The Challenges of Cost Accounting of Hungarian Higher Education – especially Competitiveness Aspect

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Abstract: A knowledge-based society is a major contribution to increasing competitiveness. Higher education institutions play a crucial role in the life of a national economy. Higher education in Hungary has undergone several transformations over the past two decades. In order to address the challenges of competition in the higher education sector, it is necessary to provide adequate financial information and to know the costs of activities and training. To improve their sustainability, universities need to develop the right tools to determine the total cost of their training. In our research, we focused on the factors that play a role in the costing of economics courses in Hungary. The research has statistically confirmed that the more prestigious and well-known higher education institutions set their tuition fees at the upper end of the differentiated normative range for a given field of study. Institutions adjust the amounts of the fees they charge to market conditions, to the cost price and to the normative envelope.

Keywords: higher education; cost accounting; managerial accounting; financing; Hungary

1 Introduction

The European Union has set out its plans for the last decade (2010-2020) in the Europe 2020 strategy, with objectives in the areas of employment, research and development, energy, education, combating poverty and social exclusion. The goal of the strategy is to reduce the rate of school dropouts below 10%, and for at least 40% of the EU population aged 30-34 to have a higher education [1].

In accordance with the education-related goals and financing possibilities of the strategy, our country has also taken steps in the direction of change.

The future objective is to establish a performance-oriented higher education [2]. The determining factor in the competitiveness of a national economy is higher education and a knowledge-based society that can be formed in this way, which greatly contributes to economic development [3].

Over the past 15 years, we have witnessed a new era of higher education facing new challenges [4], and the higher education era has seen a relatively non-competitive environment change. Reliable financial and accounting information is decisive in a competitive environment. The question arises: in a competitive environment, is the information system of higher education institutions sufficiently accurate, reliable and focused to provide up-to-date data for decision making?

2 Literature Review

2.1 The Relationship between Financing and Cost Accounting

In line with the education objectives set out in the Europe 2020 strategy, Hungary has also taken steps towards change in the higher education sector. At the end of 2014, a strategy for the transformation of the higher education sector was adopted, entitled *"A step change in higher education",* which stated that a funding system based on real training costs is needed, rather than the historically established normative system. Differentiated funding is needed, underpinned by realistic cost accounting. A uniform costing methodology for the recognised costs should be designed to encourage institutional operation while reducing expenditure, thereby achieving more efficient management as a whole [5].

Reducing student dropout, increasing the traction among motivated students, developing skills and competences, and adapting to labour market needs are a key focus [6]. The transfer of knowledge and skills that enable graduates to work effectively, efficiently and sustainably in both the domestic and international markets is a key objective [7]. Students need to be prepared for the challenges of the future and the expectations of finance [8]. They need to be better informed about financial education so that future generations can understand and appreciate the complex economic and financial processes [9]. Strengthening the quality of financial education in higher education contributes to the development of a quality financial culture [10] and a quality higher education network.

The financing of higher education is very complicated and complex, there are no clear models; there is always a mixture of different proportions of state and student contributions [11]. One of the key issues of financing is who should bear the costs of higher education, and what should be the share of state and student contributions

within the revenues, with a view to long-term sustainability [12]. At the EU level, there is also a strong view on the need to increase student and third party revenues, thus reducing the burden on state budgets [13].

Today, financing solutions are increasingly emerging that represent a shift away from pure state maintenance and financing. The need for differentiation of institutional revenues has been highlighted by many researchers [14], as the financing of higher education raises serious social, economic and educational policy issues [15]. The contribution of students to their studies is justified in order to increase their income-generating capacity in the future [16], but social inequalities and social backgrounds should be considered in the context of revenue differentiation [17].

However, the financing of higher education has also faced challenges in recent decades, such as the growth in student numbers worldwide, the development of a knowledge-based society, the limits of state resources, problems with teaching salaries and the rising cost per student [18].

2.2 The Development of Cost Accounting Methods, the Difficulties of Cost Allocation Description

Cost accounting is also critical in higher education, where it can monitor, measure and thus determine the true costs of specific courses as services. The operating environment has changed dramatically, indirect costs have increased significantly, services have become more diversified, competition has become more intense, and greater accuracy in costing is required. New and more efficient allocation methods have therefore been sought to justify the functional utility of accounting information [19].

At the beginning of the 19th Century, many management accountants took the view that companies saw classical financial accounting as an obstacle to progress [20]. From the second half of the 19th Century, the focus of management accounting shifted towards serving management functions, and interest in more conscious cost accounting systems gradually increased [21]. The cost accounting system has to serve the reporting requirements arising from legal obligations and the needs of management for effective decision making [22]. Understanding and properly managing costs leads to better decision making and more competitive operations [23].

