The MOOC Market: Prospects for Russia

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Abstract. As massive open online courses (MOOC) rapidly invaded the education services market at the beginning of the 21st century, a new trend emerged in global education. In the era of globalization and digitization, MOOC acts as an efficient tool to promote universities in the international educational arena, popularize national cultures, and raise additional funds. This is why a lot of countries, including Russia, have entered the race for online courses. Despite all the focus on MOOC in global education, the proportion of studies analyzing the MOOC market and the prospects for MOOCs in the Russian context is rather small. This article mainly seeks to describe the MOOC market and behavioral patterns of MOOC providers in the international and national online education markets as well as to classify MOOC players based on open source data collected from online platforms. As a conclusion, platform data analysis findings are used to identify vacant niches in the MOOC market, and possible avenues of Russian providers' development in the international segment are assessed. Several data sources are utilized to solve the study objectives: articles, reports, official MOOC-related documents, information from online platform websites, a body of quantitative data collected from two leading online platforms, and a base of quantitative data from the Class Central aggregator, which contains information on MOOCs offered by several major online platforms.

Keywords: online education, massive open online courses (MOOC), online platform, promotion strategy.

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Since 2012, which *The New York Times* declared the year of massive open online courses (MOOCs)[1], the number of MOOCs and new MOOC learners has been on the rise, with more and more online plat-

Translated from Russian by I. Zhuchkova.

[1] http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html /

forms being created. There are nearly 10,000 MOOCs in various fields of knowledge available to Internet users today. Over 700 universities from all over the world have entered the race to build MOOCs of their own. The total number of MOOC learners was about 81 million in 2017[2]. MOOC certificates of achievement have also been multiplying consistently since 2012 [Chuang, Ho 2016]. The most popular MOOC providers include Coursera, edX and Udacity in the United States and FutureLearn in Great Britain. National online platforms have emerged in a number of countries too: XuetangX in China, MiriadaX in Latin America, France Université Numérique (FUN) in France, EduOpen in Italy, SWAYAM in India, the National Open Education Platform (NOEP) in Russia, etc. The Chinese MOOC platform XuetangX ranked third in the number of users (9.3 million) in 2017, outdoing FutureLearn (7.1 million).

Originally, online courses were offered via platforms to reach a social goal of providing free access to quality higher education as well as to solve institutions' internal problems, allowing them to use their own MOOCs or those of other universities in their educational process [Hollands, Tirthali 2014; Kizilcec et al. 2017]. It was at the beginning of 2014 that the demand for entirely MOOC-based online education programs began to develop. In addition, offering MOOCs via international platforms becomes a means of popularizing cultural diversity and improving the status of national education systems around the world. A number of countries, primarily Asian ones, such as China, South Korea and Malaysia, approach the building and promotion of MOOCs on international online platforms as their major national strategic mission, hoping to eventually create a system of tertiary education that will be highly appreciated by the international community and able to compete with the world's best education systems [Fadzil, Latif, Munira 2015].

MOOCs have been proliferating not only because universities seek recognition in the global education industry but also due to the monetization opportunities in no small part. Online platforms like Coursera and edX cooperate with universities to offer additional credentials and personal assistant services. Not only do MOOC suppliers try to recoup their production costs, which may sometimes amount to $150,000 per course[3], but they also seek to make a profit. The existing MOOC monetization models are constantly being enhanced, and more and more new ones are being created. The MOOC market was worth $1.13 billion in 2014 and is expected to grow to $7.69 billion in 2019[4]. Besides, as universities fiercely compete globally, MOOCs have

[2] https://www.class-central.com/moocs-year-in-review-2017

[3] https://raccoongang.com/blog/how-much-does-it-cost-create-online-course/

[4] https://www.technavio.com/blog/how-do-moocs-make-money

become a new tool to promote university brands among potential applicants (including those from abroad) and a source of certificates for individuals as well as businesses that can order a series of tailored courses to develop necessary competencies in their employees.

Russian universities have been actively designing and using online courses. However, few studies touch upon the Russian MOOC market and its prospects. One of these, conducted by Netology Group in 2017[5], explores Russia's online education market and educational technology but it deals with the development of online education as a whole and does not describe the global MOOC market in detail. Other works by Russian researchers focus on the history of MOOC creation and development but ignore Russia's role and prospects in the international MOOC market [Aynutdinova, Aynutdinova 2017; Krokhmal 2017].

This study pursues the following objectives: (i) describe the prevailing behavior strategies in the global MOOC market; (ii) analyze the presence of different countries in the international MOOC market; (iii) evaluate how various topics are represented in the global MOOC market to identify vacant niches; and (iv) suggest possible avenues of development for Russian MOOC providers in the international MOOC market. The following sources of data were used for research: (i) articles, reports, official MOOC-related documents, information from online platform websites; (ii) a body of quantitative data collected from two leading online platforms; and (iii) a base of quantitative data from the Class Central aggregator, which contains information on MOOCs offered by several major online platforms.

