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The Funding Models and Efficiency Discourse in Higher Education

Abstract. *After 30 years of transformation, the government of Kazakhstan has created own higher education system shaped by various social-economic and political factors. Nowadays the higher education system operates with stable institutions despite its challenging environment. There is no doubt that global trends in education also have an impact on the country's policies. At the same time, the public finance system of Kazakhstan had also faced several major reforms. For instance, the term "Public Sector Audit" or "State Audit" was introduced by the new Law in 2015 which completely changed the approach of the Public Sector Institutions. The focus has become so called "efficiency" instead of "financial control". In this regard, this paper identifies critical dimensions of effectiveness in higher education of developed countries based on technical articles and empirical research. The article reveals the features of the education funding models in OECD countries and efficiency measuring grounds of higher education.*
Keywords: *efficiency in education, performance audit, public sector audit.*

Introduction

The way government resources are spent for the education have been always received an increased attention. It has been suggested that one of the important points regarding the government budget are the choices of the responsible institutions such as Ministry of Finance or Ministry of National Economy regarding the allocation to improve the education quality [1]. The rise of "efficiency topic" in literature has become popular several decades ago. Educational funds were accepted as efficient if its recipients make the best possible outputs of available inputs. In a non-efficient or less efficient system there are always ways to improve the educational goals for a particular spending level, or to cut the funds for the planned goals [2]. The main reason for the use of materials of Organisation for Economic Co-operation and Development (OECD) countries is the Bologna Process. One can argue that the implementation of the reforms is uneven, and some countries did not fully support it, nevertheless the overall framework is relatively close to the goals and general mission stated on the educational policy documents of Kazakhstan. Therefore, the analysis of their funding models could be a relevant benchmark for the developing country.

As the demand for the higher education has grown in OECD countries recent years, funding is growing at higher rates than the demand. In

general, official statistics say that the amount of the resources expanded two times more that the rate of enrolments in eleven years period [3]. In the same vein, data for the per capita have also demonstrated a substantial rise from approximately ten thousand US dollars to more than sixteen thousand on average across all countries within the organization [4].

The abovementioned facts regarding the constant growth of the funding creates an additional pressure on public authorities. Particularly, the most important issue is: if the tendency will continue, which is a likely process, will the funding be sustainable? Moreover, for the government organizations there are also other resources except financial that should be allocated at the expense of other important sectors such as healthcare, agriculture etc. All of this, combined with the post-pandemic situation becomes extremely complicated.

The purpose of this paper is to identify the main methods in funding structure of the developed countries in the context of the education and understand how these methods could be measured effectively for the public auditors through analyzing research papers. In simple words, the article aims to connect two different areas: the ways of funding and measuring the effectiveness. This approach may give a good starting point for the future research that will enrich the performance audit methodology.

For the first time in the history of the Republic of Kazakhstan, the term "State audit" (Public Sector Audit) was introduced by the Law "On State Audit and Financial Control" in November 2015 [5]. According to this Law and international standards of the Supreme Audit Institutions, there are three areas of public audit: compliance audit, financial audit, and performance audit.

However, in contrast to conservative types of audit as a check for compliance and verification of the financial statements, "Performance audit" is a relatively new direction in our country, and accordingly, conceptualization of the audit practice for all types of state activities is tremendously important. We believe that the development of new methodological approaches in public audit can play a key role in the sustainable development of the country's economy.

At a meeting of the Government chaired by the Prime Minister of the Republic of Kazakhstan, where the results of the implementation of the State Program for the Development of Education and Science for 2016-2019 and the project for 2020-2025 were discussed, it was said that spending on education and science by 2025 will grow to 7% of Kazakhstan's GDP [6]. Hence, this paper contributes to the literature on performance audit by offering an analysis of the nature of education funding and its efficiency. First, this paper reviews how complexity in public services may be theorized based on the OECD materials regarding the funding methods. Then it addresses the topic of efficiency by examining the terms in education efficiency that could be implemented in audit methodology. The paper concludes with comments on the challenges applying the pure quantitative methods in auditing and also with some thoughts on future research agenda.

Methodology

Our approach is qualitative and employs information from two types of secondary data outputs: interdisciplinary empirical research papers on education efficiency and technical papers published by international organizations. This article has mainly review character, hence the methodology is based on the well-known qualitative methods such as systemic review of the various research papers and reports, content analysis and comparative analysis.

