

Specifying the Costs of Academic Training in Higher Education

ABSTRACT

Actors of higher education, the government, institutions, and students form a special community of interest. Their common goal is to operate a system beneficial for all of them. It is a fundamental descriptor of their cooperation how students can make use of their knowledge. Such knowledge is required that is competitive, modern, and needed on the labor market. This can be provided by an educational system that is also modern and operated efficiently both in a professional and financial sense. Thus, all actors should address the question of how much the needed human resources, infrastructural and other requirements cost.

In Hungarian higher education there is a need for a general prime cost calculation model that leads to the allocation of justified costs to majors (programs), credit numbers in an iterative way with the help of its decision-supporting function in the planning and feedback stage; and thus to a kind of planning that supports well-founded and rational use of resources and pre-calculation.

The aim of the study is to introduce a model, focusing on the feedback stage, which can be used precisely and serve as a starting point both for the government and the institutions of higher education in determining actual and realizable costs.

The post-calculation model is indispensable for institutions of higher education because it helps in the subsequent evaluation of activities, supports decision making and its database can improve the effective operation of the institutions and is crucial in the process of planning a stable budget.

With post-calculation, it can be determined on an actual cost basis how much the maintenance of a program costs, whether reserves can be identified, with the causes of unnecessary additional costs and the actual resource needs. Meanwhile, the strategic decisions of the university become more substantiated and with the calculation of prime cost per student for each program, prime cost-based financing can be justified and realistic tuition fees can be established.

Keywords: higher education, prime cost, more effective management, strategic objectives

1. INTRODUCTION

1.1 The Common Objective of the Higher Education Community

Institutions of higher education, characterized by their outstanding role in the development of society and the economy as well as their productive operation and management corresponding to their mission, can achieve the level of efficiency expected from them by the public only with supportive financing and management regulations that display a similar approach.

Actors in higher education, the government, institutions, and the students form a special community of interest. Their common goal is to enter into an agreement that is mutually

beneficial for all of them. It is a fundamental indicator of the success of such an agreement how participants can make use of their knowledge acquired. To be successful, competitive and modern knowledge is required which can be used on the labor market. This can be provided only by an educational system that is also modern and operated efficiently both in the professional and financial sense.

In order to ensure the financial stability of the institutions of higher education, actors have to be aware of the exact cost of things within the human resources, infrastructural, and other conditions that are available or can be made available. This shall be a joint objective of the government, the institutions of higher education, and the students. The governmental decisions also predetermined by the tightening budgetary resources can result in well-founded changes that can be managed reassuringly if the educational strategy matches predictability (financially, by using pre-calculation) and the reality, the accurate knowledge of the "cost of things."

The calculation of prime costs has become increasingly crucial in the area of public finances as well. With ever-narrowing budgetary resources, it has become essential for institutions to be familiar with the necessary and incurred costs as well as their trends. With the help of post-calculation, it can be determined on an actual cost basis how much the maintenance of a program costs, whether reserves, the causes of unnecessary additional costs, and the actual resource needs of education can be identified; at the same time, the strategic decisions of the university management become more substantiated. Last but not least, with the calculation of prime cost per student for each program, prime cost-based financing can be justified and with its help realistic tuition fees can be established.

2. METHODOLOGY

2.1 Characteristics of Prime Cost Calculation in Higher Education

In 2008 a study completed within a governmental project aimed at mapping how institutions of higher education determine the prime costs of their programs. The summary of research findings is included in the publication of Havady et al. published in 2009. The main conclusions of the study were as follows:

- Institutions of higher education regulate the calculation of program prime costs at different levels and in different detail. There are institutions where regulation is completely absent.
- Calculation procedures do not start out from stipulations of law in many cases.
- The majority of institutions do not differentiate between justified and incurred costs, there is an established cost standard (based on the usually incurred costs) and the calculation involves the "redistribution" of these.
- From the calculations it is not clear how and with what methodology institutions specify the types of costs as the calculation typically includes large aggregates.
- The majority of institutions only perform pre-calculation for training programs.
- When determining direct costs, the institutions start out from the curriculum (the highest item being the personnel cost) and the indirect costs are treated in a very varied way.
- It is necessary to collect the calculation data of institutions in full and in identical structure.
- The majority of the institutions, taking the incurred costs as given, use the calculation primarily for the specification of the amount of tuition fee.