1. Global and Domestic MOOC Markets

The MOOC market has been splitting into international/global and domestic/national dimensions since 2015. The global MOOC market involves universities and other institutions from all over the world, which produce online courses in a variety of languages. Global market participants are thus MOOC providers and learners from different countries. Contrastingly, domestic MOOC markets are restricted to providers of MOOCs in national languages, e. g. in Spanish on MiríadaX[6], in French on FUN[7], in Chinese on XuetangX[8], in Russian on NOEP, etc. Domestic market participants include producers of online courses from one or more countries speaking the same language and MOOC users who are native speakers of that language. National MOOC platforms are normally created and developed to achieve local goals, e. g.

[5] http://edumarket.digital

[6] https://miriadax.net/cursos

[7] https://www.fun-mooc.fr/about

[8] http://www.xuetangx.com/global

FUN is designed, among other things, to distribute educational products for French producers.

Two major behavioral strategies can be identified in MOOC creation and promotion depending on whether MOOC providers operate in the international or domestic market. The following sources were used to assess market behavior:

- Official websites of the leading platforms (to assess behavioral strategies of the country in the MOOC market via its MOOC providers);
- Official websites of the countries' domestic MOOC platforms;
- Articles and reports describing the behavior of the country's online course providers in the MOOC market (search queries contained such keywords as "MOOC", "online course", "platform", "emerging economy", "advanced economy" as well as country names);
- Official documents regulating the country's (its MOOC providers') behavior in the MOOC market.

The first strategy implies that a country presents and promotes itself in the global MOOC market by building and adding online courses to platforms used by people from different countries. The world's top MOOC providers include edX and Coursera—they are huge American platforms that collaborate with companies and universities from other countries[9] and have the highest number of learners from all over the world[10]. The second strategy is promoting online education in the domestic market to tackle local problems. National platforms and/or leading providers' resources can be utilized to implement this strategy. In Europe, for instance, MOOCs are used to foster social inclusion, inculcate language skills and entrepreneurial competencies[11], special focus being placed on teaching immigrants skills necessary to access the labor market[12].

The first strategy is mostly applied by Asian countries (Malaysia, South Korea, Japan), a number of European countries (Denmark, Sweden, the Netherlands, Italy), and some Arab countries (Egypt and Saudi Arabia). In particular, this strategy is behind the teaching of online courses in English (as an international language) in various subjects, including disciplines from education programs, as well as

[9] For example, Coursera partners with some 164 educational institutions from 29 countries: https://www.coursera.org/about/partners

[10] As of the end of 2017, the cumulative number of registered users on Coursera and edX reached 44 million: https://www.class-central.com/report/moocs-stats-and-trends-2017/

[11] https://eadtu.eu/about-eadtu/about-eadtu

[12] https://moonliteproject.eu/

MOOCs dedicated to the history of the country, its cultural aspects, and language acquisition. For example, South Korean universities use international platforms to offer Korean language courses in English for beginners (*Learn to Speak Korean-1*) and MOOCs covering Korea's history and politics (*Modern Korean History: Liberation, War and Nuclear Ambitions*)[13]. Japanese universities have designed MOOCs to inculcate Japanese culture (*An Introduction to Japanese Subcultures*; *Visualizing Postwar Tokyo*) and a course about enrolling at Japanese universities and studying in them (*Studying in Japanese Universities*)[14].

A country's strategy for developing its national education system by creating and distributing its universities' online courses on the top MOOC platforms is sometimes coordinated by the government. For instance, the Malaysian Ministry of Higher Education elaborated a MOOC creation and support strategy in order to increase brand awareness in the global landscape [Al-Atabi 2013; Fadzil, Latif, Munira 2015]. The strategy covers a ten-year period (from 2015 to 2025) that should be used to build a necessary infrastructure, train staff, and design activity models required to successfully enter the international market of online education. The first stage under this strategy involves defining the key areas in which to build high-quality MOOCs, establishing partnership with the leading platforms, identifying vacant niches, and organizing a national e-learning center to coordinate the creation and promotion of MOOCs [Ministry of Education of Malaysia 2015]. Besides, this stage is also used to design staff training programs needed to support MOOC creation and maintenance and to elaborate credit transfer procedures to integrate MOOCs in the curricula. At the second stage, MOOCs are built in the preselected key areas. Malaysia's government requests that each university supplies at least 15 online courses for the top MOOC platforms [Ibid.]. Nowadays, users of OpenLearning[15] have access to such narrowly specialized courses in English offered by Malaysian universities as *Malaysian Taxation*, *Naval Architecture and Ship Building*[16], etc. At the third stage, progress is measured and adjustments are made to the strategy, if needed. The Ministry of Higher Education of Malaysia hopes that the creation of specialized MOOCs and the filling of vacant niches on the leading platforms will allow them (i) to increase the proportion of foreign students among Malaysian MOOC participants to 30 percent by 2022 and, (ii) to have the Malaysian higher education system globally recognized and ranked among the top 200 in the Webo-

[13] https://www.mooc-list.com/tags/korea

[14] https://www.mooc-list.com/tags/japan

[15] OpenLearning is an Australian provider of MOOCs, mostly offering courses produced by Australian and Malaysian universities.

