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Introduction

Contemporary management control and reporting both face challenges. Consequently, a new and more sophisticated scientific approach is needed. From one point of view, interdisciplinary studies and theories are necessary. From another point of view, empirical research and practical issues call for a more specific and specialized approach. This complexity is reflected by the content of this book, which covers topics that emerge from present world's complexity. Therefore, the authors focus on ever-important issues (such as the strategic approach and its support by management control and reporting, survival of companies), and more modern issues (e.g. cultural aspects, measurement and reporting adjusted to branches, spheres and organizations and specific issues of management control and reporting).

The strategic approach to managerial control and financial statements and their role for company's survival is presented in papers by J. Dyczkowska (who addresses the question whether annual reports communicate strategic issues and focuses her study on reporting practices of high-tech companies), A. Bieńkowska, Z. Kral, A. Zabłocka-Kluczka (who explain the role of responsibility centers in strategic controlling), P. Kroflin (who explores the value-based management and management reporting examining impacts of value reporting on investment decisions and company value perception) and A. Reizinger-Ducsai (who discusses bankruptcy prediction and financial statements). The problems of management control and reporting and their adjustment to specific conditions and organizations are undertaken by T. Dyczkowski (who introduces his NGO performance model), Z. Kes and K. Nowosielski (who present the case study of the process of cost assignment in a local railway company providing passenger transportation services), S. Łęgowik-Świącik, M. Stępień, S. Kowalska and M. Łęgowik-Małolepsza (who analyse the efficiency of the heat market enterprise management process in terms of the concept of the cost of capital), and M. Pietrzak and P. Pietrzak (who discuss the problem of performance measurement in the public higher education). The cultural aspect of managerial control and reporting is explored in papers written by M. Nowak (who presents cultural determinants of accounting, performance management and costs problems showing the issue from Polish perspective using G. Hofstede and GLOBE cultural dimensions) and P. Bednarek, R. Brühl and M. Hanzlick (who provide a literature overview of planning and cross-cultural research). The specific problems and concepts of managerial control and reporting are investigated by M. Ciołek (who discusses the lean thinking and overhead costs), E. Nowak (who analyses the role of costs control role in controlling company operation), Ü. Pärl, R. Koyte,

S. Näsi (who examine middle managers' mediating role in MCS implementation), R.L. Sichel (who discusses the relevance of intellectual property for management control), J. Paranko and P. Huhtala (who analyse the productivity measurement at the factory level).

Marta Nowak

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THE PROBLEM OF PERFORMANCE MEASUREMENT AT PUBLIC UNIVERSITIES

PROBLEM POMIARU EFEKTYWNOŚCI W PUBLICZNYM SZKOLNICTWIE WYŻSZYM

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Summary: Higher education is a desirable good from the social welfare point of view. This is the reason for the justification of governmental support of universities. Very often governmental support takes the form of publicly held universities. However, an important question is the efficiency of such a solution. The public sector does not seem to be the most efficient form of organization for delivering goods and services. The aims of this paper are twofold. The first one is the discussion of the problem of efficiency in the public higher education and its defining. This is done mainly from the property rights theory point of view. The second one is to study empirically efficiency of public education entities. We assume that the basic unit of both competition and strategic decisions, as well as analysis of efficiency should be a faculty instead of a university treated as a whole. Moreover, faculties should be compared in more or less similar groups because of the high differences in conducting research and teaching processes, which can be observed between different areas of science. We examined the sample of 33 faculties specialized in social sciences (i.e. economics, law, political science, sociology, management, pedagogy, psychology) from Poland. We investigated their efficiency based on the composite indicators method. A composite indicator enables aggregation of three sub-indicators (the number of students per one academic teacher, the number of publications per one academic teacher, the value of externally acquired funds per one academic teacher) into one measure, which makes it possible to compare many objects (faculties). The Min-Max method can be used in normalisation, which brings the values of all variables into the range [0, 1]. Faculties are ranked according to their scores of the composite indicator. Finally, we drew attention to potential directions of further research.

Keywords: efficiency, higher education, composite indicators.

