



From equality to diversity: Classifying Russian universities in a performance oriented system



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ABSTRACT

Over the last few decades, performance-based funding models of universities have been introduced and have made universities build and implement different strategies to enable them to compete and be viable in changing circumstances. In turn, national governments are focused on providing universities with more opportunities to run efficient programmes that advance higher education. This paper includes a detailed review of various taxonomies for structuring university. More importantly, it develops a typology of higher education institutions that is relevant for the Russian context. The Ward method is used to cluster universities on the basis of university distinctions in terms of the availability of resources, education, and research and development. This typology of universities is verified by assessing their efficiency score gained from modified Data Envelopment Analysis, incorporating universities' heterogeneity. Finally, the paper gives a decision tree for classifying universities bearing in mind their diversity. It might be expanded for a broader set of inputs and outputs, namely external project-based research funding modes and cooperation between universities and industry to pursue the development of innovation. The results can be used for shaping targeted policies aimed at particular university groups.

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1. Introduction

The organizational landscape of higher education has significantly changed in recent decades, becoming much more diverse. This is reflected in the increasingly complex organizational structures of universities, the increased number and diversity of educational programmes, the expansion of higher education institutions (HEIs) into international markets, and the strengthening of research and development (R&D), public service, and entrepreneurial initiatives. However, these recent changes in the institutional landscape are not reflected in respective state policies and broadly speaking in the societal understanding of universities' missions. The main purpose of this paper is to present a public university typology in the current Russian context.

Over the last decade, the Russian education system has transformed significantly under the influence of changes occurring at national, regional and international levels including the destruction of the authoritarian system and the disintegration of the Soviet Union, the ongoing globalization of the national science and education systems, the Bologna

process and the creation of a common European educational space as well as the new paradigm of the knowledge or creative economy. The effect of these processes is continuous and to a greater or lesser extent is reflected in the educational system transformations. Of all sectors of the Russian education system, higher education is experiencing the most complex and profound changes, and has attracted the most attention from both the government and the general public.

The education system in the Soviet Union was centralized and uniform, mostly consisting exclusively of public institutions financed by the state. The higher education system was shaped in the 1930s, in a period of intensive industrialization. During this period, a significant number of state universities (481) were created to provide large-scale education and training programmes that would supply engineers to growing industrial sectors (Federal State Statistics Service of the Russian Federation, 2015a). Newly-established higher education institutions were focused mostly on education, vis-à-vis a few major classical universities which inherited the traditions of research excellence from the Tsarist era (Gokhberg et al., 1997). It was free to study at HEIs, but graduates had to work where they had been assigned after graduating. It was possible to change this occupation after at least 3 or even 5 years (Abankina and Scherbakova, 2013).

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Afterwards, in 1992, Russian higher education had a multilevel structure, mostly represented by three principal educational programmes: bachelor's degree, specialist with higher education, and master's degree. A bachelor's degree required students to complete at least 4 years of training. A specialist, higher degree involved studying for 5 or more years, and was standard for the Soviet education system as well as for the transition years of the Russian Federation. A master's degree was awarded for completing at least 6 years of studying i.e. two further years after the bachelor degree or specialized programme. At that time, the specialist diploma was commonplace in HEIs. Even in 1997, a year after the law 'On Higher and Postgraduate Education' coming into force that allowed private universities to be established, 90.2% of public HEIs graduates (in comparison with 42% of graduates from private HEIs) had this type of education degree, compared to 8.7% of bachelors (or 47.3% of graduates from private ones). A master's degree was received by just 0.6% of graduates from public HEIs and 7.7% from private ones (Gokhberg et al., 2000, pp.70).

Moreover, the law 'On Higher and Postgraduate Education' determined the types of higher education institutions: *universities* that provided educational programmes in diverse disciplines for both undergraduate and postgraduate students, undertook research in many fields of science and technology, and implemented various kinds of training programmes; *academies* which were similar to universities in terms of the variety of activities, yet concentrated on one field of study; and *institutes* that mostly provided training for specific professional skills. As an example, at the end of the academic year 1997–1998, universities were the prevailing type of HEIs (44.1% of public HEIs), while the shares of institutes and academies were comparable (23 and 29.8% respectively) (Gokhberg et al., 2000, p.61). In addition, public higher education institutions differed not just by type but by the profile of training. For instance, the natural sciences, humanities, engineering, and teacher education were mostly provided by universities (more than 53.9%). Academies comprised nearly two thirds of agricultural and medical HEIs. Slightly less than half of pedagogical HEIs were institutes (Gokhberg et al., 2000, pp. 62–63).