- The majority of the institutions, although meeting the stipulations regarding prime-cost calculation, are rarely aware of the inherent opportunities and thus do not make use of them.
- The source of data is basically provided by the accounting systems. The qualitative and quantitative increase of information is indispensable for the improvement of decision processes of institutions of higher education and for the increase of efficiency with regard to the management of public property. Such a tool and software park has to be created that is suitable for wide-ranging database management and the analysis of data.

Based on the findings of the project, it can be stated that in Hungarian higher education there is a need (among other things) for such a post-calculation model that leads to the allocation of justified costs to majors (programs) in an iterative way with the help of its decision-supporting function (there has been no significant progress made in this area since the study either).

3. RESULTS AND DISCUSSION

3.1 The Specification of Education Prime Costs with Post-Calculation

3.1.1 A Model for the Specification of Education Prime Costs with Post-Calculation

Prime cost calculation has to be prepared for the natural unit of the subject of prime cost calculation, which, in the case of higher education, is the student. In the process of the post-calculation of prime cost there are several factors that have to be taken into consideration deriving from the special features of the educational activity. These are the following:

- Prime cost calculation is carried out at an institutional level.
- The calculation model is built on basic costs (that cannot be further divided, e.g. the basic salary) and complex costs (that can be subdivided into further elements, e.g. general costs).
- Prime cost calculation is broken down into programs with divided costs (taking into consideration that programs do not have exclusive instructors only faculties do; moreover, usually neither the program, nor the faculty has its own infrastructure thus institutional infrastructure shall be considered).
- The utilization of resources is differentiated.
- The basis of calculation is the timetable prepared based on the curriculum specified by the qualification requirements of programs; the timetable is a document which includes for each program the classes of students, the instructors, the venue, time, and duration of the program.
- In higher education the training program takes place on a semester basis, thus the unit of prime cost calculation is HUF/person/semester.

The result of prime cost calculation can be modified by numerous factors, including the following:

- The geographical, regional location of the institution.
- The composition of instructors.
- The status and utilization of the institution's building and technical infrastructure
- In the training process students in different programs often use the same personnel and material capacities simultaneously and to a different degree.

124 **3.1.2 CALCULATION SCHEME** 125

126 The calculation scheme with regard to the subject of prime cost calculation includes those
127 costs which

- 128 – are directly incurred in the production of the goods, the performance of services, the
129 performance of activities,
- 130 – are justifiably closely related to the production, service, activity
- 131 – can be accounted with the help of appropriate indices, characteristics for the goods,
132 services, activities.

133 As the first step of the post-calculation process, all those costs have to be taken into
134 consideration, which are relevant in the educational activity of different programs (calculation
135 scheme). Based on their accountability, these are divided into two groups: direct and indirect
136 costs.

137 Direct costs are those costs connected to the organizational unit responsible for teaching,
138 the staff supporting teaching, and to students, which can be accounted for one unit of the
139 teaching activity (the student) directly at the time when they are incurred. Moreover, we also
140 consider those costs as direct costs which can be connected to the organizations performing
141 and supporting teaching and to the students and which can be distributed per student with
142 the help of indices and characteristics.

143 Indirect costs are such costs of the institutional, faculty management (Dean's Office,
144 Rector's Office) and of functional (Education Management, Quality Assurance Office, Office
145 for International Relations, Financial Office, etc.) and service providing units (Library, IT
146 Center, Student Center, etc.) connected to teaching which can be reallocated to the subject
147 of diploma prime cost, i.e. the student, with the help of different indices. Depreciation and
148 amortization is also accounted among indirect costs. Depreciation is connected to teaching
149 (e.g. lecture rooms, seminar rooms), to instructors (e.g. offices) and students, to the
150 institutional and faculty management, as well as to the functional and service-providing units,
151 in proportion to their teaching activities.