[16] https://www.openlearning.com/malaysiamoocs

metrics Ranking[17], and (iii) to reduce the costs of MOOC production and obtain financial support from MOOC providers [Ibid.].

The second MOOC market behavior strategy is designed to solve domestic issues. However, leading providers' resources can also be used in the absence of financial and technology opportunities to keep the domestic platforms up and running. Creation of a national platform does not lead to the disappearance of online courses produced by the country's universities from the leading platforms—the universities remain in the international arena and keep developing courses in a foreign language for learners from abroad. Great Britain, France, China, India and Russia, in particular, have offered their MOOCs through both international and domestic platforms. National platforms feature, primarily, MOOCs taught in official languages and compliant with the specific topic and format requirements. MOOC topics are normally determined by the national labor market needs and the demand among college students and applicants. For instance, most online courses available on XuetangX[18] in the Chinese language are related to engineering [Shen et al. 2016], as engineering majors are in highest demand among Chinese university students [Hong 2015].

Some countries elaborate national strategies to create and develop domestic MOOC platforms. A good example is the unified strategy for producing and delivering MOOCs on the Indian platform SWAYAM[19], developed by the Department of Higher Education of the Ministry of Human Resource Development of India in 2017. Its distinctive feature is the Academic Advisory Council that examines and approves MOOC proposals. The Ministry appoints National Coordinators responsible for creating MOOCs at different levels of education. For instance, the Consortium for Educational Communication is in charge of undergraduate degree programs, while the National Council of Educational Research and Training is involved in providing MOOCs for school students. SWAYAM includes mandatory MOOCs that are part of education programs as well as optional courses designed to develop supplementary professional skills and available to anyone interested.

Countries that have no resources for creating and managing national platforms use the leading platforms where universities offer MOOCs in their national languages. This strategy is pursued by Latin American countries (Brazil, Chile, Colombia, Argentina and Mexico), Norway, and Turkey. Norwegian universities mostly promote their MOOCs by using the English provider FutureLearn[20]. The Norwegian government only funds local requests for MOOCs from universities

17 http://www.webometrics.info/

18 https://www.xuetangx.com/

19 https://swayam.gov.in/

20 https://www.mooc-list.com/countries/norway

and students, so all MOOCs produced by Norwegian universities are taught in Norwegian, offered to students free of charge, and transferable to university credits upon successful completion [Kjeldstad et al. 2014]. Therefore, the country uses MOOCs in the educational process of its universities, avoiding investing in a national platform.

Russian universities and companies use both leading and domestic platforms to deliver their MOOCs. The NOEP offered 259 courses at the beginning of 2018. The leading platforms—Coursera and edX—feature 256 MOOCs produced by Russian institutions, of which only 25% are taught in a foreign language. The number of online courses offered by Russian providers on the leading platforms is constantly growing. Sixty-three MOOCs were available to Coursera and edX users at the beginning of 2018, as compared to 48 in 2017.

The next step will be to analyze the MOOC market from two perspectives, that of the country's presence in the international market and that of the scope of offer, i. e. the topic landscape of this market. Two bases of data collected from publicly available sources on the leading platforms and Class Central will be used for analysis.

2. Country's Presence in the International MOOC Market

A database premised on a few key objective characteristics of MOOCs was created using publicly available data from Coursera and edX (as of the beginning of 2018) to assess the level of a country's presence in the international MOOC market. The database was built around the following parameters: the company or educational institution that has produced the MOOCs; the country they belong to; the number of MOOCs per company/university; the number of MOOCs in a non-official language; the number of courses in literature, culture and history; and the number of specializations and MicroMaster programs. In this case, the level of a country's presence in the global MOOC market is assessed through the behavior of its companies or universities that offer courses on the top MOOC platforms. The database included 234 companies and educational institutions from 33 countries and four international organizations: Amnesty International, the Open Education Consortium, the World Bank, and the International Monetary Fund. The overall number of MOOCs totaled 4,209. There are on average seven companies or educational institutions in every country offering their MOOCs on the top online platforms. The highest number of companies/universities involved in building online courses for the international platforms (95) is observed in the United States, and the lowest (1) in seven countries (Turkey, South Africa, Iceland, Egypt, Guatemala, Saudi Arabia, and New Zealand). Universities are engaged in MOOC production more than private companies in all of the countries. For example, 185 educational institutions and 43 companies offer their own MOOCs on Coursera and edX. Along with universities, Russian MOOC suppliers on Coursera also include such companies as Yandex and Sberbank Corporate University. Companies usually

produce MOOCs in the field they specialize in (e. g. *Banking and Finance* from Sberbank Corporate University) or create courses jointly with educational institutions (e. g. *Machine Learning and Data Science* from Yandex and Moscow Institute of Physics and Technology).