Discussion and results

In general, there are widely used terms that we can find in any country's regulatory documents. The following table summarizes the main terms and brief descriptions of them. Due to specific conditions in some cases the descriptions may be duplicated, for instance, philanthropic funding could be sometimes a part of the additional funding and so on.

The widely used terms regarding the financial part of the educational activities

Funding related terms	Brief description based on the literature
Additional income/ funding streams	Any other ways except direct governmental or regional public financing and student financial contributions. This category may include variety of sources related to private sector activities: contracts (research, teaching etc.), charities, paid services (consulting, rental of buildings), financial instruments
Block grant	The most popular mechanism that is distributed to educational organizations with different purposes (teaching, overhead and rarely research).
Co-funding	Shared funding with any other public or private organizations
Competitive funding	These funds are usually attached to a particular project or are targeted towards the funder's goals
Philanthropic funding	Funding for the benefit of public obtained from donor organizations or individuals not related to public bodies
Project-based funding	institutions ask for funds in order to implement a particular project with various set of requirements
Student financial contributions	a generic term for the different type of admin and tuition fees paid by people
Targeted funding	This is a type funding created for the achievement of concrete goals set by the public authorities and the form can be one or a few of abovementioned methods.

Note: sources [7], [8], [9].

Based on the terms we can clearly understand the links between different stakeholders in education sphere. The figure 1 demonstrates the simple relationship of the well-known mechanisms and players at the institutional level.

The Organisation for Economic Co-operation and Development countries implement mainly (96% of the respondents) different types of block grants according to the most recent survey (figure 2).
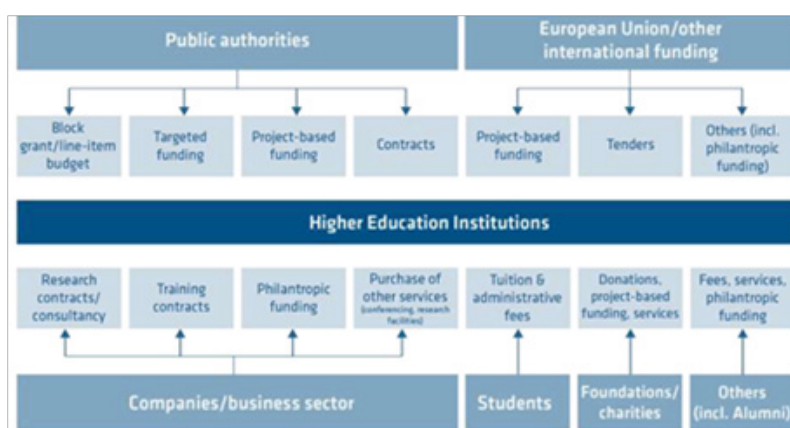

