Managing Private Higher Learning Institutions with the Support of Information Technology: Strategic Framework

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Abstract. *Nowadays, in the information age, managing organizations is inconceivable without using information technology. All areas of human knowledge are spreading fast and only quality education will allow future generations to handle its enormous scope. Therefore, the number of institutions of higher learning, especially in the private sector, is increasing on a daily basis. The management of private learning institutions is faced with the problem of choosing the right method of managing their organizations in order to achieve their strategic goals and be successful in the educational market. On the one hand, there is a lot of contemporary management methods, and on the other hand, the influence of information technology on conducting business is gaining importance. An institution's management has to choose a set of methods, i.e., a methodology, to suit them best in running their learning institution. In this paper, SWOT, BSC and AHP methods are explored and combined into a unique methodology. This methodology, together with the appropriate information technology support, represents a strategic management framework that can be used in a wide range of private higher learning institutions.*

Keywords. Method, SWOT, BSC, AHP, management, information technology

1 Introduction

In the information era [2] new business rules have been formed, making some key assumptions of competition dating from the industrial era obsolete. Organizations can no longer gain a considerable competitive advantage by merely adopting new technologies in the form of physical property or by managing their financial assets properly, but also by managing their intangible property such as knowledge.

Owing to this, there is an increasing need for knowledge and educated staff. It is estimated that the demand for intellectual services is the one to mark the fastest growth, especially in the field of Information and Communications Technologies (ICT).

The impact of the information era is even more profound and revolutionary for service-providing organizations than it is for manufacturing organizations, as new skills and competencies are required for a competitive advantage to be gained. The organization's ability to mobilize and exploit its intangible and invisible property has become more important than investments and the management of physical, tangible property [2].

All these facts have contributed to the ever greater intensification of international competition [4] in education, with a lot of countries investing heavily into university education to become internationally competitive. Over the last few years business process management and the evaluation of education have been the focal point of numerous discussions. As educational institutions are trying to learn lessons from business organizations, there is an emerging need for a variety of performance measurement tools allowing for educational goals and standards to be set and

competitiveness enhanced. Business competitiveness can further be improved by an ever more common use of management tools, such as the Balanced Scorecard Method and Six Sigma.

The management process improvement presupposes a definition of generic goals and measures for performance measurement, which can be determined by applying a combination of methods. Such a management model is based on the Balanced Scorecard Method (BSC) which, along with the SWOT (Strengths, Weaknesses, Opportunities, Threats) method and the AHP (Analytic Hierarchy Process) method can be integrated into a consistent management methodology.

The goals of this paper are related to a role continuously performed by higher education institutions in the modern educational system – that of contributing to a more flexible, better quality education in accordance with market demands, leading toward competitiveness through constant quality improvements. The purpose of the paper is to help private higher learning institutions to gain a competitive advantage in both the Croatian and foreign market by utilizing the results described in it.

2 SWOT, BSC and AHP overview

2.1 SWOT analysis

The SWOT analysis is a structured analysis matrix for categorizing the factors of organizations functioning. In the matrix, strengths, weaknesses, opportunities and threats are analyzed, including both internal factors controlled by an organization (e.g., marketing, finances, etc.) and external factors (e.g., political and economic factors, competition, etc.). The way in which weaknesses and threats will be overcome and strengths and opportunities exploited depends on how effectively a particular environment is observed and appropriate solutions for perceived situations created.

The SWOT analysis represents a diagnosis of the organization's current state as well as that of the environment that the organization acts in, which explains why it is vital to recognize as many strategic factors as possible to ensure that at any given moment the organization can respond appropriately.

The value of the SWOT analysis [5] mainly lies in the fact that it represents self-assessment for the management. However, in SWOT there is an issue with its deceitfully simple elements: in fact, deciding what the strengths and what the weaknesses are, as well as the estimation of impact and the likelihood of opportunities and threats is far more complex than it may seem at first. Furthermore, apart from a classification of SWOT elements the model does not facilitate their translation into strategic alternatives.

In this paper the extended SWOT (eSWOT) analysis was used comprising the following four phases:

1. Determining SWOT analysis elements (strengths, weaknesses, opportunities, threats) called initial elements; 2. Ranking within a group of elements, that is, determining the strength of their impact on attaining goals; 3. In this phase it is necessary to provide answers to the question concerning what should be done in order to use internal strengths (S) and external opportunities (O) to eliminate the activity of internal weaknesses (W) and external threats (T); 4. The final stage comprises the following three steps:

- for previously defined strategies specific activities for their execution are determined;
- for each predefined activity it is necessary to establish a measurable goal for determining the activity scope;
- impact of particular activities on the goals needs to be determined.