152 It should be emphasized (as institutions do not differentiate between incurred and justified
153 costs) that post-calculation in itself cannot be used as an active tool for planning and for its
154 foundation by means of changes in real processes. A reluctance to use modern methods
155 (which can be seen in changes as well, while the former regulations encouraged a business
156 management approach) is obviously fed by the fact that it comes with extra and different
157 quality work and the institutions, employees do not see a real chance for its utilization on
158 different levels of decision making. The generous approaches, techniques used despite this
159 aim to meet the minimal requirements only. At the same time, based on the currently known
160 regulatory intentions and methods, institutions have to identify what their own interests are
161 and develop and apply the solution based on their own initiatives.
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163 **3.2 The Tool for Educational Prime Cost Calculation: Modern IT Systems** 164

165 For a well-founded prime cost calculation that takes into consideration the institutional
166 characteristics, it is of crucial importance to introduce an information-based planning system
167 in higher education as well. The higher education management systems have to be
168 developed and used in line with the new requirements together with the system-level

169 databases of higher education services, which provide authentic information both for the
170 decision-makers in higher education and the “clients” of higher education.

171 The substantiated post-calculation model built on actual costs takes into consideration all
172 costs incurred for educational purposes. An essential condition for this, however, is to have
173 access to information in the appropriate structure and quality. The basis for this is provided
174 by background information (IT) systems. The information input is determined based on
175 actual processes and not simply by re-planning the fiscal framework which is irrelevant in
176 itself.

177 The specification of education costs takes places in the management information system to
178 which the necessary data can be channeled in from various resource systems.

179 The first and one of the most important systems is the adequate financial-accounting
180 system. It has been shown in practice that in most cases the financial-IT systems used in
181 higher education are not enough in themselves for the specification of training prime cost,
182 thus other information/information technology systems are also necessary:

- 183 – the resource system for personnel costs is provided by the *payroll management*
184 *systems*.
- 185 – the precise specification of *operation* costs requires the use of such an *IT system*
186 which allows for the registration of all rooms of the institutions with their measurable
187 basic features (e.g. floor space) and special equipment and which, among other
188 things, includes a scheduling module (timetables), a room reservation module, asset
189 management module, and cost allocation module.
- 190 – the *student registration systems* used by institutions are also included as resources
191 systems, this transfers the necessary data (name of programs, number of students,
192 etc.) on the one hand, directly to the management information system, and on the
193 other hand, to the information system performing the cost allocation.

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195 The above information systems provide data in an integrated manner with each other and
196 the financial information system for the calculation of specific education costs.

197 The other IT systems make it possible for the different costs incurred in relation to the
198 training program (e.g. personnel, operation) to be provided as precisely as possible for the
199 programs, then for the unit of prime cost calculation, in this case the student. It is a basic
200 requirement with regard to these systems that their information data content and the flow of
201 information should be accurate and regulated, the processing and transfer of data should
202 take place by means of such algorithms through which the process of prime cost calculation
203 is transparent and clear; moreover, it should also be in harmony with the Act on Accounting
204 and other stipulations of law as well as the internal regulations of the institution.

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206 **3.3 Transparent Higher Education: Post-Calculation – Pre-Calculation –** 207 **Planning**

208 Post-calculation, in itself only, cannot be used as an active tool for planning and for its
209 foundation through changes in real processes: here we are talking “only” about one of the
210 profiles of institutional task performance, i.e. a completely closed system is not yet created
211 this way. Moreover, post-calculation records the consequence of already completed
212 processes and explores the resultants of the processes. The specification of “justified” cost
213 is the task of the preceding decision-making: this involves the establishment of tasks,
214 requirements, conditions, work processes.

215 The efficiency of operation and financial management, and thus management discipline can
 216 also improve if these costs are in harmony with the financing allocations and its instruments.
 217 This way the financing of education is well-founded and based on prime cost calculation
 218 containing the necessary costs, at the same time, it would be the result of educational
 219 management performed in line with this and not the consequence of operative decisions and
 220 different agreements also including various eventualities.

