

ENHANCING AN ENTERPRISE'S INNOVATION PERFORMANCE MEASUREMENT SYSTEM*

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Abstract. *Business conditions under which modern enterprises operate are becoming more and more complex. The complexity of the business environment is caused not only by external but also by internal factors, which imposes the need for turnover in management focus. The turnover is reflected primarily in the change of business models. The changes are evident at all management stages. Development and enhancement of business performance measurement system is the area where the changes are most evident considering the interest of the academic and professional public. The changes in understanding that the basic purpose of business performance measurement is control have come about. Aside from control, the purpose of business performance measurement is enhancing, inciting and rewarding, i.e. connecting the aims and strategies. There is no universal innovation performance measurement system that could be suitable for all organizations. Hence, it is necessary to continually enhance value systems and adapt them in compliance with defined aims. The paper analyzes the contemporary systems of business performance evaluation and suggests the model of an enterprise's innovation performance measurement.*

Key Words: *business and innovation performance, measurement, measure system, integrated model.*

INTRODUCTION

The success assumption of all organizations and institutions is their capability to learn and acquire new knowledge in all areas. Under contemporary business conditions, innovation is one of the basic sources of competitive advantage. Long-term strategic positioning is more successful if enterprises innovate faster, more and better in contrast to competition. This relates to all innovation types. Innovation's success is conditioned by

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the enterprise's capability to create new products and services as well as to constantly redesign and enhance its business processes.

The fact that innovation can improve and disturb competitive advantage raises one more question: How should one relate to this dual nature, having in mind the existing technological and market capacities of the firm? Key impediments to enhancing innovation capacities is unadjusted business orientation and inadequate business model that stimulates innovativeness. Although many factors in the environment can stimulate or limit innovation capacities of enterprises, their success is to a largest extent conditioned by the change in the awareness of the need and ways of value creation for owners first of all and then consumers. This can be achieved by proper strategic reaction that is reflected in continual changes and alignment of business models developed by a competitive enterprise.

Innovations, especially discontinuing ones demand significant investment, whereby their success is always related to certain independency degree. The high degree of failure of new products and services, rapid technological development that imposes as an imperative quick innovation, the necessity of creating and broadening enterprises' knowledge –conditioned the need for changing the access to innovation and entry into the so-called era of open innovation. Increased costs and risk of development and launching of new products at the turn of the century led to the increase in the importance of cooperation between organizations and institutions in the effort to identify effectively and efficiently the needs and demands of consumers and develop products that will satisfy them with the achievement of the aims of the enterprises.

Key changes that initiate the turnovers are reflected in:

- **Change of the enterprise's business orientation** – Business logic of modern enterprises is changing. From managing internal efficiency the attention is redirected more and more towards managing overall efficiency. There are a few inter-related factors that affect the way in which perceived quality leads to economic outcomes. The economies of scale as a way of generating profit are not always an optimal solution. Under contemporary business conditions, the economies of scale and the economy of scope are the most reliable way of creating strategic aims of enterprises. Proactively oriented management understands the importance of balanced approach to managing external and internal efficiency.
- **Authority delegation for making business decisions** – Alignment of the ways of decision-making is one of the key problems facing contemporary management. Undoubtedly, certain, primarily, strategic decisions are made centralized. However, because of the need for establishing interactive relationships with consumers and other constituents, it is necessary to delegate the responsibility at lower decision-making levels which in turn contributes to efficient management.
- **Organizational focus** – Traditionally, organizational focus leads to building and maintaining the structure in which managerial decisions are conducted through processes which include formal control. This often creates the lack of flexibility, incites centralization and can be an impediment to the vertical information flow in the organization. Efficient management makes management turn from structure and control process towards improved external efficiency with acceptable internal efficiency. This requires flexible organizational solutions, where the imperative is resource mobilization such as management, personnel and system in order to support the relationships with key constituents (customers especially) in which value

is created. Organizational structure that meets these requirements can differ from situation to situation but some common principles can be identified.

