Uijl S. G., Prins F. J., Van Rijen H. V.M., Grobbee D. E. (2018) Challenges concerning deep learning in SPOCs// International Journal of Technology Enhanced Learning (IJTEL). Vol. 10. No 1–2. P. 111–127.
W10	Freitas A., Paredes J. (2018) Understanding the faculty perspectives influencing their innovative practices in MOOCs/SPOCs: A case study// International Journal of Educational Technology in Higher Education (IJETHE). Vol. 15. No 1. P. 1–1.
W11	García F., Martin D., de la Escalera A., Armingol J. M., Al-Kaff A.H. (2016) Enhancing engineering learning through SPOC courses// International Journal of Technologies in Learning (IJTL). Vol. 23. No 3. P. 15–20.
W12	Guillot C., Buisine E., Edouard J. (2015) Implementing a gamified SPOC: Feedbacks from a business school experience / International Conference on Education and New Learning Technologies (EDULEARN '15) (Barcelona, 6–8 July 2015). P. 5762–5769.
W13	Kany F., Louédoc B. (2017) A SPOC produced by sophomores for their junior counterparts / International Conference on Smart Education and e-Learning (SEEL '17) (Vilamoura, 21–23 June 2017). P. 120–128.
W14	Kaplan A.M., Haenlein M. (2016) Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster// Business Horizons (BH). Vol. 59. No 4. P. 441–450.
W15	Kloos C.D., Muñoz-Merino P.J., Muñoz-Organero M., Alario-Hoyos C., Perez-Sanagustín M., Parada H. A., Ruipérez-Valiente J.A., Sanz J. L. (2014) Experiences of running MOOCs and SPOCs at UC3M / Global Engineering Education Conference (EDUCON '14) (Istanbul, 3–5 April 2014). P. 884–891.
W16	López de la Serna A., Castaño Garrido C., Herrero Fernández D. (2018) Integración de los cursos SPOC en las asignaturas de grado. Una experiencia práctica// Pixel-Bit. No 52. P. 139–149.
W17	Martinez-Muñoz G., Pulido E. (2015) Using a SPOC to flip the classroom / Global Engineering Education Conference (EDUCON '15) (Tallinn, 18–20 March 2015). P. 431–436.
W18	Michou V., Bottin-Rousseau S., Rauzy A. (2017) Deploying a SPOC creation strategy at UPMC / 5th European MOOC Stakeholders Summit (EMOOCs '17) (Leganés, 22–26 May 2017). P. 16–21.
W19	Muñoz-Merino P.J., Méndez Rodríguez E. M., Delgado Kloos C. (2014) SPOCs for remedial education: Experiences at the Universidad Carlos III de Madrid / 2nd European MOOC Stakeholders Summit (EMOOCs '14) (Lausanne, 10–12 February 2014). P. 271–275.
W20	Muñoz-Merino P.J., Rodríguez E. M., Kloos C. D., Ruipérez-Valiente J.A. (2017) Design, implementation and evaluation of SPOCs at the Universidad Carlos III de Madrid// Journal of Universal Computer Science (J.USC). Vol. 23. No. 2. P. 167–186.
W21	Naert F. (2015) MOOCs, SPOCs, DOCCs and other bugs// SSRN Electronic Journal (SSRN Elect. J.). January. P. 1–7.
W22	Piccioni M., Estler C., Meyer B. (2014) SPOC-supported introduction to programming / Conference on Innovation & technology in computer science education (ITiCSE '14) (Uppsala, 21–25 June 2014). P. 3–8.
W23	Santiuste C., Pernas-Sánchez J., Artero-Guerrero J.A., Varas D. (2017) Diseño de Aprendizaje basado en Flipped Classroom utilizando SPOCs en una Asignatura de Ingeniería / 5th European MOOCs Stakeholders Summit (EMOOCs '17) (Leganés, 22–26 May 2017). P. 45–53.
W24	Santiuste C., Pernas-Sánchez J., Artero-Guerrero J.A., Varas D., Ruiz-Navas E., Segovia D. (2017) Design of a learning method based on Flipped-Classroom methodologies using SPOCs in an engineering course / 45th SEFI Annual Conference. Education Excellence for Sustainability (SEFI '17) (Azores, 18–21 September 2017). P. 407–413.
W25	Uijl S., Filius R., Ten Cate O. (2017) Student interaction in Small Private Online Courses// Medical Science Educator (Med. Sci. Educ.). Vol. 27. No 2. P. 237–242.
W26	Vaysse C., Chantalat E., Beyne-Rauzy O., Morineau L., Despas F., Bachaud J.-M., Caunes N., Poublanc M., Serrano E., Bugat R., Rougé Bugat M.-E., Fize A.-L. (2018) The impact of a Small Private Online Course as a new approach to teaching oncology: Development and evaluation// JMIR Medical Education (JMIR Med. Educ.). Vol. 4. No 1. Article e6.
W27	Ziebarth S., Hoppe H. U. (2014) Moodle4SPOC—A Resource-Intensive Blended Learning Course / 9th European Conference on Technology Enhanced Learning (EC-TEL '14) (Toledo, 15–18 September 2014). P. 359–372.

Table 3. **The Geographic Distribution of Relevant Studies and Publications on University Education**

	Relevant studies			
		on university education		
			on pedagogical models	
	Total	Total	in metadata	in titles
Europe	22.15	20.30	21.54	17.86
Asia	70.47	72.93	73.85	75
America	5.37	5.26	3.08	3.57
Australia	0	0	0	0
Africa	2.01	1.50	1.54	3.57
Total	149	133	65	28

Table 4. **The Distribution of Relevant and Primary Studies by Publication Channels**

	Relevant studies				Primary studies			
Year	Journals	Conferences	Books	Total	Journals	Conferences	Books	Total
2013	1	1	0	2	0	0	0	0
2014	1	8	0	9	0	4[1]	0	4
2015	3	15	0	18	1[2]	4[3]	0	5
2016	11	26	0	37	2[4]	0	1[5]	3
2017	19	55	1	75	4[6]	7[7]	0	11
2018	8	1	0	9	4[8]	0	0	4
Всего	43	105	1	149	11	15	1	27

[1] W15, W19, W22, W27.
[2] W21.
[3] W6, W7, W12, W17.
[4] W11, W14.
[5] W4.
[6] W3, W8, W20, W25.
[7] W1, W2, W5, W13, W18, W23, W24.
[8] W9, W10, W16, W26.

Publications by authors from six European countries, presented in Table 7, were selected to make the list of primary studies.

The studies on using SPOCs were produced by authors from 18 European institutions of higher education (Table 8).

The subject fields in which the SPOC model is applied are specified explicitly in 24 studies (Table 9).

Information on the levels of education programs is specified explicitly in 22 primary studies, which account for 81.50% of the total list (Table 10).

Table 5. **Information on the Journals and the Distribution of Primary Studies among Them**

Journal	Subject Field "Education"	Based in Europe	SJR/ Quartile (2017)	N of Publications				
				Year				Total
				2015	2016	2017	2018	
BH	–	–	1.240/Q1	0	1	0	0	1
IJETHE	+	–	0.390/Q2	0	0	0	1	1
IJTL	+	–	0.111/Q4	0	1	0	0	1
IJTEL	+	+	0.229/Q3	0	0	0	1	1
JMIR Med. Educ.	+	–	–	0	0	0	1	1
J.USC	–	+	0.357/Q2	0	0	1	0	1
Med. Sci. Educ.	+	–	–	0	0	1	0	1
Op & On	+	+	–	0	0	1	0	1
Pixel–Bit	+	+	–	0	0	0	1	1
SSRN Elect. J.	–	–		1	0	0	0	1
WPOM	–	+	–	0	0	1	0	1
Total	7	5	–	1	2	4	4	11

Source: https://www.scimagojr.com

Table 6. **Information on the Scientific Events and the Distribution of Primary Studies among Them**

Scientific Event	Subject Field "Higher Education"	Held in Europe	Ranking / Source (2017)[1]	N of Publications			
				Year			Total
				2014	2015	2017	
EMOOCs	–	+	0.167 (12th percentile)[2]	1	0	2	3
EDUCON	+	–	B4/Qualis[1]	1	1	0	2
EC–TEL '14	–	+	B2/Qualis[1]	1	0	1	2
EDULEARN '15	–	–	–	0	1	0	1
HybridEd '17	–	–	–	0	0	1	1
INTED '17	–	–	B4/Qualis[1]	0	0	1	1
ITiCSE '14	–	–	B1/Qualis[1]	1	0	0	1
JIIUE '15	+	–	–	0	1	0	1
QPES '15	+	–	–	0	1	0	1
SEEL '17	–	–	0.173 (16th percentile)[2]	0	0	1	1
SEFI '17	–	–	–	0	0	1	1
Total	4	3	–	4	4	7	15

[1] http://www.conferenceranks.com/
[2] https://www.scopus.com

Table 7. **The Distribution of Numbers of Publications by European Countries**

Country	2014	2015	2016	2017	2018	Total
Spain	2	2	2	7	2	15
France		2	1	2	1	6
Netherlands				2	1	3
Belgium		1				1
Germany	1					1
Switzerland	1					1
Total	4	5	3	11	4	27

Table **8. The Distribution of Numbers of Primary Studies among European Institutions of Higher Education**

	Studies	Institution	Studies
Universidad Carlos III de Madrid	8 (W1, W3, W11, W15, W19, W20, W23, W24)	Institut Supérieur d'Electonique et du Numérique	1 (W13)
Utrecht University	3 (W8, W9, W25)	Institut Universitaire du Cancer de Toulouse-Oncopole и Université Paul Sabatier Toulouse III	1 (W26)
Universidad Autónoma de Madrid	3 (W4, W10, W17)	Instituto de Empresa Madrid	1 (W5)
École Navale	1 (W7)	Universidad del País Vasco	1 (W16)
École supérieure de commerce de Paris Europe	1 (W14)	Universidad Europea de Madrid и UEV Universidad Europea de Valencia	1 (W6)
Eidgenössische Technische Hochschule Zürich	1 (W22)	Universität Duisburg-Essen	1 (W27)
Ghent University	1 (W21)	Universitat Pompeu Fabra	1 (W2)
Institut d'Economie Scientifique et de Gestion	1 (W12)	Université Pierre et Marie Curie	1 (W18)

Table 9. **The Distribution of Numbers of Publications by Subject Fields**

Subject Field	Primary Studies	Relevant Studies
STEM (Science, Technology, Engineering and Mathematics)	7[1]	27
Social Sciences	5[2]	21
Information Technology	4[3]	40
Medicine	3[4]	7
Linguistics	2[5]	21
Pedagogy & Education Technology	2[6]	7
Natural Science & Other Sciences	1[7]	2
Total	24	125

[1] W13, W15, W18, W19, W20, W23, W24.
[2] W3, W4, W5, W12, W14.
[3] W1, W11, W17, W22.
[4] W9, W25, W26.
[5] W2, W7.
[6] W16, W27.
[7] W10.

Table 10. **The Distribution of Numbers of Primary Studies by Levels of Education Programs**

Level of Education Program	Primary studies	Relevant studies
Bachelor's degree	13[1]	114
Master's degree	4[2]	11
Post-graduate studies	1[3]	1
Business school	3[4]	3
Professional military education	1[5]	1
Total	22	130

[1] W1, W4, W9, W13, W15, W16, W17. W18, W19, W20, W22, W23, W24.
[2] W5, W11, W25, W27.
[3] W6.
[4] W3, W12, W14.
[5] W7.

Table 11. **The Distribution of Studies across the Pedagogical Models Discussed in SPOC-Related Studies**

Pedagogical Model	Первичные публикации	Релевантные публикации
Flipped classroom	10[1]	42
Blended learning	8[2]	43
Collaborative learning	7[3]	17
Cooperative learning	2[4]	8
Hybrid learning	0	14
Mobile learning	0	7
Self-regulated learning	0	4
Deep learning	0	3
Model-based learning	0	1
Problem-based learning	0	1
Total	27	140

[1] W1, W3, W7, W14, W15, W17, W18, W19, W23, W24.
[2] W2, W3, W4, W5, W14, W18, W19, W27.
[3] W5, W13, W14, W23, W25, W26, W27.
[4] W14, W27.

In order to identify the pedagogical strategies that the European academic community applies in using the SPOC model, four clusters of pedagogical models discussed in SPOC-related studies were constructed using a word cloud generator[4] and SEO

[4] https://tagcrowd.com/

analysis[5]: blended learning, collaborative learning, cooperative learning, and flipped classroom. The distribution of studies among the identified clusters is shown in Table 11.

Discussion

This systematic literature review has found 149 relevant studies on Small Private Online Courses. In order to compare the contribution of SPOC-related studies to the overall stream of publications on open education models, additional search was performed for studies on other models of the post-MOOC era published in 2013–2018, which yielded 47 papers. The distribution of those papers with due regard to the two dimensions used in taxonomy [Pilli, Admiraal 2016:226] is presented in Figure 1, numbers of publications being parenthesized. This review adds five more models to the above taxonomy:

- SOOC (Strategic Open Online Course) [Raza 2014] as integration of SPOC and MOOC-Eds;
- sMOOC (Social MOOC [Frau-Meigs, Bossu 2017] or Social participatory MOOC [Gil-Quintana, Camarero-Cano 2017]);
- ahMOOC (Adaptive Hybrid MOOC) [García-Peñalvo, Fidalgo-Blanco, Sein-Echaluce 2018] as integration of hybrid [Perez-Sanagustin et al. 2017] and adaptive MOOC [Ewais, Samra 2017];
- professional MOOC [Granow, Dörich, Steinert 2014], which should be regarded as a generalized model of MOOC-Eds [Kellogg, Edelmann 2015]; and
- MOOE (Massive Open Online Experiments) [Wenai 2015].

Studies on SPOCs account for 76.02 percent of the total number of publications on post-MOOC era models, and studies on using SPOCs in higher education account for 67.86 percent. It can be concluded that SPOC is the most widespread model of the post-MOOC era in university education, which confirms the first hypothesis of this study.

Analysis of the geographic distribution of the authors of relevant studies found a high prevalence of Asian researchers in publications on SPOCs and their use in university education. Most relevant studies (96 papers, or 64.43%) are authored by Chinese scholars, which indicates indirectly that the quality of higher education is a priority in China. The Chinese government is implementing the Ten-Year Development Plan for Education Informatization (2011–2020) [Zhang, Zhang 2016], which envisaged expanding the infrastructure of education informatization and integrating information resources into the learning process by 2015. This plan became the basis for subsequent

[5] https://miratext.ru/seo_analiz_text

Figure **1. The Distribution of Studies on MOOC Models**

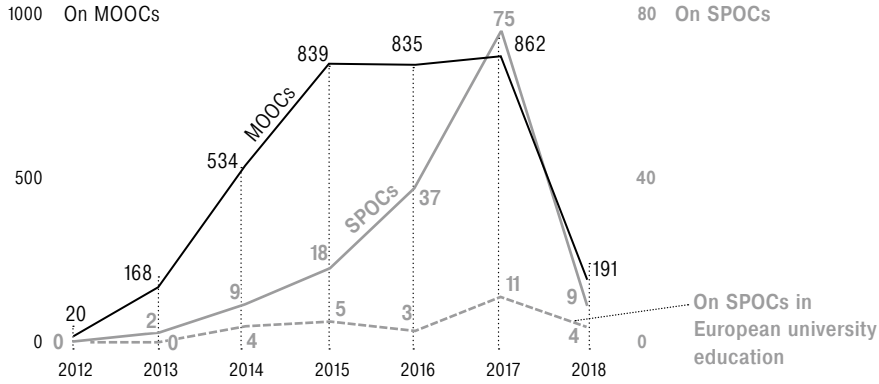
Massiveness	Openness	
	Less open	More open
Small scale	SSOC (1) SPOCs (149) groupMOOCs (1) task-based MOOCs (1) SOOC (1)	BOOCs (2) COOCs (1) DOCCs (1) gMOOCs (2) / GBL MOOCs (1) pMOOCs (1) network-based MOOCs (1) sMOOCs (2) adaptiveMOOCs (3)
	ahMOOC (1)	
Large scale	HOOCs (6) / BOOC (3) mini-MOOCs (2) VOOCs (1) SMOOCs /SynchMOOCs (2) POOCs (Personalized OOC) (1)	madeMOOCs (1) Self-Paced Online Course (3) Content-based MOOCs (1) flex-MOOCs (1) iMOOC (2) MOOC-Eds (1) MOORs (2) professional MOOC (1) MOOE (1)

governmental decisions on incentivizing educational institutions to use *e*-learning models within the frameworks of Concept of Internet + (2015) and the Education Informatization Thirteenth Five-year Plan (2016) [Zhang et al. 2017]. *The 2017 Education Informatization Work Points* (2017) issued by the Ministry of Education of China and designed to advance education informatization and improve the quality of higher education [Ibid.] determine the directions for reforming the whole Chinese university system, including the SPOC-based learning model [Sui 2017], flipped classroom [Sun, Zhang, Jing 2017], mobile learning and gamification [Cao 2016]. Therefore, the second hypothesis has not been confirmed by this systematic literature review, as the leading role in using and studying SPOC in open university education models belongs to Chinese universities. European publications are interesting from the perspective of using new open education models integrated into formal university education—not at the national but at the institutional and cross-national levels.

The number of studies on using SPOCs in European university education increased from four in 2014 to eleven in 2017 after slumping to three in 2016. The same period witnessed an increase in the number of publications devoted to both MOOCs and SPOCs in general (Fig. 2).

Systematization of the publication channels by two dimensions, "subject field" and "based in Europe", reveals that only three articles (W8, W9, W16) are represented in European education research journals, while the rest are published in periodicals that focus on more

Figure 2. **The Distribution of Studies on MOOCs and SPOCs Published in 2012–2018** (Number of Studies)



SPOC-related subject fields, which means that such studies are more applied in nature. The studies on the topic of this SLR (and SPOCs in general) are not found in the high-ranking journals where most findings on MOOCs are represented, namely *The International Review of Research in Open and Distributed Learning*, *British Journal of Educational Technology*, *Computers & Education*, *Computers in Human Behavior*, *Educational Media International*, and *Journal of E-Learning and Knowledge Society*; the same is true for the journals on university education.

All the reports on SPOCs were presented at scientific events dedicated to open education and *e*-learning issues, so the dimension "subject field" was reduced to "university education" when the scientific events were systematized. No reports on SPOCs were found in the proceedings of European conferences on university education. Most reports are dispersed among conferences with more general topics (*e*-learning) and highly specialized scientific forums (engineering or linguistic education). No reports on the topic of this systematic review (or SPOCs in general) were found in the proceedings of major MOOC conferences: *ACM Conference on Learning at Scale (L@S)*, *IEEE International Conference on MOOC, Innovation and Technology in Education (MITE)*, *Learning with MOOCs (LWMOOCS)*, and the European conferences under the auspices of Erasmus+: *MOOC–Maker* and *International Conference MOOCs, Informal Language Learning, and Mobility.*

Of all the studies found, 55.56 percent were produced by Spanish researchers. Spanish universities dominate the European MOOC market, offering their courses through Iberian platform *Miríada X*. The studies by Spanish and French authors have two important characteristics in common: (i) they do not come from metropolitan universities

alone, and (ii) both countries feature collaboration between two higher education institutions. There are examples of successful trans-continental collaboration aiming at creating and using SPOCs in lifelong learning with the participation of European universities [Mazzardo, Nobre, Mallmann 2016; Yamba-Yugsi et al. 2017], yet no international higher education projects were found in the European region.

Universidad Carlos III de Madrid is the hands-down leader by the number of publications. Four of them (50%) were created by a research team led by Carlos Delgado Kloos (W1, W15, W19, W20), who has many years' experience of integrating the SPOC model into the learning process in university education, from design through implementation to evaluation.

As for the subject fields in which SPOCs are offered, 33.33 percent of the primary studies are devoted to courses in natural and engineering science (the proportion being 10 percent lower in the relevant studies). Such prevalence of these subject fields in SPOC-related studies is due in no small part to the difficulties associated with enrolling students to engineering degrees in European universities and the need to bring their skills into compliance with the higher school requirements (W10, W12, W19, W20).

Judging by the fact that the sample largely consists of studies focusing on Bachelor's degree programs (59.09 percent of primary and 89.23 percent of relevant studies), SPOC is indeed a better choice than MOOC for students with weak ability to control themselves [Guo 2017:5961]. Further analysis demonstrates that 61.54 percent of the studies on Bachelor's degree programs in Europe (W1, W13, W15, W17, W18, W19, W20, W22) have freshmen as their target group, for whom remedial courses in mathematics, physics and chemistry are offered to prepare them for university study (W19, W20).

As we can see, the results obtained basically support the belief that "MOOC well adapts for basic theory education, while SPOC applies to professional skills education" [Guo 2017:5961].

By comparing the shares of studies on using SPOCs in various learning contexts, inferences can be made about the pedagogical models in which European authors have experience of using SPOCs.

Equal shares of publications on using SPOCs in blended learning [Graham 2006:3] are found in the primary (29.63%) and relevant (30.00%) studies, and the flipped classroom model as a special case of blended learning is also discussed with pretty much similar incidence [Bergmann, Sams 2012:13]—37.04 and 30.71 percent, respectively.

In blended learning, student activities are divided into three components: pre-classroom activities, classroom activities, and post-classroom activities. The SPOC model redefines the roles of those learning process components (W27):

- Classroom lectures give the basic definitions and a limited number of characteristic examples presented as themed videos through

an online platform, shifting the focus of classroom activity from teacher to student-centered learning;
- Out-of-class activities may take the form of online assignments extending the concepts given in classroom lectures;
- Classroom activities may include discussion forums where results of virtual exercise activities.

Whatever the version, blended learning is always more effective than either face-to-face or fully online learning approaches [Cheng et al. 2017]. Syllabi are redesigned to allow the use of SPOCs, and blended learning changes into transformative learning (W27), which transforms the pedagogical model. Instead of being passive receivers of information, students interact actively to generate knowledge (W1, W5, W9, W12, W13).

The modification of blended learning into flipped classroom consists in that traditional knowledge is disseminated outside the classroom (SPOC-supported online materials (W14)), while classroom time is used for discussion. This systematic review has identified the objectives that prompted European universities to use the SPOC-based flipped classroom model in the learning process:

- Bring high school graduates' skills in the basic academic disciplines into compliance with university requirements (W15);
- Reallocate younger students' classroom time in favor of teacher-directed practical activities, reducing time allotted for theory in IT (W1, W17) and complex STEM disciplines (W12);
- Attract senior students into specific disciplines in the context of high competition among department courses by integrating innovative technologies (W5).

The systematic review also allowed describing the features of the life cycle of SPOCs designed for flipped classrooms:

- Video materials are improved to meet the needs of the target audience (W5, W18);
- Students use SPOCs outside the classroom to study independently the whole course (W15) or some selected topics (W1, W5, W15, W17, W18) and do their home assignments online (W1); normally, students are recommended to move through SPOC materials in keeping with the course structure;
- Time for teacher-student interactions in the classroom is allocated with due regard to the learning objectives in SPOC environments (W1, W5, W15, W17).

A niche has thus been found for using SPOCs in university education: "Using multimedia contents and features, such as auto-grader, from a MOOC and pedagogies such as blended learning, a SPOC organ-

ically integrates MOOC into traditional on-campus classrooms." [Xu et al. 2014]

SPOCs are more suitable than MOOCs for students with low motivation for learning, yet they also use student motivation tools, such as collaborative and cooperative learning techniques. Publications on using collaborative learning account for 25.93 percent in the primary studies and 8.15 percent in the relevant ones, and those on using cooperative learning strategies account for 7.41 and 6.71 percent, respectively.

Two types of MOOC are commonly distinguished, (i) cMOOC (connectivist MOOC) based on connectivism theory where knowledge is constructed through social interactions, and (ii) xMOOC (MOOC as eXtension) which uses cognitive behavioral theory and a more traditional course structure [Kaplan, Haenlein 2016:448]. In collaborative learning, students set shared goals and accomplish the learning mission together [Kuo, Young 2016:169]. The findings of this systematic review show that:

- Classification by this dimension can also be applied to SPOCs, as the primary studies feature both xSPOC (W1, W2, W3, W11, W12, W14, W15, W17, W18, W19, W20, W22, W23, W24, W26) and cSPOC (W13, W25, W27);
- cSPOC is less widespread than xSPOC, the same being true for MOOC.

When assessing the efficiency of SPOCs and SPOC-supported pedagogical models, European scholars use objective measures of learning analytics (W5, W12, W11, W17, W18, W15, W20, W22, W25) as well as subjective student perceptions, i. e. student feedback (W1, W18, W22, W27) and student participation in course evaluation (W5). Objective measures confirm that SPOCs reduce unpredictability which is typical of MOOCs, and combining classroom and out-of-class activities in SPOC environments allows more effective control over the learning process, thus improving academic performance (W11, W17, W18, W22, W25). Although SPOC, unlike MOOC, implies face-to-face student-teacher interactions, analysis of student activities shows growing use of forums for online interactions (W18, W25). Students report an increase in their learning motivation (W1, W22) which results in enhanced participation in the SPOC-supported class (W12, W17, W18, W22, W25). Course developers focus on encouraging extrinsic motivation [Datsun, Urazaeva 2017:16] by crediting additional points to the final course grade for successful completion of SPOCs (W11) or by gamifying SPOCs (W22).

Conclusion

This study suggests broadening the two-dimensional taxonomy of MOOC models. Analysis and systematic review of literature on using

Small Private Online Courses (SPOCs) in university education confirms the research hypothesis about the prevalence of SPOCs among open education models in the post-MOOC era of higher education. The systematic review also proves this new area of research to be common in Europe but does not support the hypothesis that Europe is the leader in SPOC research, the leading positions being held by Chinese universities.

Using the selected search strategy, a systematic review of studies published in Scopus, Web of Science, ACM DL, IEEE Xplore, Springer Link, Science Direct and Google Scholar in 2013–2018 revealed 415 publications. After duplicate studies had been removed and the inclusion and exclusion criteria had been applied, the final list of 27 studies was obtained.

Fluctuations in the number of studies on SPOCs are substantially similar to those in the number of MOOC-related publications (account taken of a time lag of 12–18 months and expected stabilization after 2018). Publication activity of European authors increased from four studies in 2014 to eleven in 2017 (slumping to three in 2016). Scholars published their findings in eleven European and international journals, of which none, however, belonged to the high-ranking journals where most studies on MOOCs are represented. Even though European SPOC researchers presented their papers at eleven scientific events, those papers did not receive attention from the European conferences on higher education or the leading conferences on MOOCs.

Studies on using SPOCs in university education came from six European countries. Leadership in SPOC integration practices in Europe belongs to Universidad Carlos III de Madrid, the experience of which deserves in-depth examination and dissemination. The systematic review revealed some cooperative projects on the production and promotion of SPOCs initiated by Spanish and French universities. However, the benefits of international cooperation in SPOC production with support for the Erasmus+ Program have largely been unused in European university education so far.