Streszczenie: Edukacja wyższa należy do dóbr społecznie pożądanych. Z tego względu władze publiczne wspierają do niej dostęp. Jednak ważnym pytaniem jest pytanie o efektywność funkcjonowania szkół wyższych. Sektor publiczny bowiem nie produkuje ani najlepiej, ani najefektywniej dóbr i usług. W artykule postawiono dwa cele. Pierwszym z nich jest dyskusja nad problemem i definicją efektywności w odniesieniu do uczelni publicznych. Drugim jest pomiar efektywności podmiotów szkolnictwa wyższego. Badania zostały przeprowadzone w oparciu o założenie, że podstawową jednostką zarówno konkurencji, jak i decyzji strategicznych jest

wydział a nie uczelnia jako całość. Ponadto wydziały powinny być porównywane w podobnych grupach ze względu na znaczące różnice w realizacji badań i działalności dydaktycznej w różnych obszarach nauki. Badania zostały przeprowadzone na próbie trzydziestu trzech wydziałów reprezentujących nauki społeczne (np. ekonomia, prawo, nauki polityczne, socjologia, zarządzanie, pedagogika, psychologia) w Polsce. W pomiarze efektywności została wykorzystana metoda wskaźników złożonych. Do konstrukcji wskaźnika złożonego zostały wykorzystane trzy wskaźniki cząstkowe (liczba studentów w przeliczeniu na jednego nauczyciela akademickiego, liczba publikacji na jednego nauczyciela akademickiego, łączna wartość grantów i prac zleconych tzw. KZL w przeliczeniu na jednego nauczyciela akademickiego). W celu doprowadzenia ich do wzajemnej porównywalności została przeprowadzona ich normalizacja, która sprowadziła wszystkie wskaźniki cząstkowe do przedziału [0,1]. Wydziały zostały uporządkowane pod względem wyliczonego wskaźnika złożonego. W końcowej części artykułu autorzy zwrócili uwagę na potencjalne kierunki dalszych badań.

Słowa kluczowe: efektywność, szkolnictwo wyższe, metoda wskaźników złożonych.

1. Introduction

In the contemporary world human capital and knowledge development became particularly important features of creation the sustained advantage [Boulton, Libert, Samek 2001; Pietrzak 2012]. A definition of human capital put forward by the OECD [2001] describes HC as knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being. Human capital is a form of potential which could be enhanced by investments, including knowledge building [Schultz 1976].

Higher education is not a public good, because it is subject to rival and excludable consumption – according to Stiglitz's [2000] criteria. However, it is a form of so-called merit good, which means a socially desired product or service. In the case of such a good government should intervene into the free market if consumption of merit is not sufficient [Musgrave 1987]. Governments are often engaged in the higher education sector, which is justified by the need for support in creating and upgrading human capital and scientific knowledge – the key factors, which boost productivity of a nation and by this way produce a high and growing standard of living for its citizens [Porter 1992]. Such engagement is not an unambiguous question. In societies there arises pressure for public organizations to be more business like efficient entities [Ansoff 1979].

According to the New Public Management (NPM), public sector organizations have to strive toward efficiency analogous to their business counterparts, particularly by implementing competitive mechanisms, customer orientation, decentralization, performance measurement and strategic management. The New Public Management concept was raised as a reaction to the weaknesses of the traditional paradigm of public administration based on Weber's model of ideal bureaucracy [O'Flynn 2007]. The counterpart model proposed is NPM based on such a set of key ideas as: hands-on

professional management, explicit standards and measures of performance, emphasis on output controls, disaggregation of units in the public sector, competition in the public sector, private sector styles of management practice, discipline and parsimony in resource use [Hood 1991].

The New Public Management has been applied recently to the high education organizations, mainly in European countries [Schimank 2005; Tahar 2013; Wilkesman, Schmid 2012]. Consequently, at universities methods and techniques are becoming popular, such as setting targets of efficiency and effectiveness, benchmarking, performance measurement, etc. [Parker 2012]. Particularly the universities in the UK are increasingly concerned with the performance management [Taylor, Baines 2012]. According to the new law regulation, also public universities in Poland have become the subject of pressure in order to meet the requirements of accountability, effectiveness and efficiency measurement and strategic planning [Pietrzak 2013].

The aims of this paper are twofold. The first one is the discussion of the problem of efficiency in the public higher education and its defining. This is done mainly from the property rights theory point of view. The second one is to study empirically efficiency of public universities. This investigation was conducted on the sample of 33 faculties of social sciences at Polish public universities.

2. The problem of efficiency measurement at universities

Recently we can observe an increasing interest in performance measurement in public bureaus and agencies [Byrson, Alston 2011; Niven 2008]. But what is efficiency? And what does it really mean in the case of the public sector, particularly in the case of public university? How could it be measured?