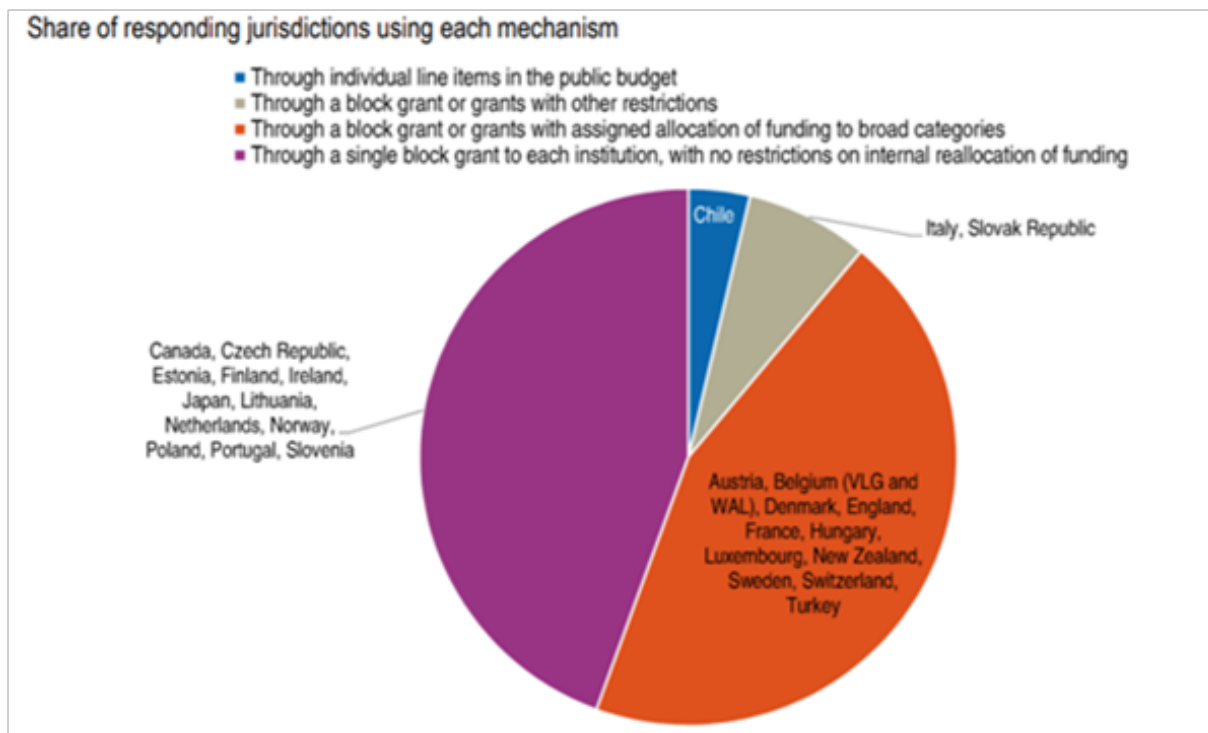**Figure 1** - Funding channels for higher education

Figure 2 - Mechanisms for allocating public resources in OECD countries
Source: [1].

Within the group of countries that have chosen a block grant, half of them allocate across broader funding areas, while another half do not put any additional restrictions. Line-item budgeting, which implies strict limits on the capability of

methodology which relies on standardised parameters; historical method which is basically imitation of the previous period that adjusted with certain rules; less popular method is an annual negotiation process between public authority and recipient organization. In general, they are used simultaneously, for instance, a combination of the formula-funding and the historical methods by restricting the formula-funding part to guarantee a bottom and top points compared to the last years level. In some countries, even though the negotiation is not accepted the universities can submit they priority requests that will be taken into account during the budget allocation process.

The following figure gives the framework to evaluate current trends in a particular country

organizations is not used as in the past: only one country responded that it uses this mechanism in higher education.

The countries also reported that there are three main methods they use: formula-funding with two variables: (1) the type of outcome, and (2) the degree of control.

This framework and understanding the nature of funding ways can help to create model for the efficiency measuring. However, first we need to define the efficiency itself. Both in research papers and international standards in auditing there are two main words that used in a similar way or with small distinctions: productivity and efficiency. Intuitively, productivity is a simple division of outputs to resources or inputs. Examples in education could be number of graduates to a number of staff or number of journal articles to number of academic staff. This kind of approach are useful in a particular situation, but they cannot evaluate the productivity of whole organization or organizations as they have multiple inputs
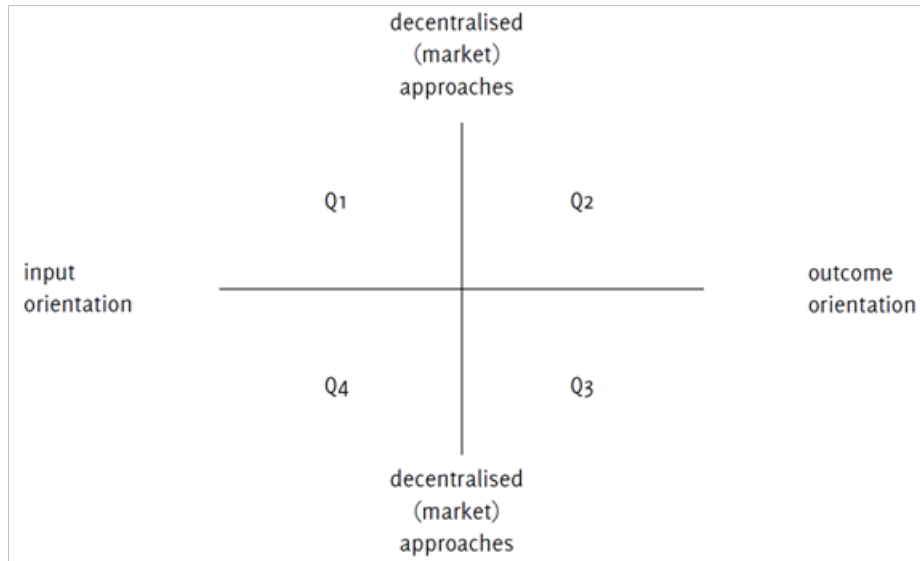
Figure 3 - The framework for the evaluation of funding mechanisms
Source: [10].