Most often, European universities integrate SPOCs into natural science and engineering courses. Over half of the SPOCs are used in Bachelor's degree programs, mostly during the freshman year. Results of the systematic review are consistent with earlier findings, showing that SPOCs are effective in teaching students with motivation levels lower than those of MOOC learners.

SPOCs and MOOCs have different target audiences, SPOC learners being represented by on-campus students. However, universities have to redesign their learning process and all of its components when using SPOCs in order to enhance student motivation. European scholars demonstrated successful experience of using SPOCs in some student-centered pedagogical models. Most often, universities use SPOCs as the basis for blended learning, flipped classroom (as a special case of blended learning), and collaborative learning. These

results confirm the previous findings that SPOCs combine with formal university education better than MOOCs.

Redesign of pedagogical, content and technology aspects of university courses to integrate SPOCs is found to have increased the motivation and learning satisfaction of European students, enhanced their transversal competencies, and provided opportunity for social construction of knowledge. In addition, the publications reviewed show that using SPOCs in European university education creates conditions for improving academic achievement and facilitating the use of blended learning.

Based on the results obtained in this study, SPOCs can be recommended for use in Russian higher education under the blended learning paradigm to increase student motivation.

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Competitive Strategies of Vocational Schools and Universities in Implementing Continuing Education Programs

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Abstract. Open statistics is analyzed to examine the successful strategies of implementing continuing education (CE) programs by vocational schools and universities. The study identifies the industries that benefit from those successful strategies the most. In vocational schools, such industries include medicine, oil and gas production and chemical processing, transport, mining and metallurgy, electrical engineering and telecommunications, pedagogy, tertiary sector, architecture and construction. As for higher education, CE programs are pursued most actively by medical, multidisciplinary, pedagogical, law and economics, and polytechnic universities. A relationship has been established between CE enrollment and general student population.

Implementation of CE programs contributes to financial sustainability of vocational institutions. Successful strategies may ensure from 25 to 40 percent of the total budget in educational institutions that specialize in oil and gas production and chemical processing, medicine, electrical and power engineering, ICT, law and economics. Efficient strategies include narrow specialization and collaboration with strategic enterprises, while online marketing tools play a relatively small part.

Continuing education was found to contribute little to financial sustainability of large national universities despite higher CE enrollments, barely accounting for five percent of their total budget. At the same time, a number of small institutions of higher education (regional branch campuses and private universities) can generate over half of their income from CE programs, university status playing a guiding role in student attraction. Analysis of university strategies shows that low interest in implementing

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CE programs for the good of regional industries is related to the absence of CE-based indicators in annual monitoring reports and the lack of established policies for integrating CE programs into higher education.

Keywords: adult education and learning, continuing education, university, vocational school, successful strategies in education.

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Professional development and training is one of the most common types of continuing education. Such educational services are largely provided by universities, continuing education institutions, and vocational schools.

With population ageing and student enrollments reducing, adult education becomes a rapidly growing segment in higher education the world over [Hinton 2012]. Strategic plans of nearly 60 percent of U.S. higher education institutions report a significant increase in adult students in their lifelong learning programs [Cook, King 2005].

Back in the Soviet Union, centralized planning was employed to meet the economy's demand for skilled labor force, in professional occupations in particular. In the post-Soviet era, solutions depend on the market situation and the ability of an educational institution to develop a successful strategy adequate to the currently existing socioeconomic needs.

The goal of this study was to analyze the results of implementing competitive strategies in continuing education (CE) by public vocational schools and universities. For this purpose, relations were examined among target industries, terms of program implementation, effectiveness of attracting learners in the CE market, and nascent opportunities for increasing the financial sustainability of educational institutions. The success measures included CE enrollment size, number of CE programs offered, tuition, and financial outcomes of program implementation.

The study is based on Federal State Statistics Service (Rosstat) statistics[1], open data of the Ministry of Education and Science of Russia[2] [3], findings of the Monitoring of University Effectiveness[4], and the information that educational institutions are required to publish on their official websites. The latter includes data on the education pro-

[1] Federal State Statistics Service (2017) *Povyshenie kvalifikatsii i professionalnaya podgotovka rabotnikov organizatsiy v 2016 g. Tom I* [Employee Training and Development in 2016. Volume I], Moscow: Rosstat.

[2] Information on Learning in Organizations Implementing Continuing Education Programs in 2016 According to Form 1-PK: http://opendata.mon.gov.ru

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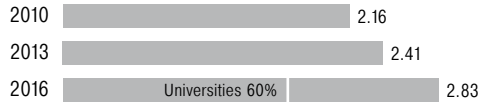
Figure 1. **Growth in the Number of Adult Students in CE: Years 2010, 2013, and 2016**, according to Rosstat (mln people)



Source: Federal State Statistics Service (2010) *Dopolnitelnoe professionalnoe obrazovanie rabotnikov v organizatsiyakh v 2010 g.: statisticheskiy byulleten. Tom I* [Employee Continuing Vocational Education and Training in 2010: Statistical Bulletin. Volume 1], Moscow: Rosstat; Federal State Statistics Service (2013) *Dopolnitelnoe professionalnoe obrazovanie rabotnikov v organizatsiyakh v 2010 g.: statisticheskiy byulleten. Tom I* [Employee Continuing Vocational Education and Training in 2013: Statistical Bulletin. Volume 1], Moscow: Rosstat; Federal State Statistics Service (2017) *Povyshenie kvalifikatsii i professionalnaya podgotovka rabotnikov organizatsiy v 2016 g. Tom I* [Employee Training and Development in 2016. Volume I], Moscow: Rosstat.

grams being administered, their cost, finance and business operations, self-study reports, evidence of completion, availability of a resource center or applied skills center, and interactions with industrial and social partners.

Continuing education programs are the fundamental component of the adult education and learning system in Russia, CE graduates accounting for over 44 percent of employed adults (aged 25 to 64) [Korshunov et al. 2018]. The absolute number of CE students is growing by 5 percent on average yearly (Fig. 1).

Over 3,400 universities and vocational schools serve 80 percent of all CE students, remaining the largest providers in this market. Universities have larger CE enrollments (1.686 million students in 2016, or 60% of total CE enrollment) than vocational schools (604,000 students, or around 21%), even though vocational institutions implementing CE programs are almost twice as many as universities offering the same services, and their number is trending upward. Independent CE organizations have also become a lot more common in Russia, but they cannot boast great contributions to the population of CE students (about 19%). As a comparison, the percentage of CE courses taken at university or college in the United States was only 18 percent in 2004[5].

Adult Learning in the System of Vocational Education

There are about 1,800 institutions of vocational education in Russia, which can be classified by target industries for which their education programs are given. Nearly one third of all vocational schools are multidisciplinary (Fig. 2), but the largest CE enrollments are observed in medicine, followed by multidisciplinary, architecture and construction, pedagogical, transport, and other categories (Fig. 3).

[5] National Center for Education Statistics. Digest of Educational Statistics: https://nces.ed.gov/programs/digest/2004menu_tables.asp

Figure 2. **The Breakdown of Vocational Schools Offering CE Programs by Industry** (%)

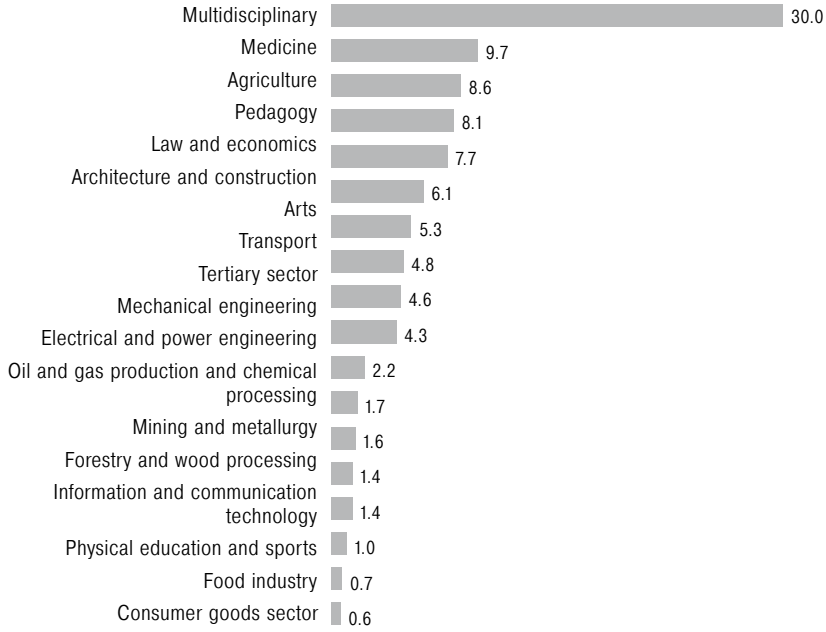


Figure 3. **The Distribution of CE Students Attending Vocational Schools by School Specialization** (%)

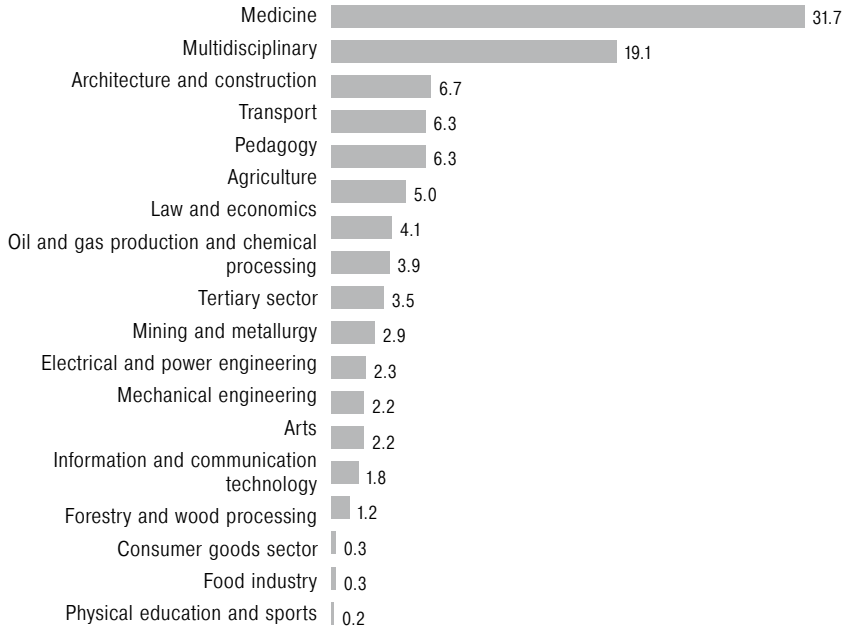
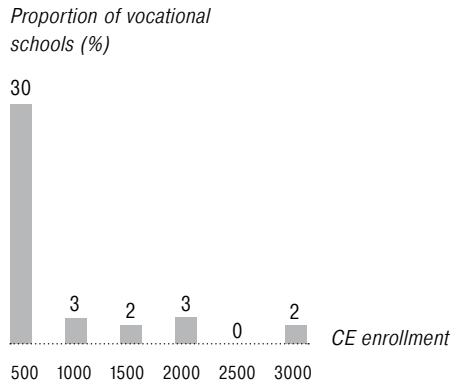


Figure 4. **The Distribution of Vocational Schools Specializing in Architecture and Construction by CE Enrollment**



Not all vocational schools engage actively in adult education. Successful CE strategies ensuring over 500 adult students yearly (which is equal to average general enrollment of Russian vocational schools) are pursued, on average, by only 16 percent of the institutions in every industry, enrollments of most vocational schools being under 500. To compare, U.S. two-year community colleges enrolled 2.6 million people aged 25 and older in CE classes in 2001, which accounted for 44 percent of their total candidates that year[6].

Figure 4 shows the distribution of vocational schools specializing in architecture and construction by CE enrollment. The nature of such distribution depends very little on the industry and reflects the existing level of management in continuing education.

We assessed the number of successful vocational schools with CE enrollments over 500 in every industry and estimated their proportion in the total number of vocational schools in the given industry (Fig. 5). Competitive adult education strategies are developed most effectively in such industries as medicine, oil and gas production and chemical processing, transport, mining and metallurgy, electrical engineering and telecommunications, pedagogy, the tertiary sector, and architecture and construction.

Analysis of publicly available information from college websites shows that industry specialization of CE programs offered by vocational schools usually matches their own specialization. Successful educational institutions do not waste their effort offering non-core programs in subject fields where they lack professional competence and recognition among employers capable of supplying an influx of people willing to engage in professional development and training.

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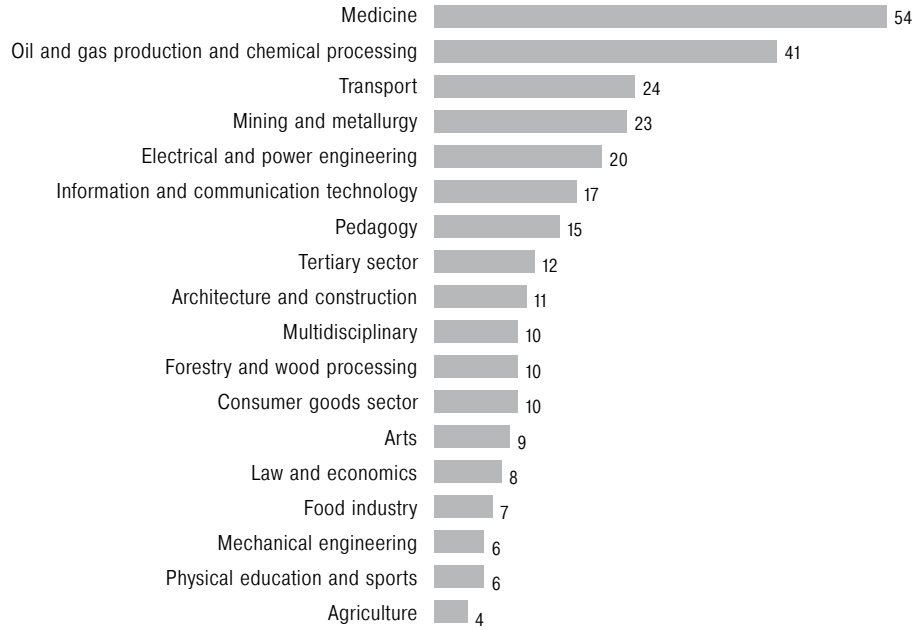
[6] National Center for Education Statistics. Digest of Educational Statistics: https://nces.ed.gov/programs/digest/2004menu_tables.asp.

Figure 5. **Proportions of Vocational Schools with over 500 CE Students in Different Industries** (%)

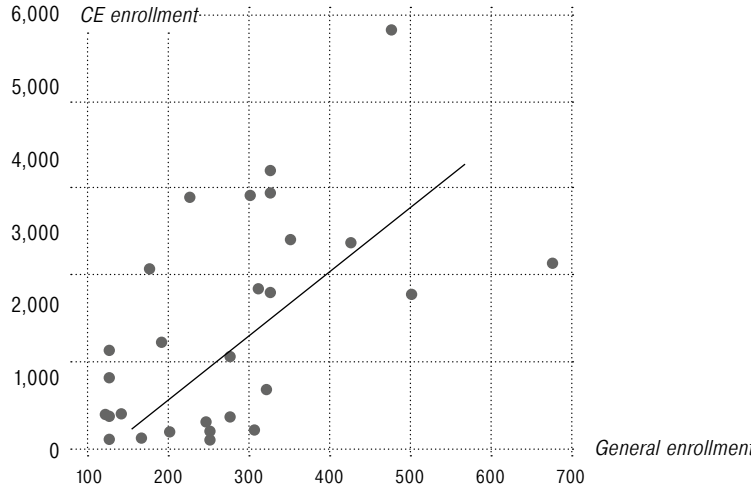


An important role in the development of adult education and learning, including CE programs, is played by "anchor" strategic enterprise partners. Most educational institutions indicate on their websites availability of employers supplying the best part of their CE enrollment. This is always done by the institutions that have already created, with direct participation of employers, well-equipped resource centers (applied skills centers). "Anchor" employers usually have an established culture of corporate learning, especially in medicine, pedagogy, transport, oil and gas and chemical processing, mining and metallurgy, electrical and power engineering, ICT, and the tertiary sector. Such culture of personnel training and development is translated to partner educational institutions. In this situation, training may be organized by the common founder, which is the case of medical and pedagogical schools.

Interactions between vocational school and employer (enterprise, corporation, bank, etc.) often take the form of public-private partnership, when the parties conclude an employee training agreement. For example, Novourengoy Multidisciplinary Vocational School won the contract for training employees of five Gazprom-owned backbone enterprises at once as well as for taking orders from public employment services.

Large institutions tend to be more successful in developing adult education programs. A moderate correlation was found between

Figure 6. **The Relationship between General and CE Enrollment of Vocational Schools Specializing in Agriculture, Transport, Oil and Gas Production and Chemical Processing, etc.**



general and CE enrollment of vocational schools (Fig. 6). On the one hand, vocational schools with larger permanent faculties enjoy more resource opportunities and more qualified instructors to involve in CE programs. On the other hand, senior students are more likely to engage in continuing education on a paying basis. Larger general enrollments correlate with higher numbers of CE students in the real economy (processing, transport, services). This correlation, however, is not observed in the public sector (medicine, pedagogy, arts, sports), as the common founder often sets enrollment requirements under private or governmental contracts at their own discretion.

High level of technology in the learning setting is critical for adult education programs ordered by real economy enterprises. Therefore, a competitive strategy to ensure high enrollment in CE programs must involve, as its integral component, an industry-oriented resource or applied skills center equipped under industrial partnership agreements and government subsidy contracts. Three quarters of all institutions with successful CE strategies have a resource or applied skills center represented adequately on their website. Successful institutions without such dedicated centers can be found in agriculture and the consumer goods sector—organizationally, it is rather difficult to provide joint equipment of learning centers with employers represented by small and medium-sized businesses.

Availability of a system for preparation for and participation in WorldSkills championships is typical of competitive CE strategies in the tertiary sector, medicine, pedagogy, and law and economics, being slightly less typical of those in mechanical engineering and forest-

ry. Information about engagement in the WorldSkills project is found to play a small part in attracting CE learners in such industries as oil and gas production and chemical processing, agriculture, and ICT.

The breadth of the spectrum of CE programs offered, concentrated around the institution's specialization, is directly related to the school's CE enrollment and revenue. Successful vocational schools offer from 30 to 100 CE programs. It is not the absolute number of programs that matters, however, but rather how well such programs meet the employee training demand in the "anchor" employers' industries.

The content of CE programs provided by vocational schools is largely designed to develop and improve specific skills and competencies. Vocational schools rarely, if ever, offer continuing education in entrepreneurship, management strategies to increase labor productivity (quality management, lean manufacturing, etc.), career orientation, or 21st century skills (communication, collaboration, problem solving, creative thinking), regular courses in new forms of literacy (digital, legal, financial, environmental, etc.), educational projects, clubs, or co-learning opportunities. Little by little, as demand for those kinds of training is growing, new niches inevitably emerge in the development of adult education and learning on the basis of vocational schools.

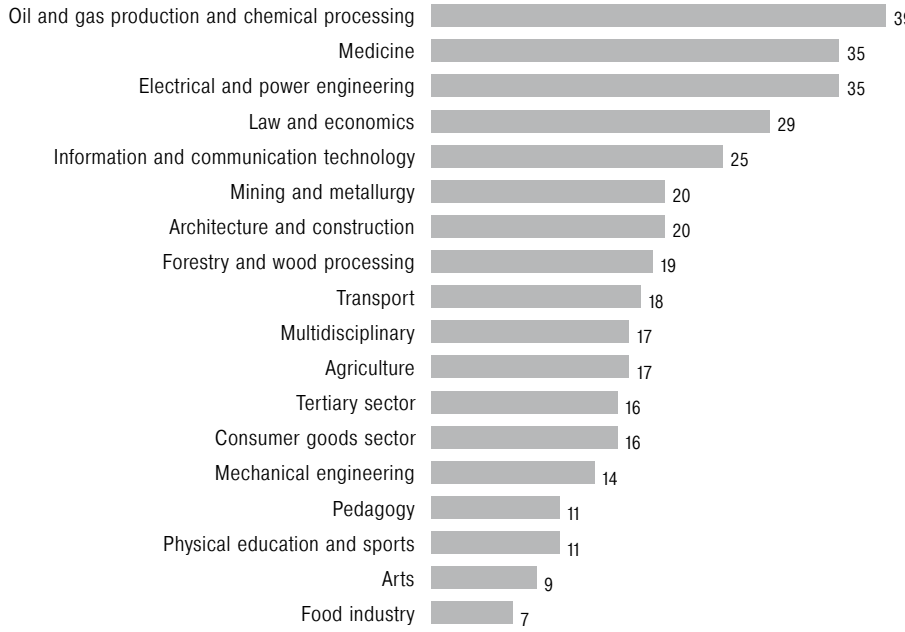
Website of an educational institution is one of the marketing tools to promote CE programs. The quality of website as a means of positioning and advertising CE programs was assessed based on the following criteria: availability of a dedicated page, including a banner with a link to it on the main page, the list of CE programs, information on tuition, certificates of completion, CE enrollment, various formats of communication between the vocational school and employers in terms of joint adult education programs, and, finally, relevance of website content and design.

Analysis of the websites of the sampled institutions shows that vocational schools largely undersell this type of educational services. Even with successful institutions, it is hard to find information on the content of CE programs, evidence of their completion or tuition on their websites. Adult education centers are not given prominence in the overall structure of institutions on their websites, being underrepresented or represented inadequately, with minor exceptions.

Websites of successful educational institutions differ across industries. The most straightforward and easily accessible information on CE programs, tuition and terms of implementation is observed in industries where demand is formed by numerous small businesses, such as services or transport. CE -related website quality is also higher in educational institutions affiliated with industries that have an established culture of systematic employee training, which include oil and gas and chemical processing, mining and metallurgy, electric and power engineering, and medicine.

Income from CE programs may account for a significant proportion of vocational schools' total consolidated budget. Analysis of publicly

Figure 7. **The Share of Income from CE Programs in the Total Budget of Vocational Schools, by Industry** (%)

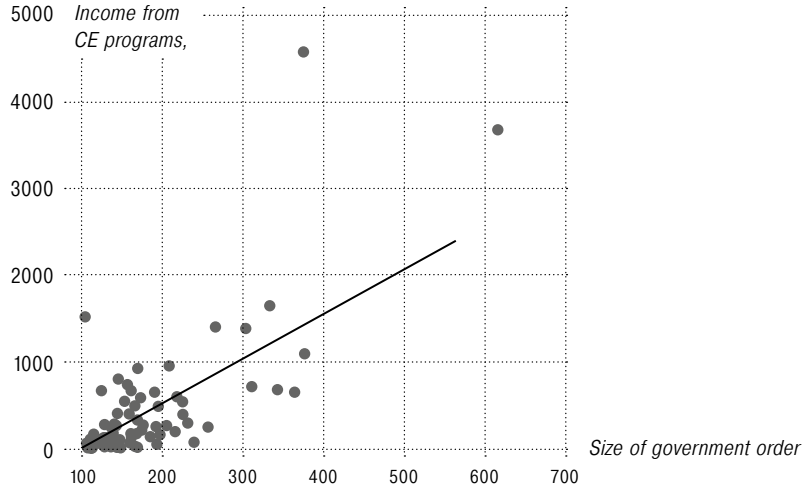


available information on finance and business operations of vocational schools shows that over one quarter of total income may be obtained from CE programs by institutions of the following specializations: oil and gas production and chemical processing (39%), medicine (35%), electric and power engineering (35%), law and economics (29%), and ICT (25%) (Fig. 7)[7]. Financial success of educational institutions is determined here by established industry-specific cultures of employee training, technology-rich learning environments, great risks associated with violation of safety standards, and expectations of returns from education in the industry on the part of population. Lower financial effectiveness of vocational schools is observed in the tertiary sector, the food industry, and the consumer goods sector. Those industries are largely represented by small and medium-sized businesses which have not yet come to treat enhancement of employee skills under the new market conditions as an effective tool for improving service quality, labor productivity and economic growth [Korshunov et al. 2018]. Income from adult education and learning accounts for 15–20 percent of the budget of most vocational schools offering training in the processing industries.

Managers of CE departments of vocational schools seek to make a noticeable contribution to the total revenues of their organization.

[7] When analyzing proceeds from adult education, no distinction was made between income from CE and general vocational programs.

Figure 8. **The Relationship between the Income from CE Programs and the Size of Government Order for Implementation of General Vocational Programs** (Million Rubles)



For that purpose, the range and cost of programs are determined to make this part of income proportionate to the overall turnover. On average, income from adult education accounts for 23 percent of the overall turnover in vocational schools with competitive strategies for implementing CE programs.

Revenue from CE programs depends more on the number of learners attracted than on the size of tuition, which is determined by program duration, vocational school specialization, and region. For instance, tuition for dental students in medical schools may reach 30,000 rubles, being higher in Moscow than in regions. However, tuition costs in CE programs that generate most of the income in successful educational institutions are fairly low, the average being 5,000–10,000 rubles—the price that an adult employee is willing to pay for training.

The amount of adult education and learning services rendered by institutions is related to the size of government order for implementation of general vocational programs (Fig. 8). A possible explanation is that, with larger government orders, the overall financial and procurement opportunities of the institution are growing, allowing modernization of infrastructure and facilities and recruitment of proactive administrators and instructors who are ready to develop adult education as a sideline entrepreneurial project. This relationship also follows from the correlation between enrollment in CE and general vocational programs (see Fig. 6). Meanwhile, industry-specific differences are not as manifest here as they were when the absolute numbers were compared, a pronounced linear dependence (Pearson's coefficient over 0.73) being observed for all the industries (Fig. 8).

To summarize the findings, a competitive adult education strategy to be pursued by vocational schools should have the following features:

- Strategy effectiveness is contingent on the target audience, i. e. consumers of educational services. Highly-effective industries for implementing CE programs include medicine, oil and gas production and chemical processing, transport, mining and metallurgy, electrical engineering and telecommunications, pedagogy, the tertiary sector, and architecture and construction.
- Flexible adjustment of the programs offered to meet the needs of the specific industry, which implies close collaboration with strategic employers in the industry, their engagement in CE implementation, and narrow specialization. The latter provides the opportunity not only for gaining attention and recognition in the market but also for training employees in the industry repeatedly, enhancing the programs and customizing learning resources to meet the needs of different enterprise categories.
- Technology-rich learning environment; availability of a resource center created under national and regional subsidy projects jointly with employers.
- Strict instructor requirements, including a postgraduate degree and experience in the real economy sector.
- Evidence of completion recognized in the industry.
- A flexible pricing policy contingent on the major/profession and the average salary in the region and industry as a whole.
- Low engagement in education of economically inactive population (the unemployed, immigrants), which yields little profit.
- A dedicated website for the resource center or CE department with direct (one-click) and obvious access to program description pages, user-friendly interface and navigation, and a clearly presented structure of programs.