In the economic theory, efficiency means that scarce resources are directed to the use most highly valued by consumers. In the neoclassical model the device for achieving such a result is a perfectly competitive market. In this model firms and consumers following objectives based on their self-interest ultimately direct to the result which is the best for each of them (private efficiency) and simultaneously the best for all in the whole economy (social efficiency). In other words, the result is Pareto efficient, i.e. no agent can gain benefits without imposing a cost on someone else [Carroll 2004].

But what about a public bureau or agency? They do not operate in a market in a similar way as firms do. Enterprises are strictly dependent on their market environment. Shareholders and obligees are willing to finance them only if they generate profits in their activities on the market. Although public organizations have also some kind of markets for their products or services, the link between the market environment and taxpayers is much less strict. Public funds from taxes devoted for financing a public entity are not directly determined by the profit or loss generated by this entity in the market [Ansoff 1979]. In such a case, prices – even if they are present in the form of tuition, fees, etc. – are losing their role of signalling devices in

economic meaning of prices as regulating incentives. Consequently, the assumption that efficiency of an organization is identical with social efficiency (i.e. Pareto optimal) is no longer valid.[1] Thus, we can only try to measure individual efficiency of any bureau or agency but we cannot translate it directly into the social optimum. It is of course better if public organizations use public resources in a frugal rather than in a wasteful way, so they produce more outputs from any given pool of resources (or use fewer resources to produce any given set of outputs). But such a situation does not mean that the allocation of resources is optimal, i.e. scarce resources are directed to the most valuable uses.

Moreover, in the case of public organizations there is no clear authority chain of governance [Carroll 2004] and there is no clear objective which could be used as an efficiency criterion. Consider self-employed freelancer business. In this case an owner is simultaneously a manager and an employee and his or her behaviour is directed simply by profit seeking. A situation became more complex in the case of a company where principal-agent problems arise between owners, board of directors, executives, managers and employees. Nevertheless, there is still one simple criterion of success – profit, which could be used as a core basis for monitoring and incentive schemes.

Public agencies, including universities, are usually big organizations with many hierarchical layers and consequently a complex principal-agent problem [Fama, Jensen 1983]. But this is not the only problem. The crucial issue in the public sector is what objectives and efficiency criteria are. Who defines objectives and criteria? Who is the owner of bureau or agency? According to Carroll [2004], in the general sense taxpayers should be considered as an owner of public organizations. It should be stressed that accordingly to the concept of separation ownership and control [Berle, Means 2009], the situation of taxpayers as owners could be treated as an extreme case of separation if we compare them with shareholders. They are extremely dispersed and moreover, as Carroll pinpointed, their "shares" are not tradable. Indeed the cost of exchanging "share" is prohibitively high, i.e. changing citizenship with no financial compensation [Carroll 2004]. Thus, the authority of taxpayers over any public organization is extremely weak. Their ultimate authority is articulated through voting and electing legislators [Carroll 2004]. However, in practice elections through the democratic system of political parties are much more complex choices taking into account much more issues than deciding about any particular bureau or agency.

Barzel [2009] made a distinction between legal and economic property rights. Thus, full ownership consists not only of possession but also authority to control [Carroll 2004]. As already discussed, control of taxpayers over a particular bureau or agency is weak. In fact, effective control is in the hands of bureau managers and consequently economic property rights effectively accrue to them [Carroll 2004].

[1] As Tirole stated: "any Pareto-optimal allocation can be decentralized (implemented by a market organization) by a choice of the right prices and an appropriate redistribution of income among customers" [1988, p. 6].

Managers of public organizations have their own interest. In the situation of possessing effective control, they could prefer benefits, such as prestige, position and tenure more than bureau or agency efficiency. This kind of problems (i.e. economic aspects of tenure) in the case of universities was deeply examined by Alchian [2006]. Legislators are representatives of taxpayers. Legislators could defend interest of them through their decisions on how much funds they allocate for projects and programs of each public organization [Carroll 2004] and through creation the rules and regulations.

As Taylor and Baines [2012] observed, the universities in the UK have become increasingly interested in performance management methods, for example in the Balanced Scorecard (BSC). Pietrzak, Paliszkiewicz, Klepacki [2015] provided evidence for how BSC could be used in strategy communication and in performance management on the example of one of the big Polish universities. Moreover, Pietrzak [2014] compared strategies of four Polish universities. He framed this comparison broadly on the BSC concept, taking into account the most important strategic issues like: mission, vision and strategic objectives.