and outputs. This can be illustrated through the following formula Total Productivity [11]:

$$Total\ productivity = \left(\sum_{i=1}^{n} w_i\, y_i \right) \Big/ \left(\sum_{j=1}^{m} d_j\, x_j \right)$$

Where:
y_i = the i_{th} output produced
x_j = the j_{th} input used
w_i = the weight of the output
d_j = the weight of the input

All in all, productivity formula above is a simple indication of the weight of each input and which is convertible to the output. In the most simplified explanation, efficiency is an index of this number.

Initially we had an assumption that inputs are absolute numbers. However, it is more relevant and presentable if we convert it to a particular currency such as tenge. For instance, we can have "the expenditures on teaching activities" and simultaneously the output would become "number of graduates". Consequently, we can get "number of graduates for one tenge" or in order to make it more usual indicator "teaching expenses per graduate". If we apply our previous point about efficiency here, the ranking based on our formula could help identify the most and least efficient organization.

The literature provides various types of efficiency term depending on the approach. For the reason of simplicity, we consider most basic two types of efficiency: technical and price (allocative). The following figure 4 represents the example where two different resources (teaching and computers) are used to get one product (let us take one graduate). In addition, we can also extend this model according to the size of the university. For instance, one graduate would be one thousand graduates and consistently the resources for one thousand graduates.
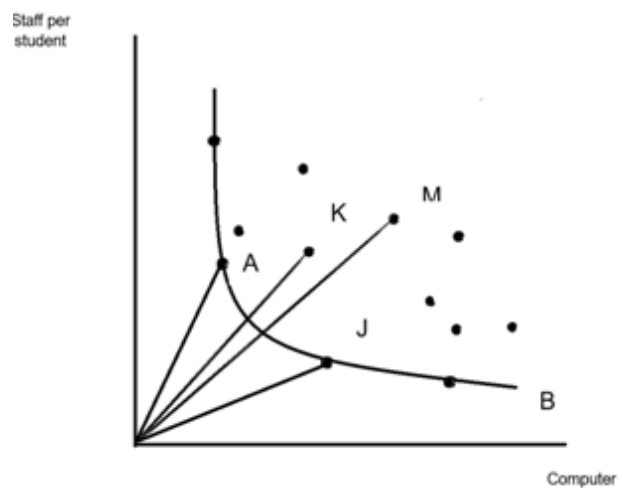

Figure 4 - A basic example of technical efficiency with two resources and one product
Source: [11].

The proposal for the future research

Selected funding type	Brief description of the possible quantitative efficiency approach
Block grant	The homogeneous universities could be comparatively analyzed to understand whether they "properly" allocate the resources
Competitive funding	The proposals could be historically ranked as benchmark for future projects
Philanthropic funding	The essence of the funding type usually not related to the efficiency, however if the organization is public, it should be accountable as well
Project-based funding	Requirements itself could be created based on the efficiency models
Student financial contributions	Cost/quality comparison could be conducted among universities
Targeted funding	The efficiency analysis could help to create more sophisticated targets

Intuitively, the line B demonstrates us the organizations with the minimum resources but with the different combinations of this resources. So, any organization on the line B would be equally efficient or in our case technically efficient. As a result, any point at the right side of our line should be considered as less efficient. In addition, we can use the distance between our line and any inefficient point to understand the level of inefficiency.

As we mentioned earlier, we can convert the absolute inputs to the currency inputs. In Figure 5 the only additional thing is C line. However, it will provide us different efficient points. For example, point A is no longer efficient as J. The reason is the cost of computer is less than teaching cost, so using "proper" combination would allow the organization J to stay at the maximum efficiency point.