This study does not look specifically at the implementation of professional training programs for adults, but similar trends can be expected there.

Adult Learning in the System of Higher Education

Universities have a long history of implementing adult education programs [Mukhina, Koposov, Borodachev 2013].

According to a 2016 monitoring, multidisciplinary, polytechnic universities and those in law and economics offer the highest number of CE programs (Fig. 9)[8].

Multidisciplinary, medical and transport universities hold the three leading positions by the number of CE students (Fig.10).

[8] Monitoring of University Effectiveness acc. to Form 1: http://indicators.miccedu.ru/monitoring/?m=vpo

Figure 9. **The Distribution of Universities by the Key Industries in CE Programs**

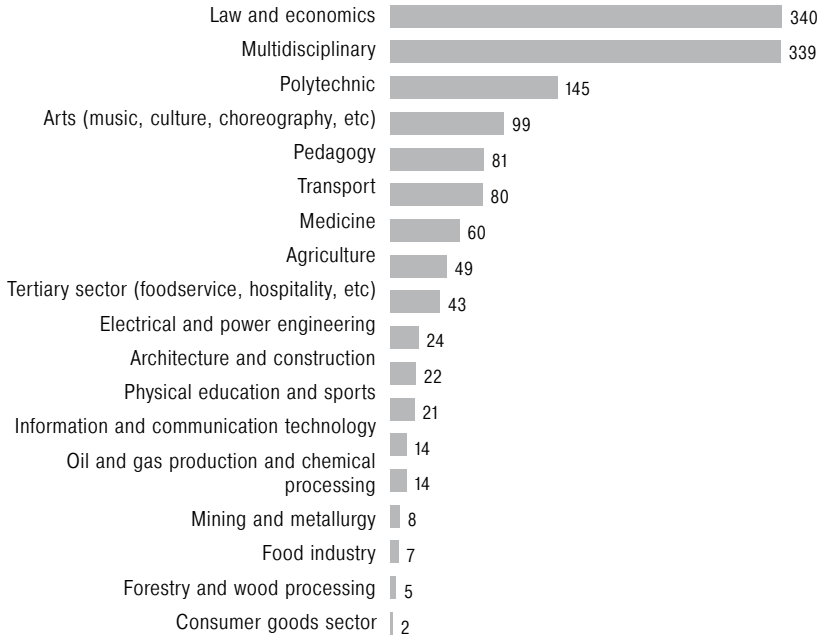


Figure 10. **The Distribution of University CE Enrollment by Industry** (1,000 Students)

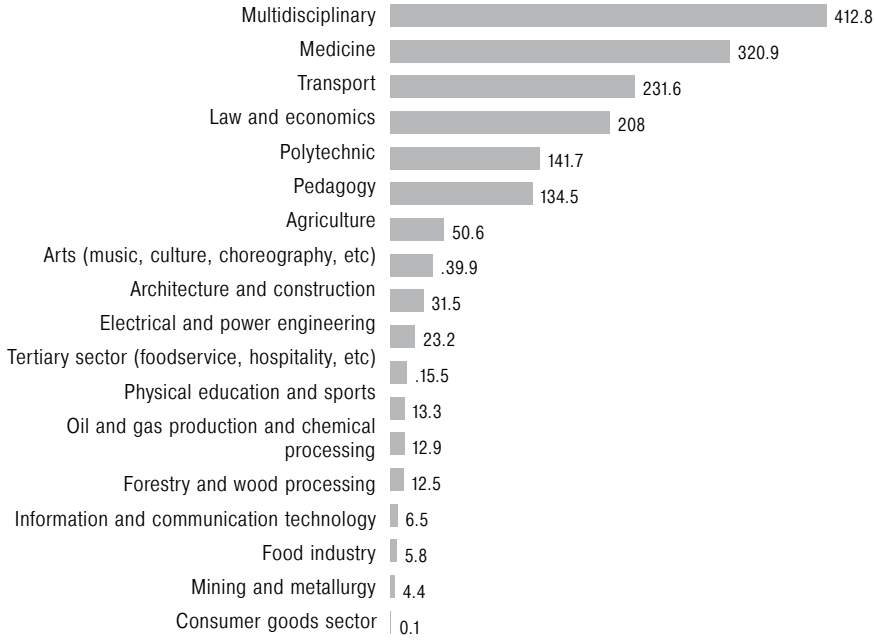
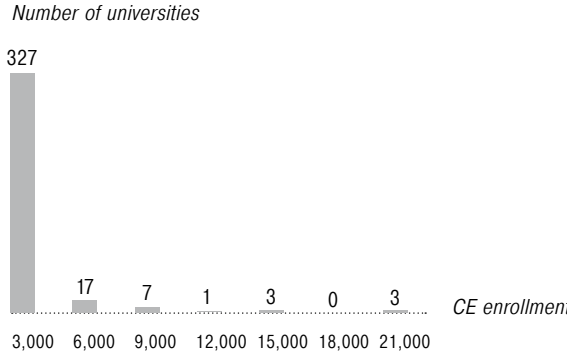


Figure 11. **The Distribution of Multidisciplinary Universities by CE Enrollment**



CE enrollment is much higher in universities than in vocational schools. Strategies ensuring over 500 students yearly are pursued by on average 38 percent of universities in every industry, as compared to 16 percent in vocational education. Yet, universities are considerably larger themselves, their general enrollments averaging 3,000. Organizations with 3,000 CE students or more account for 10 percent of all Russian institutions of higher education. Therefore, it is harder for a university to achieve a comparably successful strategy in adult education than for a vocational school.

In some industries, competitive strategies—those which generate over 3,000 CE students—are hardly implemented by 8–15 percent of the universities. Figure 11 presents the distribution of classical multidisciplinary universities by CE enrollment.

Not many universities regard CE programs as a source of development and know how to attract adult learners. University development strategies published online relatively rarely involve modernization of adult education departments. CE enrollment statistics are either lacking or indicated as a matter of form. No sources of CE development are specified, and the priority directions of CE programs are under-formulated and unrelated to the research specialization that is most heavily subsidized.

Universities' strategy documents postulate the need to increase the number of CE programs, but no directions for or measures of development are stipulated. The prospects for CE development are described in a rather formalized way, as "professional development and training of faculty members" or "creation of new competitive CE programs as ordered by the real economy sector enterprises that are recognized in the Russian and global education market". Meanwhile, demand for CE is indicative of the needs of regional enterprises and organizations, which many universities were originally conceived to meet.

Web pages of universities' CE departments feature elements of CE development strategies, pricing policies and organizational structure. However, management of CE departments is rarely captured in basic strategic plan documents, which is most likely related to the absence of CE development indicators in university monitoring criteria as well as to the national policy on continuing education.

Development strategies of Russian universities do not involve a system typical of the world's top universities where general education programs (Master's and Bachelor's degrees) are broken into micro degrees—credentials focused on specific skills sets and based on lifelong learning courses [Berker, Horn, Carroll 2003].

Interest of prospective CE learners could certainly be inspired by:

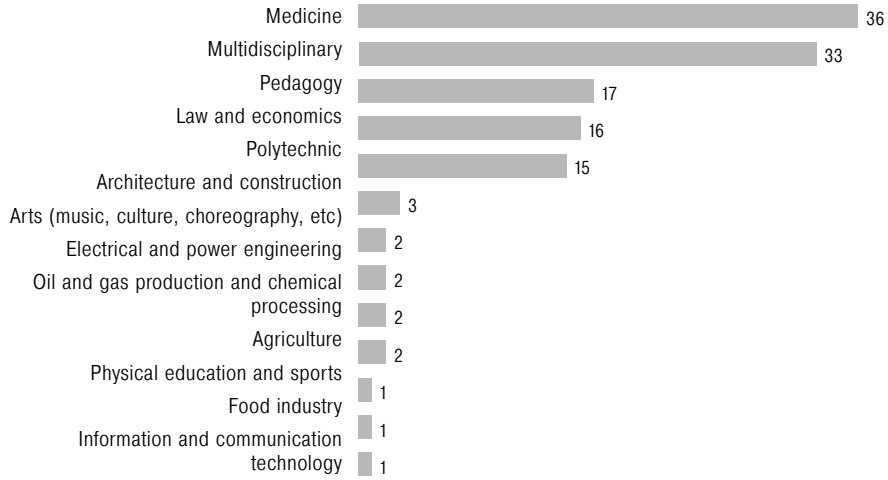
- Easier intra- and inter-university transfer of credits and students between courses and degrees (agreements between institutions regulating which courses or modules are eligible for credit in case of returning or transfer students);
- Flexible and accelerated program schedules and designs, which include weekend-only classes; online instruction; critical support services during non-traditional hours; multiple entry, exit and reentry points; more frequent start times throughout the year; shortening and modularizing of curricula; and interim credentials linked to career advancement [Kazis et al. 2007];
- Government co-funding of CE programs for adults [Bosworth, Choitz 2004].

Continuing education in the United States is viewed as a "back door" to the most prestigious universities in the world. A GPA required to petition for acceptance at the Harvard Extension School may be lower than at Harvard University, while there is absolutely no difference in the quality of the courses and other opportunities. Besides, students in continuing education programs often enjoy certain accommodation privileges over general degree students, like single rooms when they come to complete the residency requirement before graduation[9]. In addition, breaking higher education into short-term degree modules allows adult learners to spread their tuition payments, reducing strain on their budgets and making education far more accessible.

In Russia, most CE programs imply full time attendance. Russian universities do not offer a wide range of online courses for adults, as adult learners tend to have higher expectations than regular university students. According to Rosstat, enrollment in distance-learning CE programs changed little between 2010 and 2016, barely accounting for 7–8 percent of total CE enrollment [Korshunov et al. 2018]. Meanwhile,

[9] Kaufman J. Hacking Higher Education. Part 2. Hacking Harvard: https://joshkaufman.net/hacking-higher-education-harvard/

Figure 12. **The Distribution of Universities with over 3,000 CE Students by Industry**



the number of distance learning students in CE programs offered by U.S. universities spiked by almost 250 percent in just three years, between 2002 and 2005[10]. The rapid growth of web-based learning is explained by the interest of the key stakeholders, as 62 percent of employers consider online learning as effective as full-time programs[11].

Figure 12 shows the distribution of Russian universities with over 3,000 CE students across industries. Strategies for ensuring a wider reach to the audience come easier to medical, multidisciplinary, pedagogical, polytechnic universities, and schools in law and economics. Institutions specializing in the tertiary sector, consumer goods sector, forestry and wood processing, electrical and power engineering, and ICT—those which mostly serve small and medium-sized businesses—find it the hardest to implement such strategies.

Disciplines in which CE programs are offered correlate with university's profile of specialization. Multidisciplinary universities enjoy larger CE enrollments, which is, however, not the case with vocational schools. Most probably, the very status of university is one of the strongest motivators for engaging in continuing education. This advantage is actively used by a number of small universities, CE playing a more important part in their development models than general de-

[10] Eduventures (2005) Online Distance Education Market Update 2005: Growth in the Age of Competition. Boston: Eduventures, LLC: https://encoura.org/resources/enrollment-resource-library/#

[11] Eduventures (2005) Developing Effective Channels to Corporate and Government Markets, Part I. Boston: Eduventures, LLC: https://encoura.org/products-services/eduventures-research-and-advisory-services/

Figure 13. **The Distribution of Small Universities (under 3,000 Students) whose CE Enrollment is Higher than General Student Population by Industry**

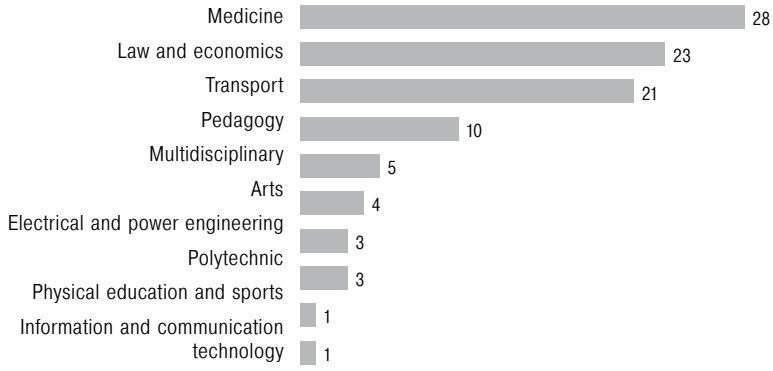
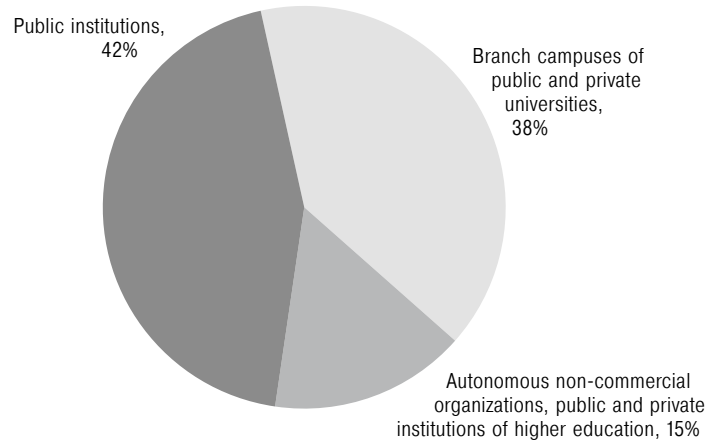


Figure 14. **Types of Higher Education Institutions with Student Population under 3,000 whose CE Enrollment is Higher than General Student Population by Industry**



grees. Their CE enrollment rarely exceeds 3,000 but is always higher, sometimes several-fold, than their general enrollment in Bachelor's, Master's and Specialist's degree programs. Figure 13 shows the distribution of such institutions, which amount to around 100 in Russia, by industry. The leading positions are held here by medical, transport and pedagogical colleges and schools in law and economics.

The majority of such educational institutions are either private institutions of higher education or branch campuses of public and private universities (Fig.14).

Websites of such universities provide more details on CE programs, include CE development roadmaps, and focus on the needs and possibilities of adult learners. Information on professional development and training courses is completely straightforward and accessible with one click. A ranking of courses based on student reviews is offered to facilitate the choice of a program. Furthermore, the CE sections of their websites also contain information on terms of instruction, opinion polls, virtual internship opportunities, etc.

Continuing education for adults can make one of the strategic goals of a small university. Private universities and, particularly, branch campuses often find it difficult to win research grants from the government or generate income from R&D projects due to the lack of investment. As a consequence, local universities and especially branch campuses often make continuing education their primary source of revenue. Determined to survive without public funding, such institutions demonstrate the financial potential of this sector of educational services. Therefore, it can be assumed that large public universities could increase the amount of their CE services dramatically, too.

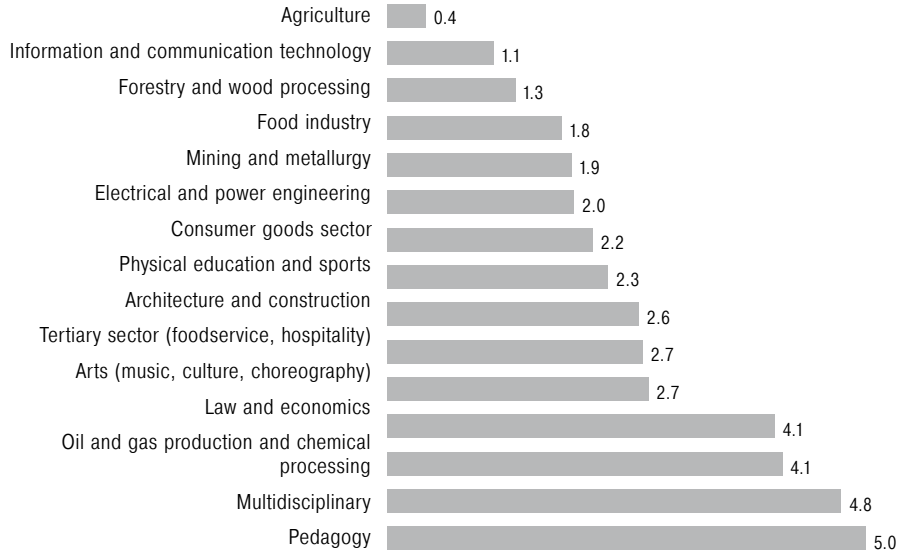
In developed countries, the sector of small universities is also rather small, accounting for only 3–5 percent of total adult students in the United States, for instance. Due to the lack of status and program diversity, such institutions represent no competitive threat to classical regionally accredited universities in terms of numbers [Bailey, Badway, Gumport 2003:1–4].

Open source statistics show that income from CE programs is exponentially higher in public universities with over 3,000 CE students than in vocational schools or small universities—in absolute terms. Nevertheless, it does not constitute a substantial share of the consolidated budget.

The highest percentages of CE programs in the revenues of public universities pursuing the most successful strategies are observed in pedagogical (5%) and classical multidisciplinary (4.8%) universities, being slightly lower in oil and gas and chemical processing (4.3%) and law and economics (4.1%). In the rest of the universities, the share of CE -derived income in the total budget is under three percent, being the lowest in agricultural institutions (0.4%) (Fig. 15).

The shares of income from CE programs are low not only because this type of activity is not evaluated in annual assessments of university effectiveness but also, and rather, because government subsidies are decisive for the budgets of universities with technology-rich learning environments. It is government funding, including research and development contracts, that makes the most of a large university's income. Neither do proceeds from CE programs look impressive when compared to the size of tuition paid by university students in general degree programs, which may account for 30 to 80 percent of the total budget.

Figure 15. **The Share of Income from CE Programs in the Total Budget of University as a Function of University Specialization** (%)



There is a relationship between general and CE enrollment for public universities with over 3,000 CE students. Just as vocational schools, universities with larger student populations have more resources, more instructors qualified to implement varied CE programs, and more senior students to involve in continuing education on a fee basis (Fig.16).

More than likely, this is also the reason why increase in the size of government order for higher education correlates with increase in the income from CE programs (Fig.17).

This study reveals a weak relationship between the informational value of CE websites and the number of CE students in most classical and industry-specific universities. A website, therefore, is not crucial for attracting CE learners, a more important promotion factor being the overall university image and brand, its reputation among the employers and the target audience in the macroregion.

Analysis of university websites shows that successful institutions administer up to 200 CE programs. Universities offer a price range of 600–600,000 rubles, which is much broader than in vocational schools. However, most of the income is provided by large CE enrollments, not by the prices as such. The more CE programs are designed and advertised through the website, the larger CE enrollment, university status being a critical factor of attraction.

Programs offered by universities include not only specific modern disciplines (e.g. in IT and programming languages) but also mana-

Figure **16. The Relationship between General and CE Enrollment in Multidisciplinary (Classical) Universities** (1000 students)

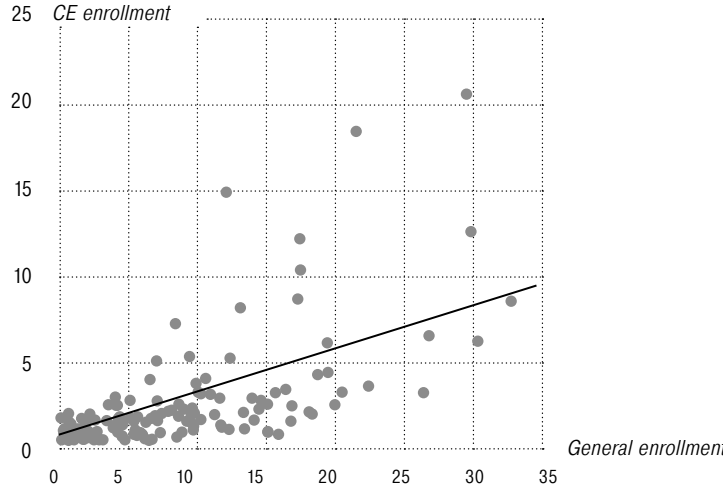
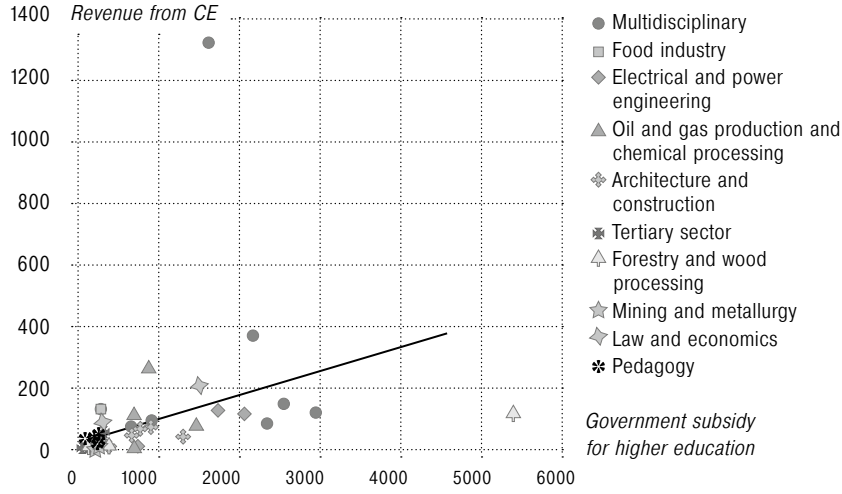


Figure 17. **The Relationship between Government Order for Higher Education and Revenues from CE Programs** (mln rubles)



gerial skills, MBA degrees, programs in leadership development, entrepreneurship, quality management technology, innovation product development and commercialization, financial literacy, information literacy, and other types of literacy for students and adults. Universities try to combine attracting learners in the free market with implementing programs for the public sector and enterprises. The most successful CE departments not only have extraordinary competencies to teach but also know which instructors, professionals and experts should be

invited to pass on the technology and skills within their area of specialization. They act as education program sales centers and central hubs in the network of profession-specific competencies that they have built around themselves.

At the same time, universities have not yet become the true "backbone" of continuing education for regional industries and, particularly, for the population. While the share of personal development programs (offered by "universities of the third age", for instance) is low in Russian higher education, western universities are discovering brand new market niches in this sector, pursuing the strategy of targeting on students "from every time zone, every culture and career background, every age from 18 to 89."[12]

Conclusion

Based upon analysis of continuing education programs implemented by vocational schools and universities, the following indispensable features of the most successful and competitive CE strategies have been identified:

- Adjustment to the needs of the key stakeholders, i.e. CE learners and their employers; development of programs for the industries in which employees have been systematically engaged in professional training and development at universities and vocational schools;
- Close collaboration with employers, their engagement in CE implementation as well as in the use of resources and facilities and in making decisions on new training and development programs, new formats of skills assessment and accreditation;
- Recognized university-level evidence of completion and diploma or certificate issued by the corporate learning center of the parent enterprise;
- Regular improvement of the existing programs and development of new ones with due regard to the needs of "anchor" employers, the industry's labor market, and the population of different age cohorts in a specific region;
- Technology-rich learning environment; availability of a resource or applied skills center created under national and regional subsidy projects jointly with employers; orientation toward the latest standards (ISO, WorldSkills, etc.);
- Attraction of instructors with excellent reputation in academia and the industry to make programs more attractive and increase brand recognition; strict instructor requirements, including experience in the real economy sector;

[12] Harvard University Extension School https://www.extension.harvard.edu/

- A flexible pricing policy contingent on the major/profession and the average salary in the region and the industry as a whole;
- Teaching methods and learning strategies tailored to adults, which take into account learners' life and career experience and ensure convenient program schedules and designs;
- Monitoring of CE quality and learning outcomes using feedback on career trajectories, information on post-graduation changes in salary, and other measurable CE outcomes.

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Internationalization of Higher Education and English Medium Instruction in Mongolia: Initiatives and Trends

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Abstract. Internationalization has become a driving motivation for reform in higher education. Higher education reform brings changes in practice, culture, and environment where the internationalization can take place. The government of Mongolia acknowledges internationalization as a pathway towards improving the quality of higher education and increasing the ranking status of domestic higher education institutions in Asia. Following this government policy, education providers are striving to internationalize their institutions. This paper aims to discuss the current process of reforms in higher education as well as national and institutional policies and initiatives towards internationalization. The paper also explores the concept of English Medium Instruction in Mongolian higher education institutions as a growing global phenomenon of internationalization. This paper does not intend to evaluate the internationalization process of universities and /or their strategies.

Keywords. internationalization of higher education, higher education policy, international collaboration, student mobility, faculty development, English Medium Instruction, Mongolia.

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In recent years, the term “internationalization of higher education” (IoHE) has become one of the buzzwords like “comprehensive internationalization”. As Hudzik [2015] explains, IoHE is not a homogenous concept but more of a global concept of interrelated dimensions. IoHE has many aspects including organized cross-border mobility of students and faculty, foreign language learning, internationalization of curricula, cross-border institutional partnerships in joint research, joint degrees, and branch campuses.

There is no agreed-upon definition for IoHE. Early on, Soderqvist [2002] defined IoHE as “a change process from a national higher education institution to an international higher education institution leading to the inclusion of an international dimension in all aspects of its holistic management in order to enhance the quality of teaching and

learning and to achieve the desired competencies" (p. 29). However, this definition is not comprehensive. The most recognized definition is the one put forth by Knight [2003]: "Internationalization is the process of integrating an international, intercultural or global dimension into the purpose, functions or delivery of post-secondary education" (p.2). According to Knight [2004], IoHE has two main spheres of action, "internationalization at home" and "internationalization abroad". 'Internationalization at home' applies strategies and approaches designed to utilize an international dimension into the home campus by including global and comparative perspectives in the curriculum or recruiting international students, scholars, and faculty and leveraging their presence on campus. 'Internationalization abroad' encourages an institution to send students to study abroad, set up a branch campus overseas, or engage in an inter-institutional partnership [Altbach, Reisberg, Rumbley 2009].

Despite a handful of studies that discussed the early IoHE initiatives in Mongolia, little is known of current strategies and activities towards internationalization at national and institutional levels. Previous studies focused on the impact of globalization on higher education [Gantsog, Altantsetseg 2003; Altantsetseg 2006], educational expansion in higher education [Agvaantseren, Hoon, 2013], or a strategy for internationalization in one national institution [Jargalsaikhan 2015]. This paper aims to provide a broader picture of current higher education in Mongolia through the lens of internationalization via the analysis of a wide range of documents available such as policy papers, institutional websites, brochures, technical reports, government documents, and reports by international organizations, academic articles, and papers.

This paper, thus, aims to answer the following two main questions:

1. What are the motives and drives of Mongolian higher education institutions to go for internationalization?
2. What are the driving factors for higher education institutions in Mongolia to implement English Medium Instruction?

The paper begins with a brief introduction to the higher education system and reforms, followed by a document analysis on national and institutional policies, strategies and approaches towards internationalization.

1. Methods

This study draws on Knight's [2004] model of internationalization of higher education, "internationalization abroad", and Soderqvist's [2002] concept of internationalization as a pathway to increase quality and competencies of HEIs as an overarching framework to explore internationalization of higher education process in Mongolia. All data related to the Mongolian higher education, reforms, internationalization,

policy, and English language policy went through the rigorous qualitative document analysis, "describing, classifying and connecting" [Coffey, Atkinson 1996: 8) to portray a comprehensive picture of the IoHE and the concept of English Medium Instruction (EMI) in Mongolia.