Balanced Scorecard is a very useful method of translating strategy into measurable targets and actionable initiatives [Kaplan, Norton 2008]. However, this role implies that it could be specifically designed for every individual case, because the strategy should be unique for any organization, indeed. Consequently BSC based on many uniquely dedicated metrics and indicators is a helpful tool for strategic management for executives of any particular university, but it does not seem very helpful for a legislator in controlling performance of many universities. In such a case, a method which allows a direct comparison of efficiency between public organizations will be more helpful. In the following sections, we will show one of the approaches of how such a comparison could be done. We draw on indicators taken from the general mission of a so-called entrepreneurial university.

3. Method

We assume that the basic unit of both competition and strategic decisions, as well as analysis of efficiency should be a faculty instead of a university treated as a whole. Moreover, faculties should be compared in more or less similar groups because of strong differences in conducting research and teaching processes, which can be observed between different areas of science. For example in the case of Warsaw University, costs of teaching one student at the Faculty of Physics are 11-times higher than at the Faculty of Journalism and Political Sciences [Wilkin (Ed.) 2009]. Thus, we assessed the efficiency of social sciences (i.e. economics, law, political science, sociology, management, pedagogy, psychology) faculties affiliated at public universities. There are 150 such faculties in Poland. Data from 33 of them are available. We investigated their efficiency and used the composite indicators method.

Composite indicators (CIs) enable aggregation of many sub-indicators into one measure, which makes it possible to compare many objects (faculties). They

integrate large volumes of information in a clear and understandable format, which is easy to interpret for recipients [Shen et al. 2011]. Construction of CIs requires determination of factors which influence the studied phenomenon and creation of a composite indicator must be preceded by normalisation of input data [Szuwarzyński, Julkowski 2014]. The Min-Max method can be used in normalisation, which in its basic version brings the values of all variables into the range [0, 1]:

$$I_{i\_norm} = \frac{I_i - I_{\min}}{I_{\max} - I_{\min}},$$

where:
I_{i_norm} – the normalized value of the i^{th} element of the vector of sub-indicators;
I_i – the value of the i^{th} element of the vector of sub-indicators;
I_{min} – the minimum value of the sub-indcators;
I_{max} – the maximum value of the sub-indcators.

The composite indicator is the weighted sum of normalized sub-indicators:

$$CI_r = \sum_{q=1}^{Q} w_q I_{qr},$$

where:
CI_r – the value of the composite indicator for the rt^{h} object;
w_q – the weight of the q^{th} sub-indicator;
I_{qr} – the value of normalized q^{th} sub-indicator for the r^{th} object for: $r = 1,..., R$ – R is the number of objects incorporated into the analysis (the number of compared faculties) and $q = 1,..., Q$ – Q is the number of sub-indicators.

4. Results

Table 1 presents a short description of indicators, along with the descriptive statistics and their interpretation. In the area of teaching activity, the authors used the number of students per one academic teacher – *I1*. For research activity, another index was defined: the number of publications per one academic teacher – *I2*. Entrepreneurial behavior was measured by the value of externally acquired funds per one academic teacher – *I3*.

The authors used three sub-indicators to create composite indicator (the sub-indicators were normalized). Identical weights were adopted[2] in calculations for all sub-indicators, which is one of the more frequently encountered aggregation methods [Paruolo, Saisana, Saltelli 2013]. Faculties are ranked according to their scores of composite indicator (*CI*). Table 2 presents the results. The method

[2] Weights are usually adopted on the basis of an expert opinion.

uses the composite indicator for rankings, but it may also allow identification of institutional strengths and weaknesses (see Figure 1).

Table 1. Set of indicators used in the analysis

Area	SD	Min	Max	Description
Teaching	28	9	68	The number of students per one academic teacher (*I1*)
Research	3	1	7	The number of publications per one academic teacher (*I2*)
Entrepreneurial behavior	5,736	0	38,681	Externally acquired funds like funds for R+D work, etc. as well as externally granted research projects per one academic teacher [PLN] (I3)

Source: own research.

