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**HUNGARIAN UNIVERSITY OF
AGRICULTURE AND LIFE SCIENCES**

**THE ANALYSIS OF INFLUENCING FACTORS IN
DETERMINING TUITION FEES AND FIRST-
COSTS FOR BUSINESS PROGRAMMES IN
DOMESTIC HIGHER EDUCATION**

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1. BACKGROUND AND OBJECTIVES

1.1. Research background

Higher education institutions play a decisive role in the life of a national economy. Knowledge-based society highly contributes to improving competitiveness. Higher education is a significant stage in establishing a knowledge-based society, where the following objectives have to be borne in mind: value-creation, high standards of knowledge transfer, the development of learning capabilities, life-long learning. These objectives are in accordance with the European Union's goals. The Hungarian higher education has witnessed several transformations and reorganisations over the years, and nowadays another significant restructuring of the institutional system is in progress. Commitment to a higher education system that is performance- and quality-oriented, that supports value-creation and is able to react to global and social challenges, as well as to take into account the generational characteristics and attitudes in higher education and one that is becoming more and more international, is clearly evident in Hungary (SISA et al 2018a, SIKLÓSI-SISA 2017).

Over the past 15 years, we have seen the shrinking of higher education, which has shown that the relatively competition-free environment is apparently changing in the sphere of higher education. In a competitive environment reliable financial and accounting information have a decisive role. The question arises whether information systems in higher education institutions are accurate, reliable and solid enough to provide up-to-date information for decision-making in a competitive environment. Institutions must react to changing student attitudes and market demand alike, as well as take into consideration requirements and obligations imposed by their maintainers. Rapid reaction, adaptability and compliance require such information provision that can help efficient managerial decision-making.

Institutions need to put a greater emphasis on the planning, analysis and monitoring of revenues and expenditures in order to promote sustainable finances and operations. In addition, with a view to developing financial literacy, costs related to training courses must be identified so that actual costs of trainings can be calculated.

In times when the higher education sector has experienced and is still seeing a decline in state financing and other state measures concerning the restructuring of the higher education system, it is becoming more and more evident that institutions need to develop their income structure so as to create the optimal balance of state and private (student) contributions. To ensure sustainable operations, the mitigation of financing risks and stable foundations for independence at the same time, a communication and marketing strategy supported programme portfolio should be developed, in which students are willing to finance their studies to contribute to the revenues of the specific institution.

In compliance with applicable statutory regulations, pay-students are required to finance the overhead tuition cost of their education program. This implies that the planned, pre-calculated unit cost of a given academic training shall correlate to the established overhead tuition cost.

To be able to meet these challenges and also to ensure financial sustainability, universities shall work out the appropriate instruments for identifying the overall costs of all their activities and trainings. The knowledge of training first-costs therefore becomes a fundamental strategic tool in institutional management.

1.2. Research objectives and hypotheses

The research focuses on the identification of the external and internal factors determining the overhead tuition cost of business study programs at Hungarian state-funded institutions of higher education, and surveying the legal framework determining unit cost calculation.

One of the novelties of the present dissertation is that it presents the practices, the difficulties and the complexities of tuition fee calculation for higher education courses. Beyond accounting instruments and information, other factors that affect determining the amount of tuition fees are also presented. In view of all this, it will be explored in given field of study (the field of economic education) how student applications, fame, geographical location of the institution and other external factors influence the amount of tuition fees announced. Moreover, legal constraints must be mentioned as state intervention has a strong influence through the normative support framework.

The literature review of the dissertation presents domestic and international literature, studies, propositions relevant to the research in a logical series of steps, ending in methodological recommendations concerning tuition fee calculation in higher education.

Statistical data included and analysed in the study covers the period between 2014 and 2019, mostly due to the time lag between statistical data provision and the publication of aggregated data.

My personal professional experience in the past and present and the review of literature serve as the basis for formulating the following research objectives:

O₁ objective: The investigation of “tuition fee competition” among institutions. Based on admission data, determining a strong cause and effect relationship between applications, geographical location, fame and tuition fee amounts.

O₂ objective: The analysis of cost elasticity, that is, whether the increasing or decreasing rate of growth in applications is in line with the rate of change in fees announced by individual institutions.

O₃ objective: A comprehensive study of the tuition fee calculation system in higher education institutions, with the analysis of the regulatory environment and tuition fee calculation regulations.

Alongside the above objectives I formulated the hypotheses as follows:

H₁ hypothesis: The most popular higher institutions among students set tuition fee amounts for the given field of education at the ceiling of differentiated normative support frameworks.

H₂ hypothesis: A significant correlation between tuition fees and the regional location of institutions can be shown in the field of economic education.

H₃ hypothesis: There is a relationship between the trend in application changes and the trend in tuition fee changes in the field of economic education.

H₄ hypothesis: The tuition fee calculation regulations of higher education institutions are made up of documents with a uniform structure, the same level of detail and quality of information content.

H₅ hypothesis: State-financed higher education institutions use traditional first-cost calculation principles when determining full first-costs for training courses.

My objectives and the related hypotheses are summarised in Table 1.