Following the qualitative document analysis methods [Ibid.], an array of documents was collected from public and academical sources. The collected documents included policy documents related to Mongolian higher education since 1990s including higher education laws, government orders, amendments, legislation; websites of 10 national universities and 18 private institutions (as of 2017); official reports by World Bank, Asian Development Bank, and Open Society Institute; online newspaper articles at three main newspapers (Daily News, Unuudur, and Zuunii Medee); and previously published articles written in both Mongolian and English. Documents concerning only IoHE, higher education reforms, mobility, and exchange were extracted and the total document size reached 350MB excluding videos and pictures. Most documents were available in Mongolian; thus, the researcher, as native Mongolian speaker, had the advantage to analyze the documents in Mongolian. In addition, the researcher used his insider perspectives working in the higher education sector in Mongolia in last 14 years. The computer-aided qualitative data analysis software, nVivo 11 was used to support the document analysis.

Two different types of data were collected. The first type of data was extracted from the literature review that covered the higher education system, reforms, privatization and financing of HEIs. The second type of data was obtained as a result of the current research including IoHE and EMI along with the respective facts and figures.

All data went through two phases of analysis. First, the documents were read closely to apply topic codes. These topic codes described the main segments of the documents. During the qualitative document analysis, an emphasis was given to official evidence relating to the strategies and approaches for internationalization and EMI policy at national level. The quotes and excerpts from the mission statements of national and private universities that were presented in the study were translated by the researcher from Mongolian into English. After completing the initial coding process, the coded data were reviewed again and coded segments that reflected similar concepts were grouped into larger categories. After the all coded data had been categorized, the categories were reexamined to identify major themes in a relationship with the IoHE in Mongolian context and the questions of the study. As a result, six dimensions were identified. However, three of the dimensions were not covered due to lack of coverage across source materials.

The second phase analyzed documents from the 28 national and private universities. Data were collected by screening the websites and brochures of the each of the universities to understand their EMI policy and the implication of EMI in their strategic plans, mission state-

ments, and public identity. These universities were selected on the basis of their experience of EMI practice. In order to confirm the reliability of information obtained from each of the universities' websites and brochures, the author contacted with the universities' academic affairs offices. As a result, a total of 385 courses in English was identified. The documentary evidence from the analysis of the websites and brochures was used to address the second research question.

2. Higher Education System and Reforms

Mongolia is a landlocked country with 1.5 million square kilometers of land area, a total population of 3.1 million and the GDP per capita of $7.8 thousand as of 2016[1]. The total number of students studying at tertiary school amounts to 157,138 (58% female) in the academic year of 2016–2017. As of 2017, 95 higher education institutions (HEIs) including a high percentage of private institutions (78%), national (18%), and a small percentage of branch schools of foreign universities (4%) are operating in Mongolia[2]. The branch schools of foreign universities include three from Russian Federation and one from Singapore. The total gross enrolment ratio in higher education is 68.57% (female 79.74%; male 57.67%) in 2015[3], growing from 53.82% in 2010. The gross graduation ratio increased from 45.07% in 2010 to 52.26 (female 67.44%; male 37.43%) in 2014[4]. The student-to-teacher ratio in Mongolia is 25:1, closer to Turkey (22:1), but much higher than OECD's average of 15:1 in 2015 [OECD, 2015].

The history of Mongolian higher education starts from the National University of Mongolia (NUM) that was established in 1942 with three faculties: medical, pedagogical, and veterinary [Gantsog, Altantsetseg 2003]. Since then, several faculties were developed: physics, mathematics, natural sciences, social sciences, economics, laws, languages, and literature. These faculties were the foundation of other national universities, such as the current National University of Life Sciences (NULS), National University of Medical Sciences (NUMS), and the National University of Education (NUE)[5].

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[1] Mongolian Statistical Information Service. Statistical Yearbook 2016.

[2] Ministry of Education, Culture, Science, and Sport. Higher Education Statistics 2016–2017 (In Mongolian).

[3] United Nations Institute for Statistics (2015) Tertiary Education. Cross enrollment ratio.

[4] United Nations Institute for Statistics (2014) Tertiary Education. Cross enrollment ratio.

[5] Due to the increasing needs and demands of teaching staff for secondary education schools, the State Pedagogical Institute was founded in 1951. In 1958, the zoological-veterinary medicine faculty at the NUM was transformed as the Agricultural Institute. Following this trend, the Medical Institute was formed from the medical faculty at the NUM in 1961. The polytechnical faculty that was established in 1969 as part of the NUM was also reformed as the Polytechnical Institute in 1982. The Russian Language Teachers' Col-

For decades, the Mongolian higher education had been free and the government of Mongolia subsidized all costs of higher education, including tuition fees, and played a key role in decision-making, planning, and development process of higher education. After Mongolia transferred to the free market economy system in the 1990s, the government ceased its funding for national universities, only covering utility costs. This resulted in the introduction of a student fee structure in 1993 [Gantsog, Altantsetseg 2003].

The reform in higher education of Mongolia can be outlined in three main phases: before the 1990s, after 1990s until 2010, and since 2010. The first phase happened in a socialist system as a way of reforming more national HEIs, separating units from the first national university. During the second phase of reform, the government of Mongolia made a policy of 'cost sharing' to shift a greater portion of the burden of payment to individuals and transfer the public expenditure on education to a student loan. The government also legalized the establishment of private universities and branch schools of foreign HEIs. The third phase of reform in the higher education sector rooted from 2010 when the government of Mongolia decided to merge national universities in response to the growing demand for internationalization.

It should be noted that the second and third phase reforms in higher education have been predominantly supported by international funds, technical assistance grants, loans and projects from both bilateral and multilateral sources, including the US, Germany, Canada, Japan, Korea, the European Union, World Bank, and Asian Development Bank (ADB) [Weidman, Yoder 2010]. One of the major ongoing projects in higher education reform is the Higher Education Reform Project of the ADB that started in 2011. This project expects to have three outcomes: 1) improved quality and relevance of higher education programs; 2) improved the effectiveness of higher education governance, management, and financing; and 3) improved equity and access.

2.1. Privatization and Financing of HEIs

As Steiner-Khamsi and Stolpe [2004] concluded, deregulation, privatization, and the introduction of tuition fees were the main features of higher education reforms in most of the Central Asian countries after 1990. Following the collapse of Soviet Union, Mongolian HEIs suffered from lack of state funding. Encouraged and supported by international donors such as World Bank, Mongolia passed a resolution # 160 in 1997 to privatize national HEIs. Under this resolution, five national universities became private in 1997–2017[6] [Khishigbuyan 2009;

lege of the NUM became the Russian Language Institute in 1982 [Weidman, Yeager 1998]. Later in 2004, the Khovd University separated from the NUM in 2004. This pattern of separating units from the NUM was the first major reform of Mongolian higher education [Ibid.].

[6] Asian Development Bank (2008) Mongolia: Education Sector Reform Project. https://www.adb.org/projects/43007–023/main; Ministry of Educa-

Table 1. **Comparison of expenditure on education**

Countries	Total public expenditure on primary to tertiary education as% of total public expenditure	Total expenditure on primary to tertiary education institutions as% of GDP	Government expenditure per tertiary student (in PPP$)
Armenia	10.66	2.81	842.06
Georgia	6.71	1.98	1174.65
Japan	9.29	3.59	9591.09
Korea, Rep.	...	5.05	5410.14
Mongolia	12.8	4.6	180.36
Norway	17.03	7.37	25483.5
Russia	11.15	3.86	3707.58
Tajikistan	16.28	5.23	556.44
Vietnam	18.53	5.66	1793.69

Source: Most recent year available data compiled from United Nations Institute for Statistics (2017) Education expenditures (http://uis.unesco.org/en/home) and Mongolian Statistics Office (2016). For Armenia, this was 2015, for Georgia, 2012, for Japan 2014, for Korea, 2015, for Mongolia, 2016, for Norway 2013, for Russia, 2012, for Tajikistan, 2015, for Vietnam, 2013.

OSF 2004; MECSS]. Another route to fund higher education was to open private institutions. While there were only six national universities in 1992, the number of universities, including private ones rapidly increased reaching 95 in 2017.

Until 1993, higher education institutions relied on full funding from the government then shifting to cost-sharing model introducing tuition fees. Currently, national universities receive funds from five main sources:

1. Government funds (student grants and loans, fixed expenditure)
2. Tuition fee
3. International organizations and donors (technical assistance, projects, and programs)
4. Research (joint research projects)
5. Individuals and businesses.

Ishengoma [2010] proposed new innovative models for financing higher education expansion while increasing equity and maintaining quality and sustainability. The proposed models include the business model or market model, bonds issues, higher-education-specific fi-

tion, Culture, Science, and Sport (2017) Higher Education Statistics 2016–2017 (In Mongolian).

Table 2. **Comparison of expenditure on tertiary education** (% of government expenditure on education)

Countries	2011	2012	2013	2014	2015
Armenia	11.3	9.5	10.3	13.6	12.7
Georgia	11.2	19.2	..	..	..
Japan	19.5	20.1	20.0	20.8	..
Korea, Rep.	..	15.6	..	..	20.8
Mongolia	3.8	3.4	-	-	8.6
Norway	29.9	..	25.9	..	..
Tajikistan	8.4	11.2	..	..	9.9
Vietnam	15.7	14.8	15.0	..	..

Source: World Bank [2018].

nancing facilities, credit or unit-based tuition fee financing, and the establishment of higher education investment banks. Among these new models, a few Mongolian HEIs apply the credit-based tuition fee to their operation.

Tables 1 and 2 below highlight comparisons of expenditures on education in several countries of low and high income (extracted from World Bank list). Percentage of national expenditure on primary to tertiary education in national budget dropped in 2011 from 2009 (14.51%) and 2010 (14.71%), but it is closer to the OECD average 12.9% in 2011 [OECD2014: 252]. While the OECD average is 5.6% in 2011 [Ibid.: 258], the expenditure on primary to tertiary education institutions as a percentage of GDP in Mongolia in 2011 remained closer to the figures in 2007 and 2010 (4.69%; 4.64%) except for the little rise in 2009 (5.15%). Table 1 shows that the government expenditure per tertiary student is the lowest among the countries compared. This indicator in the OECD average amounts $9221 [Ibid.: 249].

The table 2 shows that government expenditure on tertiary education in Mongolia fell from 3.8% in 2011 to 3.4% in 2012 but then increased to 8.6% in 2015. This number remains lowest among the countries compared in the table.

In recent years, the government of Mongolia increased its research grants to the HE sector. In 2015, a grant of $1.75 million was allocated to researchers and HEIs nationwide. In 2015, as indicated in the Higher Education Quality Reform Policy, the Ministry of Education, Culture, Science, and Sport allotted $33.5 million of funding to improve HEIs' research and teaching environment and infrastructure[7]. Compared to 2009–2012, the amount of funding to HEIs has increased by 11.7 times

[7] Ministry of Education, Culture, Science, and Sport (2015) The 2015 Year Report (In Mongolian).

Table 3. **Comparison of HEIs mission statements**

	Type	Name	Excerpt from Mission Statements
1	National	National University of Mongolia	"...to become a national model research university which meets world standards and provides pillars for Mongolia's development"
2	National	National University of Medical Sciences	"...to become a national leading and one of top 100 medical universities in the west coastal area of Pacific Ocean."
3	National	National University of Life Sciences	"To become a leading global university"
4	National	Mongolian University of Science and Technology	"...to become one of the Asian top universities."
5	National	National University of Education	"To become a competitive institution among Asian universities of education."
6	Private	Ikh Zasag International University	"...be a modern global university of technology and innovation."
7	Private	University of the Humanities	"...to become a reputable and leading university in Asia... "
8	Private	University of Finance and Economics	"...to become a leading research university recognized in the region..."

Source: Websites of each institution (translated by the author)

in 2013–2015. The funding was spent on building new research laboratories, renovation of university buildings, dormitories, and equipment.

3. Internationalization of Higher Education

Altbach, Reisberg, and Rumbley [2009] pointed out that at the institutional level, a large number of universities aim to produce 'global citizens' with 'global competencies' through the adoption of an extended mission under internationalization. Mission statements of a number of Mongolian HEIs stated that they aim to become "global" or an internationally recognized university. Table 3 below compares the mission statements of several major national and private HEIs that aim to be research-oriented and leading institutions in Asia and the world.

Becoming recognized in the region, improving research, technology, and innovation, meeting international standards are the main goals set by these universities. This goal is reflected in the Mongolian Sustainable Development Vision-2030, enacted by the Mongolian parliament in 2016. It set an ambitious goal to have at least four Mongolian national universities recognized internationally for research in STEM fields. It indicated,

Build a science and technology cluster and park in accordance with priority development areas, and ensure that no less than four Mongolian universities are ranked among Asian top universities[8].

Within the initiatives and policies of IoHE, the government of Mongolia in cooperation with its national universities strives to build up a comprehensive university campus[9]. The goal of the policy is to integrate the national educational system to international dimensions and support transformation of national and private universities to campus model. One example is the policy on curriculum. The government passed an order[10] to follow the UNESCO International Standard Classification of Education. Accordingly, the 817 field of studies was reduced to 181 in 2014. In addition, the policy focuses on developing collaborative research between faculty members, students, and scholars and making their research output more accessible and usable in productions.

The government of Mongolia believes that building up a comprehensive campus will lay a solid infrastructure base for adapting the national universities' strategic development goals, improving teaching and research quality. The comprehensive campus development plan will also allow the integration of educational resources among the national universities. In addition, national universities will be able to share resources, develop interdisciplinary research, and pursue a coordinated external relations strategy. While the NUMS is building a new campus with the assistance from the Japanese government, the NUM aims to build a large technopark, intensify research that focuses on technology transfer, and open modern research laboratories.

Under the goal to improve the quality of higher education, the government reduced national universities from 42 to 16 by merging small-sized institutions into large ones[11]. The private HEIs also started to unite with each other following the government policy to decrease the number of private HEIs. The number of private institutions which amounted to 129 in 2004 was reduced to 79 in 2014 and consequently to 74 in 2017.

In addition, external assessment and accreditation started to play an important role in improving the quality and status of higher education in Mongolia. Currently, 74 universities qualified for accreditation[12].

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[8] Partnership for Action on Green Economy (2017) Mongolia Sustainable Development Vision 2030. http://www.un-page.org/files/public/20160205_mongolia_sdv_2030.pdf

[9] Government of Mongolia (2010) Resolution on Ratification of Developing Universities with Building Campuses (In Mongolian).

[10] Ministry of Education and Sciences (2014) Order#78 on approval of indexes for fields of education in undergraduate degree level (In Mongolian).

[11] Government of Mongolia (2010) Resolution on Reforming of Some State Owned Higher Education Institutions (In Mongolian).

[12] Mongolian National Council for Education Accreditation (2017) Accredited institutions (In Mongolian).

The accreditation of HEIs was voluntary-based until 2016 when the government made it mandatory for all types of HEIs to go under accreditation[13]. In recent years, international accreditation started to play an important role. ACBSP accreditation in business for example accredited 13 institutions and processing 8 more or ASIIN accreditation in Engineering, Informatics, Natural Sciences, and Mathematics accredited few programs at national universities.

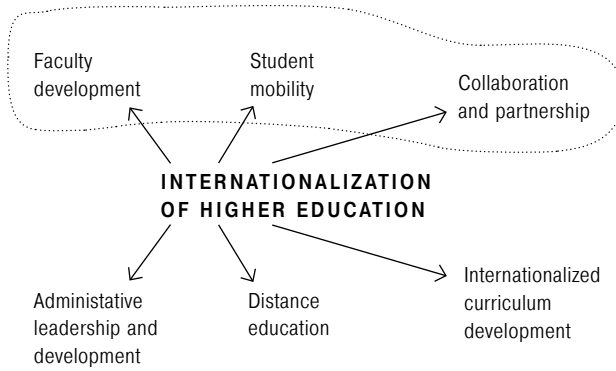
3.1. Key Drivers of Internationalization

The document analysis shows that the international rankings of HEIs, international accreditations, and in general, the necessity to improve higher education quality, and competition for high-qualified students are the main drivers for internationalization. Situated in the discourse of becoming one of the top universities in Asia, national universities started to pay special attention to rankings and international accreditation. As Elken, Hovdhaugen, and Stensaker [2016] emphasized, global university rankings are currently a worldwide phenomenon in higher education and rankings provide a visualized image of the position of particular institutions in the global hierarchy of HEIs. Since Shanghai Academic Ranking of World Universities (ARWU) first ranked universities in the world, global rankings transformed higher education [Marginson 2014; Hazelkorn 2009]. Rankings affect the decisions of university stakeholders, faculty, international and domestic students, their families, state policymakers and investors [Hazelkorn, 2009]. There are over 15,000 HEIs worldwide, 50 national ranking systems and 8 global rankings and the number are growing [Hazelkorn, 2009].

Mongolia does not have any domestic university rankings. Even more, there is no assessment information of Mongolian HEIs at the popular ranking systems, such as Times Higher Education's World University Rankings (THE), ARWU, and QS World University Rankings (QS). Research, in particular, the number and the proportion of publications in periodicals such as *Nature* and *Science* and the citations of papers in particular indexes including Science Citation Index-Expanded and Social Science Citation Index are key measurements in the rankings' indicators. The total number of Social Citation Index, Social Sciences Citation Index, and Arts and Humanities Citation Index papers from Mongolia between 1967 and 2017 is 3550 (Hu, 2017). As Hu [2017] reports, the proportion of papers in the Web of Sciences data remained lowest in 1967–1972. However, since 2003, the number of papers has dramatically increased, reaching 315 in 2016 but dropped to 252 in 2017. The total citation is 41,823 including self-citations [Ibid.]. This shows that the number of papers produced per year still remains low and there is much to do to produce more papers. To do that, two measures are urgent. The government needs to add more

[13] Legal Info System (2017) Approval of Program (In Mongolian).

Figure 1. **Internationalization of Higher Education in Mongolia**



budget for R&D whereas national universities should offer more reward to prominent faculties and researchers.

3.2. Main Dimensions of Internationalization

The document analysis showed seven main dimensions of the internationalization process at HEIs (Figure 1), (1) Administrative leadership and structure, (2) Faculty development, (3) Internationalized curriculum development, (4) Student mobility, (5) Distance Education and (6) Collaboration and partnerships. Three of these, faculty development, student mobility, and collaboration and partnerships are explained in this paper. Before explaining these dimensions, the following section explores internationalization processes of Mongolian HEIs in global and local contexts, their actions and strategies, and underlying motivations.

3.2.1. Faculty Development

Since the 1990s, faculties in higher education institutions had scarce opportunities and resources to develop their skills and knowledge. Although international philanthropic organizations such as Open Society Institute offered short-term exchange programs for faculties, project funding support and other initiatives, faculties across all HEIs lacked language skills to benefit from international training. However, with the need to improve the quality and competency, acknowledgment from government policy, national universities started to focus on faculty development in order to increase their quality and competency. Fink [2013] defined faculty development as “a set of activities that engage all members of the teaching faculty in the kind of continuous professional development that enhances their ability to construct curricula and modes of instruction that more effectively fulfill the educational mission of the institution and the educational needs of students and society” (p.1).

Fink [2013] also offered four levels of national efforts in faculty development programs including 1) little or no faculty development activ-

ity, 2) substantial minority of institutions offering faculty development activity where participation is voluntary, 3) nearly universal activity—mandatory for new teachers, and 4) continuous faculty development expected to all instructors. Fink noted that most universities in developing countries fall in the first level with little or no faculty development activity. While Mongolia has belonged to the first level, main national universities are striving to offer more faculty development opportunities, thus, aiming for the second level. The Mongolian government action plan of 2008–2012[14] indicated in the section under education, "…HEI faculty development program will be implemented", and "…Young researchers and scholars will be supported" in order to improve HE quality and standards. The Roadmap for HE Reform set goals for faculty development for 2010–2021 to increase the number of HE faculty members with a Ph.D. by at least 50 percent[15]. Currently, 2034 of 6917 (29.4%) full-time faculty members have a Ph.D.[16]

However, despite these initiatives, the majority of HEIs do not have a comprehensive plan for faculty development and faculty members spend little time for self-development due to a heavy workload [Narankhuu, Batkhishig 2015]. Through questionnaire study, Itgel et al. [2018] concluded that faculty members (67.3%) at major national universities view that the top priority in faculty development is the academic research and foreign language skills. This means that faculty members feel disadvantaged in participating and conducting high-quality academic research in a foreign language, mainly in English. The study emphasized that national universities including NUM, NUMS, and MUST have a faculty development unit that focuses on three key areas of faculty development: methodology, academic research, and more advanced English language instruction.

3.2.2. Student Mobility

In regards to incoming mobility, currently, Mongolia hosts 1,520 international students in 2017[17]. Of these, 55.9% are studying at bachelor's level, 32.7% at master's level and 11.4% at Ph.D. level. The geographical origin of incoming students reveals that the largest number of students are from China (969), Russia (182), and South Korea (132), representing 84.4% of all international students. The list is followed by Turkey (3%), Japan (2%), Laos (2%), Kazakhstan (1%) and Vietnam (1%). Of the total international students, 6.8% are studying with scholarship according to bi-lateral government agreements while 83% are

[14] Legal Info System (2018) Mongolian Government Action Plan 2008–2012 (In Mongolian).

[15] Ministry of Education, Culture, Science, and Sport (2017) Roadmap for Higher Education Reform 2010–2021 (In Mongolian).

[16] Ministry of Education, Culture, Science, and Sport (2017) Higher Education Statistics 2016–2017 (In Mongolian).

[17] Ministry of Education, Culture, Science, and Sport (2017) Higher Education Statistics 2016–2017 (In Mongolian).

self-financed. The rest of 155 (10.2%) are paying from other sources. Compared to the last five years, the number of international students increased by 0.7% (1,098 in 2012) (MECSS, 2017a). In addition, the "EBI" government-funded short-term scholarship (named after former President Elbegdorj who initiated the program in 2017) encourages inbound student mobility. The purpose of the program is to support foreign young researchers and scholars conducting research in Mongolian studies. Currently, nine researchers from eight countries received this scholarship in 2017[18].

In regards to outgoing mobility, the government of Mongolia promotes study abroad programs with the aim to prepare domestic students for international careers and develop future high-level human resources. In 2014, the government commenced the Higher Engineering Education Development Project in cooperation with Japan International Cooperation Agency (JICA) to prepare 1,000 Mongolian engineering students in Japan by 2023. Currently, 200 students received their degrees from universities in Japan[19].

There is no comprehensive database on outgoing student mobility yet available in Mongolia. However, based on UNESCO figures, it is estimated to be around 9874 students in 2017[20]. This figure does not count the students studying in China and Russia. As reported by the Mongolians Abroad non-governmental organization[21], 9900 students were studying in China and 5500 in Russia in all levels of higher education in 2016. The true and accurate figure may be higher if it includes all types of mobility, including internships and the consolidated figures coming from the universities themselves.

The number of outbound Mongolian students has been stable during the past decade, with only some minor fluctuations. The most popular destination countries included the United States of America, China, Russia, Japan, Korea, and Taiwan. Numerous foreign government-funded scholarships play a crucial role in the outbound mobility of Mongolian students. The popular scholarships are from U.S., Japanese, Chinese, UK (Chevening), Australian, Russian, German (DAAD), Hungarian, and South Korean governments.

3.2.3. International Partnership and Collaboration

For HEIs worldwide, building relationships with counterparts abroad is seen as a key aspect of strategies for internationalization. A greater number of HEIs around the world are eager to establish joint and dual degree programs and other types of partnerships with foreign

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18 Ministry of Foreign Affairs (2017) "EBI" Scholarship for Foreign Young Mongolists

19 Mongolian Economy (2017) 1000 students to study engineering in Japan.

20 United Nations Institute for Statistics (2017) Outbound internationally mobile students by host region. http://data.uis.unesco.org/#

21 Mongolians Abroad. (2016) A database of students studying abroad should be created (In Mongolian).

Table 4. **Comparison of gross outbound enrollment ratio of international tertiary students, all regions, both sexes** (%)

Country	Income level	2011	2012	2013	2014	2015	2016	2017
Mongolia	Lower middle	3.4	3.5	3.1	3.5	3.7	3.9	..
Tajikistan		1.0	1.0	1.2	1.5	1.8	2.4	2.3
Uzbekistan		0.7	0.6	0.6	0.8	0.8	1.0	1.0
China	Upper middle	0.5	0.6	0.6	0.7	0.8	0.9	..
Kazakhstan		2.6	2.6	3.4	4.4	5.4	6.6	7.0
Russian Federation		0.4	0.4	0.5	0.6	0.7	0.7	..
Japan	High	0.5	0.5	0.5	0.5	0.5	..	..
Norway		4.8	5.1	5.4	5.3	5.4	5.5	..
Republic of Korea		3.8	3.5	3.2	3.0	3.0	..	..

Source: United Nations Institute for Statistics (2017) Gross outbound enrolment ratio by host region. http://data.uis.unesco.org/#

institutions (especially in highly developed countries). As the International Association of Universities [Egron-Polak, Hudson 2014] reports, among 782 institutions worldwide, 64 percent offered joint degree programs with partners abroad, and 80 percent offered dual degree programs.

With regard to internationalization at home, Mongolian HEIs experience international partnership and collaboration in three ways: joint/dual degree programs, student exchanges, and research and academic collaboration. The partner foreign schools in Asia, especially from Japan, South Korea, China, and Taiwan weigh higher than other regions. Examples show that 146 of 220 foreign partners with NUM are from Asia, Mongolian University of Science and Technology (MUST) (83/137), NUE (47/70) and the list will go on. Student exchange programs are funded by an array of institutions from private companies (e. g. Mitsubishi Scholarship) and national institutions (e. g. Mongolia-Namyangju Education Promotion Scholarship) to the government (e. g. DAAD or Erasmus Mundus programs).

Dual degree programs have become attractive for students interested in getting an international degree but have limited resources to complete full four years abroad. Thus, institutions offer such programs to attract more students which require increased English language exposure, training, and quality in order to prepare students for the partner institutions.

In Mongolia, joint and dual degree programs mostly in business studies have been experiencing considerable growth over the past decade. While there is some variation in the structure of the programs,

in most programs, students take half of the years of undergraduate or graduate courses in the home country and then complete other years in the partner institution. Currently, about 40 joint/dual degree programs are offered at national universities as of 2017. Most of the programs are taught in English, thus it requires students to have advanced English skills. The tuition fee for these programs is much higher, compared to the domestic average.