2.2 BSC and Strategic Maps

According to Kaplan and Norton, the authors of the BSC method, Balanced Scorecards represent a strategic management system. The method is described in their book [2] *The Balanced Scorecard,* which serves as a guide to current and future execution by monitoring the measures in the following four categories: 1) financial performance, 2) customers, 3) internal business processes, 4) learning and growth.

The BSC method is a concept through which strategic management is adapted to the requirements of doing business in the information age. By doing so, it enables companies to face and successfully meet the aforesaid challenge by structuring and extending the traditional strategic planning and management in the following ways:

- by making the entire company face a clear, common vision related to operations and a

structured approach to defining actions required for the vision realization;

- by updating the relevant information from the entire organization and its effective implementation for improvement and assessment of strategic goals;
- by strategically managing the 'intangible' as well as 'traditional' property through the introduction of new managerial parameters, along with conventional financial parameters.

A balanced scorecard strategy map [6] provides a framework illustrating the way in which a strategy connects intangible property with processes creating new value, as well as a visual representation of a strategy. On a single page goals integrated and combined across four perspectives are displayed with a view to describing a strategy. Every organization adapts the strategy map to their specific goals.

2.3 AHP

Analytic Hierarchy Process (AHP) is one of best known scientific methods of scenario analysis and decision-making by a consistent validation of hierarchy comprising the following elements: goals, criteria, sub-criteria and alternatives, all of which form decision-making support. The conceptual and mathematical grounding of the AHP method was devised by Thomas Saaty.

AHP enables interactive creation [7] of a problem hierarchy as a preparation for the decision-making scenario, and subsequent validation of pairs of hierarchy elements (goals, criteria, alternatives) in the top-down direction. Eventually all the validations are synthesized and, following a strictly defined mathematical model, weight coefficients of all the hierarchy elements are determined. The sum of weight coefficients of elements on each level of the hierarchy equals *one,* which enables the decision-makers to rank all the elements in a horizontal and vertical sense.

During hierarchy elements validation, until the very end of the procedure and results synthesis, the consistency of the decision-maker's reasoning is verified and the consistency of ranking the alternatives and criteria, as well as their weight values, are determined.

In terms of methodology, AHP is a multi-criteria technique based on breaking down a complex problem into a hierarchy. The goal is placed at the top of the hierarchy, whereas criteria, sub-criteria and alternatives are found in lower positions. Figure 6, for example, shows a hierarchy comprising one goal, three criteria and four alternatives.

3 Connection into a common framework

In this paper, by means of a predefined model (integration of SWOT, BSC and AHP), a tool is represented which will presumably facilitate the management of private higher learning institutions.

The following phases in model development were defined:

1. By applying eSWOT analysis (one of the three managerial methods to be integrated into a single model), strategic goals (Competitiveness and Student satisfaction) are analyzed and sub-goals chosen which provide prerequisite data for the Balanced Scorecard method. The eSWOT analysis was applied to avoid using a rule-of-thumb method in identifying the sub-goals distributed into perspectives of a BSC strategy map.

2. By designing a strategy map of goals and a strategy map of measures, that is, by connecting the goals across all the four perspectives, cause and effect chains are obtained to be further quantified and used for measuring the level of performance and advancement of private higher learning institutions.

3. For identifying the chains and, consequently, the goals connected in a chain, which need to be controlled and monitored in short time intervals, the AHP method was selected. By applying mathematical logic, formulas and operations as well as mathematical reasoning in general, strategy maps are analyzed and highest weight cause and effect chains are chosen. Criteria for selecting the chains are derived from the pre-defined missions and visions of private higher learning institutions.

The result of the described methodology are the most important cause and effect chains, with the goals requiring more frequent monitoring in order to ensure better management and control in private higher learning institutions, with a view to achieving mission realization and vision fulfilment.

Step One – eSWOT analysis of strategic goals

The first step [8] in designing a model refers to determining the strategies, activities and sub-goals by means of which previously defined strategic goals are to be realized. Once determined, the sub-goals, along with the initial strategic goals, will be distributed into four fields (or perspectives) in which the overall success of a private higher learning institution will be measured: its financial results, relations with users or buyers, the organization's internal processes and the organization's ability to continuously increase its competencies (learning and growth) in its core discipline.