Traditional costing methods emerged at the beginning of the 20th Century [24]. The main problem of traditional cost accounting, besides its static nature, is the question of how to determine the cost of expenditures, beyond the quantification of direct costs, and what projection basis for the allocation of overheads would be appropriate, taking into account the principles of accounting (e.g. the cost-benefit principle) [25].

Logically, indirect costs are divided into cost objects based on cause-and-effect relationships, but there will always be distortions in the method, inadequate projection bases. Traditional cost allocation methods are appropriate if the services provided are similar, indirect costs are low, and the processes and customers are equal [26].

Kaplan and Cooper [27] introduced the activity-based costing method (ABC method) in the late 1980s, which was used to solve the weaknesses of the traditional method. Activity-based costing is a proven methodology that accurately and completely measures the cost of resources, activities and products. The ABC method identifies all activities that are performed in the production of a product or the provision of a service.

Activity-based costing is considered by Johnson [28] to be the greatest 20th Century of management accounting described it as the innovation of the century. While Horngren [29] reported that, no consulting firm used the ABC method. However, since Horngren's observation, many large service companies have successfully implemented activity-based costing. According to Kaplan and Anderson [30], the ABC method spread more slowly than expected because it was very difficult to follow the complexity of company operations, its introduction was very time-consuming, and its operation was expensive.

The methodological development of cost accounting provides several possibilities to determine the cost of a product or service, so the question arises which cost monitoring system is the most appropriate for higher education to provide efficient, fast and accurate information, taking into account cost allocation requirements and legal constraints?

2.3 Application of the Appropriate Cost Allocation Method in Higher Education

In higher education institutions, it has become essential to provide adequate cost information in the decision making processes, since the institutions have to face an ever-increasing financial rationalization. Higher education institutions must pay more and more attention to their accounting records and accounts [31]. The financial crisis that occurred in some universities in the 1980s also proved that it became necessary for state-funded institutions to examine costs, recover costs and demonstrate losses for all processes and activities [32].

In recent years, it has become clear that the cost of institutional activities is playing an increasingly important role in management decision making. The subject has attracted considerable interest in the 20th Century, as evidenced by the work of several researchers [33]. Researchers have pointed out that while universities operate in a relatively uncompetitive environment, little attention is paid to accurate cost information, but the environment is constantly changing [34].

The European University Association (hereinafter: EUA) has been working on costing issues in universities and higher education institutions since 2008, with total cost reduction as a key research objective and implementation [35]. In its reports, it has stated that total costing methods are an essential tool for modern university management [36]. European universities are currently facing a number of funding challenges that they need to overcome in order to continue to provide high quality teaching and conduct excellent research [37]. Total costing systems assume that all costs, direct and indirect, are attributed to an activity. Direct costs are directly linked to the activity and are monitored by taking the process into account [38].

A suitable costing system enables more efficient resource allocation and better-founded pricing. A cost accounting system that takes into account the specificitys of the institution should be established. A costing system that takes into account the needs and characteristics of the organisation contributes to the success of the short- and long-term decision-making process, providing appropriate information and making the university's activities transparent [39].

The effectiveness of cost and management accounting in universities was investigated by Cropper and Drury [40] in UK higher education institutions in the mid-1990s. The focus of the survey was the examination of the complexity and extent of the continuous liquidity methods used by the universities. In the study, attention was drawn to the necessity and timeliness of greater transparency of costs related to teaching and research in connection with the cost calculation of the higher education sector.

The renewed interest in costing in educational institutions dates back to the last 25 years. In their study, Goddard and Ooi [41] report that when the ABC method started to be used in practice, it was less effective than in theory. Significant costs were incurred in developing and maintaining it, such as the cost overruns of the general activities associated with the system.

In a later study, Cropper and Cook [19] sought to answer the question of whether activity-based costing has a future in higher education. Its introduction could bring about major changes at the institutional level, providing the necessary background for the operation of cost accounting systems. Its main impact will is felt in higher level functions such as training, communication and data collection.

With an increased demand for institutional accountability, increased scrutiny of university performance and costs, there is pressure on managers to maintain quality services while the funding is reduced [42]. A commitment to greater efficiency requires an understanding and appropriate management of cost behaviour. One of the best tools for understanding cost behaviour and refining the cost system is activity-based costing [43].