Research and academic collaboration is an excellent way that not only accelerates the internationalization progress but also enhances the institutional quality and extends the performance of the partners. HEIs in Mongolia benefit from participating in effective research and academic collaborations with others, both within the country and internationally. In 1974–2016, the government of Mongolia funded 4235 research projects (23.5% in natural science, 23.5% in technology, 22.8% in medical science, 17.8% in social science, and 12.4% in agricultural science)[22]. However, joint projects take a small percentage-18.5% in social science, 12.8% in natural science, 2.8% in medical science, 2.7% in the agriculture, and 2.04% in technology. In 2016, $3.1 million was allotted to HEIs for 164 research projects. Unfortunately, Mongolian HEIs have not yet provided any accurate data regarding their academic collaboration with foreign institutions.

3.3. Current Challenges

The document analysis on the discourse of IoHE in Mongolia presents the following key challenges:

- Institutional autonomy and short-term leadership. When the government of Mongolia appoints rectors and leadership teams for limited terms, national universities face difficulties with autonomy and short-term leadership to the continuity of vision for internationalization and sustaining strategic actions over extended periods.
- Insufficient funding. Funding and grants are unstable and insufficient for the internationalization process to go forward. This surely relies on the country's economic capacity and it will likely have long-term consequences for Mongolia's internationalization agenda and outcomes. (While the funding increased due to a loan from international organizations dedicated to developing higher education, the funding is not sustainable once the loan finishes.)
- Brain drain. As the International Organization for Migration[23] estimates, 130,000 Mongolian migrants were living abroad in 2016. Among the migrants, young highly educated and skilled people are the majority. There is little government incentive, award, or

[22] Mongolian Foundation for Science and Technology (2016) The 2016 Year (In Mongolian).

[23] International Organization for Migration (2017) Mongolia. https://www.iom.int/countries/mongolia

potential advantage for high academic talents to stay in Mongolian HEIs.

- Quality assurance. Before 2016, HEIs were not required to go for accreditation. The only incentive for it was the government's financial support in the form of student loans only to accredited HEIs. The negative results of not being accredited may include a loss of funding, students, and even bankruptcy. Now there is a hope that the mandatory accreditation will benefit all HEIs and their stakeholders.

4. English Medium Instruction in the Internationalization of Higher Education in Mongolia

English medium instruction (EMI) is one trend in IoHE across many non-English speaking countries as countries shift from their focus on teaching English language to teaching academic subjects in English language [Graddol 1997; Deaden 2014]. Although there is no set agreed definition, Oxford Center defined EMI as, "The use of the English language to teach academic subjects in countries or jurisdictions where the first language (L1) of the majority of the population is not English" [Dearden 2014: 2]. EMI is a growing global phenomenon in all phases of education, and more and more universities are in rush to offer both graduate and undergraduate programs through EMI [Macaro et al. 2018]. By offering courses in English, an institution is able to attract international students and faculty members and this brings opportunities to its own students and teachers to participate in international scientific research [Graddol, 1997].

Currently, there is no data of EMI in the higher education sector of Mongolia. By carrying out the first attempt, this section will be able to answer the second research question, 'What are the driving factors for higher education institutions in Mongolia to implement English Medium Instruction?' This section examines the accounts for the history of foreign language instruction and then discusses the current situation of EMI in the country to discover the reasons.

After the 1921 Independence Revolution, as a newly formed communist country with a strong tie to the Soviet Union, the Mongolian education system had the policy to teach only Russian as a foreign language. In the 1980s-1990s, 30 out of 1500 Mongolian students studying in the Soviet Union majored in Russian language (Begz, 2001). During the socialist period, it was mandatory for all students regardless of their fields to learn Russian language for 3–4 years continuously and take a state examination in Russian. Students majoring in Russian language were eligible to take other foreign language courses, such as English and French, for only one semester.

The English language department opened at NUM in 1956, and it was the beginning of teaching English in HEIs of Mongolia in an extensive way (Munkhbayar, 2016). In the 1990s when Mongolia expanded its foreign relations with other countries, it needed more professionals who were able to communicate in English. Therefore, more HEIs

started to offer English courses. However, there were not enough English language teachers. In 1990–1995, with the support from UNDP and ODA-British Overseas Development Agency, a specialized English language institute was founded to retrain hundreds of Russian language teachers as English language teachers [Altan-Od, Khongorzul 2012].

English is not the second official foreign language in Mongolia. However, the documents on the English language in the past two decades show that English is treated as the second main foreign language of Mongolia. In 1997, the Minister of Enlightenment[24] passed an order to teach English language as a foreign language from the academic year of 1997–1998 in all levels of education institutions. Later, the order by the Ministry of Education, Culture, and Science indicated that the main foreign language in bachelor's level programs would be English[25].

The term, EMI, was first used officially in the Comprehensive National Development Strategy of Mongolia that based on Millennium Development Goals [World Bank 2008]. The strategic objective 2 in Education Development Policy indicates, "…provide financial support to high schools, vocational schools, and universities which use English as the medium of instruction" [Ibid.:19]. Moreover, this document addressed the importance of English, pointed out the goal of making the English language a major foreign language in Mongolia, and set a goal to have civil servants be competent in English by 2021. Prior to this official document, in its resolution on English language education, the government of Mongolia announced the need of teaching of EMI courses such as international relations, economics, journalism, tourism, medicine, and technology[26]. The National Program on English Education (Government of Mongolia, 2008) highlighted the importance of "creat[ing] a system/mechanism pushing the need and use of English as the main tool for education, for communication, information access, and business…"[27].

Currently, national and private universities in Mongolia offer, in total, around 385 EMI courses. However, despite handful private universities, opportunities to earn academic degrees in English are limited. Examples include the Mongolia International University that offers undergraduate degree programs entirely in English since its establishment (in 2002). Another institution is Royal International Univer-

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[24] Ministry of Enlightenment (1997) Resolution # 208 on Some Measures for Foreign Language Training (In Mongolian).

[25] Ministry of Education, Culture, and Science (2006) Resolution # 481 on making an amendment in the standard module (In Mongolian).

[26] Government of Mongolia (2001) National Program on English Language Education (In Mongolian).

[27] Government of Mongolia (2008) Resolution on Ratification of the National Program on English Language Education (In Mongolian). P. 5.

sity that opened its doors offering business degree programs entirely in English in 2010. At the graduate level, the opportunities to gain degrees in English are available in joint and dual degree programs (mostly Master's degree) at major national and private universities, such as NUM (1), NULS (6), University of Finance and Economics (9), and Otgontenger University (3).

As Macaro et al. [2018] concluded, the rationales for adopting EMI in a broader global context include 1) a perceived need to internationalize the university; 2) the need to attract foreign students due to the decreasing number of domestic students; 3) national cuts in HE investment; 4) the need of state HEIs to compete with private ones; 5) the importance of English in academic research publications. In the Mongolian context, the document analysis identifies that HEIs in Mongolia implement EMI for the following four reasons, 1) increasing the employability of domestic graduates, 2) promotion of international collaboration, 3) generating more income, and 4) increasing domestic and international profile. These four reasons are interrelated. When national universities strive for increasing their international profile by offering EMI courses and joint and dual degree programs in English, private universities promote international collaboration via joint and dual degree EMI programs to generate more income. Both national and private universities pay much attention nowadays to the employment ratio of their graduates due to the increasing demands of international and domestic business organizations to hire graduates who will be able to function internationally. English language knowledge is one of the main requirements in the employment.

5. Discussion and Conclusion

This study attempts to explore internationalization of higher education in Mongolia, current strategies and approaches to internationalization at national and institutional levels, the concept of EMI policy and its implementation in HEIs in Mongolia. Two research questions were raised, what are the motives and drives of Mongolian higher education institutions to go for internationalization? and what reasons do the HEIs implement English Medium Instruction in Mongolia?

In terms of the first question, the key findings of this research are that at the national level, the world university ranking affects the government to push its national universities to go for internationalization. In a bigger picture, the Mongolian government sees the IoHE as a way to integrate international dimensions into higher education [Knight 2003] in order to improve the quality of higher education. These two reasons are the key drivers of internationalization.

At the institutional level, national universities started to pay special attention to rankings, research output to journals with high impact factor, international collaboration and delivery of courses in English language. On the other hand, private institutions are increasingly applying for international accreditations to compete for high-tuition paying

domestic students. These two phenomena are moving forward the IoHE in Mongolia by integrating international dimensions into higher education.

Although the government of Mongolia makes progress through strategic actions and projects in the higher education sector, Mongolia's internationalization efforts are still dispersed and managed in an ad-hoc fashion. At the national level, higher education policies and laws are not stable and they are constantly changed. Consequently, the internationalization process is becoming slow. As expected in the major document Roadmap for Higher Education Reform 2010–2021[28], Mongolia's first ambitious priority is to have four universities to be internationally visible at least in Asia by 2021. However, the plan is way behind the schedule. The Mongolian government should consider actions to intensify faculty development on a substantial scale for the development of scientific research in the country. The government should also grant full autonomy to national universities and increase its investment in a great amount in the coordination of international initiatives.

It is clear that more private rather than national institutions perceive the forms of international delivery through joint and dual degree programs as Deschamps and Lee [2015] claimed. The forms of joint and dual degree programs in Mongolia support Mongolian domestic students to study abroad rather than calling for international students. The medium of instruction in the courses offered at the joint and dual programs is mainly in English. There are relatively few programs offered in English. The country will remain disadvantaged and it will be crucial to many aspects of the internationalization when the number of programs in English is not leveraged. While many foreign institutions implement EMI to attract international students this does not seem to be a practice at Mongolian HEIs. Therefore, the answer to the second question is that HEIs in Mongolia adopt EMI policy for four reasons, increasing the employability of domestic graduates, promotion of international collaboration, generating more income, and increasing domestic and international profile.

To conclude, the Mongolian government is the key player in IoHE by making policies, taking initiatives, and encouraging national universities. However, the process of internationalization is much slower in private HEIs. More in-depth research and particularly qualitative research of a comparative nature are clearly needed in order to gain greater insights into how the internationalization of higher education is implemented at national and institutional levels.

[28] Ministry of Education, Culture, and Science (2010) Roadmap for Higher Education Reform 2010–2021. http://www.mesc.gov.mn/article-398–435.mw (In Mongolian)

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New Dimensions of Functional Illiteracy in the Digital Economy

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Abstract. We explore the new aspects of functional illiteracy associated with the inability to seamlessly fit into the new economic reality that requires mastering skills and technologies adequate to the digital economy. Data on the level of computer literacy and web accessibility for different categories of population is used as basic indicators of readiness to use digital technology in everyday life and in the workplace. The study shows that about one third of the adult population in Russia is at risk of functional illiteracy. Older cohorts, low-educated people from low-income households, and rural dwellers are the most vulnerable groups. The regional factor makes an additional contribution to the digital divide. We argue that special measures and programs to overcome digital illiteracy targeted at population groups in high-risk geographic areas should be developed. The article is based on the data from the Comprehensive Survey of Living Conditions conducted by Rosstat and the Federal Statistical Survey on the Use of Information Technology.
Keywords: digital economy, functional illiteracy, computer literacy, the Internet, digital divide.

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A pivotal trend in modern socioeconomic development is the active digitalization of the most diverse aspects of societal life marking the onset of the so-called digital economy [IMF 2018]. A country's ability to fit into this trend successfully is largely determined by the so-called "national human potential". The problem of adjusting this potential to the new requirements is multifaceted, the most obvious facet being the need for expanded reproduction of experts in information infrastructure creation and maintenance. Of no less importance, however, is how the people at large will adapt to the new reality. The threat of functional illiteracy is looming as technology advances in quantum leaps, not only revolutionizing data transfer, search, and processing but also fundamentally transforming the relationship mechanisms of both the labor market and the satisfaction of material and social needs.

Translated from Russian by I. Zhuchkova.

The Modern Concept of Functional Illiteracy

The concept of functional illiteracy was adopted by the scientific community in the late 1970s, when it became evident that a substantial share of population in the developed countries was unable to solve the problems arising in their increasingly complicated everyday life, e. g. understand medication and technical instructions, compare prices and read ingredients in the supermarket, or fill out utility bills. According to UNESCO, "a person is functionally literate who can engage in all those activities in which literacy is required for effective functioning of his group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development" [UNESCO 1978:183]. Initially, therefore, the problem concerned low-educated people who, while not being illiterate in a strict sense, had serious deficiencies in the level and structure of their traditional basic skills [Levine 1982; Lankshear 1985; Chudinova 1994].

Today, the situation is radically changing. The rise of the digital economy requires that not only working population but every member of society possess a fairly wide range of new generation skills built around computer literacy. In this context, the concept of functional literacy must be reconsidered and extended. More and more researchers of the new millennium use terms like computer literacy [McCade 2001; Talja 2005], functional Internet literacy [Johnson 2007], and ICT literacy [Lynch 1998; International ICT Literacy Panel 2007]. The authors of the report *Digital Transformation. A Framework for ICT Literacy* define ICT literacy as the ability to use digital technology, communications tools, and networks to access, evaluate, disseminate, and create information, noting that "the notion of a literate populace must be expanded to include the technology-based skills and abilities that will enable citizens to function in an increasingly technological world" [International ICT Literacy Panel 2007:1, 2].

In today's world, therefore, functional illiteracy acquires a considerably larger scale, affecting well-educated social groups with human capital of the pre-digital era who are unable to seamlessly fit into the new economic reality that requires mastering skills and technology adequate to the digital economy.

The Evolution of ICT Literacy in Russia

Three rounds of the Comprehensive Survey of Living Conditions (CSLC) conducted by the Federal State Statistics Service (Rosstat) in 2011, 2014 and 2016[1] are used to measure the depth of the functional illiteracy problem in Russia and get an insight into the pace of transformations. The study also uses the results of the 2016 Federal Statistical Household Use of Information Technology (FSHUIT) Survey[2]. Data on the level of computer literacy and web accessibili-

[1] http://www.gks.ru/free_doc/new_site/inspection/itog_inspect1.htm
[2] http://www.gks.ru/opendata/dataset/7708234640-ikt2016-v01

Table 1. **The Increasing Percentage of Adult Population aged 15–72 with Computer Skills and Internet Access** (%)

	2011	2014	2016	2016/2011
Percentage of population with computer skills	56.9	63.3	70.1	1.23
Percentage of population with Internet access	51.3	63.0	70.9	1.38

Calculated based on the 2011, 2014, and 2016 CSLC data.

ty for different categories of population is used as basic indicators of readiness to use digital technology in everyday life and in the workplace.

The CSLC statistics indicate a rapid expansion of the percentage of population possessing at least the basic skills and opportunities necessary to function in a digital economy. Both measures of "digital maturity"—computer skills and web accessibility—were below the level of statistical significance in Russia in 1992, but in 2011 over half of the adult population had ICT skills and access to the Internet (Table 1). The levels of computer literacy and Internet literacy increased by 13 and 19 percent, respectively, between the first and the third CSLC rounds. In 2016, about 70 percent of the population aged 15–72 had computer skills and access to the web.

Because the growth rate of web accessibility is higher than that of computer literacy, it may be assumed that basic computer skills, not access to the Internet, are what inhibits the use of digital technology in Russia. The reported reasons for having no home internet confirm this assumption indirectly: only around five percent of the households without web access explain it by high prices or infrastructural deficiencies. The vast majority of the non-users say that they have no need for the Internet, which may indicate an underdeveloped demand for digital technology caused by low computer literacy.

Data from Rosstat's FSHUIT Survey allows evaluating not only the incidence of the basic skills but also the level of computer literacy. As can be seen from Figure 1, only a little over 40 percent of the population have word processing skills. The next most widespread skill (29%) is transferring files between the computer and peripheral devices, such as digital camera, audio player, or mobile phone. Only 20 percent of the adult population know how to work with spreadsheets and edit photo, video and audio files, and hardly one citizen out of ten is able to connect new devices to the computer or create electronic presentations. Therefore, the best part of Russian Internet users have only mastered the very basic computer skills.

Cross-national assessments of the basic indicators of adapting to the use of digital technology reveal that Russia is falling behind the most advanced economies. According to the Programme for the Inter-

Figure 1. **Shares of Population with Specific Computer Skills** (%)

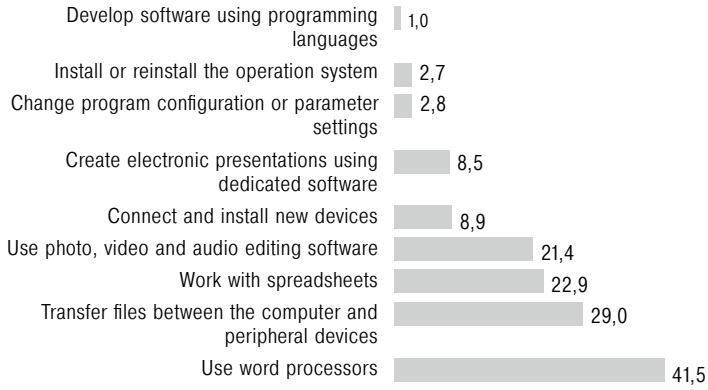


Table 2. **Levels of Adult Adaptation to the Digital Economy in Individual Countries**

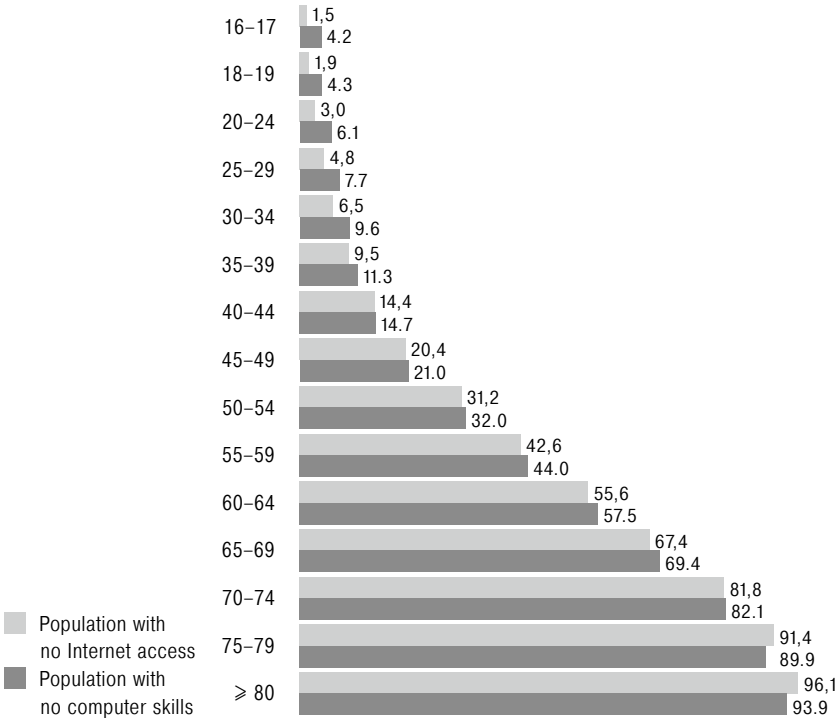
Category	Share of respondents (%)				
	OECD	Norway	USA	Greece	Russia
Refused the computer-based assessment	9.6	6.7	6.3	11.2	12.8
No computer experience	10.0	1.6	5.2	17.4	18.3
Failed the core ICT test required to participate in tests for problem-solving in technology-rich environments	4.7	5.2	4.1	2.8	2.5
Below Level 1	14.2	11.4	15.8	22.4	14.9
Level 1	28.7	31.8	33.1	25.5	25.6
Level 2	25.7	34.9	26.0	11.5	20.4
Level 3	5.4	6.1	5.1	2.5	5.5

Based on the PIAAC data.

national Assessment of Adult Competencies (PIAAC)[3], the percentage of adults who refused the computer-based assessment in Russia was nearly 25 percent higher than the OECD average and twice as high as in the top-ranked countries. The share of citizens with no computer experience in Russia is comparable to that of the OECD "underachievers", Greece being a typical example. At the same time, the proportion of digital-savvy population (reaching Levels 2 and 3) is pretty much meeting the standards set by the top-rankers (Table 2).

[3] http://www.oecd.org/skills/piaac/

Figure 2. **Shares of Population with No Computer Skills vs. No Internet Access in Different Age Groups, 2016** (%)



Skills and opportunity to use the advantages of the digital economy are distributed rather unevenly across the different social classes and groups in Russia. Considerable differences are observed as a function of sociodemographic characteristics as well as the external factors including income level and geographic location.

ICT Literacy Age Structure

The extremely rapid development of digital technology, its integration into learning and everyday life give a competitive edge to youngsters as the cohort most actively accumulating human capital and responding flexibly to changes in the outside world. For this reason, there is a very distinct relation between age and the degree of adaptation to the digital economy.

According to the CSLC, the average age of the respondents with computer skills was 39.9 in 2016 while the average age of those without computer experience was 64.5 years. As illustrated in Figure 2, computer literacy is inversely related to age, young people being much more likely to have computer skills than middle-aged adults and, even more so, older adults. Less than two percent of 16- to 19-year-

Table 3. **Computer Skills in Different Age Groups** (%)

Skill	Share of respondents aged					
	15–24	25–34	35–44	45–54	55–64	65–72
Use word processors	64.4	50.2	46.3	38.5	23.5	9.1
Work with spreadsheets	39.7	28.4	25.4	21.1	10.2	2.5
Use photo, video and audio editing software	40.3	30.2	22.6	14.9	8.3	3.4
Create electronic presentations using dedicated software	23.6	9.5	7.5	5.5	2.3	0.4
Connect and install new devices	16.1	13.3	9.4	6.3	3.1	0.9
Develop software using programming languages	2.2	1.7	1.0	0.5	0.2	0.1
Transfer files between the computer and peripheral devices	48.1	41.0	32.8	22.5	11.7	4.2
Change program configuration or parameter settings	5.4	4.6	2.9	1.7	0.8	0.3
Install or reinstall the operation system	5.0	4.7	2.8	1.6	0.7	0.2

Based on the FSHUIT Survey.

olds reported having no computer skills in 2016. The proportion is gradually increasing with age, reaching 49.5 percent among the population aged 55–59 and accounting for over half of those aged 60–64.

Web accessibility is also strongly related to respondent age. Less than five percent of 16- to 19-year-olds had no access to the Internet, as compared to one out of every ten in the age group 30–39 and an overwhelming majority of the respondents aged over 60.

The FSHUIT Survey statistics show that the range of computer literacy skills is also steadily shrinking with age. The youngest age cohorts are much more likely to possess nearly all sorts of skills from basic to the most complex ones, such as changing program configuration settings and developing software (Table 3).

As we can see, it is mainly older adults who are responsible for the relatively low rates of computer literacy and web accessibility in Russia. According to the CSLC, population above the working age accounts for about two thirds of the respondents without computer skills (67.2%). The increase in adult computer literacy between the rounds was largely due to the fact that youth cohorts, well-adapted to the digital economy, had reached the working age. The problem of ICT illiteracy is thus expected to gradually subside with the change of generations, even if no targeted adaptation programs are developed. However, this is a very slow process, and the passive waiting strategy ignores the need to adapt the vulnerable groups—which are not restricted to the elderly, as it will be shown below.

Table 4. **Percentages of Male and Female Respondents with No Computer Skills and No Internet Access in Different Age Groups** (%)

	16–17	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80+
No computer skills															
Males	1.6	1.8	3.0	5.2	7.4	11.4	17.0	23.9	36.3	48.1	59.0	67.7	80.0	89.4	93.6
Females	1.3	1.9	3.0	4.4	5.8	8.0	12.1	17.5	27.2	38.7	53.3	67.2	82.8	92.2	96.9
Gender bias	0.3	–0.1	0.0	0.8	1.6	3.4	5.1	6.4	9.1	9.4	5.7	0.5	–2.8	–2.8	–3.3
No Internet access															
Males	4.4	3.8	6.2	8.0	10.2	13.0	17.1	23.2	34.9	45.4	56.5	67.0	79.7	87.8	93.5
Females	3.9	4.8	5.9	7.5	9.0	10.0	12.7	19.3	29.8	43.0	58.2	71.0	83.4	90.8	94.0
Gender bias	0.5	–1.0	0.3	0.5	1.2	3.0	4.4	3.9	5.1	2.4	–1.7	–4.0	–3.7	–3.0	0.5

Estimated based on CSLC-2016.

ICT Literacy Gender Structure

The widely held stereotype that women are less capable of succeeding in science, technology, engineering and math (STEM) disciplines than men allows hypothesizing a lower level of computer literacy in females. Indeed, the general adult population statistics indicate that women are more vulnerable to ICT illiteracy—35.2 percent of female respondents reported having no computer skills, as compared to 32.2 percent of male respondents. No access to the Internet was reported by 37.5 percent of women and 32.4 percent of men. The gender bias towards males is small but rather stable, the proportion of ICT-illiterate respondents being higher among women in all the three CSLC rounds.

However, age should be considered as the main determinant of computer literacy and web accessibility when analyzing the gender structure of functional illiteracy (Table 4). A small gender bias towards males in 2016 was only documented for 16- to 19-year-olds. In the rest of the cohorts, women were found to be better adapted to the digital economy.

The level of computer literacy is equally high among male and female teenagers. The decrease with age is typical of both genders but is much more conspicuous among men, which results in a gender bias towards women that peaks at pre-retirement age. Consequently, computer literacy rates are higher among women in most age cohorts, this

Table 5. **Computer Skills in Men and Women** (%)

Skill	Men	Women
Use word processors	38.6	44.0
Work with spreadsheets	20.6	24.9
Use photo, video and audio editing software	22.5	20.5
Create electronic presentations using dedicated software	7.8	9.1
Connect and install new devices	11.8	6.3
Develop software using programming languages	1.5	0.6
Transfer files between the computer and peripheral devices	30.8	27.4
Change program configuration or parameter settings	4.2	1.6
Install or reinstall the operation system	4.2	1.4

Based on the FSHUIT Survey.

tendency being typical of all the three CSLC rounds. The largest gender gap in computer literacy was observed for age 50–59 in 2011 and age 50–54 in 2014, being 9.1 percentage points in both cases. Therefore, higher average rates of digital literacy among men may be explained first of all by the differences in the age structure of male and female population. Life expectancy is longer for women than it is for men, so women's population features a higher share of the oldest age cohorts, least adapted to the new digital economy.

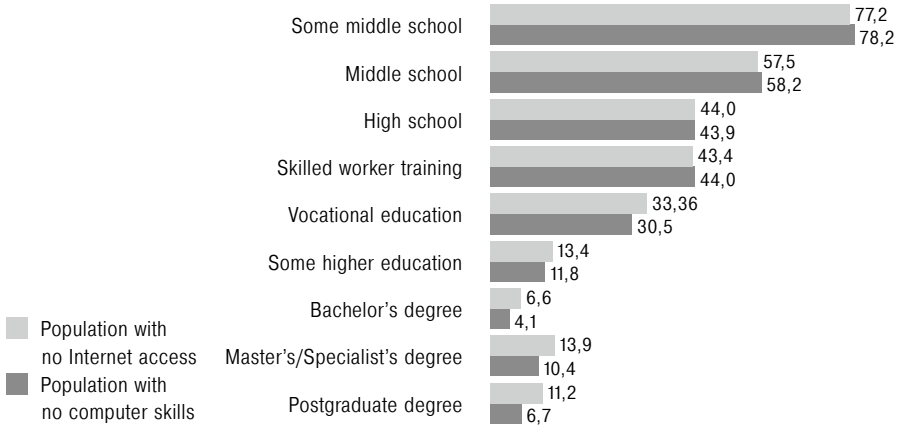
Additional information on the gender structure of computer literacy is provided by the FSHUIT Survey. As seen in Table 5, women are more likely to have such relatively common skills as using word processors, working with spreadsheets, and creating electronic presentations, while being essentially behind men on more complex and technology-based skills, such as changing program configuration settings and developing software.