Table 1. The objectives and hypotheses system of the research

OBJECTIVES	HYPOTHESES
<p>O₁ objective: The investigation of “tuition fee competition” among institutions.</p> <p>Based on admission data, determining a strong cause and effect relationship between applications, geographical location, fame and tuition fee amounts.</p>	<p>H₁ hypothesis: The most popular higher institutions among students set tuition fee amounts for the given field of education at the ceiling of differentiated normative support frameworks.</p>
	<p>H₂ hypothesis: A significant correlation between tuition fees and the regional location of institutions can be shown in the field of economic education.</p>
<p>O₂ objective: The analysis of cost elasticity, that is, whether the increasing or decreasing rate of growth in applications is in line with the rate of change in fees announced by individual institutions.</p>	<p>H₃ hypothesis: There is a relationship between the trend in application changes and the trend in tuition fee changes in the field of economic education.</p>
<p>C₃ objective: A comprehensive study of the tuition fee calculation system in higher education institutions, with the analysis of the regulatory environment and tuition fee calculation regulations.</p>	<p>H₄ hypothesis: The tuition fee calculation regulations of higher education institutions are made up of documents with a uniform structure, the same level of detail and quality of information content.</p>
	<p>H₅ hypothesis: State-financed higher education institutions use traditional tuition fee calculation principles when determining full first-costs for training courses.</p>

Source: author’s own compilation (2020)

2. MATERIALS AND METHODS

2.1. Literature research

The aim of the literature review serving as the basis of my research is to present relevant legislation, the results of previous research and the literature background and publications concerning the topic. The review of relevant literature is also used to support the obtained research results. I find it indispensable to include related knowledge from financing, financial and accounting literature. To the extent necessary, the regulatory environment, accounting procedure options and the changes in the methodology of tuition fee calculation are also dealt with in the second part of the literature review.

The figure below summarises the topics dealt with in the literature review (Figure 1.):

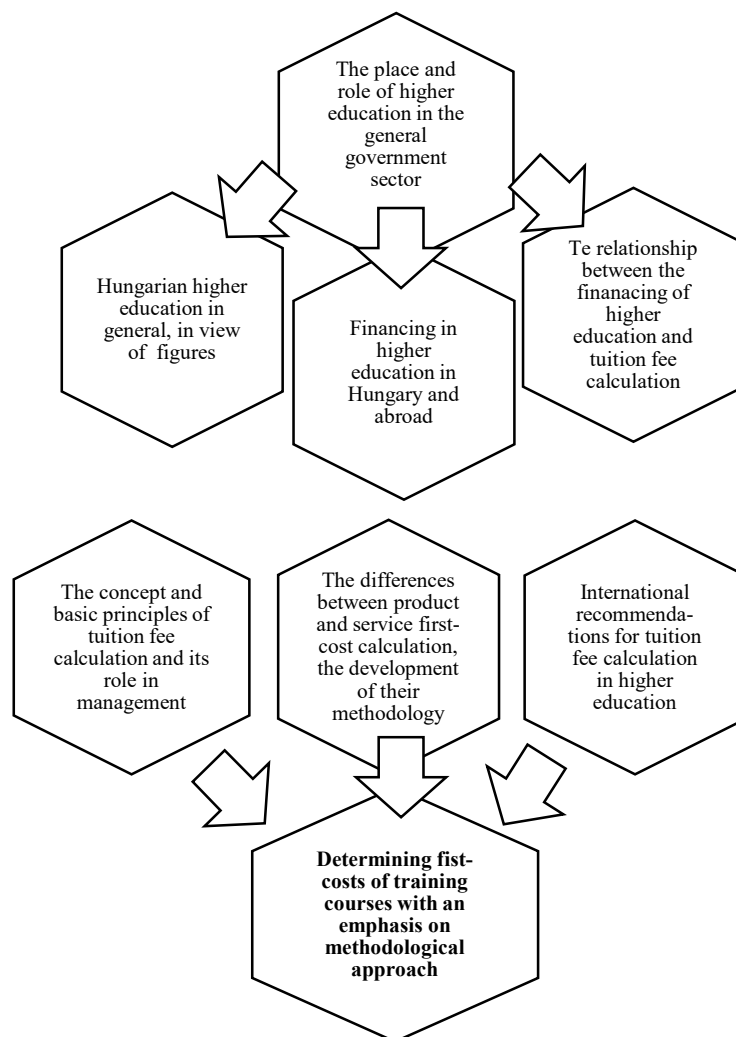


Figure 1. The logical sequence of literature review

Source: author's own compilation (2020)

2.2. Description of the quantitative and qualitative research

In my research dealing with the methodological and other influencing factors of coat-accounting in higher education I included both quantitative and qualitative methods of analysis.

In the quantitative research phase, I analysed data tables from structured data on applications retrieved from www.felvi.hu using data-mining. The analyses are descriptive and exploratory in nature.

To support and justify the hypotheses stemming from the research questions, the analysis and assessment of two data bases were used. Information extracted from the database on applications serves the purposes of supporting the first half of the hypotheses. Retrieval concerned 6 years of data (2014-2019). Admission data – in the first quarter of 2020 – was retrieved in a structured way with the following factors considered:

1. Hungarian higher education embraces a wide range of training courses, therefore, specification of the study is necessary to ensure the manageability of interpretation and drawing conclusions. Among economic courses Business Administration and Management undergraduate courses (Commerce and Marketing, as well as Tourism and Catering are in the Top 10) have been the most popular for several years. State measures of withdrawing from higher education financing appeared in 2012, and had a significant effect on the field of economic education. My professional interest also lies in economics. Therefore, taking all the above factors into consideration, the investigation of the relationship between applications and tuition fee calculation **is restricted to the field of economic education.**

2. 87% of students attend state-owned higher education institutions and a substantial part of state resources adds to the income of public institutions. Moreover, legislation and regulations related to tuition fee calculation presented in the literature review mostly hinder the methods of tuition fee calculation in public higher education, thus, **the research only entails public institutions.**

3. Public accounting was subjected to major transformation as of the implementation of the 4/2013. Government Decree on the Accounting of Public Finances (hereinafter: Áhsz.), which came into force on 1 January 2014. Due to the new legislation the accrual approach has appeared in the accounting records and reports of public bodies and institutions. This is the reason why the earliest time of admission data retrieval is 2014.