Table 1. Strategies and a strategic theme of a strategic goal

Strategies – Activities – Derived strategic goals - *Being competitive* Goal
Strategy	Strategy description	Activities	Goal labels	Goal description	Directly affected goal
S3→W4	Ensuring managerial management in private higher learning institutions (PHLI)	Introducing one of quality improvement methods	C1.p1	Optimizing business processes	C2.f2
			C1.p2	Modernizing organization of work	K2, C2.f2
S2→W1	Developing new programmes	Participating in calls for EU projects	C1.f1	Ensuring flow of funds	C1.f2
S4→W3	Familiarizing future students and employers with the functioning of PHLI	Utilizing new approaches to marketing, such as guerrilla marketing	C1.k1	Promoting PHLI	K2
O3→T2	Improving the level of quality of business processes in PHLI	Cooperating with companies, participating in the work of business associations	C1.k2	Ensuring distinctiveness (quality) in relation to other educational institutions	C1.f1
			C1.k3	Increasing the number of enrolled students	C1.f1
O2→T3	Improving the level of quality of the educational process in PHLI – adhering to excellence	Permanently educating teachers	C1.k4	Changing the attitude of the environment toward PHLI	C1.k3
O2→W1	Listening to the demands of the economy	Designing new curricula	C1.f2	Increasing income	
O1→W2	Providing in-service training	Establishing contact with particular institutions in EU	C1.u1	Encouraging participation in projects	C1.p3
			C1.p3	Attaining employee satisfaction	K1

For easier execution and control, this procedure is formalized and transparently displayed in the table, in line with the eSWOT methodology.

The method presupposes that for each goal a separate table is designed. As each goal refers to one of the perspectives of balanced scorecards, it will be labelled accordingly, for example, financial goals will be labelled as *f*.

In order to achieve the strategic goal *Being competitive,* for instance, seven strategies are proposed, with the way of describing those strategies illustrated in the following example:

-    S3→W4 – **Ensuring managerial management in private higher learning institutions**

In order to achieve optimization of business and educational processes in private higher learning institutions and ensure efficient management, it is necessary to introduce a management improvement and control method. This is the way to systematically approach business process optimization, which also implies continuous

monitoring of business results and their comparison.

Step Two – Creating BSC strategy map

Strategy map [8] of goals is a basic graphical representation of relationships between activities undertaken for an organization's strategic goals to be realized. The logical rationale for its construction is as follows: if activities focused on increasing the level of associates' knowledge are undertaken (that is, those in the Learning and Growth perspective), such as, for instance, activity C2.u1 – Utilizing (Establishing contact with institutions in EU and university) and transferring knowledge and experience, which is in function of fulfilling C2.u1 "Improving the level of expertise of teaching staff", this will probably not have a direct impact on goal C1.f2 "Increasing income". On the contrary, this activity will increase business costs during the period in which education is performed; however, it is expected that it will positively affect goal C2.p2, which in turn will indirectly affect the fulfilment of goal C1.k3, and, consequently, goal C1.f1, as well as goal C2.f2.

goals was constructed for private higher learning schools shown in Figure 1. All the goals in the strategy map are distributed within four standard perspectives.

Although certain specific organizations formulate their strategy maps of goals by using more than four perspectives (for instance, non-profit organizations and public administration), it can be presumed that in our case it was not necessary, as private learning institutions can be considered **profit-oriented** organizations.

For easier interpretation, certain goals can be assigned different colours, with all the goals derived from the strategic goal K1 e.g. marked with white and those derived from K2 e.g. marked with blue.