- **Control** – In traditional management approaches, control systems are related to the evaluation of the capability of the organization and its different parts in performing the tasks in compliance with set standards. If these standards are met, an employee or a whole group of employees have achieved successful performance and can be rewarded. However, these control systems are not always in compliance with the needs. The systems are needed that will provide information on the basis of which the achieved outcomes can be compared to the defined standards.
- **Measurement** – What is controlled and rewarded must be measured first. The past focus can be turned and broadened. Shareholder value is more certain if the consumer satisfaction is achieved in perceived and delivered quality. Development of a balanced measurement system that meets the efficiency and effectiveness criteria is an assumption of successful management.

1. THE PURPOSE OF PERFORMANCE MEASUREMENT

Performance measurement is one of the key activities in the process of managing modern enterprises. The rationality of measurement is conditioned by clearly defined purpose and choice of a measure system that will enable the realization of defined aims. One of the key purposes of performance measurement is control. This is the management process phase in which the achievement of aims, strategies and efficiency of an organization is measured and corrective actions are undertaken when it is established that this is necessary (Milisavljević, 2007). Performance measurement helps the management to continually reexamine **its business model**, create value for key subjects and groups. It is also an important means of communication and strategy implementation. For example, by measuring the fastness of response to consumers' orders the management wants to emphasize how important this is. It is logical that employees are expected to strive to achieve these aims or to improve the response fastness. It is very important to use a balanced measurement system as well as the set that supports strategic intents of the organization. A well-established performance measurement system gives clear signals to all employees about the priorities in the business of an organization. Performance measurement can provide a strong means for inciting advancement. Often, the measurement announcement itself can make advancement. By its connection to rewards (like bonuses) and/or punishment, measurement can motivate individuals to improve performance –under the assumption that they can control what is measured. Information on what makes closer or distances the process from the aim also helps individuals and the organization to learn how to enhance process management.

When the purpose is defined for each measurement, one must check whether the adequate systems or procedures are selected for achieving the purpose. We often meet the argument of managers that the measurement is there to improve the organization's performance. For example, there is a weak and often non-existent process of advancement incitement. Also, for the purpose of control, the vital part of control circle that often misses is an action for bringing the process back to the aim.

The choice of a measure system and some indicators within certain groups are affected by numerous factors. Comprehensibility is one of the assumptions since the measure that is comprehensive must be applied. It is closely related to simplicity. The complex meas-

ures are not always clear to the users which may affect the rejection of that measure or wrong response in the process of business activity performance. A limiting factor of choosing measurement set is the possibility of their quantitative expression. Performance measures must be established both for the enterprise as a whole and the level of activity in order to show which activities add value that is which activities lose value. The choice of performance measures must help in avoiding arbitrariness of interpretation. Suitability of modifying and enhancing is one of the most important characteristics of performance measures. The potential number of performance measures is high. The large number of used measures can baffle managers and employees, which imposes the need for choosing the optimal number. Efficient performance measurement enables the provision of timely feedback. Having in mind that one of the basic purposes of measurement is business process enhancement, a continual information flow is necessary. Fast feedback is the presumption of successful overcoming of existing problems.

2. THE NEED FOR CONTINUAL MEASUREMENT ENHANCEMENT

The characteristics of innovative, successful enterprises are their orientation on creating new markets or business redefinition in order to make their competitors inferior or scarce. It is a complex process and requires an invisible connection between all processes and functions, special skills and learning, which significantly reduce the possibility of copying. Innovation is the best way for companies to acquire sustainable competitive advantage, especially under conditions of intensive global competition. The best companies develop processes and/or strategies for finding and acquiring the target market.

Intensive changes under business conditions characteristic of the end of the prior and the beginning of the new century change the relationships in the market and require redefinition of innovation role and in turn the capability of the organization to measure their contribution. The basis for acquiring competitive advantage is not only superior resources but superior capabilities as well. Connection and cooperation between participants in the market lead to the concentrating of management on innovation and creation of market related capabilities.

Adequate business performance measurement systems are a secure guideline for an enterprise's management. Namely, information that we receive as a result of measurement indicate what kind of changes should be initiated as well as when and at what levels. Based on the results received through measurement, the enterprise perceives what its competitive position is, has an insight into how much and how it can improve its position if it realizes the necessary changes either radical and/or incremental.