The following data were gathered during data-mining, based on variables:

Table 2. Variables involved in the research

Institution	Language of the course	Total number of applicants
Town/City	Level of education	First-place application
Programme	Form of study	Number of admitted students
	Financing	Tuition fee

Source: author's own compilation (2020)

I shortlisted the 64 state-recognised higher education institutions, based on the aforementioned factors, to include the following institutions (public institutions that offer courses in economics):

Table 3. Higher education institutions involved in the 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	University of Győr
Eszterházy Károly University	University of Szeged
University of Kaposvár	Szent István University

Source: author's own compilation (2020)

In the primary phase, the observation units are comprised of the designated programmes in the field of economics at the above institutions between 2014 and 2019, regardless of the level of education, form of study or the form of financing.

Table 4. Programmes involved in the research by level of education

Higher Education VET programmes (FOSZK)	
Business Administration and Management	Finance and Accounting
Commerce and Marketing	Tourism and Catering
Bachelor Programme	
Applied Economics	International Business Economics
Human Resources	Finance and Accounting
Business Administration and Management	Tourism and Catering
Commerce and Marketing	
Master Programme	
Supply Chain Management	Regional and Environmental Economic Studies
Economic Analysis	Sports Economics
Marketing	Accounting
Master of Business Administration (MBA)	Tourism and Catering
International Economy and Business	Business Development
Finance	Management and Leadership

Source: author's own compilation (2020)

To support the second half of the hypotheses the tuition fee calculation regulations at institutional level are compared. Qualitative analysis is used for the analysis and assessment of tuition fee calculation regulations. When comparing the regulations, the content analysis technique is applied, and to ensure the reliability of conclusions based on the sample, the hypothetico-deductive method is used.

2.3. Methods of analysis

Cross tables

To check the strength of associations, I plan to use the cross table from among the methods usually used for nominal-scale variables. It contains the distributions for all possible combinations of the examined two variable values, thus, it allows for conclusions about the association between the two variables (FREEDMAN et al 2005). To check the actual existence of association and to measure the strength of association, Cramer's V test is used, which is widespread in research practice (WAGNER 2013). The association is considered significant if the level of significance is $p < 0,05$ for the test.

Variance Analysis

Variance analysis (ANOVA – analysis of variance) is used for comparing the group means, where the groups have normal distribution and equal variance. The method examines whether the deviation of the total variance of the groups created in the sample by the categorical variable is caused by randomness or another explanatory factor, such as group mean deviations (NORTHCOTT 2008). The homogeneity of variance will be tested using Levene's test, which is based on the assumption that variances are equal, homogenous across the examined populations. If the p-value results are below the critical level ($p < 0.05$), the differences in variance in the sample are not likely to be present in the population. In this case, the null hypothesis has to be rejected, and declare that there is significant difference between group variances, and their means. Variance analysis is carried out using the usual F-test (NORTHCOTT 2008).

Pearson's correlation coefficient

By using the correlation coefficient, I seek to answer the question whether there is a significant relationship between the variables measured on the two metric scales, and if the answer is yes, how strong the bond is. The covariance of variables is described by Pearson's correlation coefficient, r . The algebraic sign of the correlation coefficient refers to the direction of the relationship (HUNYADI et al 2000). The existence of the relationship between two variables is accepted as greater than zero if the level of significance for the indicator exceeds the 0.05 value.

Linear trend

Since the database built from secondary data consists of time series, it is important to touch down on its dynamics. For this reason, for all the programmes in the database (on condition that they were provided for minimum two semesters – to be able to observe any kind of dynamics) I have calculated the slope (m) of the fitted linear trend line ($y = mx + b$). Its algebraic sign shows the direction of the trend (increasing/decreasing), whereas its absolute value shows the size value of the trend slope (the indicator enables relative comparison) (HUNYADI et al 2000). The slope was determined using the parameters of the linear trend lines fitted with the least square method.

The thus calculated slopes define the trends in tuition fees and the number of applicants for the observation units (programmes) in the observed period in terms of a single indicator. This way the indicator is suitable for drawing conclusions (although it has to be remarked that fitting the trend lines on specific data can be diverse – it can be measured using the R^2 determining coefficient which I did not use in my investigation for partitioning data, as there is no objective bottom value for R^2). However, as the indicator is a metric variable that can be measured on a continuous scale, it is also suitable for comparing these slopes to the above correlation coefficient. This way the dynamics of the two variables over time can be examined.

Content analysis

The objects of content analysis can be books, newspapers, laws, constitutions. This analysis technique is suitable for presenting who communicates what, when and to whom. It is a research technique used for the objective, systematic and quantitative description of obvious communication content (BABBIE 2017). Using content analysis on texts makes it possible to draw such conclusions using methodical and objectives procedures that are not obvious but are justifiable with the appropriate instruments (ANTAL 1976). Content analysis can also be interpreted as the presentation, the systematic organisation of content structure, a form of content description. Besides the frequency of textual elements, the correlation system also has to be investigated, and the missing pieces of information also have to be noted.