Step Three – Connecting BSC strategy map with AHP

AHP is applied so as to structure a balanced scorecard into a unique system of measures needed by the decision-maker. The first and most important step in the AHP process is structuring the problem as a hierarchy. Priorities of hierarchy elements are determined by means of replies to the questions concerning the
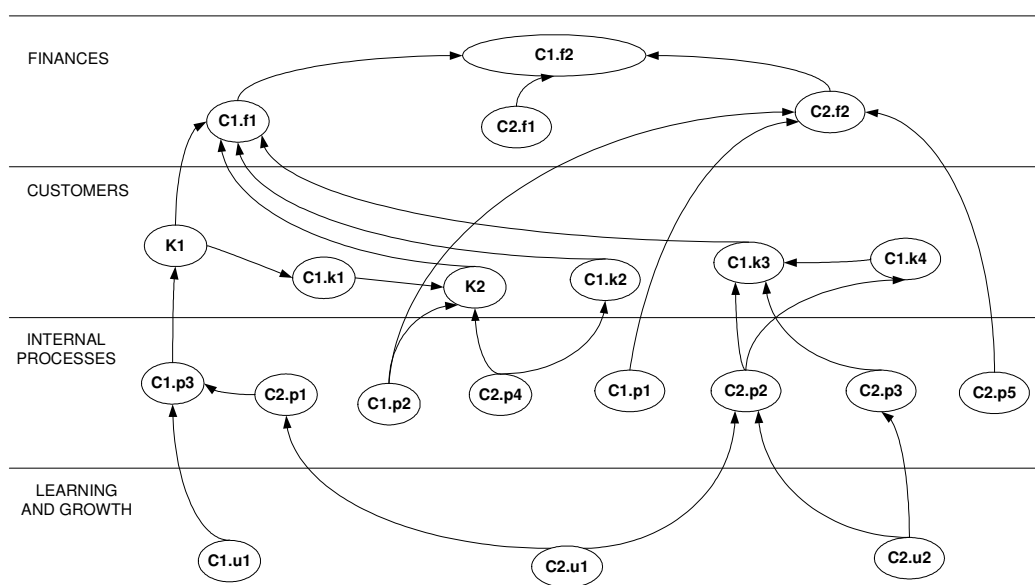

Figure 1. Cause and effect chain of goals

All the data for the construction of a strategy map of goals can be found in the last three columns of the table (Table 1), including: goal label, goal description, and the label of a dependent goal directly affected by the observed goal. On the basis of those data a strategy map of

dominance or importance of one element in relation to another. As this analysis requires a systematic approach, without neglecting mutual influences of one goal upon another, goal weights are not determined by individual perspectives. Instead, cause and effect chains of goals are observed. In the map an optimal number of goals – 21 – was achieved. However,

the number of cause and effect chains (15 chains) to be monitored is still fairly complex, so it is very hard to simultaneously monitor and control all of them. The management of private higher learning institutions can thus choose to:

1. monitor all cause and effect chains; 2. choose only those chains that the management considers to be relevant for mission realization and vision fulfilment, that is, more frequent reporting on activities and attained results concerning the selected goals. A selection of criteria and cause and effect chains whose elements are to be monitored more frequently in vision realization was made. For easier reference, cause and effect chains will be marked as *Lx* (Figure 2).

The definition of the goal is as follows: Determining the relative importance of cause and effect chains so as to choose the most important chains (and corresponding measures) for managing private learning institutions, that is, for mission realization and vision fulfilment, which are to be monitored over a three-month period.

The selection of criteria is derived from the defined missions and visions of private higher learning institutions. The selection of criteria is shown in Table 2.

Table 2. Criteria for selecting management chains

	Criteria
1	Advancement in employees' careers
2	Managing activities contributing to regional expansion
3	Monitoring the development of cooperation with legal entities
4	Monitoring the process of financing
5	Ease of scanning the values of goal measures on the observed chain (ease of chain informatization)
6	Damage that can be caused by the failure of chain goals to materialize (non-realization of vision or mission)

After the weights of individual criteria and weights of alternatives for particular criteria have been calculated for the determined goal, results are synthesized in accordance with the predefined hierarchical structure, so as to obtain the total priorities of goal alternatives. Accordingly, for the observed problem, it has been calculated that, if weights are taken into

consideration, the chain to be most frequently monitored is the one labelled as *L6*. The total consistency ratio amounting to 0.06 confirms the validity of this selection (Figure 3).

Figure 2. Chain 6

4 Impact on management

The observed strategy map shows that goals can be condensed into a single structured approach, wherein its very construction reveals implicitly and explicitly formulated strategies.

It is evident that all the four perspectives of balanced scorecards can be connected into a cause and effect framework providing a structure for the realization of the entire vision and mission, which, in combination with the AHP method, can present a mighty managerial tool. Mapping strategic questions contributes to the understanding of the nature of goals by creating a series of factors which are connected to enable mission realization. By applying the described model of defining generic goals and measures, a structure for mission realization and vision fulfilment has been defined.

Consider a private higher learning institution that defined its vision and mission in the following way:

Vision – To act in the Republic of Croatia in compliance with international standards and act through international development of attendees;

Mission – To equip students with skills and competencies for lifelong learning so as to make them competitive in the global market.