221 With the help of post- and pre-calculation, the preparation of the budget could go beyond the
 222 mechanism which only means the mere breakdown of given amounts and their detailing.
 223 The basis for the creation of an executable budget could be the planning of the costs of real
 224 processes calculated in advance, connecting to it from the other side the specification of
 225 sources and their extent. For this it is essential to get access to pre-calculations (building on
 226 business organization and not fiction) for the different versions of the budget and its
 227 elements, which necessitates the precise knowledge of facts (post-calculation).

228

229 **3.3.1 Task- and Cost-based Budget Planning**

230 The starting point of the financial management process is realistic planning and one of its
 231 essential tools is that the institution should specify the costs of its basic tasks, thus that of its
 232 training programs as well, with post-calculation. After providing the answer to the question of
 233 "what is the cost of something" (which is necessarily a "single version" answer) it will be a
 234 new task to decide "what can/should be the cost of something for someone and how." If we
 235 can provide a relevant budget planning technique for this, it can become the basis for a
 236 budget that is "counted" and executable by the financing body and the institution performing
 237 public service and for a rational and disciplined financial management during the year.

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239 **3.3.2 The Task of Institutions**

240 The modern planning system that reacts to the current situation, trends, and expectations
 241 should be implemented at an institutional level as the supporting central financial regulation
 242 and toolbox (not only providing fiscal discipline) is currently not available. The logic of input-
 243 type regulation with a uniform approach towards the entire system of institutions and
 244 emphasizing the dominance of the directing body's budgetary support among resources
 245 (also) only forces higher education to framework management. Therefore, the institutions,
 246 similarly to the financing body, are not forced to

- 247 – plan the budget in a more exacting way with a service/quality/performance approach
- 248 – justify the included appropriations and their fulfillment by organizing the work
- 249 processes in a more rational way during the planning of institutional operation and
- 250 the performance of expert tasks, to measure and regulate the tasks and conditions
- 251 for this purpose.
- 252 – manage the costs in a more efficient way, and provide the means for all this on their
- 253 own.

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255 **3.3.3 The Process of Budget Planning, Its Elements, Pre-Calculation**

256 Budget planning that is suitable for meeting the requirements described above includes the
 257 justified and acknowledged cost needs and income in a way that it

- 258 – deduces them from the identified general budget requirements and those
- 259 professional requirements prescribed for certain higher education public services as
- 260 well as various other (long-term and actual) boundary conditions,

261 – relies on process planning to be implemented in the particular institution, and
 262 – builds on the internal regulation of professional, infrastructural, and income
 263 conditions of task performance.

264 The work processes (as it can be seen from the detailed description) appear as boundary
 265 and internal conditions in the post-calculation model but in planning they already mean
 266 variable elements. The pre-calculation of costs and income is connected to these.

267 The general frameworks mostly prevail at the organizational level in the current budgeting
 268 but not comprehensively and not in task depth. These include, for example, the budget
 269 figures from the fiscal side, the normative grants, specific indexes, the wage and
 270 employment stipulations, as well as the professional specifications (training requirements of
 271 programs, definitions of research, regulations for healing, for experimental, educational
 272 production activity, student welfare services, etc.), the specific qualitative and quantitative
 273 performance expectations, other indicators, and finally the individual management body
 274 decisions. The actual consequences of these types of factors are thus to be displayed in the
 275 task based pre-calculation as well.

276 The next planning phase involves the organization and specification of professional tasks,
 277 and for each task that of the method of solution, its process and the work processes with the
 278 consideration of the foregoing, the internal professional requirements, and the personnel,
 279 material, infrastructural, organizational characteristics. These processes have to be recorded
 280 in protocols for the purposes of creating the executable budget. The professional content of
 281 these is complex, in accordance with the profile of the institution.

282 After this it is necessary to

283 – specify the quantitative and qualitative expectations and conditions with regard to
 284 the above (e.g., personnel and material capacities, room availability and utilization,
 285 their equipment, cost items: salaries, use of atypical forms of employment, hourly
 286 wages, direct professional material costs, usage costs, etc.) and then
 287 – assign the closely connected financial, material, personnel conditions to the
 288 professional activities according to the protocols on a program-project-task-subtask
 289 level as well as the (direct and indirect) expenses and revenues with pre-calculation.