Dražić Lutilsky and Dragija [44] present the possibilities and limitations of the implementation of the activity-based costing (ABC) method as a complete costing method in European universities. They analyzed the trends and current movements in universities in EU countries. Using this information, guidelines for the

development of a full costing system at the University of Zagreb have been proposed. Their study shows that, despite public demands for effective management at universities, a very small proportion of universities are implementing a full costing system.

With regard to domestic regulation, state higher education institutions are subject to the provisions of the Government Decree on Accounting for Public Finances [45], according to which: ”the internal regulations of the state higher education institution on the system of cost accounting shall provide for the separation of costs of teaching, research, preventive care and other activities. In determining the cost price of educational activities, the cost price per student per semester shall be determined by subject, by level of training and by work schedule." With regard to domestic regulation, state higher education institutions are subject to the provisions of the Government Decree on Accounting for Public Finances [45], according to which: “the internal regulations of the state higher education institution on the system of cost accounting shall provide for the separation of costs of teaching, research, preventive care and other activities. In determining the cost price of educational activities, the cost price per student per semester shall be determined by the major, by the level of training and by the work schedule."

According to the provisions of the Government Decree on Accounting for Public Finances, it is mandatory to determine the cost price per student, however, it does not regulate the method of determining, even though the entire spectrum of institutional management is subject to costs that are difficult to allocate to individual activities [46].

According to the National Act on Higher Education [47], institutions receive basic funding for their basic activities, which is determined by the Government in a decree. This Government Decree is Government Decree No. 389/2016 [48] on the Financing of the Basic Activities of Higher Education Institutions, according to which the amount of basic funding for institutions is determined based on the differentiated normative framework bands. The amount determined by the institution for each subject and the number of students with a Hungarian state (part) scholarship multiplied by the number of students (regardless of private and state higher education institutions). According to the provisions of the National Act on Higher Education, the contribution of students with state scholarships and students with self-financing should be the same, as they use the same services. The training costs per student (own costs) determined by the institution must be set within the differentiated normative framework [47]. It is not possible to depart from (exceed) this framework even if the actual own costs would justify this. It is clear from the legislation governing the funding that the funding, so that all students must contribute to these costs in order to ensure sustainable management, does not cover the ‘classical’ indirect costs (sales, distribution, administrative and other overheads). Consequently, a student must be charged the full cost of his training (the student's form of financing is therefore irrelevant for the determination of the cost price).

Thus, the method of determining the total cost per student is a critical issue given the funding possibilities and constraints. The research and studies conducted so far provide sufficient evidence that the ABC method can be used to monitor the costs of universities and is a sufficient example for universities to adopt the ABC method as a costing method [49].

3 Methodology

A specialized literature search was carried out to establish the basis of the research, with the aim of identifying relevant legislation, the results of previous research, and the background of the financing, financial and accounting literature on the subject. Both quantitative and qualitative analysis methods are used in our research, which takes into account the methodological and other influencing factors of higher education cost price. In the quantitative research phase, data mining methods were used to analyse data tables resulting from the structured collection of publicly available enrolment data. The analyses are descriptive and exploratory in nature. The query covered 5 years of data (2017-2021). A field of study was narrowed down to allow for a manageable sample, resulting in a focus on the most popular field of study today, namely economics. Competition between institutions in this field of study is also evident, due to both its popularity in demand and the relatively large number of institutions in supply. This restriction also limits the scope of the research, as not all higher education institutions have focused on all courses.

During the period under review, the institutions surveyed offered a total of 4,211 courses in the field of economics in higher education junior training courses, bachelor's and master's programmes, with regard to the level of training, the work schedule and the form of financing.

The institutions listed in table (1) below were included in the research. The number of courses included in the sample is 4,211, which consists of 1,109 the higher education junior training courses, 1,762 bachelors' and 1,340 master's courses included in the research, in the selected, relevant institutions in this field of science, in 5 years, shown in Table 1.

Table 1
The higher education institutions involved in the research
source: own research

Corvinus University of Budapest	University of Miskolc
Budapest Business School	University of Nyíregyháza
Budapest University of Technology and Economics	Óbuda University
University of Debrecen	University of Pannonia
University of Dunaújváros	University of Pécs

Eötvös József College	University of Sopron
Eötvös Loránd University	Széchenyi István University
Eszterházy Károly Catholic University	University of Szeged
University of Kaposvar	Szent István University (Hungarian University of Agricultural and Life Sciences)

To check the closeness of the association, the usual methods used for nominal scales were cross-tabulations, which contain the distributions obtained for each combination of the values of the two variables under study, and therefore allow the correlation between the two variables to be inferred. The Cramer V index was used to measure the actual existence of the association and to measure the association closeness, as is common in research practice [50].