The average number of MOOCs per country is 127. The United States tops the list with over 2,000 courses, which account for 52% of all the MOOCs globally. Russia and China rank second and third, respectively, each producing nearly ten times fewer courses than the United States. Iceland has been the smallest producer of MOOCs, offering one online course only.

Russia's closest competitors in the global MOOC market are China, Australia, the Netherlands, and Spain. Russia is ahead of all four by the total number of courses (256 MOOCs) and MOOC producers (13 companies/universities) but behind China, Australia and the Netherlands by the number of MOOCs taught in English. Russian MOOCs delivered in foreign languages account for 25 percent of all courses, as compared to 42 percent in China, for instance.

The overwhelming majority of countries mostly produce MOOCs in their official language: 79 percent of all the online courses available are designed for native speakers. Latin American countries offer MOOCs in Spanish (Argentine, Chile, Mexico) and Portuguese (Brazil). English-speaking countries (England, Canada, India, Australia, South Africa) do not produce online courses in any language other than English. In addition to educational courses, these countries also create MOOCs for studying their own culture and history (e. g. *Indigenous Canada* from the University of Alberta, *Understanding the Australian Health Care System* from the University of Queensland) as well as those of other nations (e. g. *Mao to Now: On Chinese Marxism* from the University of Newcastle, Australia).

Some countries, including China, Russia and the United States, use not only their official language but also foreign ones when producing MOOCs. China and Russia usually opt for English as a foreign MOOC language. Most English-based courses created in China are devoted to Chinese culture and traditions as well as to learning Chinese. Russian companies and universities do not cover those subjects in their English-language segment of MOOCs. Online courses on the history of Russia (e. g. *Saint Petersburg, the Capital of Peter the Great's Empire* from the Higher School of Economics), literature (*Reading Russian Classical Literary Works Together. The Master and Margarita by Mikhail Bulgakov* from Tomsk State University) and the Russian language (*Sketches of Siberia. Tomsk: A Course of Russian for Foreigners* from Tomsk State University) are delivered exclusively in Russian.

Even though the great majority of MOOCs offered by U.S. providers are taught in English, the United States uses the greatest number of foreign languages in building their online courses. For instance, the Museum of Modern Art, Yale University and the Pennsylvania State

University offer MOOCs in Chinese, the University of California, Irvine in Ukrainian, Northwestern University in Arabic, Doane University in Spanish, etc. U.S. universities actively occupy the vacant niches, creating English-based MOOCs about other countries: *Coexistence in Medieval Spain: Jews, Christians, and Muslims* from the Colorado State University System, *Wonders of Ancient Egypt* from the Pennsylvania State University, *Russian History: From Lenin to Putin* from the University of California, Santa Cruz, etc.

English is the most popular language among European and Asian countries seeking to improve their presence on the international platforms. MOOCs in English are produced by Denmark, Sweden, the Netherlands, Belgium, and Germany as well as Singapore, South Korea, and Japan. These countries create a good deal of MOOCs covering their own history, literature and culture, e. g. *Scandinavian Film and Television* from the University of Copenhagen (Denmark), *Greening the Economy: Lessons from Scandinavia* from Lund University (Sweden), *Understanding Korean Politics* from Yonsei University (South Korea), *Studying at Japanese Universities* from the University of Tokyo (Japan).

The greatest number of MOOCs per company/university is observed in the United States (Table 1), Microsoft being the largest MOOC producer with its 176 courses. Meanwhile, the Higher School of Economics is the most productive producer of MOOCs outside the U.S., offering 81 courses on Coursera, of which 43 percent are taught in English.

A distinctive feature of universities—leaders in the number of MOOCs produced—is that they offer online courses devoted not only to the culture of their own country but also to the history and cultures of other nations. For instance, the Massachusetts Institute of Technology has a course in Japan's history called *Visualizing Japan (1850s-1930s): Westernization, Protest, Modernity*; the Higher School of Economics has developed a course *Religions and Society in China*; Harvard University offers *Stravinsky's Rite of Spring: Modernism, Ballet, and Riots*, etc. As a rule, the top MOOC providers always use the same platform to deliver their courses: Microsoft, the Massachusetts Institute of Technology and Harvard University rely on edX, the Higher School of Economics on Coursera, and only the University of Pennsylvania is present on both.