During the analysis the text has to be reread several times, special statements and words have to be identified and extracted to provide the coding categories of the investigation. This way the analysed text becomes quantifiable, measurable and suitable for analysis (MAJOROS 2004). The analysis process can be divided into several stages. In the first phase, during the first reading the analyst develops the observation categories. Then, in the second phase the frequency of occurrence can also be examined. Finally, the analysis process ends with drawing conclusions, trends and general rules, making the examined document, content more transparent, comparable, and revealing hidden meaning and needs (KRIPPENDORFF 1995).

Hypothetico-deductive method

According to ITELSON (1967) scientific understanding, the process of exploring the principles we experience in reality is justifiable using the hypothetico-deductive method. This process can be divided into 6 steps. Based on experience and knowledge gathered related to the topic of research, if specified criteria are met, there are certain general rules (assumption phase). In the phase of organised observations, the circumstances in which the connections apply are identified. If the results of the observation are in accordance with the assumption, a hypothesis can be formulated, the assumption becomes a hypothesis (hypothesis formulation phase). However, generalities have to be examined with a critical eye, even those small elements of reality have to be found where the hypothesis may not be justified, so a new area has to be involved in the investigation (phase of critical conclusions). Then comes the test of critical conclusions (decisive test phase). If the results of the decisive test are in accordance with the hypothesis and earlier expectations, the hypothesis becomes a scientific law (ITELSON 1967).

3. RESULTS AND DISCUSSION

3.1. The analysis of the relationships between tuition fees at public higher education institutions, applications and regional location

My present research questions and the hypotheses stemming from these are based on my previous national research presenting the relationships of higher education applications. In the research I conducted three years ago – concerning general applications in 2017 –, I sought to reveal the relationships among applications, admitted students, tuition fees, the field of education, geographical location and institutional brand. The focus of my research was the mapping of the underlying factors of applications. Overall, first-place applications are mostly influenced by the institution and its brand, while tuition fees have little explanatory power. However, it was also concluded that tuition fee becomes a significant variable for the second and other places students applied to. This is explained by fact that first-place preferences are made on the basis of institutional fame and the prospects of employment after graduation, whereas for further institutions students choose, tuition fee amounts are also considered. This influences the ranking of institutions by students, and consequently the competitive situation among universities as well (SZIJÁRTÓ-FÖRDŐS 2018, SZIJÁRTÓ et al 2018).

In the light of these results and experience, the present research project aims to investigate the (strength of the) relationship between the popularity of institutions and tuition fees charges for courses at the institution. The first step of the research project was to revise the database. This study focuses on economic education, where, due to the reduced number of state-financed places, the phenomenon of “price sensitivity” is clearly observable in student decision-making regarding applications.

In my assessment I used data from all applications, but the same results and conclusions apply to first-place applications.

Applications clearly show that in the field of economic education regarding FOSZK courses major university faculties and rural universities are popular. Bachelor programme preferences are dominated by capital city major university faculties and other universities in Budapest, followed by rural universities. For Master programmes Budapest institutions are popular with students, major university faculties and other universities to the same extent.

The table (5.) below shows and proves that there is a medium-strength significant correlation between popularity, which for me equals applications, and first-costs for courses – which equals announced tuition fees –, which shows the existence of the relationship between the two variables. Pearson’s correlation coefficient is the strongest Bachelor programmes, but the relationship exists for FOSZK courses and Master programmes as well, the correlation coefficient being significant for all three levels of education. The medium-strength significant connection proves that more famous higher education institutions that are popular with students determine their tuition fees for the given field of education at the ceiling of the differentiated normative support framework.

Table 5. Correlation coefficients and levels of significance for total applications and first-costs by level of education

Level of education	r	p
FOSZK	0.37	below 0.001
Bachelor programme	0.49	below 0.001
Master programme	0.29	below 0.001

Source: author's own compilation (2020)

Both in terms of total applications and first-place applications, it has been justified that more famous higher education institutions that are popular with students determine their tuition fees at the ceiling of the differentiated normative support framework.

3.2. Regional differences in tuition fees

During the course of the analysis of the relationship between tuition fees and fame, the existence and influencing power of regionalism arose several times. This led to the next study area, for which I want to answer whether there are differences in tuition fees by region in the field of economic education. F-test was used for scientific justification; Table 6. shows the values and levels of significance.

Table 6. F-test values and their levels of significance in the analysis of regional tuition fees by level of education

Level of education	Relative tuition fees		Tuition fees	
	<i>F-test</i>	<i>p</i>	<i>F-test</i>	<i>p</i>
FOSZK	57.15	below 0.001	57.15	below 0.001
Bachelor programme	176.16	below 0.001	170.50	below 0.001
Master programme	115.75	below 0.001	115.84	below 0.001

Source: author's own compilation (2020)

On all three levels, the hypothesis was justified as significant, that is, there is a relationship between the amount of tuition fee and the regional location of the institution. It can be stated that the relationship is especially "true" for Bachelor and Master programmes. In the case of FOSZK F-test values are lower, but it does not mean a lack of significant differences between FOSZK training tuition fees across the regions. FOSZK course tuition fees are in a considerably lower range (between 110 000 HUF and 200 000 HUF) than Bachelor programme fees (between 150 000 HUF and 350 000 HUF). **The analyses of regional location and tuition fee data have shown that there is a relationship between the amount of tuition fee and the regional location of the institution in the field of economic education.**

3.3. Comparison of the trends in the changes of applications and costs

The analyses detailed above have shown that there is a medium-strength significant relationship between the popularity of the institution and declared tuition fees. This connection serves as the basis for the following research question of whether there is a relationship between the trend in application changes and the trend in tuition fee changes.