Since the database built from secondary data contains time-series data, it is important to capture the dynamics inherent in this data. For this purpose, the slope (m) of the linear trend line (y=mx+b) that can be fitted to each of the classes in the database (assuming that they started in at least two semesters, this is the only way to observe any dynamics) was calculated. Its sign indicates the direction of the trend (increasing/decreasing) and its absolute value indicates the magnitude of the slope of the trend (the indicator allows relative comparisons) [51]. The slopes were determined using the parameters of the linear trend lines fitted by the least squares method. The slopes thus calculated are a single indicator characterising the trends in the cost price of the observation units (courses) and the number of applicants over the period under study.

4 Empirical Resulst and Discussion

4.1 The Relationship between the Popularity of the Institutions included in the Study and the Cost Price of their Training

The boxplot diagram below (Figure 1) shows the distribution of the cost price of economics courses in the period under review (2017-2021). For all three types of training, the institutions advertise their courses in the top two-thirds of the statutory normative range.

In the case of the higher education junior training courses with a sample number of 1,109, there is no tuition amount in the lower 55% of the frame band, so the cost prices are between HUF 110,000 and HUF 200,000. In the case of basic training, training is not advertised in the lower 42-43% of the frame range, so the reimbursement amounts are between HUF 150,000 and HUF 350,000. In the case of a master's degree, no training is advertised in the lower 60% of the frame range, so the reimbursement amounts are between HUF 240,000 and HUF 400,000.

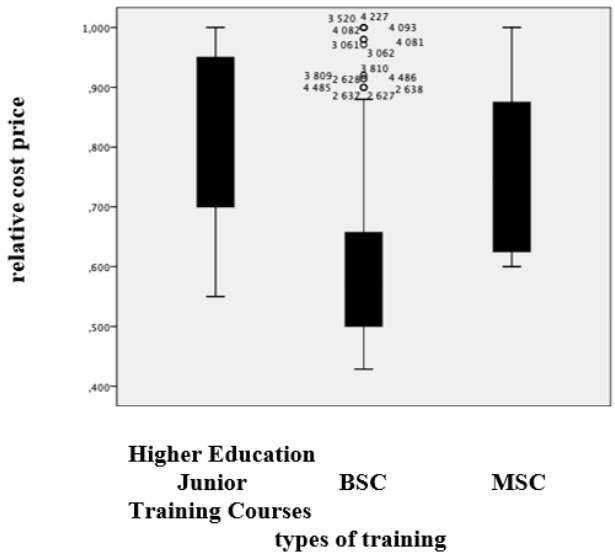

Figure 1
Boxplot diagram of the distribution of relative cost prices
source: own research

The higher education junior training courses are typically positioned close to the maximum, for half of the sample the cost price is 70-95% of the maximum, so for half of the training courses the amount of reimbursement falls between HUF 140,000 and HUF 190,000. In the case of cost price for the basic course, half of the sample falls between 50-65% of the maximum of the normative frame band, so for half of the courses, the cost price amount is between HUF 175,000 and HUF 230,000. In the case of the bachelor's degree, there are special courses whose cost price is close to 100%, HUF 350,000. This study also shows our preliminary expectations experienced from everyday life that the costs of training at the leading institutions in the field of science are at the upper limit of the normative framework. While in the case of the master's courses, it can be established that half of the sample falls between 62-87% of the maximum of the normative frame band, so for half of the courses the cost price amount is between HUF 245,000 and HUF 355,000.

In the examined period, the total number of higher education junior training courses announced was 1,109, of which the institutions advertised their courses at the normative maximum in nearly 250 cases. An outstanding value in the case of the relative cost price is the value of 0.75, which in the case of higher education junior training courses represents the HUF 150,000 reimbursement amount, in more than 200 cases. It is definitely important information that the higher education junior training courses are not at all profitable and feasible in the lower part of the normative framework band and at the same time the value of the training tends towards the maximum.

The number of BA programmes is 1,762, of which, in the case of more than 1,200 basic courses, it can be clearly seen from the figure that the relative cost of the courses ranges from 0.45 to 0.65, i.e. between HUF 150,000 and HUF 230,000. Among our preliminary expectations was that the cost price amounts for BA programmes would be better distributed between the minimum and maximum values.