It is evident from the strategy map and selection of chains that chain *L6*, which contains elements *Increasing the level of expertise* and *Improving the quality of instruction* affecting the goal *Changing the attitude of the environment toward PHLI,* and *L7*, which contains elements *Adopting best practice in instruction* and *Faster adaptation to the requirements for new skills and competencies,* are to be more frequently monitored. The aforementioned elements of the two chains affect the adoption of international educational standards and improvement of expertise and competence of the teaching staff, which has a direct impact on training the students and acquiring a competitive advantage in the

labour market, which is in line with the defined vision and mission.

All these arguments speak in favour of this model as a means of facilitating the connection between the vision and mission of higher learning institutions and measurable strategic goals. In other words, measurable strategic goals are the outcome of transformation of the organization's mission and vision into its strategy.
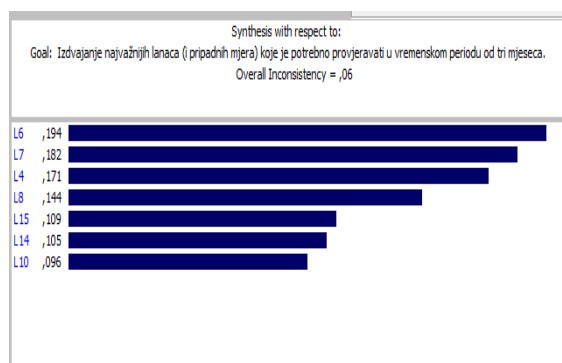

Figure 3: Ranking the priority of alternatives for a determined goal – example

5 IT support to performance management

When organizations started applying BSC as a management method in the early 1990s, there was no software to support the method. Every organization applying this method would develop their own software for reporting by means of scorecards. One of the first organizations to have utilized scorecards is CIGNA Property & Casualty [3]. First reports in the form of scorecards were made on paper, after which electronic spreadsheets were introduced. A lot of organizations today keep their transaction data, operating data, as well as data on users and suppliers in their ERP (Enterprise Resource Planning) systems. These data are mainly accessible from their respective data warehouses. Presently there are several BSC software vendors and we can broadly classify their software into two categories – standalone software and that integrated in other software environments, most commonly ERP systems and data warehouses [1]. Standalone products are independent products offered on the market which support the development of scorecards, while run time functionality is usually performed by manual entry of performance indicators or predefined spreadsheet files. Their automatism is limited, which means that they have calculators for derivation of values of dependent measures based on manually entered or predefined set of independent variables. Standalone products usually have software connectors towards spreadsheets and some other simpler data formats. They provide relatively fast entrance into BSC usage within an organization without lengthy implementation, preparation of business processes and software adjustments.

Integrated BSC modules lie on top of software systems which collect data across the enterprise through various business processes. This means that certain performance indicators can be automatically collected at the very moment of transaction. This is quite a good solution for financial transactions, and also some operational indicators like production, sales, etc. However, it is quite often the case that such indicators in their 'raw' format are not suitable for BSC. They should be integrated and consolidated for a given BSC context. This also applies to various frequencies of data that are collected by transaction systems. These frequencies might vary significantly, so for placing them into the context of BSC, it is necessary that frequencies and census data are aligned for correct conclusions to be attained. Finally, a significant amount of measures which are usually entered in BSC systems (e.g. customer satisfaction) are not entirely collected by standard ERP systems and require manual or spreadsheet entry.

Therefore we might draw a conclusion that, despite aggressive marketing of various ERP vendors, integrated BSC modules are not significantly better than standalone ones.

6 Conclusion

Over the last few years in the Republic of Croatia significant changes have been occurring in the segment of higher education as well as in the knowledge and labour market. The higher education reform in accordance with the Bologna Declaration enables students and teachers with mobility, which also implies more intense competition in education – students are allowed to choose from a larger number of institutions and programmes to increase their value in the labour market. In the workforce market there has been an increase in the demand for highly-qualified employees so that all the supplementary competencies, especially business-related ones,

become a means of achieving a competitive advantage.

If they are to thrive, private higher learning institutions need to continuously adapt themselves to new work conditions and transform their functioning by accepting innovative ways of performing business tasks, which results in new business processes and significant strategic advantages in enterprises which manage to achieve such a transformation. To aid organizations in this endeavour, a model described in this paper has been proposed. In this model, balanced scorecards represent the key method enabling a systematic approach to choosing most relevant goals. This method, integrated with SWOT and AHP, makes it easier for organizations to manage their strategy over a longer period of time. It clarifies and translates the company's vision and mission, and exemplifies the organization's goals and measures to all the stakeholders. This model can be considered as an instrument of change preparing the organization for attaining excellence over time, and its application is very likely to provide organizations with numerous advantages.

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