In the examined period, the previous investigations have shown that there was a change in both applications and the amounts of tuition fees. I examined by the level of education and by faculty the changes of total applications and average tuition. For those programmes and institutions where data were suitable, trend lines were fitted on changes and I determined the slope of the trend line. This helps interpret the scope and the direction of the change.

A special emphasis was put on conclusions by level of education, with focus on major universities and other universities in Budapest (as key institutions).

In the case of FOSZK trainings tuitions fees in popular institutions showed a smaller increase, the increase in applications exceeded the increase in fees. Repeatedly, it has to be mentioned that FOSZK tuition fees are distribute in the top third of the framework determined by legislation, which means that no drastic increase is to be expected.

As regards Bachelor programmes, is can also be concluded that tuition fees are increased in institutions enjoying a greater popularity, with one exception (the Institute of Economics at Corvinus University in Budapest increased the fees while the number of applications dropped). In the case of Bachelor programmes, the 3 Budapest-located faculties of the Budapest Business School stand out among the institutions, where parallel with the growing number of applicants, the amount of tuition is constantly increasing.

In relation to Master programmes, the capital appeared to be appealing to students during the precious analyses. Trend analysis shows that in the case of increasing the amount of tuition to a lesser or greater extent, students' application willingness declines. The reason for this is the relatively new entrant, the Institute of Business Economics at Eötvös Lóránd University. Looking at their detailed data, I found that compared to the size of the Master programme market, they championed both year 2018 and 2019 with massive numbers of applicants despite the fact that their tuition fees were positioned at almost the higher level.

The existence and the strength of the connection between the trends of changes in applications and tuition fee developments have been shown using correlation coefficients. In the knowledge of correlation coefficients and trend slopes it had been justified that for Bachelor and Master programmes, **there is a relationship between the trends in changes of applications and the trends in changes of tuition fees in the field of economic education.**

Primarily in the case of Bachelor programmes, it is concluded that **institutions follow the trends in changes of applications when determining the amounts of tuition fees.** The changes in the declared tuition amounts show that institutions react to the trends in changes of application.

3.4. Analysis of regulations on tuition fee calculation

The conditions of the obligation to comply first-cost calculation regulations is laid down in the Act of Accounting (hereinafter: Sztv.). It has to be mentioned though that the Sztv. does not specify the contents of the first-cost calculation regulation. Recommendations for content points and descriptions of the information content can be found, however, in accounting literature (KARDOS et al 2016, BOSNYÁK et al 2010).

There are no methodological recommendations, guidelines or regulations concerning higher education to guide and assist institutions in creating the regulations and their application.

The reliability of the sample based on decisions is justified by representation, the number of students attending higher education in the 13 institutions is 161 097 accounting for 57% of total student numbers, and 66% of students in public institutions in 2019. In addition, it can be concluded that the total number of higher education institutions in 2019 was 64, which, due to the focus of the research is not regarded as the entire population. The present research focuses solely on public institutions, their number being 28 in 2019. Thus, the sample accounts for 46.43% of the examined institutions. Therefore, my conclusions are drawn based on data from the practice of almost the half of public institutions, with two thirds of the students.

The conclusions were drawn based on the analysis of tuition fee calculation regulations at the following state-financed institutions:

- Corvinus University of Budapest
- Budapest Business School
- University of Debrecen
- University of Dunaújváros
- Eötvös József College
- Eötvös Loránd University
- Eszterházy Károly University
- University of Miskolc
- University of Nyíregyháza
- Óbuda University
- University of Pécs
- University of Sopron
- University of Szeged

I assessed the regulations using the following 11 criteria:

1. Presentation of the aim of the regulation
2. Description of the people responsible for preparing the regulation
3. Description of basic concepts in costing
4. Provision of documentation procedure
5. Description of time horizon
6. Presentation of first-costing
7. Provision of a general calculation scheme
8. Detailed cost items (calculation items)
9. Description of cost calculation methodology
10. The order and direction of (indirect) allocation of costs
11. Calculation sheets

Based on the analysis of regulations using the 11 criteria quality categories have been created:

- **Average (cost calculation regulation)**
- **Good (cost calculation regulation)**
- **Excellent (cost calculation regulation)**

During the investigation I established that all regulations include the minimal and recommended information content found in literature. These criteria are:

1. Presentation of the aim of the regulation
2. Description of the people responsible for preparing the regulation
3. Description of basic concepts in costing
4. Provision of documentation procedure
5. Description of time horizon
6. Presentation of first-costing
7. Provision of a general calculation scheme
8. Detailed cost items
9. Description of cost calculation methodology

All the regulations in institutions in the sample begin the regulations with describing cost calculation and the aims of the regulation, followed by people responsible and documentation procedures. There is a marked emphasis on describing the basic costing concepts in every regulation, detailing the relationship between cost, expenditure and expense, the definition and significance of cost categories. All the regulations present the concepts of preliminary, interim and post calculations; some regulations include detailed descriptions. The subjects of cost calculations comprise the central element of regulations, referring to educational activities in every case; however, other activities outside education are also subject to calculation. Calculation schemes in institutional practice follow a general, standard calculation scheme applied from management accounting literature. This scheme, in my opinion is not informative enough, it does not include subsector-specific calculation items, does not reflect the problem of the indirect allocation of costs or its solution at the institution. On a general level, all the examined institutions describe the content of calculation items.