The number of master's programs was 1,340 during the 5 years under review, the cost of which shows similarities with the higher education junior training courses. In more than 450 cases, institutions advertised training with a reimbursement amount of HUF 250,000. Furthermore, it can be seen that many people advertise master's degree programmes close to the maximum (up to 70-85% of the maximum) or at the maximum value (Figure 2).

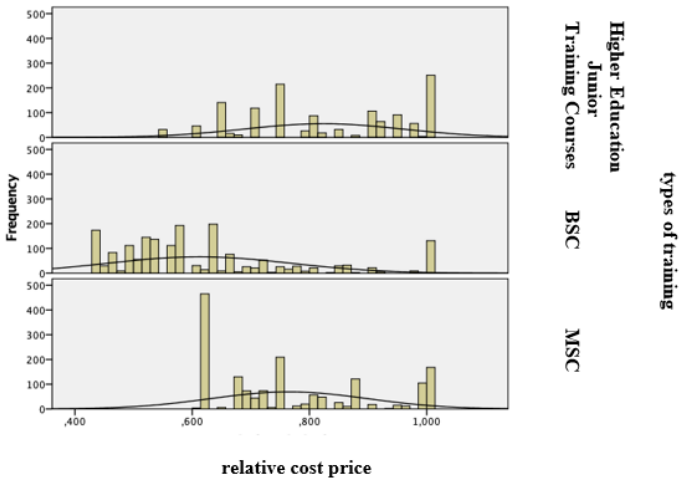

Figure 2
Distribution of relative costs prices per training in the period under review
source: own research

The research has shown that higher-ranked higher education institutions set the cost of their training at the upper end of the normative range. Table 2 below shows and demonstrates that there is a moderately strong and significant correlation between the cost of the most popular courses, i.e. those with high enrolments, and their cost, indicating the existence of a correlation between the two variables.

The Pearson's correlation coefficient is strongest for bachelor's degree programmes, but a relationship can also be found for the higher education junior training courses and master's degree programmes. Furthermore, the correlation coefficient is significant for all three levels of education. The moderately strong significant **relationship demonstrates that higher-ranked higher education institutions, which are more popular with students, set their tuition fees at the upper end of the differentiated normative bands for a given field of study.**

Table 2
Correlation coefficients and significance levels between total enrolments and cost prices, by level of education
source: own research

Forms of training	**r**	**p**
Higher Education Junior Training Courses	**0.37**	**lower than 0.001**
Bachelor's programmes	**0.49**	**lower than 0.001**
Master's programmes	**0.29**	**lower than 0.001**

The analyses carried out confirmed that there is a moderately strong significant relationship between the popularity of institutions and the advertised out-of-pocket costs. The existence of this relationship is the basis for the main research question of whether a relationship can be established between the trend in the change in enrolment and the trend in the change in the cost price, and whether the magnitude and direction of the change can be well and meaningfully characterised.

Table 3 shows the existence and closeness of the relationship between the trends in the evolution of enrolments and self-financing in the form of correlation coefficients. The presentation focuses exclusively on basic education, because this level of education has the largest dispersion of the cost of enrolment between the minimum and maximum values of the normative range. Only those institutions and their training courses that show the strength and direction of the relationship at a reliable level are now included in the table (in several cases, there was not enough information available for the calculations, as at least 2 years of data are needed to establish a trend). For the correlation coefficients, coefficients above 0.2 have been taken into account in the assessment by training level.

When examining the correlation coefficients for the bachelor's programme, it can be seen that all but 2 institutions show a significant positive relationship. This positive relationship, which is in many cases very strong, is a decisive factor for the study and also shows how strong the consistency of the two trends is between the faculties and science universities.

Table 3
The strength of the relationship between the cost price and the average slope of the trend line of all applicants in the case of a bachelor's degree, broken down by institution (faculty)
source: own research

Faculty	**Correlation coefficients of undergraduate education**
Corvinus University of Budapest - Faculty of Economics	-0.51
Corvinus University of Budapest – Faculty of Public Sciensec	not.
Budapest Business School - Faculty of Commerce, Hospitality and Tourism	0.24