Moreover, there can be overall efficiency points which would satisfy both requirements. In our example it is point J, where the organization efficient from two different perspectives.

The main limitation of this pure quantitative approach is its use only with comparative institutions. Neither of graphs above cannot demonstrate the absolute efficiency point. The points we have discussed as a maximum efficient point are the comparatively efficient points. One can argue that these organizations could be even more efficient.
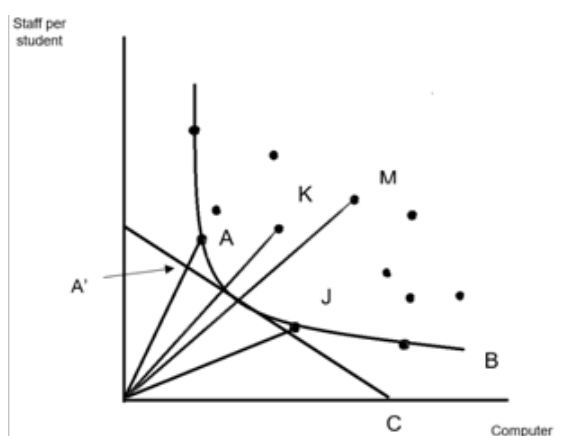

Figure 5 - A basic example of price (allocative) efficiency with two resources and one product
Source: [11].

Conclusion

Considering the types funding in OECD countries that are relevant for our country and the efficiency approach to the funding we can propose future research areas that will enrich the performance audit methodology (table 2).

To sum up, achieving quantitative efficiency or even sustainable efficiency does not guarantee the intended impact of any public policy. It should be noted that the use professional judgement as well as efficiency models may significantly decrease the audit risk. As the best audit practice suggests audit team should always consider alternative perspectives in any project of performance audit.

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Қаржыландыру үлгілері және жоғары білім берудегі тиімділік дискурсы туралы

Аннотация. 30 жылдық трансформациядан кейін Қазақстан үкіметі әртүрлі әлеуметтік-экономикалық және саяси факторлармен қалыптасқан өзіндік жоғары білім беру жүйесін құрды. Қазіргі уақытта жоғары білім беру жүйесі қиын жағдайларға қарамастан тұрақты институттармен жұмыс істейді. Білім берудегі жаһандық тенденциялар ел саясатына да әсер ететіні сөзсіз. Сонымен бірге Қазақстанның мемлекеттік қаржы жүйесі де бірнеше ірі реформаларға ұшырады. Мысалы, «Мемлекеттік сектордың аудиті» немесе «Мемлекеттік аудит» термині 2015 жылы жаңа Заңмен енгізілді, ол Мемлекеттік сектор институттарының көзқарасын толығымен өзгертті. Негізгі бағыт «қаржылық бақылау» орнына «тиімділік» деп аталды. Осыған байланысты бұл жұмыс техникалық мақалалар мен эмпирикалық зерттеулер негізінде дамыған елдердің жоғары біліміндегі тиімділіктің сыни өлшемдерін анықтайды. Мақалада ЭЫДҰ елдеріндегі білім беруді қаржыландыру модельдерінің ерекшеліктері және жоғары білім берудің тиімділігін бағалау негіздері ашылады.

Түйін сөздер: білім беру саласындағы тиімділік, тиімділік аудиті, мемлекеттік аудит.

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О модели финансирования и дискурс эффективности в высшем образовании

Аннотация. После 30 лет преобразований правительство Казахстана создало собственную систему высшего образования, сформированную различными социально-экономическими и политическими факторами. В настоящее время система высшего образования работает со стабильными учреждениями, несмотря на сложную среду. Нет сомнения, что глобальные тенденции в сфере образования также оказывают влияние на политику страны. В то же время система государственных финансов Казахстана также претерпела ряд крупных реформ. Например, термин «аудит государственного сектора» или «государственный аудит» был введен новым Законом в 2015 году, который полностью изменил подход органов государственного аудита. В центре внимания стала так называемая «эффективность», а не «финансовый контроль». В связи с этим в данной статье на основе технических статей и эмпирических исследований определяются критические параметры эффективности высшего образования в развитых странах. В статье раскрываются особенности моделей финансирования образования в странах ОЭСР и методы оценки эффективности высшего образования.

Ключевые слова: эффективность в образовании, аудит эффективности, государственный аудит.

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