Respondent age determines whether there is a gender bias in using the Internet, and its direction, the gender structure of web accessibility being similar to that of computer literacy. Yet, the bias towards women among the middle-aged population is not that significant as with computer literacy, and the change in bias direction occurs somewhat earlier (see Table 3).

ICT Literacy and Educational Attainment

There is a direct relationship between the level of computer literacy and the highest level of education completed by respondents (Figure 3). Among the college-educated, only 10 percent have no computer skills, being mostly represented by older adults who obtained higher education in the pre-digital era. Disturbingly, though, computer illiteracy is reported by four percent of Bachelor's degree holders—

Figure 3. **Shares of Population with No Computer Skills and No Internet Access in Groups with Different Levels of Educational Attainment, 2016** (%)



young people who are comparatively recent graduates (*Translator's note:* Bachelor's degree became part of Russia's Federal State Education Standards in 2010).

As educational attainment decreases, so does the level of computer literacy, gradually. Among respondents with vocational qualifications, 30.5 percent have no computer experience, and only one in five people with some middle school has computer skills. However, the share of ICT-illiterate population in this group has reduced as compared to the previous CSLC round (2014), when only 13.9 percent of the lowest-educated had computer skills.

Similar dependence on educational attainment is observed for web accessibility. In lower-educated groups, Internet access rates are approximately the same as computer literacy rates or even higher, while the situation is reverse for people with higher education. The percentage of computer users with no access to the Internet is only three percent among holders of Master's, Specialist's, and postgraduate degrees.

Effects of Income Level on ICT Literacy

The effects of household income on ICT literacy, too, should only be assessed through the prism of the age structure. According to the CSLC, the overwhelming majority (83.3%) of adult population with the lowest income[4] is within the working age[5], whereas the propor-

[4] Respondents in the first quintile of income, i. e. 20 percent with the lowest levels of household income.

[5] Most families are having children at the working age, which results in a high dependency load.

Table 6. **Shares of Population with No Computer Skills and No Internet Access in Groups with Different Income Levels** (%)

Age group	Category Based on Household Income			
	No computer skills		No Internet access	
	Lowest income*	Higher income**	Lowest income*	Higher income**
Under the working age	1.8	0.6	7.2	0.8
In the working age	22.3	11.2	25.2	11.9
Above the working age	79.2	65.7	73.7	67.8
Mean	30.5	35.2	32.2	36.5

* 1st quintile (the lower 20 percent).
* 2nd-5th quintiles (the higher 80 percent).
Source: Rosstat (estimated based on CSLC-2016).

tion of people above the working age, more vulnerable to ICT illiteracy, reaches 44.1 percent among citizens with higher incomes.

Table 6 demonstrates that low income has significant negative effects on both measures of adaptation to the digital economy in every age group. The effects are the most manifest at younger age and the least conspicuous at the retirement age. The Internet access gap among youths caused by differences in family income is the most disturbing factor of functional ICT illiteracy.

Geographic Differences in ICT Literacy

Socioeconomic and demographic differences between the regions of Russia are determined by the great diversity of ethnicities and faiths which are distributed unevenly across a vast territory. Despite the uniform national system of general and professional education, computer literacy rates differ dramatically across regions and types of localities.

The incidence of computer skills and Internet accessibility is essentially lower in rural areas than in cities, despite higher growth rates (Table 7). ICT literacy growth rates changed similarly in rural and urban areas between 2011 and 2016: the share of urban population with no computer experience decreased from 38.5 to 25.6 percent, rural from 56.4 to 42.7 percent. That is, the urban-rural gap reduced very little, from 17.9 to 17.1 percentage points. Computer illiteracy of adult population was found to be related directly to the size of locality, the lowest rates being typical of metropolises (20.7%) and the highest (53.6%) for rural areas with population of a few dozen people.

The situation is somewhat better with regard to the growth of web accessibility rates. During the same period, the percentage of non-In-

Figure 4. **Shares of Urban and Rural Population with No Computer Skills in Different Age Groups, 2016** (%)

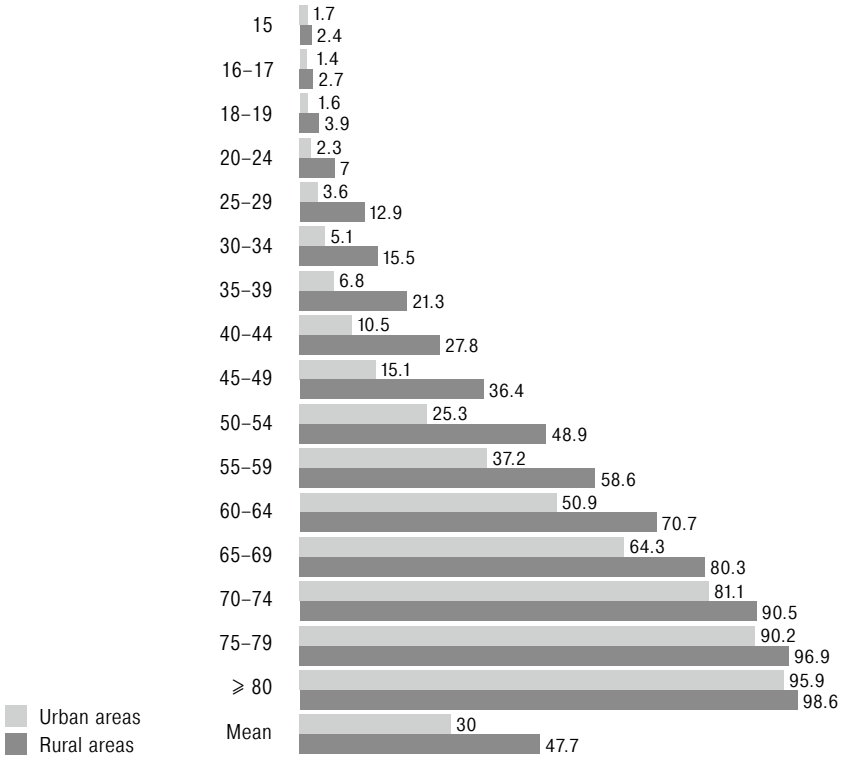


Table 7. **Shares of Adult Population with No Computer Skills and No Internet Access in Urban and Rural Areas** (%)

	2011			2016		
	Total	Urban	Rural	Total	Urban	Rural
No computer skills	43.1	38.5	56.4	29.9	25.6	42.7
No Internet access	48.7	43.2	64.7	29.1	24.4	43.3

Estimated based on CSLC2011, 2016

ternet users dropped from 43.2 to 24.4 percent in urban areas and from 64.7 to 43.3 in rural ones. Therefore, the urban-rural gap reduced from 21.5 to 18.9 percentage points, which is more significant in both absolute and relative terms. Nevertheless, the Internet access gap between urban and rural populations remains very large, exceeding the gap in computer literacy.

The age structure of rural and urban population, namely low numbers of youth and a high share of older cohorts in rural areas, adds

a lot to the urban-rural gap in computer literacy. It is seen in Figure 4 that lower levels of computer skills among rural respondents are typical of all age groups, but the difference is particularly striking in middle and older age. The computer literacy divide is relatively small between urban and rural youths aged under 25, the rates being fairly high in this age cohort, whereas the oldest groups demonstrate "equality of illiteracy". Obviously, the urban-rural gap will gradually diminish provided that current trends persist, but the process is going to be slow.

A similar pattern is observed in the inequality of access to the Internet.

Differences in computer literacy and web accessibility across regions are at least as significant as those between urban and rural populations. In 2016, there was a four-fold gap between the regions with the lowest and highest shares of non-computer users. As expected, the top positions are held by wealthy oil- and gas-producing regions and megacities with high proportions of well-educated urban citizens. Yamalo-Nenets Autonomous Okrug, where ICT illiteracy rate among the population aged 15 and over was only 12.4 percent in 2016, is ranked first, followed by Saint Petersburg (15.9%), Khanty-Mansi Autonomous Okrug—Yugra (16.6%), and Moscow (16.7%). Regions of European Russia with low-educated population and low youth, where nearly half of the adults have no computer skills—Penza Oblast (45.0%), Nizhny Novgorod Oblast (45.6%), Novgorod Oblast (46.2%), and Tambov Oblast (47.8%)—are ranked at the bottom.

Analysis of region-specific age structure of ICT literacy results in patterns similar to those observed for urban-rural differences: the gap between the top- and bottom-rankers is present virtually in every age group, being much smaller for younger generations than for older ones (Table 8).

Regional differences in web accessibility are similar to the regional structure of computer literacy (Table 9). The top three regions are Yamalo-Nenets Autonomous Okrug with only 13.8 percent of non-Internet users, Saint Petersburg, and Moscow (both 15.7%). Counterintuitively, again, the lowest rates of Internet connection are observed in rather densely-populated regions of European Russia—Tambov Oblast (47.9%) and Penza Oblast (48.9%)—and in one of the republics of the Northern Caucasus region, Dagestan (47.9%). The extremely high Internet inaccessibility rates in Dagestan are observed for all age groups, including youth, one in every five 15- to 29-year-olds being unable to use the Internet. With such age structure of the measure analyzed, it is most probably the demographic composition, i. e. a high percentage of youth, that prevented the region from being ranked the lowest. Relatively high ICT illiteracy rates among youth are also observed, although less prominently, in some other regions of the Northern Caucasus.

Because the data from the first CSLC round was not representative at the level of regions due to the small sample, this survey does

Table 8. **Shares of Population with No Computer Skills in the Top- and Bottom-Ranked Regions, by Age Groups** (%)

Age	Regions with the lowest shares of non-computer users			Regions with the highest shares of non-computer users		
	Yamalo-Nenets Autonomous Okrug	Saint Petersburg	Khanty-Mansi Autonomous Okrug	Nizhny Novgorod Oblast	Novgorod Oblast	Tambov Oblast
15–29	2.0	0.9	0.5	2.3	8.0	4.3
30–59	12.3	5.9	9.6	30.3	31.7	33.4
60 and over	43.1	56.1	58.7	84.6	86.2	85.0
Mean	12.4	15.9	16.6	45.6	46.2	47.8

Source: Rosstat (estimated based on CSLC-2016).

Table 9. **Shares of Population with No Internet Access in the Top- and Bottom-Ranked Regions, by Age Groups** (%)

Age	Regions with low shares of non-Internet users			Regions with high shares of non-Internet users		
	Yamalo-Nenets Autonomous Okrug	Saint Petersburg	Moscow	Tambov Oblast	Republic of Dagestan	Penza Oblast
15–29	1.3	0.7	0.2	5.1	20.8	3.7
30–59	13.2	5.8	5.0	34.0	45.6	33.7
60 and over	53.4	56.3	57.4	84.2	80.9	86.2
Mean	13.8	15.7	15.7	47.9	47.9	48.9

Estimated based on CSLC-2016.

not allow tracing how the regional structure of computer literacy and Internet access changed during any long period of time. However, the changes can be indirectly assessed using the statistics on the percentage of households that own a home computer (submitted by Rosstat since 2010), which increased 1.4-fold, from 54.5 to 74.3 percent, in 2010–2016. The growth rates differ greatly across regions, being the highest in Ingushetia (13.3-fold), Karachay-Cherkessia (2.9-fold), Tambov Oblast (2.3-fold), Kostroma Oblast (2.2-fold), and Ivanovo Oblast (2-fold). High computerization of households in these regions is mostly explained by their low baseline rates. In Ingushetia, for instance, the percentage of households owning a home computer increased from 5.2 to 68.7 percent during the period of survey, yet the region has not even reached the country's average. Computerization rates below the average are observed in remote areas (0.9-fold in the Republic of Sakha, 1.1-fold in Kamchatka Krai, Sakhalin Oblast, Ud-

murtia, and Chuvashia) as well as in highly-computerized regions (e. g. 1.1-fold in Moscow). Consequently, not only computerization rates increased but they also became more equalized across the country. The coefficient of variation in the percentage of households with a home computer in the region decreased more than twice between 2010 and 2016 (from 0.26 to 0.12).

Conclusion

Comparison of ICT literacy across different types of social groups in Russia reveals the main factors of the digital divide and, consequently, the at-risk groups in which low ICT skills inhibit adaptation to the digital economy. At-risk population categories include older adults, low-educated people, low-income citizens, and rural dwellers. The regional factor adds to the digital divide. Risks are multiplied for the population groups affected by two or more negative factors, so targeted adaptation measures and programs should be developed to support them. Special attention should be paid to at-risk youths, as ICT illiteracy will inevitably become a major hindrance to their careers, making them unattractive for employers in the context of high Internet literacy among coeval competitors in the labor market.

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The Role of Engagement in the Development of Critical Thinking in Undergraduates

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Abstract. This study explores the link between academic research, extracurricular engagement and the development of critical thinking of undergraduate students using a single statistical model. Empirical basis of the research was provided by the results of the Student Experience in the Research University (SERU) survey conducted in one of Russian national research universities in 2017 (N=3,344). Binary logistic regression reveals a statistically significant relationship between the development of critical thinking and student engagement in learning, research and extracurricular activities, higher involvement corresponding to better critical thinking skills. The findings may be useful for developing curricula, allocating student workload, and devising new initiatives for university students.

Keywords: critical thinking, student engagement, student experience, academic activities, extracurricular activities, undergraduate research.

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Critical thinking is one of the most discussed learning outcomes in higher education of the 21st century. Researchers define this skill as reasonable, purposeful thinking that include analyzing, synthesizing, and evaluating information to make further inferences and decisions [Halpern 1993]. Along with creativity, collaboration, and problem solving, critical thinking is classified among the most in-demand higher-order thinking skills, or 21st century skills [Lai, Viering 2012; Vasilyev et al. 2015; Podolsky, Pogozhina 2016; OECD2017]. The role of critical thinking became especially prominent in the digital transformation era, as ubiquitous expansion of the Internet into everyday life made the use of personal portable communications devices a world-

Translated from Russian by I. Zhuchkova.

wide trend[1]. Indeed, it is the ability to critically evaluate the incoming information that enables individuals to make decisions in their career, personal and social life [Strayhorn 2008; OECD2017].

An important trend in the global labor market today is the growing number of jobs that require non-routine, or higher-order thinking skills [Casner-Lotto, Barrington 2006; Podolsky, Popov 2014; Vasilyev et al. 2015; Dvorkin 2016; Gray 2016; Mikidenko, Storozheva 2017; Froumin, Sorokin 2018]. In particular, this trend manifests itself in employer surveys, which reveal that college transcripts alone are not enough anymore to evaluate candidates' knowledge, skills and productivity [Association of American Colleges & Universities 2018; Podolsky, Popov 2014; Podolsky, Pogozhina 2016]. The vast majority of employers consider critical thinking a fundamental requirement for employment [Casner-Lotto, Barrington 2006; Podolsky, Pogozhina 2016]. The modern economy is in demand of professionals who not only possess knowledge but also know how to apply it in any life situation [Kapuza et al. 2017]. That is why critical thinking is emphasized as one of the key learning outcomes in a number of educational systems and has recently received greater attention from instructors, methodologists, and education policymakers.

In the early 2000s, looking at the latest PISA[2] assessment results, the participating countries realized the need to revise their educational systems and made it their policy to develop critical thinking in school students [Hautamäki 2014; Schleicher 2014; Kapuza et al. 2017]. As noted by Andreas Schleicher, the coordinator of PISA, "The modern world no longer rewards you just for what you know. Google knows everything. The modern world rewards people for what they can do with what they know" [3] using creativity and critical thinking as tools. However, it is not only the school educational systems of the countries seeking intensive development that want to lay the foundation of critical thinking; this skill has become an integral part of higher education models. The Information Notice of the Ministry of Education and Science of Russia No. 05–735 On Enhancing the Federal State Education Standards and Developing the Guidelines for Secondary Education Programs of March 23, 2017 states that Bachelor's degree holders must possess the universal competencies of systems and critical thinking, which include the ability to find, critically evaluate and

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[2] Programme for International Student Assessment. http://www.oecd.org/pisa/

[3] Schleicher A. (2017) What Are the Keys to a Successful Education System. https://www.npr.org/templates/transcript/transcript.php?storyId=541644277

synthesize information and apply a systematic approach to problem solving[4]. However, despite the fact that the higher-order thinking skills requirement is considered at the level of national learning standards, no recommendations have been provided so far on the most effective methods and tools to develop these skills. Therefore, studies aiming to identify and develop the tools to improve students' critical thinking skills are in the spotlight in pedagogy and sociology of education now.

The majority of the studies assess the effectiveness of specific teaching practices, collaborative and cooperative learning, and various classroom activities designed to develop and improve critical thinking skills [Halx, Reybold 2005; Shakirova 2006; Muryukina, Chelysheva 2007]. A number of articles, for instance, reveal a positive correlation between undergraduates' critical thinking skills and their involvement in debates, critical analysis, and teamwork [Smith 1977; Gibson 1985; Astin 1993; Tsui 1999; Coates 2009; Haskell 2016]. Modern western teaching practices, which Russia has recently adopted, are based on the famous Bloom's taxonomy of educational objectives [Bloom 1956]. In the revised version of this taxonomy, critical thinking can be advanced through six fundamental levels of information synthesis: remembering, understanding, applying, analyzing, evaluating, and creating. This approach has proved effective in enhancing students' mastery of material in a discipline-specific manner [Crowe, Dirks, Wenderoth 2008; Gilboy, Heinerichs, Pazzaglia 2015]. However, the primary focus of the taxonomy is on the teaching methods and activities that instructors use in the classroom to improve academic engagement of students. Meanwhile, the taxonomy ignores the potential of university environment that offers opportunity for both academic and non-academic student involvement. However, research confirmed that engagement in research projects, student organizations, and extracurricular events could enhance students' learning outcomes, including higher-order cognitive skills [Astin 1984; Pascarella, Terenzini 2005; Strauss, Terenzini 2007]. To the best of our knowledge, there are no studies that evaluate the cumulative effects of all the three types of engagement on the development of critical thinking skills in Russian or international literature. The current project thus seeks to explore how academic, research and extracurricular engagement affects the development of critical thinking in undergraduates using a single statistical model. The study addresses the following research questions:

1. Is academic engagement of undergraduates related to their critical thinking skills?
2. Is research engagement of undergraduates related to their critical thinking skills?

[4] http://fgosvo.ru/fgosvo/142/141/16

3. Is extracurricular engagement of undergraduates related to their critical thinking skills?
4. What are the cumulative effects of student engagement in various aspects of university life on the development of critical thinking?

Strategies for Developing Critical Thinking Skills

Critical thinking does not develop spontaneously; it requires a well-organized learning process [Halpern 1993; Popova 2013]. Depending on the structure of teaching practice, two different approaches to critical thinking instruction are distinguished: embedded and explicit. In the embedded instruction mode, teachers infuse critical thinking using their subject material, while explicit instruction implies specialized courses targeted exclusively on critical thinking skills.

Diane Halpern and Lisa M. Marin [2011] point out that dedicated critical thinking courses are more effective than embedded instruction. Such courses were also found to be more appropriate for students with high academic achievement, as low-achieving students may find themselves struggling with tasks that require higher-order cognitive skills [Zohar, Dori 2003]. Critical thinking courses can be integrated into the curriculum, if possible, or delivered as a supplementary class after regular class hours.

Critical thinking is interpreted as the ability to define a problem, interpret and explain ideas, evaluate arguments, make decisions and inferences, etc. [Glaser 1941; Ennis 1987]. Such cognitive processes can be learned through cooperation in groups [Plotnikova 2015; Johnson, Johnson, Smith 2014], brainstorming [Fahim, Eslamdoost 2014], *ad hoc* problem solving in the classroom [Popova 2013], and other teaching strategies. There has been no scientific evidence of a single teaching strategy being more effective than any other. Some authors insist on discussion, instructor/student interaction and case studies as the best teaching methods to promote critical thinking [Staib 2003]. Others recommend using real-world examples in teaching to increase the chances for the acquired skills to be applied beyond the classroom settings [Sternberg 2001]. At the same time, researchers point out that most educators focus on transferring established and a priori knowledge or the content matter rather than the instructing techniques to foster critical thinking and analytical skills in students [Fahim, Eslamdoost 2014].

The Effects of Undergraduate Engagement on the Development of Critical Thinking

In the late 1990s, the concept of student involvement was one of the most discussed in the debate on the U.S. system of higher education. It was introduced by Alexander Astin, a professor at the University of California, who postulated that “student involvement reflects the amount of physical and psychological time and energy the student invests in the educational process” [Astin 1984]. The term was introduced to Russian sociology of education in the mid-2010s [Ma-

loshonok 2014], yet studies in this area are rather few. The main idea of student involvement theory is that curriculum should be developed in such a way so as to allow students to invest a sufficient amount of effort and energy into developing the necessary skills [Astin 1984].

Following Russian and international researchers [Astin 1984; Pascarella, Terenzini 2005; Maloshonok 2014], we identify the following types of undergraduate engagement within the framework of this study:

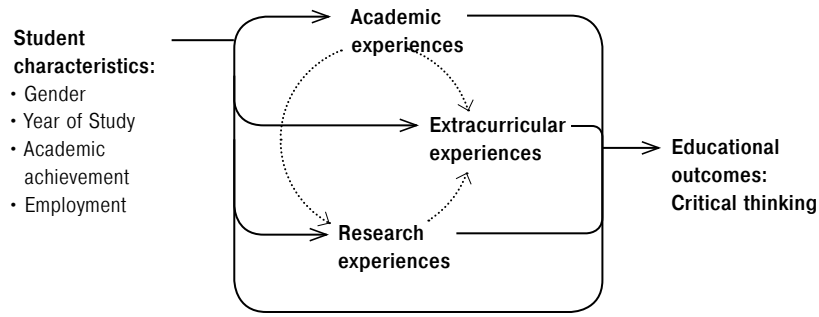
- *Academic engagement*— student engagement in the classroom which is assessed based on contribution to a class discussion; application of disciplinary knowledge in a global context; hours spent studying; and out-of-class activities, such as studying with a group of classmates outside of class, communicating with the instructor outside of class about issues and concepts derived from a course, etc.;
- *Research engagement*— participation in research projects, science research workshops and conferences beyond the curriculum;
- *Extracurricular engagement*— participation in student organizations.

Empirical evidence shows that these types of engagement are related to the development of higher-order thinking skills to different extents [Centra, Rock 1971; Pace 1984; Astin 1984; Pascarella, Terenzini 2005; Strauss, Terenzini 2007]. Students involved in the learning process are considerably less likely to withdraw than their academically disengaged peers [Kuh 2009; Terentyev, Gruzdev, Gorbunova 2015]. Besides, active participation in university academic life improves undergraduates' self-reported gains, learning satisfaction, academic performance, and persistence [Pascarella et al. 2010]. Frequency of student-faculty and peer interaction in the classroom was found to be positively related to critical thinking skills [Terenzini, Pascarella 1978; 1980; Endo, Harpel 1982, 1983; Pace 1984; Terenzini, Wright 1987; Baxter Magolda 1987; Ory, Braskamp 1988].

Involvement of undergraduate students in research activities can be fostered by professors sharing their research experience in the classroom as well as through guided or self-guided student research. Research engagement is an important factor affecting the development of higher-order thinking skills, including critical thinking [Terenzini, Pascarella 1980; Zydney et al. 2002; Kim, Sax 2009; Miller, Rycek, Fritson 2011; Hand et al. 2011]. Participation in research projects was also found to help students develop their research interests and encourage them to pursue postgraduate studies and build academic careers in the future [Russell, Hancock, McCullough 2007].

Along with studies indicating the importance of academic and research engagement for the development of higher-order thinking

Figure 1. **The Conceptual Framework of Critical Thinking Development**



skills in undergraduates, more studies emerge that stress the need to engage students in extracurricular activities, such as student clubs and organizations [O'Brien 1995; Strauss, Terenzini 2007]. Participation in intellectual competitions, professional communities and associations correlates positively with analytical skills [Strauss, Terenzini 2007]. Out-of-class experiences contribute to such learning outcomes as teamwork skills, critical thinking, individual and collective responsibility [Pace 1984; O'Brien 1995; Pascarella, Terenzini 2005; Strauss, Terenzini 2007]. Involvement in university non-academic life helps students build their social not only by establishing peer ties but also by connecting to some accomplished academics and business actors [Kasharin 2017; Savelyeva, Voskresensky, Alexandrov 2017]. It has been that extracurricular engagement is a major contributor to starting salary [Hu, Wolniak 2010]. At the same time, a statistically significant negative relationship was found between working more than 20 hours per week and grades, yet working 20 hours or less on campus was significantly and positively related to academic achievement [Pike, Kuh, Massa-McKinley 2008].

All the scholarly articles referred to above focus on one specific type of undergraduate engagement. Studies considering various types of student involvement at once and controlling for the development of higher-order thinking skills, including critical thinking, are extremely rare in the international literature and completely lacking in Russia.

The choice of the conceptual framework for this study was based on the results of previous research that established the relationship between academic performance and undergraduate engagement in: (i) classroom activities, (ii) formal out-of-class instructional experiences, (iii) research, (iv) extracurricular activities. The study relies on the conceptual model proposed by the American scholars Patrick T. Terenzini, Leonard Springer, Ernest T. Pascarella, and Amaury Nora, who were the first to notice that student engagement in various expe-

Table 1. **Sample Characteristics**

	Variable	
Gender	Male	32%
	Female	68%
Year of study	1	42%
	2	26%
	3	16%
	4	16%
Employment	On campus	38%
	Off campus	52%
Academic achievement	Average score	7.6

riences in the learning environment may promote the development of higher-order thinking skills. Their basic idea is that undergraduate students differ by the level of pre-college preparation, academic achievement, gender, and socioeconomic status, but university environment provides them all with an opportunity to accumulate student experiences by involving actively in various aspects of university life, thereby fostering the development of higher-order thinking skills [Terenzini et al. 1995a; 1995b] (Fig. 1).

Data

The study was carried out within the framework of the international project Student Experience in the Research University (SERU)[5]. The sample involved 3,344 Bachelor's degree students enrolled in one of Russia's national research universities in the academic year 2016/17. Participation in the survey was voluntary. Students received the survey invitation in their university email accounts in April 2017. The response rate was 22 percent. Sample characteristics are presented in Table 1.

In terms of academic achievement, the sample differs from the statistical population by 0.3 scores, the overall average score being 7.3 in 2016/17. The sample is skewed towards females, as female students account for 60 percent of total student population. The resulting gender bias of 8 percent is compensated for through weighting adjustments.