Every regulation in the institutions includes the cost calculation method applied, which is a mix of absorption and simple division calculations. These calculations reflect traditional cost-calculation, cost allocation principles, where the indirect costs are allocated to cost bearers using carefully selected cost drivers. Then, using the number of students and simple division calculation the per capita cost of the course is derived.

Those institutions that provide all the content points (9 criteria) listed above are classified as average. **3 institutions got the average qualification.**

The other 11 institutions stand out from the average category, because they detail the order, methods and direction of indirect cost allocation and/or they provide detailed calculation sheets related to their courses and other major activities, services.

Those regulations were classified as good, which, beyond the general elements provided detailed calculation sheets, complying with 10 assessment criteria. I found the overview of these calculation sheets extremely useful, as I could see that every institution has their own way of calculating course costs per student. **5 institutions were granted the good qualification.**

Based on the above, **5 institutions** in the examined sample have detailed, sound calculation regulations that comply with all the 11 criteria. This group **were awarded with excellent qualification.** Beyond detailed calculation sheets, excellent and outstanding regulations also include detailed descriptions of indirect cost allocation principles, directions, that is, what cost driver was used to allocate the gathered costs at the budget centre to cost bearers. In general, student and public servant numbers make up cost drivers.

At the end of the investigation it is concluded that the qualification of cost calculation regulations is not dependent on the geographical, regional location of the institution or the university, applied sciences university or college qualifications.

As the result of the comparison of examined cost calculation regulations it can be concluded that higher education institutions are homogenous concerning their cost calculation regulation structures. However, considering content criteria, the picture of similarity and uniformity is more nuanced. 23% of examined regulations contain general information with low information-content elements. The greatest problem with these regulations is that they do not provide information, cost allocation steps or benchmarks that reflect the special expectations of the subsector. In contrast, excellent regulations provide high quality, in-depth information reflecting the specialities of the subsector, and the complexities of cost allocation. Another problem to be dealt with is the diversity of calculation sheets, which shows that there is no standard derivation method. **In this light, I conclude - bearing in mind the priority of content - that higher education institutions do not have a unified regulation of cost calculation.**

Based on the National Higher Education Act (Nftv.), to perform their core activities, institutions are entitled core funding, established in Government Decree. This is the Government Decree 389/2016 on Financing the Core Activities of the Higher Education Institutions, which stated that institutional core funding is determined by the institutions based on the differentiated normative support frameworks for programmes multiplied by the number of state (partially)-funded students. The Nftv. 81§ list the range of services available to state (partially)-funded students, and declares that fee-paying students are entitled to these services with paying the tuition fees for the

programme. Thus, it can be stated that student contributions to education is the same for state-funded and fee-paying students. In the case of state-funded students the costs are covered by the state, whereas fee-paying students pay the tuition fee to the institution.

The per capita cost of education (tuition fee) is determined by the institution within the differentiated normative support frameworks. The costs cannot exceed the framework support even if the actual first-costs would justify it. The act on financing states that the maintainer does not provide for “traditional” indirect costs (sales, distribution, administrative or other general costs), therefore, every student has to contribute to these costs to ensure sustainable management. Consequently, students have to pay the full costs related to their education.

The regulations of all the institutions in the sample show that they focus on the full cost of their courses. To confirm again, institutions with good or excellent qualification assessment included detailed calculation sheets presenting first-costs, in which per student first-costs were only quantified at the full cost level.

In the following section I will discuss the justification of the existence of the cost calculation based on traditional cost allocation principles. The justification is built on the first-cost calculation regulations in the sample. In addition, I will carry out a hypothetico-deduction analysis on other state-financed institutional regulations, with the sole purpose of getting to know first-cost calculation methods. In dealing with the previous hypothesis I did not find it necessary to include other regulations and institutions, the sample itself and the literary and regulatory information proved sufficient to justify my decisions regarding the hypotheses.

Going through the steps of hypothetical deduction I managed to prove that **in determining the full costs of courses state-financed higher educational institutions follow traditional cost calculation principles.**

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions of the research results

Statistical analyses of the relationship between student applications and declared tuition fee amounts in the field of economics show that there is a strong connection between popularity and the tuition fees in the case of institutions and courses dominating this field of education. The results of the investigation showing a medium-strength significant relationship proves that more famous and more popular higher education institutions determine the tuition fees for their courses at the ceiling of the differentiated normative support frameworks.

Among FOSZK courses in the field of economics, faculties of the major universities and rural universities are the most popular. In the case of Bachelor programmes, the faculties of the major universities of Budapest and other universities are dominant, followed by rural universities. As regards Master programmes, institutions in the capital enjoy the greatest popularity, faculties of major universities and other universities to the same extent.

It is true for all three forms of education that public institutions offering courses in the field of economics determine the tuition fees for their courses at the ceiling of the differentiated normative support frameworks.