Table 2. Ranking of faculties based on composite indicator

Faculty	*I1*	*I2*	*I3*	*CI*	*R*a
Faculty of Educational Studies (AMUP[b])	**1.00**	0.38	0.14	0.51	1
Faculty of Economic Sciences (UW[c])	0.24	0.27	0.99	0.50	2
Faculty of Political Science and Journalism (AMUP)	0.59	0.76	0.03	0.46	3
Faculty of Management (LUT[d])	0.27	0.68	0.43	0.46	3
Faculty of Psychology (UW)	0.18	0.16	**1.00**	0.45	5
Faculty of Law and Administration (UW)	0.34	0.83	0.11	0.43	6
Faculty of Managemnt (CzUT[e])	0.23	**1.00**	0.02	0.41	7
Faculty of Law and Administration (USK[f])	0.66	0.38	0.19	0.41	7
Faculty of Economics and Management (UZG[g])	0.52	0.53	0.06	0.37	9
Faculty of Management (UW)	0.74	0.17	0.09	0.33	10
Faculty of Economic Sciences (WULS[h])	0.55	0.33	0.10	0.32	11
Faculty of Law and Administration (JUK[i])	0.43	0.40	0.14	0.32	11
Faculty of Management and Social Communication (JUK)	0.45	0.37	0.04	0.29	13
Faculty of Social Science (USK)	0.22	0.38	0.26	0.29	13
Faculty of Journalism and Political Science (UW)	0.35	0.26	0.14	0.25	15
Faculty of Education (UW)	0.38	0.26	0.09	0.24	16
Faculty of Ethnology and Educational Science (USK)	0.17	0.38	0.16	0.24	16
Faculty of Pedagogy and Psychology (USK)	0.25	0.38	0.08	0.24	16
Faculty of Applied Social Sciences and Resocialization (UW)	0.12	0.41	0.14	0.22	19

Table 2, cd.

Faculty of Radio and Television (USK)	0.26	0.38	**0.00**	0.21	20
Faculty of Organization and Management (SUT[j])	0.17	0.31	0.10	0.19	21
Faculty of International and Political Studies (JUK)	0.16	0.31	0.08	0.19	21
Faculty of Law and Administration (UWMO[k])	0.48	0.01	0.04	0.18	23
Faculty of Law and Administration (AMUP)	0.08	0.35	0.10	0.17	24
Faculty of Economics (UWMO)	0.44	0.07	0.01	0.17	24
Faculty of Administration and Social Sciences (WUT[l])	0.24	0.21	0.02	0.16	27
Faculty of Management (WUT)	0.35	**0.00**	0.15	0.17	24
Faculty of Social Science (AMUP)	0.05	0.32	0.12	0.16	27
Faculty of Social Sciences (WULS)	0.27	0.12	0.01	0.13	29
Faculty of Management (RzUT[m])	0.08	0.23	0.05	0.12	30
Faculty of Education, Psychology and Sociology (UZG)	0.11	0.21	0.01	0.11	31
Faculty of Social Sciences (UWMO)	0.25	0.05	**0.00**	0.10	32
Faculty of Pedagogy and Fine Arts (AMUP)	**0.00**	0.29	**0.00**	0.10	32

[a] Ranking; [b] Adam Mickiewicz University in Poznań; [c] University of Warsaw; [d] Lublin University of Technology; [e]Częstochowa University of Technology; [f] University of Silesia in Katowice; [g] University of Zielona Góra; [h] Warsaw University of Life Sciences; [i] Jagiellonian University in Kraków; [j] Silesian University of Technology; [k] University of Warmia and Mazury in Olsztyn; [l] Warsaw University of Technology; [m] Rzeszów University of Technology.

Source: own research.

5. Conclusions

Governments typically support higher education services according to externalities created by them. In Europe, governments usually finance public universities. This raises a question about efficiency of such a solution. Property rights arrangements in the public sector do not create strong incentives to enhance efficiency. Moreover, there are difficulties in defining and measuring efficiency at public universities. We find that that the most efficient were two Adam Mickiewicz University in Poznań faculties: Faculty of Educational Studies, Faculty of Political Science and Journalism and one Warsaw University faculty – Faculty of Economic Sciences. The last two places were occupied by Faculty of Social Sciences (University of Warmia and Mazury in Olsztyn) and Faculty of Pedagogy and Fine Arts (Adam Mickiewicz University in Poznań).