The SERU project includes a student survey supplemented with administrative data. The survey collected information on the level of

[5] Information on the SERU Consortium is available at https://ioe.hse.ru/seru/ and https://cshe.berkeley.edu/SERU

undergraduates' skills, including critical thinking, their engagement in different types of experiences, and other characteristics. The data used for analysis was fully anonymized and aggregated.

Changes in critical thinking ability were measured based on students' responses to the question, "Please rate your level of proficiency in analytical and critical thinking skills *when you started the program in the university* vs. *now.*" The response categories were presented on a six-point scale, ranging from "Very poor" to "Excellent". Student self-assessment of improvement in their critical thinking abilities was estimated as the difference between the two variables obtained from the responses, which served as the basis for a dichotomous variable describing how students' critical thinking skills changed since beginning university, "Did not change" (36%), and "Improved" (64%). This measure thus represents retrospectively self-assessed development of critical thinking.

The respondents were asked how frequently they had engaged in the following: (i) in-class (factor score) and out-of-class (factor score) academic activities; (ii) research (participation in research projects: No=0; Yes=1); and (iii) extracurricular experiences (participation in student organizations (No=0; Yes=1) (Appendix A).

The dataset collected during the survey was complemented with administrative information, including such student characteristics as gender (Male=0; Female=1), year of study (1; 2; 3; 4), employment on campus (No=0; Yes=1) or off campus (No=0; Yes=1), and academic achievement (average score, 1–10) calculated as the ratio of the sum of all grades to the number of disciplines, no allowance being made for non-attendance of any kind. Those indicators were used as control variables in the statistical model. The questions about paid employment (including internships) on and off campus yielded the rates of 38 and 52 percent, respectively. However, it appears to be impossible to verify the type of students' employment and the exact number of hours they spent working.

Data Analysis Strategy

The direct effects of student engagement on the development of critical thinking were assessed using the method of binary logistic regression, which allows testing the direction and strength of the relationships between the dichotomous dependent (predicted), variable and various independent variables, (predictors), as well as measuring the contribution of individual predictors to the model. Students' self-reported level of proficiency in critical thinking was the predicted variable. The key independent variables were represented by indices of academic (in-class or out-of-class), research and extracurricular engagement of undergraduates while controlling for such factors as gender, year of study, academic achievement, and employment.

Indices of in-class and out-of-class academic engagement obtained by factor analysis are given in Appendix B. Cronbach's alpha

Figure 2. **Self-Reported Level of Critical Thinking Skills among Undergraduates Who Engaged or Did Not Engage in Research While Being Students**

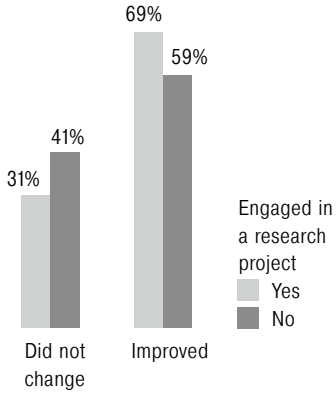
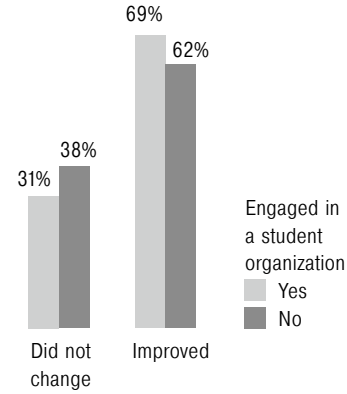


Figure 3. **Self-Reported Level of Critical Thinking Skills among Undergraduates Who Engaged or Did Not Engage in Extracurricular Activities (Student Organizations) While Being Students**



was used to verify internal consistency of the items on the scales of in-class and out-of-class academic engagement. The estimated Cronbach's alpha coefficient was 0.82 for the in-class academic engagement scale and 0.71 for the out-of-class academic engagement scale, which indicates high internal consistency for the two indices.

Figures 2 and 3 present the descriptive statistics for the changes in critical thinking skills based on the subjective perceptions of undergraduates who engaged or did not engage in research (Fig. 2) and student organizations (Fig.) while being students.

As Figures 2 and 3 show, improvement in the level of critical thinking skills is reported more often by students engaged in research and extracurricular activities than by their disengaged peers. Correlation analysis reveals a weak yet statistically significant positive correlation between improvement in the level of critical thinking skills and in-class academic engagement ($r=0.15$) at significance level $p<0.001$, correlation with involvement in out-of-class academic experiences being non-significant.

Analysis Results

Table 2 presents the results of binary logistic regression. The resulting model allows for correct classification of 67 percent of the respondents. Skewness of the model was tested using the mean value of the unstandardized residuals (M=0.0; confidence interval [–0.19; 0.19]). Homoscedasticity test did not reveal any statistically significant correlations between the residuals and the predictors, hence the data is homoscedastic. A test for correlations among the variables selected for

Table 2. **Binary Logistic Regression Analysis Examining the Relationship Between Different Types of Undergraduate Engagement and Students' Self-Reported Critical Thinking Skills**

Variable	Self-Reported Critical Thinking Skills: Did not change=0; Improved=1		
Engagement in different aspects of university life	B (S.E.)	Exp(B)	Wald
In-class academic engagement	0.324 (.055) ***	1.382	34.603
Out-of-class academic engagement	–0.029 (0.050)	0.972	0.334
Research engagement	0.256 (0.098)***	1.292	6.792
Extracurricular engagement	0.237 (0.098) **	1.267	5.804
Student characteristics			
Academic achievement (average score)	–0.063 (0.046)	0.939	1.847
Gender (female)	0.204 (0.099)	1.226	4.223
Year of study (first year being the reference group)			
2	0.508 (.115) ***	1.662	19.379
3	0.837 (.146) ***	2.310	32.802
4	1.245 (.161)***	3.474	59.733
Employment on campus	–0.007 (.138)	0.993	0.003
Employment off campus	–0.176 (.109)	0.839	2.590
Constant	0.370 (0.355)	1.447	1.086
Nagelkerke pseudo R^2	0.099		
Overall predictive accuracy	66.5		

*$p \leqslant 0.05$; **$p \leqslant 0.01$; ***$p \leqslant 0.001$

regression analysis found statistically significant correlations among the engagement-related variables ($p<0.001$), but the strength of correlations does not exceed 0.2. The variance inflation factor (VIF) was used to quantify multicollinearity. The VIF coefficient was found to be in the range [1; 2], which means that there are no significant linear relations among the variables.

Statistically significant coefficients are observed for the following independent variables: "in-class academic engagement" ($p \leqslant 0.001$), "research engagement" ($p \leqslant 0.001$), "engagement in student organizations" ($p \leqslant 0.01$), and "year of study" ($p \leqslant 0.001$). Exp(B) values greater than 1 indicate a positive correlation between the predictor and the predicted variable, so increasing the predictor value will increase the odds of success—in this case, the level of critical thinking skills. The variables "gender", "academic achievement", "employment on campus", and "employment off campus" do not contribute to critical thinking development.

It is important to remember, while interpreting the results, that regression analysis detects the existing correlations among the variables, which do not explain cause and effect. Besides, the full model explains a comparatively low proportion of the variance (Nagelkerke R^2 = 9.9%), which implies that some factors are left unattended, such as the nature of research activities (individual or group projects, degree of student autonomy, etc.), family characteristics, or types of extracurricular experiences.

Conclusions and Future Prospects

The findings of this study indicate that academic, research and extracurricular engagement of undergraduates is positively associated with critical thinking skills. Classroom participation appears to be the strongest predictor of critical thinking, which confirms the necessity to intensify the effective classroom practices. However, academic involvement alone is not enough in the modern world, so universities should also consider other aspects of university life, namely research and extracurricular activities.

An important finding of this study is that it determines the roles of academic and non-academic experiences in the development of critical thinking in undergraduates. Evidence of the crucial role of research engagement is in accordance with the conclusions made by international scholars, who established that participation in scientific events contributes to the development of independent thinking skills and promotes idea synthesis and evaluation [Kinzie 2010; Kilgo, Sheets, Pascarella 2014], and Russian researchers, who contend that the development of higher-order thinking skills cannot be achieved through mastery of theoretical knowledge alone but requires learner engagement [Mikidenko, Storozheva 2017:371].

Engagement in student organizations was also found to play a significant role in the development of critical thinking, which is confirmed in a number of international studies [O'Brien 1995; Strauss, Terenzini 2007]. Since this study did not control for the type of student organization, the results cannot be extrapolated to specific associations and clubs. Meanwhile, available empirical evidence shows that participation in different types of student organizations yields different outcomes. For example, involvement in political organizations and creative activities has a positive effect on academic performance, whereas participation in sports and religious involvement do not affect student achievement significantly [Baker 2008; Kasharin 2017].

It follows from our findings that academic performance is not related directly to the development of critical thinking. This inference is consistent with the conclusions made by Russian [Podolsky, Pogozhina 2016; Rudakov et al. 2017] and international researchers [Casner-Lotto, Barrington 2006; OECD2017] who assert that good grades and the "right diploma" are not enough to guarantee that graduates possess all the necessary skills and will make productive employees.

Gender and engagement in paid work are found to be insignificant factors, as opposed to the year of study—the older the students, the higher they estimate their own critical thinking skills, which is supported by previous findings [Halpern, LaMay 2000].

The results of this study point to the need to extend the range of academic and non-academic activities for university students. The findings may be useful to curriculum developers, methodologists, and instructors; they can be used in developing syllabi to allocate student workload so that students would have the time to involve in research projects and non-academic university life. Research on the practices of organizing the academic and extracurricular activities of undergraduates will promote the integration of new strategies into university education, talent detection, and the creation of an effective learning environment conducive to better education outcomes.

We suggest that, by engaging in various aspects of university life, undergraduate students will be able to develop and improve the necessary skills to get the most of their potential in professional, personal and social life. Nevertheless, it should be noted that the cumulative effects of academic, research and extracurricular engagement explain a comparatively low proportion of the variance in the predicted variable, which means that there are other important factors affecting the development of critical thinking. While this study took student participation in research and extracurricular activities into account, it did not look into the types and structure of such activities. Future research should be focused on research and non-academic engagement to find out which types of such engagement stimulate critical thinking the most, and which activity components should be promoted in university education. It is planned to obtain qualitative data from semi-structured interviews with instructors, heads of research laboratories and leaders of research teams, representatives and coordinators of student organizations, and students themselves.

Limitations of the Study

Critical thinking skills were evaluated in this study based on student self-assessment. A widespread position in sociology of education is that self-reported learning gains are invalid measures of actual learning gains [Porter 2013]. However, a number of studies show that the retrospective pretest method, which evaluates skills “as you started the program in university” vs. “now”, provides a valid assessment of learning outcomes [Thomson 2017; Zilvinskis, Masseria, Pike 2017].

Low response rates are typical of most surveys, including student ones, which may be related to survey fatigue caused by the increased number of surveys [Dey 1997; Porter, Whitcomb, Weitzer 2004; Gruzdev 2013; Mavletova, Maloshonok, Terentyev 2014]. Relying on experimental data, researchers conclude that a more efficient strategy, instead of chasing high response rates, would be to collect a small set

of data representing the statistical population and focus more on evaluating and using this data [Fosnacht et al. 2017:262].

The gender bias resulting from convenience sampling was compensated for by weighting adjustments.

Since the sample consisted of undergraduates from the same university and the study did not control for university selectivity, type, or size, the strength of correlations between students' engagement in university life and their critical thinking may vary across institutions. Further research is supposed to use an extended sample to include students from universities of other types.

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Appendix A. Descriptive Statistics by Variables

Variable	Percentage
In-class engagement	
Asked an insightful question in class	
Never	5
Rarely	20
Occasionally	30
Somewhat often	19
Often	16
Very often	10
Contributed to a class discussion	
Never	1
Rarely	8
Occasionally	23
Somewhat often	19
Often	23
Very often	27
Used disciplinary knowledge in a global context	
Never	1
Rarely	8
Occasionally	22
Somewhat often	24
Often	27
Very often	18
Found your courses so interesting that you did more work than was required	
Never	8
Rarely	24
Occasionally	33
Somewhat often	17
Often	12
Very often	7
Out-of-class engagement	
Studied with a group of classmates outside of class	
Never	10
Rarely	20
Occasionally	26
Somewhat often	19
Often	15
Very often	10
Worked on class projects with classmates outside of class	
Never	21
Rarely	15
Occasionally	23
Somewhat often	18
Often	17
Very often	14
Helped a classmate better understand the course material when studying together	
Never	6
Rarely	20
Occasionally	32
Somewhat often	20
Often	15
Very often	8
Communicated with the instructor outside of class about issues and concepts derived from a course	
Never	16
Rarely	32
Occasionally	28
Somewhat often	12
Often	8
Very often	4
Research engagement	
While a student, have you completed or are you now participating in a research project(s)?	
Yes	56
No	44
Extracurricular engagement	
While a student, have you involved or are you currently involved in a student organization(s)?	
Yes	38
No	62

Appendix B. Undergraduate Engagement in Academic (In-Class and Out-of-Class), Research and Non-Academic Aspects of University Life

In-Class Engagement Index	Out-of-Class Engagement Index
During this academic year, how often have you done each of the following? 1) Asked an insightful question in class (0.84) 2) Contributed to a class discussion (0.85) 3) Applied disciplinary knowledge in a global context (0.83) 4) Found your courses so interesting that you did more work than was required (0.67) Proportion of explained variance: 59.2%	During this academic year, how often have you done each of the following? 1) Studied with a group of classmates outside of class (0.72) 2) Worked on class projects with classmates outside of class (0.55) 3) Helped a classmate better understand the course material when studying together (0.58) Proportion of explained variance: 61.4%
Response categories: Never (1), Rarely (2), Occasionally (3), Somewhat often (4), Often (5), Very often (6)	

The true greatness of a people does not consist in borrowing nothing from others, but in borrowing from all whatever is good, and in perfecting whatever is appropriate

Report on the State of Public Instruction in Prussia, Victor Cousin, 1835

German-American Academic Migration and the Emergence of the American Research University, 1865–1910

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Abstract. The study investigates into the background, process and effects of the German-American academic transfer of the second half of the 19th century and its role in the development of the modern American research university. The crisis of the traditional American college that reached its climax after the Civil War prompted a few waves of academic migrations to Germany. Most graduates chose to return to the US, where they formed a group of reformers to promote the German university model during the Academic Revolution. The student body is analyzed as the main mediator which determined the way this model was adapted and implemented. In analyzing the transfer of the concept of "academic freedom", the study looks at how exactly the process was affected by the mediator. The reformist agenda pursued by the German graduates in the US was directed against the hegemony of pietist administrators and the ideology of the "all-rounded-man" education. Achievement of those goals suggested the establishment of graduate research programs to be regulated by the academic community at its own discretion. The article consists of three parts, which describe the background, motives and process of student migration, the position of American students in German universities, and their perception of the German research university model. The final part of the article examines the political agenda of the "reformist-returnees" and its implementation.

Keywords: history of education, American research university, German research university model, American-German academic transfer, academic freedom.

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In a great battle for the American higher education in the second half of the 19th century, graduate programs were seen by all the opponents as a critical resource which might have enabled them to shape the future of American academia. Numerous groups of educational reformers and visionaries competed for the right to define the institutional design, structure, and content of graduate programs. Although hundreds of elements composed the institutional and ideological

Translated from Russian by Author.

landscape of American education, the foremost student of the history of American higher education, Laurence Veysey, defined three ideal-type reformist models, that crystallized during the Academic revolution, and three ideologies related to them. Those were 'utilitarianism' and the idea of applied research in the service of society, 'cultural liberalism' and the idea of the preservation of classic culture under the supervision of the liberal arts, and the German model of research university with the corresponding idea of the 'quest-for-truth research' [Veysey 1965: 57–59]. Claims about the 'Germanization' of American education in the 19th century and related studies are usually based on the close examination of the last one of Veysey's types, and this article is not an exception. Therefore everything stated further is relevant for the processes in only one part of the spectrum (although it finally took over the whole American academia). In hindsight, we can see that advocates of the research model won the battle for graduate programs and as their prize, they got the opportunity to determine the modern university model not only in the US but all over the world.

The understanding of the course and resolution of the American academic revolution, and, therefore, the emergence of the modern research university is impossible without the examination of a parallel process, namely the German-American academic migration in the second half of the 19th century. The academic experience of American migrant students in German universities shaped the substantial part of both the institutional reforms and the intellectual revision that were initiated by the proponents of the research university during the Academic revolution.

Quite a lot have been said about the influence of the 'Humboldtian' model of higher education on the development of the American university (see [Herbst 1965; Geitz 1995; Werner 2013]). Some historians went so far as to declare—though with a certain irony—that allegedly 'Humboldt found his home in America,' [Ash 2006: 249] and that the complete realization of his model was achieved only on the other side of Atlantic.

At this point, historians of knowledge face the major problem of their intellectual enterprise, namely a 'contactless transfer' of ideas. Historians, who pointed to the 'Germanization' of American education, were primarily concerned with the circulation of ideas understood in a rather abstract way. Historiography of Academic revolution considers ideas of disinterested research, objectivity and neutrality, and of professional scholarship. However, noetic 'ideas' are not enough to understand the transfer of ideas, since ideas are the object of transfer and, in this case, can not perform the functions of the mediator [Wendland 2012: 45–67]. Recent research in transfer studies has three main analytical goals to be achieved in an analysis of similar cases: first, explore how particular elements become demanded and selected by the recipient culture; second, how the recipient culture incorporates those elements; third, how the recipient culture fur-

ther gets along with incorporated elements either concealing or recognizing their origin [Espagne 1999: 20–24]. An algorithm of transfer analysis thus implies considering three key elements: sending culture, receiving culture, and mediator. Certainly, transfer analysis is not limited to tracking down the key elements on their way from one culture to another. It is foremost interested in innovations and disruptions that appear as a result of both selection and incorporation.

Not only the theoretical apparatus of transfer studies but common sense suggests that ideas do not transfer themselves; they need bodies to mediate their transfer. In the case of German-American academic transfer, those bodies were provided by migrant students. American college graduates, who were seeking a professional education in Germany, formed a distinct group of reformers upon their return. Their pro-German agenda was not replicating an initial Humboldt plans but was determined by the initial setting of the American educational system and significantly altered by their migration experience. A reduced scheme of German-American transfer might be presented as follows: from American College, through German University, to American University. So what happened to the ideas and practices of university life on their road from Germany to the US in the second half of the 19th century and in which way after mooring on the East Coast those ideas and practices were incorporated into the model of the modern American research university?

In this article, I set two main issues which, being adequately elaborated, might contribute to the understanding of the process, background and the effects of the German-American academic transfer and its role in the development of the modern American research university. First, it is the analysis of the student body as the principal mediator of the transfer. American students, who went for their studies to Germany during the crisis of the American college system, upon returning not only formed a group of reformers for the promotion of the research university but also, due to their specific position inside academia, were able to determine the character of the adaptation of this model and its implementation. Second, examining the notion of 'academic freedom', I will demonstrate how exactly student mediation determined the outcome of this transfer, directing the German innovations included in the reformist program to the solution of the problems which caused the traditional college crisis in the middle of the 19th century and pushed future reformers out of the American academic system. The reformist agenda formed by the German graduates in the US was directed against the hegemony of pietist administrators and the ideology of the 'all-rounded-man' education. As mentioned above, those two goals were seen to be achieved through graduate programs dedicated to research and managed by the research community.

The article consists of four parts, in which I examine preconditions, motives, and a process of student migration; the position of American students in German universities as well as their studying and re-

search experience; their specific viewpoint on German model of a research university and the notion of academic freedom essential to it, and also the political agenda of the 'reformist-returnees' and its implementation.

1. The American experience with the institutions of liberal education has a history compatible, probably, only with the American churches. Old-fashioned colonial colleges were created imitating the only examples available at the time from Britain, namely Oxford and Cambridge. British colleges inspired everything: prescribed curricula, the model of relations between teachers and students, and the pedagogical theory, on which such practices rested. The founders of American colleges were not inclined to institutional creativity, although the exact imitation of the British experience was hampered by the socio-economic conditions in which they found themselves (on the colonial education see: [Cremin 1970; Hoeveler 2002]). However, unlike Northern European or British educational institutions, American colonial colleges enrolled few students and teachers, developed in an unfavorable environment (for instance, on campuses surrounded by wild animals [Morison 1998: 229]) and had limited goals. There were no professorships or graduate education, no scientific societies or publishing houses. The typical college was composed of a few dozen students, several young tutors, and a president. Despite differences in the religious views of trustees—ranging from radical non-sectarianism to congregationalism—colleges had a shared pedagogical basis, as well as similar educational and organizational patterns, which did not experience any considerable changes till the very beginning of the nineteenth century [Rudolph 1962: 44–68].

A college was considered successful if it was able to nurture piety, humility, and other Christian virtues in its disciples which might have been optionally accompanied by scattered knowledge included in a prescribed curriculum. Frederick Rudolph ironically described the 'College Way' of study as 'little more than a body of established doctrine, an ancient course of study and a respectable combination of piety and discipline' [Ibid.:136]. Poor and small, American colleges led their quiet, conservative lives, not questioning traditions and facing no need to revisit them. However, irony aside, to understand this 'College Way,' one should first grasp the pedagogical doctrine which regulated and legitimated it, namely the doctrine of mental discipline.

The notion of 'mental discipline' was used to identify the interlocking set of psychological, theological and moral convictions [Veysey 1965: 25–32]. According to the claims of its advocates, soul (or mind in later writings) constituted the 'vital force' that animated the human being. The soul itself was a composite of internal subdivisions—faculties, each responsible for specific abilities or talents. However, those faculties were seen as merely potential and needed adequate condi-

tioning and specific training to achieve expression [Porter 1870: 206–238]. Together, advanced faculties formed the divine harmony of a successful human being and therefore the primary purpose of college education and discipline was to perfect the faculties in order to prepare the student for a worthy adult life [Peabody 1901: 39–67]. The notion of college discipline thus referred to two different phenomena that secured a fixed four-year course of study in the college: mental and moral discipline, each getting its adequate training. Subjects taught in the university were subordinated to this pedagogical view and were expected to accomplish the purposes of mental discipline (on the development of the educational model see: [Newman 1886: 124–151]).

The role of a college tutor was something of a mixture between a sports trainer and a preacher who helped students to improve their divine mental faculties. The non-professionalized, low paid and non-prestigious position of a college tutor made it of little career interest, so usually, those college graduates who were still looking for a proper path in a life spent a couple of gap-years teaching at the same places from which they recently graduated. While staying, a tutor prescribed and controlled the fulfillment of daily training exercises—drillings, recitations or declarations—and supervised the general discipline on campus [Porter 1870: 134–148]. This specific pedagogical view formed the system of faculty selection in which advanced knowledge of the subject and professionalism in the field were the last features which tutors were expected to demonstrate. Seeking for a new tutor, trustees and the wider public looked for a reliable, strict and diligent person, modest and in every way able to strengthen Christian virtues.

Since the advancement of mental faculties and not the education of students in arts and sciences was a tutor's primary responsibility, he was usually responsible for an extensive set of disciplines, the combination of which might seem odd today. For instance, the same tutor was responsible for chemistry, music and belles lettres, Ancient history and civics [Leslie 1979: 245–266]. Courses were organized not according to the subject of studies or the tutor's qualification (which was typically hard to define) but presented the hierarchy of mental faculties. Courses in the first year were designed to train necessary mental faculties and those in the last year to develop more sophisticated ones. Long established tradition proved its efficiency, and there was no reason 'to doubt that the scheme of studies, the order and the arrangement of them, was the very best possible, that everything included in the course was there by right and that nothing had been omitted' [Snow 1907: 54]. The course in moral philosophy crowned the whole hierarchy. The president usually taught it and, in case of a positive outcome, excellence in moral philosophy completed the transformation of students from disorganized substance into reliable citizens, it was moral guidance to the life of an individual, community, and the nation [Schmidt 1930: 108–146].

American boards of trustees, if compared with their European counterparts, had broader opportunities to regulate college life and

used them in a somewhat authoritative manner. The fluidity of teaching staff, the inability of tutors to form a robust corporate body, and their lack of experience served as a rationale for the hierarchical administrative model in which almost everyone except trustees and a president were excluded from the decision-making process [Gerber 2014: 12–27]. The rise of colleges and the popularity of external boards hindered the immediate intervention of trustees in the campus life. Forced to solve the fundamental principal-agent dilemma, trustees created the position of a college president, nominated by trustees and accountable only to them. The president appointed candidates to new posts and took the final decision on matters of dismissal. Furthermore, he was also the only authority to choose the direction of the general education policy. With minor variations among colleges, the president was the foremost authority to define courses and prescribe textbooks, regulate ceremonies and examinations, sign diplomas and review finances, revise catalogs and plan the purchase of library books. Despite his numerous duties, the most significant feature of the college president was probably that he somehow also found time to teach. The strong position of the college president was maintained not only by his formal institutional position and external guarantees provided by the trustees but also by his pedagogical role as the highest supervising authority able to check the moral perfection of college students. Due to the age of students and staff, it led inevitably to the establishment of 'a regime that resembled nothing so much as a benevolent parental despotism' [Schmidt 1930: 78]. The legacy of old-time college that was inherited by the future American universities were extra-mural boards of trustees and a strong president.

The other side of college discipline was paternalism, the overriding spirit of which 'infused the American college' [Veysey 1965: 32]. Paternalism marked relations on each stage of hierarchy: between students and tutors, faculty body and president, president and trustees [Cattell 1913: 19–53]. Trustees, who were formally on top of the pyramid, were usually represented by the lay board and thus were not located on campus. Therefore, the president of a college, appointed by and accountable exclusively to the lay board of trustees, was their main representative and the highest intramural supervisor, who possessed almost patriarchal authority [Schmidt 1930: 77–108]. The Statutes of Columbia College of the year 1811 prescribed that 'it shall be the duty of the President to take charge of the College generally,' and thus trustees indicated to their chief executive the 'well-high boundless responsibilities in office' [Ibid. P. 93].

George Schmidt defined two primary purposes of paternalistic supervision—moral and religious,—and three areas in which the president exercised this supervision, namely the problems of administration, discipline and instruction. Moreover, tutors were usually young, recent graduates of the same college, and occupied the post only for a few years before finding a better place. No one thought of tutorship

as a legit occupation. It resulted in continuous staff turnover, which, on its turn, led to lower legitimacy of tutors as well as their indifference toward educational politics. Larry Gerber provides data which might be helpful to illustrate the level faculty's professionalism: at the beginning of the 19th century, approximately 100 teachers had professional education, and only a dozen of them were known outside of their state [Gerber 2014: 23].

