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EVALUATION OF THE EFFECTIVENESS OF MANAGEMENT AT THE INSTITUTE OF TECHNOLOGY AND BUSINESS IN ČESKÉ BUDĚJOVICE

Abstract:

The purpose of the article is to evaluate the effectiveness of the Management by Objectives (MBO) system applied at a higher education institution, specifically at the Institute of Technology and Business in České Budějovice. Generally, effectiveness can be defined as a favourable ratio of inputs and outputs where we are able to measure only the least ineffective value of the attained outputs using a specific number of inputs (however, not the point of absolute effectiveness). For the collection of data we used a management and control system called Excellent Top Manager System (ETMS) which was originally developed as a tool for the registration of the performance of employees working at the Institute of Technology and Business (ITB) in České Budějovice. The ETMS is used at the Institute for the provision of planning, supervising and follow-up evaluation of the fulfilment of objectives set by individual sections, departments as well as by individual employees of the Institute. Considering the quantity of data and the scope of the subject, the article focuses specifically on the effectiveness of the management of teaching, research and other creative activities performed at the Institute of Technology and Business in České Budějovice.

Keywords:

Management of higher education institutions, excellent top manager system, strategic, tactic, operational objectives, effectiveness

INTRODUCTION

The public higher education institutions (PHEI) in the Czech Republic are established by law where the management is placed in the hands of the academic community self-administration. Operating plans of the individual higher education institutions respond to the strategic plan of the Ministry of Education, Youth and Sports. After processing, or, where applicable, receiving the strategic plan of the Ministry, the process of planning for a five-year period starts at the individual higher education institutions. The Higher Education Act provides that together with the strategic plan a so-called update of the strategic plan is created as well. The strategic plan can be perceived as a summary of strategic plans of the given institution whereas the update of the strategic plan as a summary of tactic plans. In the case of a higher education institution tactic plans are understood as one-year plans as the update and approval of the strategic plan proceeds on an annual basis. For the aforementioned reason the Institute of Technology and Business selected a tool for the management of objectives, the Management By Objectives, which is often used in industrial practice. This methodology was invented in the 1950s based on the works by Peter Drucker (The Practice of Management) and Douglas McGregor (The Human Side of Enterprise).

The Excellent Top Manager System (ETMS) has been developed at the ITB for the management of the Institute by objectives and is able to cover not only the planning and control phase but it also enables to evaluate the performance of each employee at the Institute in all aspects of their activity based on objective criteria. In addition, the ETMS evaluates individual processes at the Institute in terms of quality with differentiation into strategic, tactic and operational levels. The management of the ITB in České Budějovice thus responds to the requirement of the Ministry of Education, Youth and Sports of the Czech Republic (MEYS CR) for the improvement of the effectiveness of the operation of the higher education institutions.

The article focuses on the management of activities performed by academics at the Institute of Technology and Business in České Budějovice where the purpose is a proposal for the evaluation of the work effectiveness.

Information and Retrieval

In the theory of economy, effectiveness is perceived as a relationship between the values of resources and the values of outputs, or, where applicable, as a favourable ratio between inputs (factors of production) and outputs (products) (Synek, 2010). If there is a greater number of beneficial activities, we can say that the situation is effective provided that one of the activities cannot be improved without another activity being aggravated (Soukupová, 2001).

A higher education institution is not established to generate profit, which implies that the management of a higher education institution is different from that of a business corporation. Although the business-administration concept of the classification of factors of production is based on the concept of general economic theories (labour, land, capital), it is modified to a certain extent. The concept defines and distinguishes four basic factors of production (Vochozka, 2012):

1. planning (control work)
2. executive work

3. fixed assets

4. material (Wöhe, 1995)

The vehicle of executive work is the academic and, as in the case of a business corporation, it is vital to monitor the effectiveness of the expenditure of factors of production compared to outputs.

Academics (ACs) are employees of a higher education institution who perform both teaching and scientific, research, development and innovative, artistic or other creative activity (pursuant to sect. 70(1) of Act No. 111/1998 Coll.).

The purpose of the research is to find the optimal ratio between the amount of spent wage resources and the scope and quality of work performed by academics. Within the framework of the evaluation of the effectiveness of work performed by academics it is necessary to point out that the academics with the associate professor (*docent* in Czech) and professor (*profesor* in Czech) degrees have a positive impact on the indicators of quality and performance in terms of the budgetary procedure of the HEI based on the MEYS contribution for educational and scientific, research and innovative, artistic or other creative activity to which the public higher education institution is eligible. The amount of the contribution is defined by the document titled Rules for the Allocation of Contributions and Subsidies to Public Higher Education Institutions Depending on the Reference Indicators, e.g. number of students, credits in the Register of Information on Results (*RIV* in Czech), number of professors and associate professors, employability of the graduates, students sent out and received within the framework of international mobility programmes, etc. The aforementioned rules are published regularly on an annual basis and the weight of the reference indicators is changed periodically to which fact the higher education institution needs to respond or otherwise the contribution for the respective higher education institution is reduced considerably.