The countries supplying their own online courses to the global MOOC market were classified according to their level of presence using the data collected from the leading online platforms and the k-means clustering algorithm with a pre-specified number of clusters. The clusters were formed using the following variables: (i) the number of MOOC producers; (ii) the total number of MOOCs; (iii) the number of MOOCs taught in a foreign language; and (iv) the number of specializations and MicroMaster programs. The rest of the variables from the database were not included in the analysis as they contributed lit-

Table 1. **The Largest MOOC Providers**

Provider	Country	Number of MOOCs	Platform
Microsoft	United States	176	edX
Massachusetts Institute of Technology	United States	138	edX
Harvard University	United States	112	edX
University of Pennsylvania	United States	82	Coursera, edX
National Research University Higher School of Economics	Russia	81	Coursera

tle to cluster formation. As a result of the cluster analysis, four groups of countries were determined (the final cluster centers are presented in Table 2). The first cluster is represented by the United States alone as an indisputable leader in the MOOC market with the highest number of MOOCs, MOOC providers, specializations, and MicroMaster programs. There are on average 23 online courses per every US company/university present on the international MOOC platforms, which is comparable to the total number of MOOCs supplied by entire countries like Italy, Guatemala or Chile.

The second cluster includes China, the Netherlands and Russia as countries that engage actively in building MOOCs of their own. Each of the countries has on average 11 MOOC producers and produces around 221 MOOCs each. Their distinctive feature is that they create MOOCs in both their official and foreign languages. It is not only domestic consumers but also the international audience that are the focus of Chinese, Dutch and Russian MOOC producers. Courses taught in a foreign language account for nearly half of all the MOOCs supplied by the three countries (as compared to only 5 percent in the United States, the industry leader).

The third cluster includes six countries: Australia, Canada, France, Mexico, Spain, and Switzerland. Their presence on the international MOOC platforms is smaller than that of the countries in the previous two clusters, with on average 119 MOOCs and 7 providers per country. The third cluster countries are largely oriented towards their domestic markets, the best part of their MOOCs (83 percent) being taught in their official languages.

The fourth cluster encompasses 23 countries: Argentina, Belgium, Brazil, Chile, Colombia, Denmark, Egypt, Germany, Great Britain, Guatemala, Iceland, India, Israel, Italy, Japan, New Zealand, Saudi Arabia, Singapore, South Africa, South Korea, Sweden, Taiwan, and Turkey. What they have in common in terms of their presence on the global MOOC market is low engagement in the production of online courses. Each country in this cluster supplies on average 27 MOOCs

Table 2. **Final centers of the four clusters**

Indicator (average)	Cluster			
	1	2	3	4
Number of MOOC producers	95	11	7	3
Number of MOOCs	2,179	221	119	27
Number of MOOCs taught in a foreign language	111	100	20	14
Number of specializations and MicroMaster programs	159	8	7	1

and one specialization/MicroMaster program, produced by on average three companies/universities. These indicators are way lower than in the previous three clusters, which makes it possible to classify the countries in the fourth cluster as passive participants on the international MOOC market.

3. The Topic Landscape of the International MOOC Market

The topic landscape of the international MOOC market is assessed based on analytical data from Class Central's MOOC reports and the list of online courses offered on such large-scale platforms as Coursera and edX. The 2012–2017 Class Central's reports demonstrate a steady growth of the global MOOC market, in particular, a gradual increase in the number of MOOCs, MOOCs producers and new learners. Only 250 MOOCs were available in 2012 on the online platforms, but their number increased almost 38-fold by the end of 2017 to reach 9,400 (Fig. 1). The peak of the boom was observed in 2016 and 2017 (an increase of 2,650 between 2015 and 2016 and 2,550 between 2016 and 2017).

The overall number of MOOC learners increased 40-fold between 2012 and 2017 (Fig. 2), the growth peak of 48 million users falling again on 2016 and 2017.

Many of the online courses presented on the leading MOOC platforms are devoted to IT technology, computer science, data science, and conduct of business rules (Fig. 3)—they accounted for 38% of all the MOOCs offered in 2017. These four career fields demonstrate accelerated growth; they were unfailing leaders in the number of MOOCs available between 2015 and 2017 (in 2014, courses in humanities prevailed over those in computer science and business). An increase of 615 MOOCs in conduct of business was observed between 2015 and 2016, which was the peak of the boom. For computer science, the peak was in 2017, when the number of relevant MOOCs rose by 669 as compared to the previous year. The prevalence of online courses in these fields of study is easy to explain: first, such courses are easily convertible to an online format [Patru, Balaji 2016]; second, the U. S. Department of Labor classifies the IT industry as dynamically

Fig. 1. **Increase in the number of MOOCs on the international platforms in 2012–2017**

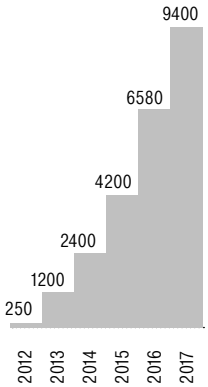
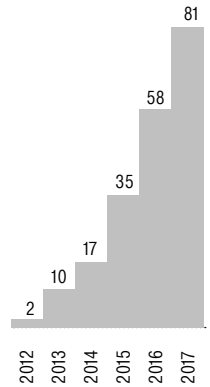