290 For the calculation of the costs of activities related to the performance of professional tasks,
 291 for pre-calculation the above characteristics and indices have to be (re)established in
 292 consideration of the possibility for changing the emerged situation.

293 The specification of material and personnel costs of organizational operation, administration,
 294 functional intellectual and physical tasks is the next task together with the consideration of
 295 non-distributable expenses.

296 Finally, in the case of a lack of harmony between the tasks and conditions defined up to that
 297 point in the planning process, the consequences have to be specified together with the
 298 necessary additional action to be taken. These are such planning and organizational
 299 decisions (with regard to cost factors and income items, in this case already in pre-
 300 calculation per variable) which are necessary for the observation of performance
 301 requirements and the execution of the budget.

302 All this requires decisions mostly within institutional competence but can also mean the
 303 initiation of higher level stipulations. The costs should be harmonized with the financing
 304 allocations by means of increasing the efficiency of operation and management.

305 If the planning of the budget could go beyond the mechanism which currently means the
 306 mere division of given amounts and their detailing, then the planning of the previously

calculated costs of real processes could be the basis for the development of the executable budget, connecting to it from the other side the specification of sources and their extent. For this it is essential to get access to pre-calculations (building on business organization and not fiction) for the different versions of the budget and its elements.

311

3.4 The Connection Between Pre- and Post-Calculation

In general, it can be stated that during pre-calculation (during its preparation) it is necessarily utilized already if the methodology of post-calculation is elaborated, its data types, data content, the results of its application are used and evaluated. It is a theoretical consideration that the budget methodology, which also includes the planning of the implementation of professional and operating tasks, should consider the planning elements not as the causes, explanation of emerged cost levels (and resource need) for pre-calculation but as its active cost driver and thus as the basis of decisions.

The elaborated post-calculation model based on actual costs considers all costs incurred for the purposes of education. An essential condition for this, however, is to have access to information in the appropriate structure and quality. The basis for this is provided by background information (IT) systems. The information input is determined based on actual processes and not simply replanning the fiscal framework which is irrelevant in itself.

According to those mentioned above, the planning, budgeting of task performance (within the framework of financing) involves the planning, organization, cost-allocation, and own income calculation of professional and infrastructural supply processes deriving it from the external and institutional requirements and conditions. This is why it is important to explore as deeply as possible in the above described post-calculation the relationship of tasks, the activities supporting them, and the costs realized in the actual processes so that the constant and (to a certain extent) variable elements are identifiable and quantifiable with regard to their effects. An additional, active step involves the change of real processes identified as cost drivers so that the financial consequences can also match the development of boundary conditions.

Therefore, in the process of drawing up the budget, the information (partly organizational, partly financial data) from the application of the deduction already completed during post-calculation are indispensable.

338

4. CONCLUSION

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4.1 The Effect of the Use of the Planning Method

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If the planning of task implementation and the pre-calculation of costs and income connected to this become an integral part of the usual and necessary process of budget planning, then it

- supports the evaluation of budget figures, the substantiation of external and internal budget negotiation processes, the acceptance of budgets that are optimized and executable from a professional and fiscal point of view, including the calculation of income that is more and more in the foreground;
- helps the judgment of operation and management as well as professionalism, the convergence of units and institutions with a less dominant business management approach,

353 – contributes to (at least with the management of calculable factors) the minimization
354 of adjustment-aimed decisions during the year also containing contingencies.

355 The significance and utilization of the post-calculation model will thus become indispensable
356 for all institutions of higher education not only because it helps in the subsequent evaluation
357 of activities and in the support of decision making but also because the model and the use of
358 its database are important also in budget planning.

359 Institutions of higher education, characterized by their outstanding role in the development of
360 society and the economy as well as their productive operation and management
361 corresponding to their mission, can achieve the level of efficiency expected from them by
362 the public and to which it is capable of only with supportive financing and management
363 regulations that display a similar approach.

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