The basic indicators for the budgetary procedure of a HEI are the A and K indicators, which can be influenced to a certain extent on the part of the respective organization (the degree of such influence is given by the proportional representation in the fulfilment of other part indicators concerning performance and quality).

The A indicator refers to the budgetary indicator quantifying the performance of the higher education institutions with a focus on the type and financial requirements of the accredited study programmes and lifelong learning programmes, number of students and results achieved in educational and scientific, research, development and innovative, artistic or other creative activity as well as the requirements imposed on such creative activity (Rules for the Allocation of Contributions, 2014).

This part of non-investment subsidy is derived from the scope of educational activity of the HEI and is calculated as the product of the normative number of students and the basic standard. The basic standard is a sum in Czech crowns representing the ratio of the funds available for educational activity and the number of students attending all higher education institutions (Peková, 2005).

The K indicator refers to the budgetary indicator quantifying the performance of the higher education institutions with a focus on results in educational and scientific, research, development and innovative, artistic or other creative activity (Rules for the Allocation of Contributions, 2014).

METHODOLOGY

Prerequisites for the calculation of effectiveness at a higher education institution

The Institute of Technology and Business has implemented the quantification of individual outputs of academics and thus has created a basis for a tool enabling to monitor the resources (costs) spent on part activities in the working process. There is a certain equivalent relationship among individual activities which are recognized for the employees as measurable and which subsequently enter the evaluation process. This relationship is expressed in the form of a score. The score expresses, on the one hand, the time requirements for the implementation of the output concerned and, on the other hand, it takes into account the amount of benefit for the higher education institution in terms of evaluation parameters on the part of the MEYS, the Accreditation Commission and other institutions.

Therefore, to be able to assess the effectiveness of work, the source information on the amount of the spent inputs (factors of production) must be known together with the scope of the acquired outputs (products). Both the items must be defined in the same units of measure to be able to find the level of correlation. The optimal unit of measure in the case of a higher education institution is a financial unit of measure, or, where applicable, some working activity converted to financial resources and rated products - students, publication outputs, intellectual property outputs, studies and analyses. As it follows from the aforementioned, the prerequisite for the calculation of effectiveness on the part of inputs is the knowledge of the respective employee's wages, which means the knowledge of their expert and professional qualifications representing the employee's focus on the implementation of the forms of outputs considering the optimal structure of their activity. An employee with lower professional qualifications is focused mostly on the implementation of outputs of teaching activity with a minor participation in the outputs of creative activity while the situation in the case of an employee with higher professional qualifications is completely different. On the other hand, the prerequisite for the calculation of effectiveness on the part of outputs is the knowledge of the economic benefit of part inputs. In the area of teaching activity it applies that all activities of the employees must concentrate on sharing comprehensive knowledge and skills with students who pay for this service, or in more cases the payment for this service is made on the part of the MEYS. Publication outputs as well as intellectual property outputs implemented within the framework of activities performed by academics at a higher education institution are, above all, the prerequisite of the higher education institution’s eligibility for accreditation, which means the prerequisite for the possibility to perform educational activity. Financing of these outputs is therefore closely related to the provision of a contribution to own educational activity and the value of such outputs is then reflected in the institutional support for long-term conceptual development of the research organization. Each of the aforementioned depends on the quality of individual outputs. Outputs performed for other external entities are evaluated based on actually incurred costs.

The ITB has introduced a system of performance pricing based on a so-called activity code list. The pricing is applied on performed outputs, which determines a return in the management accounting.

The period for the evaluation of performance is always from 1 January to 30 June and from 1 July to 31 December of the current calendar year.

Data

The personal data, positions, working hours fund and wage fund for the calculation were acquired from the Vema wage-payment application, which is used at the ITB. Considering the high total number of academics at the ITB, a random sample of 10 academics was used for the needs of this article. For the sake of personal data protection, identification of the employees was encoded as AC 1-10.

All performance executed by individual ACs is quantified using the activity code list available in a part section of the ETMS. Scores of individual activities are based on requirements for the specific output in terms of work and its added value in relation to the evaluation of the performance of the higher education institution from the point of view of the MEYS. The individual activities are expressed by the coefficient stated in Table No. 1.