It would be hard to imagine a place more remote from the idea of a research institution than a traditional American college at the beginning of the 19th century with its traditional course of study on par with tutorship, the subordinate position of teachers and students, the authoritative president dependent on the external board of trustees, superstitious fear of criticism and references to the classic curricula from the 17th century, educational pietism, moralism and pursuit to control every movement of bodies and thoughts on campus whether concerned with the rewriting of prayers or washing bedsheets.

Colleges 'backwardness' was obvious for certain groups of American intellectuals already in the 1820s. Critics were pointing to lack or absence of professional training among graduates, an unnecessary predominance of 'dead languages' in curriculum and its ignorance toward new subjects, which could satisfy the needs of industrialization and urbanization. Colleges, however, were called 'disciplinary citadels' not without reason. Early critics faced a resolute resistance that was mirrored in a famous Yale Report of 1828. The report had two principal parts: the first one argued for the necessity to preserve a classic curriculum unchanged; the second one was dedicated to the 'dead languages' and their keystone role in educational process [Yale College 1828]. Colleges not only refused to engage in professional training; they furthermore questioned the admissibility of research work in colleges as such [Lane 1987; Geiger 2014: 187–193].

Yale professors were supported by their colleagues from the other old prestigious colleges. For the time, professorial conservatism succeeded in postponing far-reaching reforms and provoked further isolation of campus life. Closer to the Civil War, reformist views spread behind a close scholarly community and became prevalent among civil servants and extra-mural intellectuals [Storr 1953: 29–46]. However, it was already too late. When the American public was discussing pedagogical models, students and graduates who were seeking professional training or were willing to pursue their research career already started looking for opportunities outside the US. Due to several reasons, which will be overviewed further, they chose Germany.

2. In 1810 students of the first cohort under the supervision of the most significant German masterminds began their studies at the newly opened University of Berlin, which would later become a prototype

for the research universities all across Germany. The direct role of Wilhelm von Humboldt in designing the structure of a modern research university was significantly revised in the latest research. The 'modernization' of higher education in different states of Germany gain momentum already in 1780–1790. Educational and research innovations which were promoted as a unique feature in Berlin, such as a changed attitude towards research and introduction of seminary work, have already been practiced in Halle and Goettingen at the end of the 18th century [Josephson 2014: 23–44]. However, at the same time as the first cohort in Berlin started their classes, in Château Coppet, Madame de Staël was finishing her work on the book *De l'Allemagne*. Even though Madame did not write a word about the University of Berlin, the book succeeded in introducing Americans to the specific type of university, which would be later called 'Humboldtian.'

Three years later, John Murray of London published the first English translation of Madame de Staël's *On Germany*. In 1814, when the numbers of students in Berlin already counted in the thousands, American newspapers reported that the reprint of the book was available to the American public [Jaeck 1915: 251–343]. A few decades later, Americans constituted the absolute majority of foreigners enrolled in German universities [Werner 2013: 52–61]. De Staël's book, written amid the European political polemics, unexpectedly affected the American public detached from continental politics and gave rise to the first massive wave of academic tourism.

A historian of the American culture, John Waltz, acknowledged that 'with this American reprint the influence of German thought on American life and education may be said to have begun' [Walz 1936: 8]. Aaron Burke Hinsdale, an educational reformer from Michigan, followed him in noting that 'it would not be easy to measure the immediate influence of this book upon the American mind; suffice it to say, the disclosure that it made of the schools, and particularly of the universities, of Germany, was the principal cause that sent George Ticknor to the University of Göttingen to study' [Hinsdale 1898: 63].

Apart from a comprehensive description of German mores and manners, the social etiquette, literary movements, principal books and authors, the status of women, descriptions of the army structure and language particularities, and chapters on Lessing, Herder, Goethe, Schiller and Winkelmann, the book also contained a section entitled 'Of the German Universities' which opened with the strong claim that 'All the North of Germany is filled with the most learned universities in Europe <…> In Germany, a man who is not occupied with the universe has really nothing to do' [Staël-Holstein 1864: 117]. Migrants of the first wave, those who crossed Atlantics in 1810–1820, reported how reading 'On Germany' had impressed them. Edward Everett, future prominent politician, reformer of higher education and diplomat, kept his copy on the desk while planning his journey to Göttingen; the above-mentioned George Ticknor 'mentions in his dia-

ry that reading 'On Germany' put the idea of studying at Germany in his head'; George Bancroft, one of the leading American historians of the 19th century, took his copy as a travel guide [Herbst 1965: 1–23] (see other biographical materials in [Long 1935]). Those young Americans, who could not find their place in domestic universities, read that 'the strangers, who came from all parts of the world, submitted themselves with pleasure to an equality' and even that 'the education of the German universities <…> begins where that of most nations in Europe ends' [Staël-Holstein 1864: 118, 121]. It would not be an exaggeration to say, that many of those seeking higher wisdom and the scientific spirit found Madame de Staël speaking to them directly. Although however influential this advertisement from the Romantic era was, it was not enough to transform one academic system into another. One might suggest that poor circumstances of the domestic environment dictated the susceptibility of American students to the images of German academia.

Of course, American students traveled abroad well before the 19th century. The most advanced students and children of the colonial elite got their education in Oxford, Cambridge, and Edinburgh. During this period, Americans showed almost no interest in other systems of education, and no particular interest in Germany. Although some children from migrant families spent time in Halle, this migration occurred due to their family connections and was not of an educational character [Werner 2013: 23–25]. Of similar low impact on the academic or even cultural transfer were the large German-speaking settlements flourishing in Pennsylvania, since 'the Pennsylvanian Germans were not in touch with the new intellectual currents of their homeland,' so they made little effort in becoming true 'mediators between the intellectual life of Germany and that of the US' [Walz 1936: 8]. The only kind of academic migration that existed during this period was rather scant, elite-centered and aimed at the reproduction of social status more than educational advancement. The favorite reason to travel was the recreation of a romantic grand-tour experience which one could not fully enjoy in the US. Pioneers like Ticknor visited Goethe in Weimar and reported about these events as the apotheosis of their German experience [Herbst 1965].

Estrangement from Britain after the generation change in the independent Republic lead to an increasing distance from the British educational system. Before the Revolution, the best students went to Edinburgh, while after the Declaration of Independence, they started showing interest in Paris. In spite of the short-term impact of Paris on a higher level of education, German models affected the level of secondary instruction. Slowly, interest in the study of the German language in secondary schools arose since 'German <educational> ideals did not influence the American colleges at first, but rather the common schools and the education of the masses <…> yet American public-school men of the nineteenth century was well aware of the

great debt they owed to the German schools' [Walz 1936: 12]. While reformist ideas were penetrating schools and kinder-gardens, imitation of vigorous discussion, which started after the Yale Report, calmed down without leaving any significant change.

Reports written by Ticknor, Bancroft, Everett and the nascent crisis of the liberal college system, induced the first wave of migration in 1820–1840's. The great army of American students followed academic pilgrims to the German universities, mostly to Göttingen. American educators, aware of the increasing numbers of migrants, made several unsuccessful attempts to reform the colonial system of education during this period. Thomas Jefferson was modeling the University of Virginia to meet public needs [Smith 1753], George Ticknor tried to reform Harvard but succeeded only in changing one or two rules at his department [Veysey 1965: 168–172; Long 1935: 41–63]. Theodore Dwight Woolsey also tried to preserve the genuine American system of education but through the transformation of the standards under which it was functioning. The University of Michigan under Henry Tappan was the first one to experiment with the replication of the German system in the US. The University Catalogue for the years 1852–53 claims that 'The State of Michigan has copied from Prussia what is acknowledged to be the most perfect educational system in the world' (cit. ex: [Walz 1936: 50]). Numbers of students enrolled in German universities were gradually increasing, and already in 1850's the Heidelberg University became a place of major attraction. Reforms were aimed to overturn the tendency of massive student migration. Nevertheless, dissatisfaction with colleges was further re-enforced by the writings of Americans who went to Germany to study the subject of public education and American student numbers in Germany kept increasing. Between 'American copy' and 'German original,' students chose the second option.

Two simultaneous movements gathered strength during on the eve of Civil War: the voices of spokesmen for the reform of the college system were becoming louder, and at the same time, Germany established itself as a role model for American higher education. During the next half-century, thousands of American students enrolled in German graduate programs (estimates vary from 6 thousand to almost 20 thousand, for the overview of different estimation strategies see [Werner 2013: 46–76]). The generation born in the 1820's was familiar with German education methods and the statement that 'Germany possessed the sole secret of scholarship was no more doubted by us young fellows in the eighteen-eighties than it had been doubted by George Ticknor and Edward Everett when they sailed from Boston, bound for Göttingen, in 1814' [Perry 1935: 88–89].

3. American migrant students, who were seeking a new academic home, and their parents, who were worrying as they usually do, praised Germany as innovative and rigorous and thus contrasted to 'stagnating

Britain' and 'libertine France' [Wigmore 1917: 354]. Nationalistic prejudices aside, several more reasons were holding American students back from these countries. France was still highly centralized and all academic potential was pulled to Paris, the city considered as a place 'dangerous for a young man' [Leslie 1979: 247]. The education was not a pleasure either: Paris University prescribed nine years of stay and annual examinations, after passing which student got a diploma that guaranteed him the employment perspectives in France only. This order did not change until 1896 [Clark 1973; Rüegg 2011: 207–283].

In England, American students knew British scholars to stay away from college campuses and lead isolated lives. An aristocratic tradition of scholarship presumed that scholars 'did not take anything from the state and did not owe anything to the state' [Veysey 1965: 89]. Omitting political and educational challenges, professors were seen to only prepare students for examinations, completely ignoring pedagogy and research issues. A British professor could gift a sophisticated student a conversation, but it was not enough to coincide with an American's image of professionalism [Hart 1874: 321–338]. Aside from that, to be enrolled in three of the most prestigious places, namely Oxford, Cambridge and Durham, each student had to sign the Thirty-nine Articles of Religion of the Anglican Church. This requirement was in power till June 1871 and dissuaded many Americans from coming.

Nevertheless, institutional causes and cultural stereotypes cannot fully grasp (and describe) the inner motivation that pushed thousands of students away from home. At least three motives can be identified, and only one of them can likely be called academic. The first reason to go to Germany was the issue of material conditions. Compared to the US, student life in Germany was incredibly cheap: one year of study in Berlin with all transport expenses was almost three times less expensive than a year at Johns Hopkins University. Also, graduating from German universities was relatively easy for international students. Enrollment was a mere formality, and the only requirement to enter a German graduate program was to have a college diploma; after that, the student was obliged to attend seminars for two years, write a thesis with accordance to vague requirements, and pass an oral examination [Hart 1874: 35–65]. That was everything needed to get a doctoral degree. The ease with which Americans passed German examinations later became mere ridicule; no later than in 1901 The Association of American Universities claimed that almost all examinations held in American universities were much more rigorous than exams in Berlin [Veysey 1965: 319].

The second benefit that American students gained from the German degree was the ease of career promotion in the domestic academic labor market. In the German educational system, the doctorate was the first step in someone's academic career track that was followed by the Habilitation as a *Privat-Dozent.* Indeed, nothing com-

parable existed in America, so German graduates found a position of assistant professor or even full professor without any hindrances. New administrators who were already promoting some changes in university education needed well-trained professionals who were a rarity among American graduates. Therefore, returnees were in demand after the Civil War and faced almost no competition. They could bargain for a higher salary or new offices, request specific course requirements or even the reorganization of programs (see e. g. correspondence of a recent German graduate Herbert Adams with the president of Johns Hopkins University in [Holt 1938: 28–32]). This benefit of the German doctorate was widely known and was one of the primary reasons for the migration at least till the mid-1880's.

The third reason was the possibility to feel free and mature. This motive, usually underestimated, is, however, one of the most repeated in reminiscences and reports of the time. As was discussed above, in American colleges students were considered more as schoolboys, who should have been controlled and disciplined. The campus life was clocked and completely controlled; the hallmark of a college disciplinarian was an elaborate codification of rules and regulations. College disciplinarians designed a system for the production of religiosity and moral uprightness which comprised everything from the prescribed curricula to the timing of extramural walks. In Germany, university life was limited to a library and a seminar room. There were no dormitories, no tutors, no 'authoritative supervision' of students' morals and the life of a student outside campus was completely on their conscience. Richard Ely, future president of the American Economic Association and one of the core-faculty professors at Johns Hopkins, briefly summarized his experience in Germany as follows:

> The development of science also depends very largely on an atmosphere of freedom of thought and expression, upon what the Germans call *Lehrfreiheit* and *Lernfreiheit*—freedom to think and freedom to express one's thoughts to one's fellows. When I first went to Germany, I seemed to breathe a new and exhilarating atmosphere of freedom. There was a free and large spirit to which I had not been accustomed. I felt that in the German universities there was room for growth and the development of individuality. I asked myself a question, 'Was the atmosphere of Columbia College as I knew it favorable to freedom of thought and expression? Did it stimulate and encourage the research which results in significant thought?' Although I was happy to have had three years at Columbia as an undergraduate, the only honest answer I could give myself was 'no' [Ely 1935: 124].

For Americans *Lernfreiheit*, or the freedom of learning, among other things denoted the emancipation of the student from *Schulzwang*, compulsory drill by recitation. While inside the German academic tra-

jectory, *Schulzwang* was an integral part of the gymnasium education, for Americans this term signified everything they left behind at colleges. From the point of view of the American student experience, they were perceived as mature and reliable persons, free to hire a separate room, eat in a canteen and even carry out their research. As G. Stanley Hall, future president of Clark University put it, they felt that they were in the freest place on Earth [Hall 1923: 202].

Although not all motivations for migration were academic, the particular experiences German graduates gained during the term of their study was shaping academic claims they were later advancing at home. Some reminiscences clearly show that Americans had rather limited knowledge of the scientific advantages that Germany could offer. Richard T. Ely, before he left for Germany, had to go from Columbia College to Yale to find a man who could have told him what type of theories and research practices he might find on the continent. However, the information he got was already overdue, as he immediately found out after coming to Halle [Ely 1935: 218; Rader 1966]. No catalogs of German universities were available in the US, and more generally Germans did not dedicate significant effort to promoting themselves among confused American students. Furthermore, college teachers usually could not answer numerous questions that college graduates had, and any information on the state of the arts in Leipzig or Berlin was only available by word of mouth from those students who had already come back. The only distinct feature of the German university which everyone was aware of was the possibility to get advanced professional preparation, although usually, those who were crossing the Atlantic could not answer in which field and under whose supervision.

The institutional position and background of American students at the German university allowed them to observe only part of theories and practices which defined the life on doctoral programs, in research laboratories, and during seminars. As Walter Metzger put it, 'Germany seen through American eyes was in part a figment of American preconception' [Metzger 1955b: 214]. Foreigners were subjected to the 'softened' set of requirements and enjoyed the gifts of mature life. Due to described circumstances of student migration, the main thing they were bringing back home was not pure theories or concepts, but the more general outlook on the order of graduate educations and graduate studies. In his narrative of his stay in Germany, Hart compared what he had observed with the American system and tried to explain the success of the new scientific schools in terms of German 'freedom':

> 'I have no personal knowledge of the Sheffield Scientific but [...] I infer that a certain degree of freedom exists there between the instructors and pupils. Herein probably lies the secret of success, of the rapid growth of scientific schools as distinguished from colleges. The teachers, at least very many of them, have been trained un-

> der the German system, and have caught its tone. They work more with students and seek to guide and stimulate them, rather than to play the pedagogue' [Hart 1874: 189].

Those two phenomena were brought to the US inseparably: graduate studies presumed sophisticated methods of research and practices of critical reading, while advanced knowledge required specific techniques of university organization. Therefore, the discrepancy between old-fashioned colonial colleges and demand for advanced studies found its resolution in both *Wissenschaft* as an intransigent quest for truth, which later in American imagination was transformed into investigation prominently connected with the effort toward careful minuteness in method completely free of an underlying concept of spiritual unity, and the combination of *Lehrfreiheit* and *Lernfreiheit* that also radically changed their meaning. Observing Germany from a relatively privileged position, students constituted their image of the master-model of a research university, which they later utilized in support of domestic educational reforms.

Two principal concepts that grounded all pro-German project were scientific search and academic freedom—required condition for the scientific pursuit. The first concept was used to argue for the status of research as a professional enterprise contrasted to the utilitarian idea of applied studies. The second concept pushed the professional aspect further: since researchers are a professional community, they shall possess the same rights as any other professionals and be therefore liberated from the requirements of external pressure groups. Returnees envisioned university as a scientific institution dedicated to the enlargement of knowledge through both graduate education and research itself. Fairly quickly this vision lost its national labeling. Already in 1880's reformers claimed that there was nothing specifically German about German universities since they simply perfected what was essential to the University as such [Burgess 1884: 2].

Initially, reformers refused the idea to ameliorate colleges somehow since they relied on further separation of different educational levels among corresponding institutions. Johns Hopkins University founders were vocal about their refusal to establish bachelor programs [Gilman 1906: 47–59]. At Hopkins, students were severely examined before enrollment; they also received scholarships and attended seminars. In the first years, Hopkins creators even attempted to establish *Privat-Dozent* positions. Same pedagogical methods were applied in Clark and Chicago universities, also founded by German graduates.

However, neither of three universities remained exclusively graduate. After the turn of the century, new research universities launched undergraduate programs while state universities and old colleges launched their own graduate schools [Geiger 2014: 338–348]. Thus 'German' practices praised in new universities were slowly infusing an

educational system forming a distinctly 'American' patterns. Incorporation of each novel element presupposed the preceding process of selection and negotiation of theories and practices on both intellectual and institutional levels. The next part is dedicated to the detailed account of one case of incorporation that is the case of academic freedom.

4. Roughly speaking, the German academic freedom was constituted by two components: *Lehrfreiheit*—freedom of teaching and the right of professors to decide what to teach and in which form; and *Lernfreiheit*—freedom of studying and the right of students to choose subjects and supervisors according to their interests [Paulsen 1906: 227–265]. However, a historically adequate interpretation of those components is more strict and possesses lesser ideological power. *Lehrfreiheit* regulated not an individual professor but the rights of the professorial corporation as such. Unlike southern Catholic universities, the academic politics of Northern Germany implied protection of the university corporation from external interest groups (church and local authorities, political and economic elites). The state guaranteed such freedom in the form of the personal patronage of the minister and direct subordination of the professorial body to the ministry [Metzger 1955a: 93–139].

Personal subordination to the state authority allowed professors to alternate both the order and the content of curricula, as well as the pursuit of their 'quest-for-truth' by any ways and means they found appropriate without taking into consideration claims and criticisms of 'third powers' while staying inside the limits set by the ministry. The vertical was further strengthened by the professorial self-government and almost complete absence of administrative personnel inside the university corporation. However, German professors were not only searching for protection from economic or pedagogical claims. They had other reasons to avoid the extramural world. The German professor of the second half of the 19th century was akin to a missionary, bringing the light of reason to the decaying world of utilitarianism and corrupted morals. The system of state patronage, which embraced professors as enlightened bureaucrats, was therefore characterized by a hostile attitude to the outside world with its self-interest requests and requirements. Still, an alliance with the state did not mean gratuitous emancipation of scholars. The prohibition of any political discussions followed freedom of research. For a long time, however, professors did not find any political problems deserving of their respectable attention.

American colleagues of liberated German professors who had introduced the idea of *Lehrfreiheit* found themselves in entirely different setting. Firstly, there was neither ministry of education, nor national academic politics in decentralized America. Secondly, universities

were directly dependent on external interest groups either financially (as in the case of private-funded institutions) or both economically and ideologically (as in state-funded institutions) and could not afford to neglect them. Typically, there was a direct dependence on churches and local elites, maintained by funding and boards of trustees, and backed by the impossibility of the intervention of federal authorities. Thirdly, as was already mentioned, the external board of trustees stimulated the development of an administrative sector, which in the very beginning was represented only by a president but soon expanded to the modern bureau. Already in the 1890s, the national academic market was almost established in the US and the competition between universities for professors and students started, American administrators shared the fears of the German government as far as the academic freedom is considered.

For the reasons described above, the raised flag of *Lehrfreiheit* in the US became a symbol of professorial liberation from the administrative apparatus and old-school pietism. Because professors could not seek protection from federal authorities (there just were no such mechanisms), trustees (seen as administration's allies), or students (who still had no voice), they were compelled to appeal to the people. That was the same 'people' for the benefit of whom the American educational system was designed and whom German professors were trying to avoid [Chapman 1913: 453–461]. On November 12, 1900, Professor Edward Ross from Stanford was informed about the decision of his dismissal due to his unacceptable political views. On November 13, 1900, he organized a press-conference and pleaded for public support against administrative violations of academic freedom (for the detailed account or Ross Affair see [Elliott 1937: 326–379]).

As for freedom of studying, in Germany, the notion of *Lernfreiheit* designated merely the right of students to travel freely inside the country, change universities and take courses. Students enrolled in different universities, participated in various seminars, attended lectures and received certificates until decided to terminate their nomadic life and defend their doctoral dissertations. An absence of prescribed curricular and necessity to be living on campus for years was accompanied by the complete freedom of students outside lecture halls, laboratories, and libraries. Students enjoyed their independence from both educational and pedagogical supervision—their mores and manners were supervised only by their conscience and general law.

The foreword to the American edition of Friedrich Paulsen's book 'German Universities' contains a curious comment on the translation of basic categories which perfectly illustrate the fate of *Lernfreiheit* on the other side of Atlantic. It is proposed to translate the term as 'elective courses' [Paulsen, 1906. vi]. The claim for the abolishment of prescribed curricula was a major stumbling-block since the time of the Yale Report. Back then, in 1828, neo-republicans and early utili-

tarians were deeply disturbed with the mandatory courses in Ancient languages and argued for the revision of the classic program. Therefore, in the history of American academia, the issue of the freedom of learning was linked to the struggle for elective courses. Charles Eliot, president of Harvard and an ardent defender of elective courses, said once, that if he had to choose the course mandatory for every student, he would choose dance training and nothing more. Therefore one should not be surprised that in 1906, trying to please the demand for applied education, Harvard introduced a course in agriculture during which students were taught to cut rose bushes [Veysey 1965: 90–91]. In 1907, when the battle for elective courses seemed to have been won, Eliot put on par the right of students to refuse attending prayers and the right to choose between general biology and botany. However, even Eliot with his progressive views could not imagine that a student from a remote college somewhere in Idaho might have been able to take several courses at Harvard. As already noted, there was no federal regulating service which would guarantee equivalent shifts inside the academic system, and there were no federal standards to measure students advancement during their studies. Due to this heterogeneity in requirements and an extraordinary variety of educational tracks, a nomadic student life of the German type was almost impossible and American students remained settled, although enjoying the modest privilege to choose some of their courses [Eliot 1907: 15–20]. Since there was no state regulation in higher education, there was no common measure which could enable student transitions among colleges. Lack of evaluating instruments and institutional variety did not leave a room for 'nomadic' studentship to emerge. They remained sedentary and only enjoyed the benefits of elective courses.

Speaking of student mores, it would not be an exaggeration to say that what was good for a German boy, could (as seen by professors) kill or severely cripple a poor American. Young men during their stay in Germany took pleasure in adult life but could not even dream of 'transferring' this part of student culture back home. Returnees were also inclined to see college students as 'unready and immature' to fully accept the freedom of learning. John Burgess, one of the founders of American political science and a Heidelberg graduate, lamented in his reminiscences that he could not 'find a single man in a class who seemed to me to have any aptitude <…> I did not consider a single one of them worthy of the degree of A.B.'. Burgess accused college, an 'outdated and second-rate institution,' and blamed the lack of entrance examination [Burgess 1934: 180]. The ultimate separation of universities and colleges never happened. Even those newly-created universities that initially insisted only on the graduate education were later forced to open undergraduate programs as well. In the German system, gymnasiums—institutionally and ideologically separated from universities—served as a bulwark for strict discipline. In the US, on the contrary, 'paternal care' of the college type penetrated further

levels. 'Paternal care' covered norms of behavior but was still separated from the content of studies [Butler 1921].

The fact that college was never equivalent to gymnasium set the limits for the compatibility of German theory and American practice of student freedom. The system of *Volksschule* is also worth mentioning here, namely the state-regulated system of public schools, which were followed by the gymnasium and later by the university. Successful gymnasium graduate passed through matriculation examination (*Abitur*) which was used as a universal measure of educational level. The connection between those three levels was maintained by the only ultimate regulator—the German state and its ramified institutional supervising structure. However, in America, as Hart notes pessimistically, 'colleges started with nothing and ended in nothing' [Hart 1874: 312], meaning that there was no obligatory unified education which preceded enrollment and no clear understanding of the graduate's perspectives. The ability of a professor to keep being 'neutral' in questions of public validity was seen as evidence of his competence. Moreover, if before professors had been afraid before that students, owing to their immaturity, were vulnerable to heresy, now they were also seen as easy prey for political propagandists [Seligman 1912: 153–162].

In the US, the focus of the discussion on academic freedom shifted from scholarly and research issues to institutional and organizational ones. This interpretation of academic freedom became a powerful weapon against pietism since it claimed both the liberation of students from disciplinary control and professors from the obligation to follow the rules external to their research interests. Furthermore, it reinforced resistance to the authoritative administration by appealing to the professional community and the public. In other words, in the US, 'academic freedom' denoted first of all the freedom of the modern university from the old college.

* * *

The decline of foreign student enrollments in German universities is usually explained with the obvious political reasons and the beginning of World War I. Although it might be the case for academic migrants from European states and the Russian Empire, statistical tables compiled by Anja Werner clearly show that the decline in numbers of enrolled Americans started already in the second half of the 1890's [Werner 2013: 46–76]. This dynamic is not surprising if we consider the crisis of American academia as the primary motive (or stimulus) that forced mass student migration. By the mid-1890's the great reformist debate was almost over and gave way to the consolidation of the new academic system, which both incorporated and generated scientific schools, shared governance and indifferent university administration. It might be argued that the establishment of graduate programs in America stopped the exodus of students to Germany which

their absence caused half-century earlier. They also constituted the institutional ground for the further development of the American system of higher education.

Graduate programs occupied a specific place in the reformist debate since they were related simultaneously to two principal questions of the Academic revolution: the institutional reform and the intellectual revision. On the one hand, graduate programs made possible the institutionalization of research in the university and, therefore, the expansion of the university's functions. On the other hand, graduate programs, built around the idea of research and advancement of knowledge, were expected to promote the complete revision of the classic canon and the establishment of the new scientific order based on modern knowledge and principles of academic freedom. Although deeply rooted in the development of the American educational system after the Independence, the problem of graduate programs found its solution in a non-American context, namely in German academia and the 'Humboldtian' model seen with American eyes. Certainly, to achieve the ultimate victory and completely reorganize the American educational model, American-German doctors, who graduated between 1860–1890, would need 20 more years. To maintain and strengthen their take on a reorganized university structure German graduates of 1860–1880's required much more time. However, the line was crossed: American universities started competing for their own students who more often refused the idea of an unpleasant transatlantic journey 'in the extreme stern of the vessel' [Burgess 1934: 86–91] chose the railroad trip from their home-college to one of the reformed universities.

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