Fig. 2. **Increase in the number of MOOC learners in 2012–2017** (million)

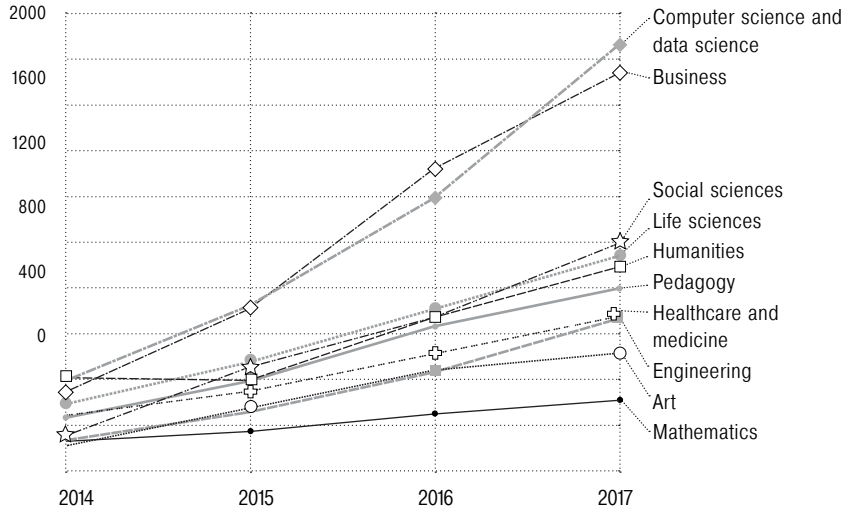


developing[21], with programmers and big data experts being in high demand in the global labor market. Therefore, the needs of the labor market shape the offer in the MOOC market, and the labor market itself requires that employees should be reskilled regularly, particularly in computer science. Online education has made such reskilling less labor-intensive and more universal. Different universities often provide MOOCs similar in content, so online platform users face a high level of market saturation with courses in the topics mentioned. Learners interested in computer science, for example, are offered a range of 40 MOOCs in cybersecurity and 45 in algorithms and data structures.

Courses in mathematics, applied art, pedagogy, healthcare and medicine are the least numerous in the international MOOC market, cumulatively accounting for 25 percent of all MOOCs in 2017. The number of courses in mathematics available in 2017 did not even approach the number of courses in computer science observed in 2014, which increased by over 1,000 between 2014 and 2017, as compared to the increase of only 180 in the number of MOOCs in mathematics. Whereas both mathematics and engineering were presented by 130 courses each in 2014, the increase in engineering MOOCs by 2017 was three times greater than in mathematics. The number of courses in such career fields as art, humanities, healthcare and medicine did not increase by more than 500 each between 2014 and 2017, in contrast to MOOCs in engineering, pedagogy, life sciences, computer science, and business.

[21] https://www.dol.gov/

Fig. 3. **Changes in the number of MOOCS in various fields of study between 2014 and 2017**



MOOCs in humanities accounted for about 9.5 percent of all the MOOCs on international platforms in 2017. The proportion of courses in history, culture and literature of various countries does not exceed 7 percent of all the MOOCs (3 percent of them being delivered in English[22]). Most of them (around 65 percent) cover the culture, literature and history of the course developer's country. The choice of courses in foreign languages remains rather limited. The platforms mostly offer MOOCs for English language learners, from Basic to Advanced level. Besides, there are courses designed to develop particular English-language skills like speaking, listening comprehension, or punctuation rules. The course *English for Career Development* was ranked among the top ten most popular MOOCs in 2017. Some courses are subtitled in Chinese or Spanish, thus raising the demand from audiences with poor English. Chinese is the second most popular foreign language after English to learn in MOOCs. Chinese courses are a few times less numerous than English ones, yet learners can always find one that suits best their attainment level, goals and objectives. Courses for learning other languages—Spanish, Portuguese, French, Italian—also begin to appear on the international MOOC platforms, but

[22] Analysis was performed using a base of data on the number of MOOCs in various subjects across countries and institutions collected by the authors from the two leading online platforms (Coursera and edX) at the beginning of 2018.

their proportion cannot compete with that of MOOCs taught in English. Very few courses are available for learning Russian and Dutch.

According to Class Central's analytics, there are beginner- (introductory) and advanced-level MOOCs in every field of study. Most courses are devoted to cutting-edge scientific and technology industries and the most pressing problems of today. MOOCs in life sciences and technology most often deal with robotics, energy, and nanotechnology. More courses emerge to shed light on climate change, the environment, and common responsibility for the planet's well-being. Medicine and biology courses cover genetics, bioinformatics, and biotechnology. A separate group of MOOCs is designed to develop healthy life skills.

The platforms also offer ever more courses about the "challenges of modernity". For instance, the University of Michigan came up with the course *Fake News, Facts, and Alternative Facts* just after the 2016 U.S. presidential elections[23], aiming to teach learners to distinguish between credible news sources and information biases as well as to be critical consumers of information. *Global Health—The Lessons of Ebola*[24], created by the University of Maryland, Baltimore, informs about current problems in healthcare, the Zika and Ebola viruses, and the role of international organizations in protecting global health.