However, there are some limitations of our study. Firstly, the selection of inputs and outputs to assess efficiency at universities is very difficult [McCormick, Meiners

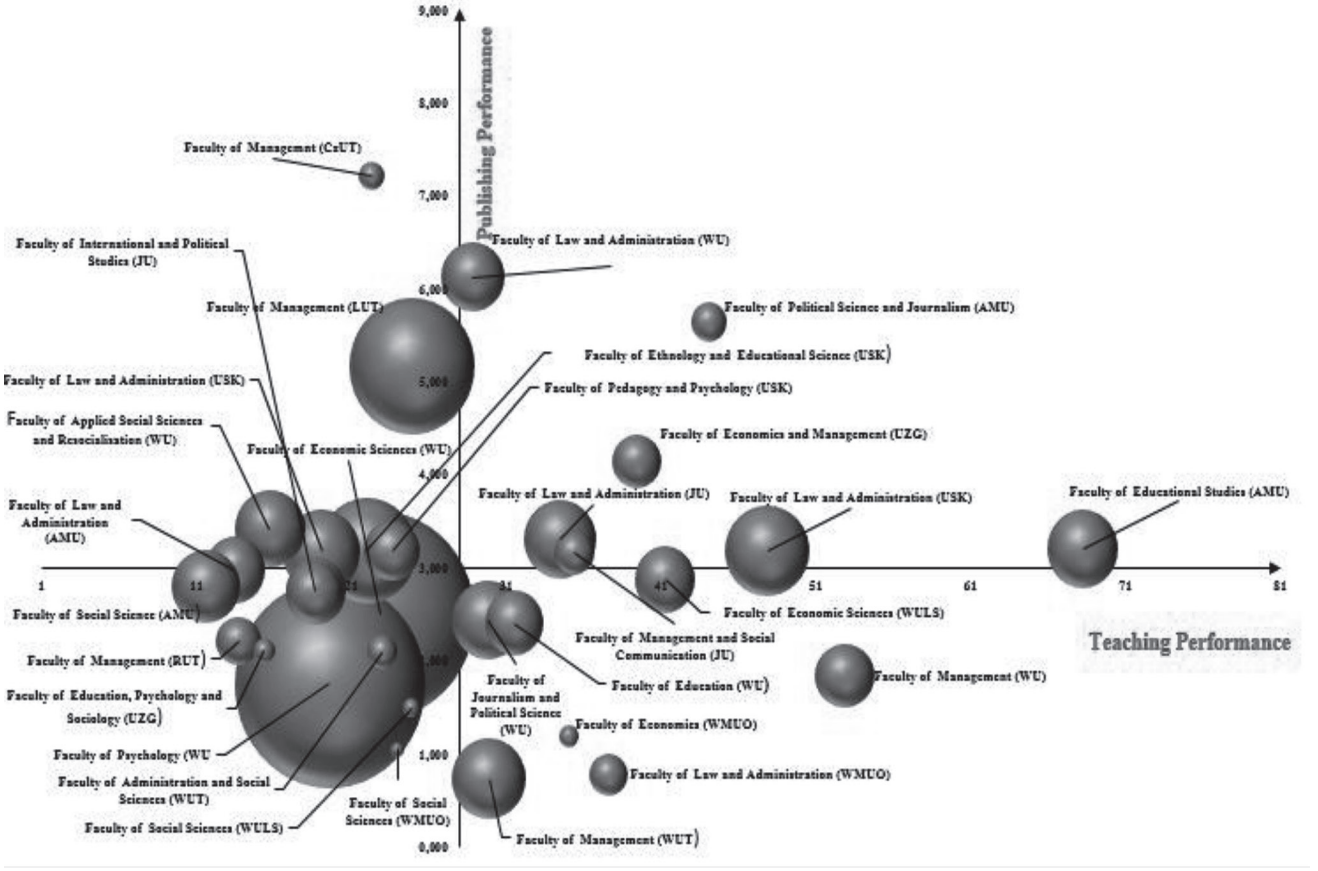

Figure 1. The faculties' strengths and weaknesses (the size of bubble is represented by value of externally acquired funds per one academic teacher)

Source: own research.

1988]. Thus, our set of indicators is arbitrary and as such it is questionable. Property rights theory predicts that in public organizations there will be a tendency to narrowly frame performance and focus mainly on visible inputs/outputs such as the number of students or academic staff [Carroll 2004]. This is also a problem of our study, in which indicators concern easy to measure factors, but do not have very much to do with quality of research or teaching. Therefore, further investigations are needed. We suggest following our approach to study efficiency in a faculty rather than at the university level, particularly in doing comparisons between faculties from public and private universities and also between faculties from different countries.

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