55% of FOSZK tuition fees do not offer education in the bottom of the framework, thus, tuition fees are between 110 000 HUF and 200 000 Ft HUF. 20% of FOSZK courses are provided at the maximal amount, and half of the tuition fees are within the 140 000 to 190 000 HUF range. FOSZK trainings are emphasised because regulations enable equivalence between FOSZK and Bachelor programmes. 75% of credits obtained during FOSZK training can be accounted in Bachelor programmes. If we are being generous, a FOSZK degree can be accounted in the Bachelor programme. Taking this into account, material content and quality shall be at a near equal standard with Bachelor materials (in the case of the same, equivalent subjects). It is thought-provoking that a 2-year FOSZK training has to provide the same quality and the first semesters of a Bachelor programme. If the quality of education is nearly equal, what justifies the differences in maximal normative support values (200 000 HUF for FOSZK, 350 000 Ft for Bachelor courses)?

There are no courses available in the bottom 40% of the framework, thus, tuition fees range between 150 000 and 350 000 HUF. This shows that there are great variations in tuition fees at this level of education. There are no Master programmes available in the bottom 60% of the frameworks, meaning that tuition fees are between 240 000 and 400 000 HUF.

I carried out further analyses to check the relationship between the trends in changes of applications and trends in changes in tuition fees. With regards Bachelor and Master programmes the resulting trend slopes and correlation coefficients showed pointed out that in many cases there is a strong relationship between the changes in applications and the changes in tuition fees. This investigation yielded the result primarily for Bachelor programmes that institutions pay attention to the trends in changes of application when determining their tuition fees. The changes of declared tuition fees show that institutions react to the trends in the changes of applications.

The comparative analysis of higher education institution cost calculation regulations reveal that institutional cost calculation regulations are not unified, there are differences in the depth of information and the level of information detail. At the beginning of the research I made assumptions due to the special situation and specialities of the subsector. I presumed that maintainers provide a methodological guideline – with specified accounting content – as the Áhsz. obliges public higher education institutions to determine the cost of education related to their educational activities, per student, per semester, by programmes, level of education and time schedule. The Sztv. does not help institutions either, as it does not prescribe any formal or content requirements regarding the order of the first-cost calculation process, or regulation contents.

The examined institutions and their regulations, as well as the review of relevant literature mutually reinforced that institutions have to rely on accounting literature and experience in developing cost calculation procedures. My initial hypothesis saying that first-cost calculation regulations in public higher education institutions are unified, was not justified.

By studying and revising legislation regulating financing in higher education, as well as the content analysis of cost calculation regulations in the sample it is concluded that institutions benefit from the determination of full costs and tuition fees. In the knowledge of calculation sheets it can be stated that the same derivation, scheme is used during preliminary and post calculations.

Preliminary calculations – actually cost planning – is an extremely complex task as cost estimations refer to the entire period of the programme. It has to be taken into account that planning the tuition fee for a – 3.5-year – Bachelor programme has to calculate with future factors and changes (for example, inflation, wage growth), which increase uncertainty in reliable planning. Another difficulty in cost planning is that by legislation the amount of tuition fee cannot be changes during the period of the programme, which might pose financing problems. Precaution is needed and therefore it is not surprising that sometimes planning shall cover unexpected cost in the tuition fees.

The result of preliminary calculations is in reality the “selling price” developed through a series of cost planning steps. The statistical analyses have shown that institutions pay attention to “market demand”, and adapt to the “tuition fee competition” among higher education institutions when they determine the amounts of tuition fees for courses.

Within these legal constraints, institutions have no other choice than calculate tuition fees adjusted to market demands using a generous estimation during preliminary testing. At the moment cost calculation cannot fulfil the role it usually plays in the business sector, as it is hindered by financing requirements, the differentiated normative support frameworks and growing competition, and thus institutions are supposedly not interested.

I am convinced that as long as the financing system is based on the existing support system of differentiated normative support, and the tuition fees of admitted students cannot be changed during the course of the training period, preliminary calculations are stuck at the present generous and often inaccurate level.

To ensure sustainability and reduced operational risks, in the current situation the role of post calculation should be prioritised. Post calculation, as a means of follow-up, regarding the actual costs, recognises the actual first-costs of a course per student. I find it extremely important to note that while it is sufficient to focus on full first-costs in preliminary calculations, post calculations should follow all the levels of first-costs. In post calculations, it would be of particularly great importance if not only full first-costs were quantified, but the direct or trimmed costs applied in the business sector without non-attributable indirect also appeared. This first-cost level could show how much a course costs per semester, per student, which, compared to the amount of the tuition fee would enable the calculation of coverage costs, the break-even point. In the knowledge of actual first-costs the optimal course portfolio could be defined and developed.

Awareness in cost management and first-cost calculations and ex-post analyses are becoming more and more critical areas of higher education operations with the model change in progress today. The decline in student numbers is creating a highly competitive situation. Planning and understanding costs, plan-fact analysis and the application of different management supporting accounting and controlling tools play a vital role in management decision support.

In contrast with international recommendations in literature and from experience, Hungarian higher education institutions apply traditional cost allocation principles in first-cost calculations for their courses. The present research has highlighted that adherence to regulatory requirements, normative support frameworks justifies the allocation of costs based on the cost bearer principle. To implement this cost allocation, absorption and simple division calculation methods based on traditional cost allocation principles are suitable.

4.2. Recommendations based on the research results

The analysis of declared tuition fees revealed that in the case of FOSZK trainings these costs are distributed around the maximum value of the differentiated normative support framework. This is an indication that the available maximum cost of 200 000 HUF is rather low. The need for an increase is further underlined if the opportunities for moving from FOSZK to Bachelor programmes are considered, especially in the light of the related provision of nearly the same level of knowledge issue.