MOOCs in machine learning, cryptocurrencies and neural networks were named the most popular in 2017[25]. Other courses with the highest number of registered users were designed to develop self-study skills. For example, the course *Learning How to Learn: Powerful Mental Tools to Help You Master Tough Subjects*[26] developed by the University of California, San Diego attracted over a million learners. A great popularity is also enjoyed by MOOCs in which participants can obtain practical recommendations on doing business as well as those that encourage creative thinking and innovation. For instance, *Developing Innovative Ideas for New Companies: The First Step in Entrepreneurship*[27] from the University of Maryland, College Park has become the second most popular MOOC, enrolling over 730,000 learners. The examples cited above demonstrate that the biggest audiences are attracted by one-of-a-kind courses oriented at solving the most pressing problems of today.

The leading MOOC platforms, Coursera and edX, offer over 4,000 courses jointly, and yet there are topics that are obviously underrep-

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23 https://www.edx.org/course/fake-news-facts-alternative-facts-michiganx-teachout-2x

24 https://www.edx.org/course/global-health-lessons-ebola-usmx-umuc-gbh100x

25 https://blog.coursera.org/year-review-10-popular-courses-2017/

26 https://www.coursera.org/learn/learning-how-to-learn

27 https://www.coursera.org/learn/innovative-ideas

resented for foreign learners. This study cannot answer the question why MOOCs in some subjects are way less numerous than in others. Perhaps, this gap can be explained by monetization schemes and the demand for courses in specific subjects. It follows from Class Central's analytics, for example, that the search queries of prospective MOOC learners most often relate to computer sciences, e. g. "machine learning", "data science", "deep learning", "SQL language", "Python", etc. These keywords have remained popular since the Class Central aggregator was created. Queries about learning foreign languages (English, Spanish, French), mathematics (statistics) and art (photography, design) are pretty frequent, too. This allows for identifying the vacant niches on the global MOOC platforms. Very probably, demand for online courses in these subjects will not be as high as for courses in computer science[28]. Such vacant niches include (i) courses in mathematics, healthcare and medicine; (ii) courses in country-specific knowledge (e. g. legislation and taxation, culture and social order); and (iii) foreign language courses.

4. Assessing the Potential Demand for Courses in the Vacant Niches

The potential demand for MOOCs in the vacant niches can be assessed either directly or indirectly, i. e. either by surveying potential MOOC learners or by obtaining information about the popularity of similar MOOCs from other providers and evaluating the number of potential learners based on indirect indicators (e. g. popularity of MOOCs for learning Russian among foreign learners). Potential consumers of Russian MOOCs include international actors (students of foreign universities, citizens of other countries willing to broaden their horizons and/or prepare for a trip) and the Russian State as an agent interested in popularizing its history and culture.

Let us now assess indirectly the potential popularity of Russian MOOCs in the three identified vacant niches on the international MOOC market. The assessment is made using analysis of Russian universities' education programs that are popular among foreign students, information on foreign universities' education programs obtained from available sources, and the range of MOOCs presented on the international platforms. Potential consumers of such courses must be surveyed in the future in order to measure the demand for Russian MOOCs among international actors more accurately.

4.1. MOOCs in Mathematics and Medicine

MOOCs in these subjects can be in demand among foreign students in scientific, mathematical and medical majors (which are most popular among foreign students studying in Russian universities) [National Research University Higher School of Economics 2016]) as well as

[28] In order to assess the demand for such MOOCs, it is necessary to analyze the profiles of participants in similar MOOCs that are already available on the international platforms. However, this information is inaccessible.

universities that can buy those MOOCs for their students. Export of such MOOCs will allow Russian universities not only to increase their sales profit in the international online education segment and their online foreign student audiences but also to attract foreign students to their offline degrees, using MOOCs to promote the quality of education and the teaching methods applied in Russian universities. MOOCs in these subjects can be delivered as specializations (for Coursera) or MicroMaster programs (for edX) that allow users to take their degree partly online and partly in person.

The demand for higher education degrees will grow with the development of science and technology, especially in Asia, researchers predict. In India alone, the number of school leavers is expected to reach 40 million by 2025, and MOOCs can become one of the means of satisfying the growing demand for higher education [Kjeldstad et al. 2014]. Universities in a number of European and Asian countries—Russia, Finland, Germany, Malaysia, India—officially declare the possibility of including foreign universities' MOOCs in their educational plans with subsequent credit transfer. Therefore, integration of MOOCs in the educational process can be regarded as a way of addressing the problem of underfinancing and the lack of quality courses [Klimentyev, Klimentyeva 2015].