Budapest Business School - Faculty of Finance and Accountancy	0.69
Budapest University of Technology and Economics - Faculty of Economics and Social Sciences	not.
University of Debrecen - Faculty of Economics and Business	0.73
Eszterházy Károly Catholic University - Faculty of Economics and Social Sciences	0.41
University of Kaposvar	not.
University of Miskolc - Faculty of Economics	0.37
University of Nyíregyháza	not.
Óbuda University - Keleti Károly Faculty of Economics	not.
University of Pannonia - Faculty of Business and Economics	0.16
University of Pécs - Faculty of Business and Economics	0.37
University of Sopron - Lámfalussy Sándor Faculty of Economics	-0.49
Széchenyi István University - Kautz Gyula Faculty of Economics	0.85
Szent István University - Faculty of Economics and Social Sciences	-0.13
University of Szeged - Faculty of Economics and Business Administration	0.98

Knowing the correlation coefficients and trend slopes, it can be concluded that **the institutions monitor the trends of changes in applications when determining the cost prices.** The variation in the amounts of the advertised reimbursement reflects the institution's response to the trend in enrolments in the case of undergraduate courses.

4.2 Comparison of Cost Accounting Codes and Conclusions to be Drawn

Qualitative analysis (content analysis) is used in the analysis and evaluation of the cost accounting policies of the institutions included in the study. The conditions for the obligation to draw up cost accounting rules are laid down in the Accounting Act [52], but it is important to stress that the Act does not provide for the precise content of the cost accounting rules and the methodology to be applied, so institutions must rely on their experience and accounting literature.

In May 2015, the State Audit Office of Hungary published its audit experience on the operation and management of state higher education institutions. The study shows that a general weakness was that fees and reimbursements were not established in a regular manner, and that fees and reimbursements, which accounted for part of the revenue, were not based on a cost price calculation, which entailed the risk of losses in the respective activities [53].

From the comparison and analysis of the cost accounting regulations of the higher education institutions, it can be concluded that the cost price calculation regulations of the higher education institutions are not uniform, there are differences in the depth and detail of the information content provided. Through knowledge and reflection on the legislation(s) governing the financing of higher education and content analysis of the cost accounting policies included in the study, it was found that institutions are interested in determining the total cost i.e. the cost price.

Conscious cost management, self-financing and ex-post analysis are becoming an increasingly critical area of higher education operations with the ongoing model change. The decline in student numbers is creating an increasingly competitive environment. Cost planning, cost awareness, plan-fact comparisons and the use of various decision support accounting and controlling tools play an important role in supporting management decisions.

The research has shown that the adaptation to the legal requirements and the normative limits justifies the allocation of costs based on the cost-bearer principle. This cost allocation can be carried out using the traditional cost allocation principles based on a supplementary and simple cost allocation method.

5 Future Directions

In order to solve the funding problems that are also appearing in the international higher education space [54], as a result of the university model change [55] that has taken place in Hungary in recent years, institutions can implement their ideas within a more flexible framework [56]. They also have the opportunity to develop competitive education that is also relevant in international terms, which is relevant for the 21st Century [57]. The emergence of a corporate management approach in the case of higher education institutions is emerging, so that cost-consciousness and cost discipline in the corporate sector will be inevitable in the future. Starting from the data content in the reports and accounts, indicators of efficiency and profitability will be developed, with a view to comparability [58]. Of course, the focus of the current transformation is not on the area of cost accounting, but in a few years' time, a much greater awareness of the planning, monitoring, grouping and allocation of costs will be inevitable for the sustainability and development of institutions.

Conclusions

Statistical analysis of the relationship between enrolments and the amount of fees advertised, focusing on the field of economics, shows that there is a strong relationship between popularity and the amount of fees advertised for courses at institutions dominating the field of economics and their courses. The experience of the institutions in this research has shown that there is no conscious causal allocation of costs in terms of cost accounting, and that in fact the amounts of

reimbursement advertised reflect market conditions and the normative framework. This finding is confirmed by the analysis of the State Accountants [59].

In the research, we narrowed down the fields of study as cost calculation regulations were only available for state-run universities, so we have been aware of the limitations of research. In order to accomplish nationwide representativeness, we will expand the research to all universities in the future. The transformation of several state universities has also been taking place, so it has become necessary to investigate the changes in cost accounting.

It can be formulated as a new research direction and question, whether the corporate management approach that appears as a result of the transformation encourages a more conscious cost monitoring system and the use of cost accounting based on more modern principles?

To meet these challenges and improve their financial sustainability, universities need to develop the right tools to identify the full costs of all their activities and training. Knowing the cost price of the training courses, as described above, becomes an essential strategic tool for managing an institution.

The development of an internationally relevant higher education system requires a timely and effective response to societal and market challenges and a focus on performance and quality. In order to mitigate and avoid financial, funding and operational risks, institutions should place greater emphasis on revenue and expenditure planning, transparency of accounting data and financial awareness.

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