My recommendation related to the constant monitoring of differentiated normative support frameworks: **Taking institutional data provision and needs assessment into account, the maximal values of normative support require interim reviewing with special attention to determining the maximum values of FOSZK fees.**

Owing to the special situation and difficulties the higher education subsector is faced with, it would be necessary to provide a professional guideline including general and special considerations, which could help institutions in the further improvement of their first-cost calculation systems. The guideline could assist institutions not only by providing the regulations, but also in terms of the methods and principles of cost allocation. I also find it vital to include a detailed description of the formal and content requirements for the regulation, in order to ensure uniformity and reliability across institutions. Moreover, I regard it especially important to develop a detailed derivation of calculations, a formula for determining first-costs in which cause-effect relations and cost drivers are also discussed. In my opinion, this process is only possible with the inclusion of higher education institutions and expert stakeholders. This could assure that such a calculation scheme based on cost allocation principles is developed that can be applied in practice and reflects the complexities and difficulties of reality.

My recommendation concerning the development of first-cost calculation procedures: **With the support of the maintainer and institutional joint efforts a guideline needs to be developed including general and specific requirements regarding first-cost calculation procedures.**

First-cost calculation regulations revealed that there is no standard method for determining the full first-costs and their content. Leading institutions regarding first-cost calculation regulations deal with handling non-cost items as well, which issue highlights the complexities of cost planning.

Recommendations for content accuracy of full first-costs: **Regulatory level definitions are needed for determining the items of course costs serving as a basis for financing to assist institutions in developing the full costs of courses.**

Regulatory restrictions on changing the amount of tuition fees during the period of the programme add to the inaccuracy of cost planning, financing uncertainties and possible risks. Changing the fixed amount of tuition fees would be advisable, which would also motivate students, thereby reducing dropout rates, and finishing the programme on time.

Recommendations for reducing sustainability, operational and financing risks: **The modification of fixed tuition fees should be provided at specified intervals.**

4.3. Directions for future development related to the model change in higher education institutions

Based on the research it can be concluded that present methods of cost calculation perform their tasks, however, the question arises whether based on international practice methodological renewal could bring progress. I believe that current financing legislation limit cost planning and cost allocation during preliminary calculations, hindering the emergence of willingness to progress. However, the present (2021) model change in higher education may bring forwards the need for a more refined and accurate cost observation system.

In institutions undergoing model change the state's role as maintainer ceases to exist and a trust fund steps in its place. The foundation and its curators adopt the organisational and operational rules, the annual report, budget and plans on institutional development and funds. The change brings market perspectives and market thinking into institutional management. If a rigid, bureaucratic system is replaced by a flexible regulatory environment, it can help develop institutional operations adjusted to market demands. The development of an internationally competitive education is only possible within more flexible frameworks. For teachers and staff, a performance- and reward system motivating change and development can be developed. With more flexible financing, the changes in the regulatory and organisational environment may result in improved standards of education and research efficiency (DERÉNYI 2020).

Among the institutions involved in the research, Corvinus University of Budapest stepped onto the path of change on 1 July 2019, University of Miskolc, University of Sopron and University of Győr on 1 August 2020, whereas Szent István University on 1 February 2021. Budapest Business School, University of Debrecen, University of Dunaújváros, Óbuda University, University of Pannonia, University of Pécs and University of Szeged are in the preparatory phase of model change expected in the autumn of 2021.

The corporate management approach will appear in higher education institutions, therefore cost awareness and cost discipline present in the business sector will become inevitable. Naturally, the focus of the current change is not directed on the field of cost calculation, however, in a few years' time it will be necessary to become more aware of cost planning, observation, grouping and allocation to ensure institutional sustainability and development.

New research directions: With a focus on the present, I would investigate institutions subject to the model change. Does change, the corporate management approach encourage higher levels of awareness in cost observations, systemisation, and the application of cost calculation based on more modern principles? To investigate this issue, in-depth interviews are required to map the attitude, opinion and preparedness of specific institutions.

Suggestions: Do model changing institutions change the method of cost calculation? Does this change bring about greater awareness in cost calculation?

5. NEW SCIENTIFIC FINDINGS

The primary aim of the research project was to map the regulatory and methodological background of cost calculations and identifying their shortcomings related to educational programmes in state-financed higher education institutions in Hungary. My dissertation focused on the determination of the cost calculation method, the value of tuition fees applied in higher education institutions.

The research results are the following:

1. Using statistical methods (exploration of associations) it was justified that more famous and popular higher education institutions determine their tuition fees in the given field of education at the ceiling of differentiated normative support frameworks.
2. Using statistical methods (analysis of variance) it was justified that there is a significant relationship between tuition fee amounts and the regional location of the institution in the field of economic education.
3. Using statistical methods (linear trend analysis) it was justified that there is a relationship between the trends in changes of applications and the trend in changes of tuition fees in a given field of study. Regarding Bachelor programmes in the field of economics it is clearly shown that institutions pay attention to the trends in changes of application when they determine the amounts of tuition fees for courses.
4. Legislation information and content analysis of cost calculation regulations revealed that there is no unified cost calculation procedure in state-financed higher education institutions, despite the fact that is a legal requirement.
5. Content analysis of first-cost calculation regulations proved that institutions plan the full costs of courses based on cost and expenditure items of different contents and sizes.

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