4.2. MOOCs in Country-Specific Knowledge

The proportion of MOOCs covering the culture, literature and history of specific countries on the international platforms does not exceed 7 percent (of which 3 percent are in English). Most of them are designed by U.S. universities and devoted to the United States and China. Russian universities could offer series of foreign-language-taught MOOCs on the history of Russia (the Russian Empire, the Soviet Union, and the post-Soviet era), Russian literature (e. g. Russian writers' literary works widely recognized abroad), biographies of famous Russian scientists and composers, or courses about Russia's indigenous peoples. If Russian MOOC providers do not occupy this niche, foreign universities will squeeze in. For instance, U.S. and Australian universities have designed courses in India studies, such as *Importance of India* from the Ohio State University and *Contemporary India* from the University of Melbourne on Coursera.

Russian universities' MOOCs on Russia's culture, literature and history can be in demand among foreign universities and foreign students majoring in Slavic studies. There are at least 37 Master's degrees[29] in this field in the United States; research centers that study Slavic history, literature and philology are available in Great Britain, Austria, Germany, Hungary, and other countries. Despite the potential demand for Slavic and Russian culture studies in the world, this field

[29] American Association of Teachers of Slavic and East European Languages: http://www.aatseel.org/graduate_programs

is only represented by a few MOOCs from the Higher School of Economics and Tomsk State University, most of them being delivered in the Russian language. Online courses in this field from Russian universities could also attract the attention of foreigners of Russian origin or simply those interested in getting to know the culture and history of Russia. In addition, MOOCs about the regions and cities of Russia could be offered by Russian universities to increase tourism and foreign student traffic.

It is vital that foreign students learn not only about the courses provided by Russian universities but also about their enrollment procedure and admission criteria. It is no coincidence that foreign universities use international platforms to offer MOOCs devoted to practical issues and recommendations on entering to institutions of higher education. For instance, Coursera features several courses created in the United States and Japan advising prospective students how to enroll in the U.S. and Japanese universities, choose education programs, and fill out various application forms. The Russian government attracts foreign students to Russian educational institutions under a quota program, but opportunities of the international platforms are not used for this purpose.

4.3. MOOCs for Learning a Foreign Language

Russian Universities could offer courses for learning basic, intermediate and advanced Russian as well as individual aspects of the language, like grammar or stylistics[30]. The demand for such courses can be expected from foreign universities and their students, mostly those majoring in Slavic studies. Interest for MOOCs in Russian can also be expected from Chinese, Polish, American and German students, as the respective countries had the highest absolute number of students learning Russian and the highest number of universities offering Russian learning programs in the 2010/11 academic year [Arefyev 2015]. Besides, such courses may be popular among employees of foreign companies that are affiliated with Russian ones and/or have their business in Russia, as well as anyone willing to learn Russian. Creation and maintenance of MOOCs for learning Russian as a foreign language is crucial for popularizing the Russian language, since the number of its speakers is declining every year. For example, the number of Russian speakers in the world was about 260 million in 2010, which is 10 percent less than in 2004 and 20 percent less than in 1990 [Ibid.].

5. Conclusion

Analysis of the MOOC market reveals a considerable increase in the number of MOOC producers and providers as well as MOOC learners. Millions of people all over the world need high-quality, accessible education and search for career and personal development opportunities,

[30] Today, there are only two courses for learning Russian available on Coursera, both from Tomsk State University and both for advanced level.

so the world's top economies have become active participants in the online education race. By offering foreign-language-taught MOOCs produced by Russian universities in the global MOOC market, Russia will be able to solve a number of cultural, political and economic problems. The international MOOC platforms can be regarded as a way to popularize the national culture and an opportunity to inspire interest in the country's history, its state-of-the-art advances in science and technology. Online courses can also be used to derive economic benefit. Direct profits from creating and offering online courses through the international platforms include those from the sale of MOOC certificates and content licensing, while indirect ones can be an increase in tourism traffic and the attraction of more foreign students to Russian universities. Most MOOCs produced by Russian universities are delivered in Russian today, thus losing their market potential and reducing the opportunity for attracting external consumers who do not speak Russian.

Analysis of the global MOOC market has revealed vacant niches and outlined the prospects for filling them with Russian courses. It is advisable for Russian universities to build the following online courses taught in English:

- MOOCs in mathematics and medicine;
- MOOCs in Russian culture, history, art and literature, about Russian scientists and composers, Russia's peoples and regions/cities;
- MOOCs for learning Russian as a foreign language;
- MOOCs about the enrollment procedures and admission criteria in Russian universities for foreign applicants;
- MOOCs promoting understanding of the current economic and political situation in Russia for foreign companies doing or planning to do business in Russia.

Indirect data was used in this study to determine the potential demand for Russian universities' MOOCs among international actors. In order to obtain objective indicators, additional research into the demand in the MOOC market is required. Such research should imply analyzing the platforms' data on the popularity of courses in the specified subjects, the profiles of learners enrolling in them, the information on profits from certificate sales, and the results from surveys of potential MOOC learners.

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