Furthermore, Russia experienced a boom of fee-paying education services, both private and public in the 1990s. In 2010–2011, the HEI network already reached its maximum, i.e. 462 private HEIs out of 1115 with 7 million students enrolled in total. In 2014–2015, this network involved 402 private and 548 public universities, and HEIs enrolled 5.2 million students (Federal State Statistics Service of the Russian Federation, 2015b).

It is worth noting that competition to get a place in public HEIs remains high to this day. Thus, while there were 188 entrants per 100 vacancies in 1980, by 1990 this figure was 194 and then fell in 1997 to the 1980 level (Gokhberg et al., 2000, p.65). By 2014, this indicator has increased dramatically to 446 applications per 100 vacancies for both types of public and private HEIs (Federal State Statistics Service of the Russian Federation, 2015c). Moreover, some professions have always been in high demand by entrants. For example, arts and cinema courses were desired by 628 applicants per 100 vacancies in 1980; even in difficult times of social and economic shocks such as in 1990, this same ratio was 451 entrants per 100 places (Gokhberg et al., 2000, pp. 65).

With minor exceptions, Russian R&D activities were historically concentrated outside universities, mostly at R&D institutions governed by the Russian Academy of Sciences and major industrial agencies.¹ Recently, the government has made significant efforts to foster R&D in universities and increase their global competitiveness. According to legislation, two new types of universities were specified in Russia: (1) Federal Universities, founded by merging several universities in major regional cities (10 currently exist, with more planned); (2) National Research Universities selected on a competitive basis and focused

on cutting-edge research areas. Both groups receive funding earmarked from the state budget for their individual development programmes.

Contemporary Russian evidence suggests that universities should be classified not just by formal characteristics (specialization), but also by other indicators which shed light on their mission and strategic development. In the framework of new, university-based initiatives for innovative and scientific enhancement programmes supervised by the Ministry of Education and Science of the Russian Federation, the most interesting typologies to researchers and practitioners reflect R&D and education activities in the comparable clusters of HEIs. These aspects can be complementarily covered by an input and output mix (product characteristics and availability of resources). Such typologies create a multi-dimensional picture of various strategies and their efficiency, hence, the potential may be measured by the means of Data Envelopment Analysis (DEA).

This paper promotes a relevant typology in the contemporary Russian context to support the understanding of university diversity. First, we compare the typologies widely used in European and American educational landscapes. Based on this, we develop a typology of Russian public universities using indicators of education, research and development. Finally, we present a typology of universities combined with their efficiency score and taking into account the heterogeneity of universities.

The paper contributes to the literature by providing the first analysis of Russian HEIs. In a nutshell, our estimations show that the comparative study of clustering findings should be complemented by HEIs' efficiency scores. Clustering HEIs is based on external factors and does not take into account which universities are peers in a cluster and are hence more efficient, i.e. producing more outputs over inputs than others. For each university, DEA gives a certain score measured by the ratio of the sum of weighted outputs divided by the sum of weighted inputs and shows the most favourable weights that were previously unknown. This might provide a degree of evidence on differences in efficiency scores. However, this difference is not always defensible as some clusters vary in terms of external characteristics but have the same efficiency scores. This result suggests the need to both cluster HEIs and assess efficiency scores of universities. In other words, if we rely on just one formal procedure we may get opaque results. For example, most of our clusters are significantly different, while a few of them that have obvious external distinctions do not differ statistically from each other by a latent factor, i.e. their efficiency score. Hence, all these techniques together provide stakeholders with appropriate tools to compare HEIs.

The paper is structured as follows. Section 1 provides an overview of approaches for university classification and performance evaluation. Section 2 describes the dataset, the classification criteria, and the selected performance indicators. Section 3 presents the methodology for clustering universities and evaluating their efficiency. Section 4 discusses the proposed typology of universities based on the clustering results, shows how the efficiency of universities is measured, and compares the distribution of HEIs by cluster and efficiency score. The final section concludes.

2. Literature overview

The problem of capturing the heterogeneity of universities for policy making can be addressed via two radically different approaches: by defining one simple and popular criterion, or by clustering HEIs based on a multi-dimensional set of parameters.

In the first case, universities are grouped according to their activity parameters, the level of education they provide, or the range of disciplines (Abankina et al., 2012; Abankina et al., 2013b). However, there is no common criterion that encompasses all meaningful differences of HEIs. For example, the UK traditionally uses various university classifications based on their age and history: Oxford University, Cambridge University, the University of London, technology universities and former technology colleges, new universities (former polytechnics), universities

¹ The share of HEIs in R&D expenditure in Russia had been around 5–6% of the national total since Soviet times until the early 2010s (Gokhberg et al., 2011).

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