Table No. 1: Selected part of the activity code list, including the number of units reported in the PA AC1

ID	Activity title	Coefficient	Number of units
4.080	Tutorials, laboratory exercises	1.15	42
4.130	Consultations for AC	2.0	26
4.150	Examination passed	0.3	120
4.160	State exit examination (including defence of Bachelor's theses)	0.25	4
4.081	Tutorials, laboratory exercises in a foreign language	1.3	30
1.130	Reviewed technical article in academic journals included in the WS with an impact factor	350.0	0.6
1.140	Reviewed technical article in academic journals included in the SCOPUS database	250.0	0.5
1.155	Reviewed technical article	20.0	2.5

The performance account (PA) - a summary of activities performed by the academic concerned. Matched with creative and other activity, stated in the part section of the ETMS.

PC - the Price Coefficient applied by the ITB to individual types of employees, stated in Rector's Provision No. 5 2014.

AC – instructor (*asistent* in Czech) CZK 261/credit

AC – assistant professor (*odborný asistent* in Czech) CZK 296/credit

AC – associate professor (*docent* in Czech) CZK 375/credit

AC – professor (*profesor* in Czech) CZK 671/credit

The price coefficient expresses the financial return earned by individual departments per performance credit acquired the academic.

Data processing

MRCA - the Minimum Ratio of Creative Activities / The calculation is based on the structure of working hours of the academic whose structure of working hours contains a number of hours per week reserved for the creative activity according to Guideline No. 8/2010.

$$MRCA = (CAt/40) * 100$$

(CAt - AC - instructor 6 h; AC - assistant professor 12 h; AC – associate professor 18 h; AC – professor 23 h)

PF - The required Performance Fund / The product of the working days in the respective period subject to evaluation of performance and 6 performance credits (PF is based on the working hours fund, which is corrected by 25 % for the purposes of the registration of performance due to exclusion of absence with leave and certain administrative activities). Determination of PF for the period of Winter 2014, which means the period from 1 July to 31 December 2014.

$$PF = Nwd * 6$$

CA - Creative Activity / Includes publication, project, research and contract activities structured according to the activity code list.

Nwd – number of working days

$$CA = \sum_{i=1}^{n} APu_i * k_i + \sum_{i=1}^{o} APr_i * k_i + \sum_{i=1}^{p} AR_i * k_i + \sum_{i=1}^{q} ACo_i * k_i$$

Where:

APu_i – publication activity based on the activity code list in the i-th position in the publication activity code list

APr_i – project activity based on the activity code list in the i-th position in the project activity code list

AR_i – research activity based on the activity code list in the i-th position in the research activity code list

ACo_i – contract activity based on the activity code list in the i-th position in the contract activity code list

k – coefficient of the i-th activity in the specific-type activity code list

n, o, p q – number of activities of the respective type

OA - Other Activity / Includes teaching and administrative activities structured according to the activity code list.

$$OA = \sum_{i=1}^{n} ATe_i * k_i + \sum_{i=1}^{o} AAr_i * k_i$$

Where:

ATe_i – publication activity based on the activity code list in the i-th position in the publication activity code list

AAr_i – project activity based on the activity code list in the i-th position in the project activity code list

k – coefficient of the i-th activity in the specific-type activity code list

n, o, p q – number of activities of the respective type

PR - Performance Result / Expresses the fulfilment of the requirement set for the employee concerned. The calculation takes into account the degree of the fulfilment of the requirement for sufficient volume of creative activity and in the case of insufficient fulfilment of creative activity a reduction in the other activities is made according to the following formulas:

if the prerequisite No. 1 does not apply

$$\frac{Ca}{MRCA} * (100 - MRCA) < Oa$$

then the formula 1.1 applies

$$Tcr = Oa + Ca$$

if the prerequisite No. 1 applies, but the prerequisite No. 2 does not apply

$$\frac{PF}{100} * (100 - MRCA) < Oa$$

then the formula 1.1 applies

if the prerequisites No. 1 and No. 2 apply, but the prerequisite No. 3 does not apply

$$\frac{PF}{100} MRCA < Ca$$

then the formula 3.1 applies

$$Tcr = Oa + Ca - \frac{Oa - \frac{PF}{100}(100 - MRCA)}{2}$$

if the prerequisites No. 1, No. 2 and No. 3 apply, then the formula 3.2 applies

$$Tcr = Oa + Ca - \frac{Oa - \frac{Ca}{MRCA}(100 - MRCA)}{2}$$

where:

PF – the required performance fund pertaining to the employee [c]

Ca – creative activity [c]

Oa – other activity [c]

MRCA – the minimum ratio of creative activities [%]

Tcr – the total number of credits after the application of the reduction [c]

The result of performance is then expressed as follows:

$$PR = \frac{CAk + OAk}{PF}$$

PMRCA – the Performance of the Minimum Ratio of Creative Activities / Expresses the fulfilment of the requirement for the performance of creative activities imposed on the employee concerned.

$$PMRCA = \frac{CA}{MRCA * \frac{PF}{100}} * 100$$

EF – Effectiveness / The calculation of effectiveness of the AC is the product of the return coefficient and the sum of earned performance credits divided by the wage costs of the employee concerned for the period concerned. The return coefficient expresses the employee's cost related to the performance made, i.e. per credit.

$$EF = \frac{(CA + OA) * PC}{WC} * 100$$

Where:

WC – the Wage Cost pertaining to the academics concerned.

In the case that the AC attains the level of effectiveness:

above 120 %the work performance is classified as productive and an increase in personal bonus in the following period is proposed;

90 % to 120 % the work performance is classified as the fulfilment of work duties;

70 % to 90 % the work performance is classified as below the average and a decrease in personal bonus in the following period is proposed for the employee concerned;

below 70 % the work performance is classified as poor and the employee is proposed for reprimand due to failure to fulfil their work duties.

Results

The aforementioned procedure was applied to the test sample of academics. The results of the calculations are provided in Table No. 2:

Table No. 2: Effectiveness of the use of wage resources

AC	MRCA	PF [c]	CA [c]	OA [c]	Result of the performance	Performance concerning the MRCA	Effectiveness
AC1	30.0	696.0	385.0	176.3	80.6 %	184.4 %	80.9 %
AC2	15.0	714.0	37.5	1156.5	128.7 %	35.0 %	167.7 %
AC3	30.0	750.0	15.0	1076.6	108.8 %	6.7 %	146.1 %
AC4	15.0	75.0	0.0	89.8	102.3 %	0.0 %	120.0 %
AC5	15.0	450.0	33.3	472.1	102.4 %	49.4 %	112.6 %
AC6	30.0	750.0	35.8	1248.0	123.0 %	15.9 %	171.8 %
AC7	30.0	342.0	75.0	287.4	98.9 %	73.1 %	106.3 %
AC8	15.0	750.0	94.6	640.3	97.8 %	84.1 %	98.3 %
AC9	45.0	750.0	331.7	398.0	97.3 %	98.3 %	97.6 %
AC10	30.0	750.0	19.1	690.0	83.6 %	8.5 %	94.9 %

Source: own source

The calculated values give evidence of the degree of the fulfilment of the required performance by the academics, which forms the basis for the calculation of the effectiveness of the use of wage resources spent on the tested academics. As it follows from the calculations made 90 % of wage resources in the tested sample of academics are used effectively. With 30 % of the tested sample the calculated level of the effectiveness of spent wage resources exceeded 120 % and thus the performance of the academics concerned can be regarded as excellent. Only one of the employees failed to fulfil the expected level of effectiveness, which means 10 % of the tested sample.

The following measures are recommended for application by the supervisors of the tested employees considering the knowledge of analytical data.

Results of the employees AC2, AC3 and AC6 have been classified as productive, which means that they will be nominated as candidates for an increase in personal bonus.

Performance of the employees AC4, AC5, AC7, AC8, AC9 and AC10 has been classified as fulfilled. Retaining the existing personal bonus is recommended.

In the case of the employee AC1, the work performance was classified as below the average, which means that the employee will be nominated as a candidate for a reduction in the personal bonus.

CONCLUSION

With the application of the aforementioned calculations on the outputs collected by the ETMS system, the management of the Institute of Technology and Business in České Budějovice will acquire not only a tool for the monitoring of the performance of individual academics and whole departments, but also a tool for their supervision and evaluation.

The described system will enable the Institute of Technology and Business in České Budějovice to manage more effectively the resources acquired from the national budget as it enables to control the amount of spent wage resources in direct proportion to performance executed by academics. In addition, this system is a powerful motivation element for individual academics.

It is obvious from the aforementioned results that the purpose of the article, the proposal for a system of evaluation of the effectiveness of employees working at the Institute of Technology and Business in České Budějovice has been achieved. The applied method of collection of data and its subsequent processing can be used by other public higher education institutions in the Czech Republic as the main objectives are basically identical.

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