Theoreticians and practitioners strive to develop purposeful business performance measurement system. The well known fact is that reliance on traditional measurement systems related to an enterprise as a whole is insufficient since it does not provide necessary information for efficient resource and capability management. Efficient management is possible if that system is constantly enhanced through development of new systems that will enable the measurement of contribution of different functional areas and business processes. The problem of measurement choice for those functional areas where it is difficult to connect costs and income they generate is evident.

One of the most important areas whose contribution to overall business performance is not always possible to be manifested is the area of innovation. Having in mind the importance of innovation for competitive positioning of an enterprise, the need for developing

and continually enhancing the measurement system is a permanent task of the management. The contribution of innovation to business success of the enterprise is not always possible to measure because they pervade all functional areas and processes (Webster et al, 2003). The need to measure the yield generated by investment in innovation conditioned numerous researches whose aim is the development of a measure system that enables not only tangible but intangible assets of an enterprise. Considering that in the structure of overall property the share of tangible property increases and competitive advantage is more and more acquired according to this property (intellectual property, brand property, consumer property) there is a continuous search for consistent measurement system.

The state related to innovativeness of enterprises in Serbia is possible to indirectly view on the basis of decomposition of New Global Competitiveness Index (NGCI) that measures the competitiveness of national economies. This index is based on the so-called twelve competitiveness pillars that are summarized in three groups: basic requests, factors affecting the efficiency enhancement and factors related to innovation. The last group implies the measures of business and innovativeness sophistication (WEF). Data on innovativeness of enterprises can be gained on the basis of reports related to the usage of EIS (European Innovation Scoreboard) system for monitoring innovation process's outcomes. EIS is an instrument that the European Commission uses for monitoring and comparative analysis of innovation performance of non-member countries (Croatia, Serbia¹, Turkey, Island, Norway and Switzerland) but which have joined the group of countries that use this performance measurement system. On the basis of information from EIS, it is possible to establish Summary Innovation Index that is calculated by means of aggregate index of national innovation performance and calculated as a composite index containing 24 EIS indicators.

The analysis encompasses the set of related innovation performance indicators grouped in three blocks of pondered composite indices: support indicators, enterprise activity indicators and innovative activities effect indicators. Innovation performance in Serbia is below the average in EU – 27 because the total innovativeness index for Serbia is 22.7 in contrast to 47.8 for the EU.

In time, for the purpose of evaluation of enterprises' business performance (including innovation area) complex systems were developed². One of the most used systems is a balanced performance measures system of an enterprise developed by Kaplan and Norton and later advanced by numerous researchers. The limitations of successful application of Kaplan and Norton's model in a new Internet economy conditioned the need for adjustment and advancement of the system. One of the basic complaints at the expense of BSC is that it does not allow an adequate way of considering and measuring the contribution of connection between stakeholders in different network and relationship modes.

Aside from this system that is continually enhanced and adjusted to the needs of concrete companies, recently the application of dynamic multidimensional models are more and more insisted on. By analyzing these models it can be concluded that they comprise some new dimensions in contrast to the beginning Kaplan and Norton's model. Some of the dynamic multidimensional models measure effectiveness at three organizational levels: projects, strategic business unit and enterprise. The proposed model implies five di-

¹ Serbia was, for the first time, included in the group of countries that use the EIS in 2009. Research is realised by Statistical Institute of Republic of Serbia, in accordance with the methodology of the European Commission to calculate these indicators.

² (Kaplan, Norton, 1996); (Kaplan, Norton, 2001); (Niven, 2002); (Neely, Adams, 2001); (Novičević et al, 2006).

mensions: financial, marketing, process, people and future. The choice of measures within each dimension is possible to adjust to concrete company depending on the purpose that is wanted (Maltez et al, 2003).

Similar to BSC and other measurement systems, the multidimensional model that has metaphorically been called management board strives to reflect the essence of enterprises' business model (Rayport, Javorski, 2001, 257-290; McGovern et al. 2004). Management board is a strategic framework for performing necessary measures. This multidimensional measurement system developed by many companies can offer the management critical information. Regardless of the industry in which the company persists and products and services that provides, management board is structured to reveal fundamental interdependence of company indicators, its growth strategy and knowledge and skills source. In contrast to individual performance measures of certain functional areas that are often insufficient, irrelevant and incomplete, the management board enables managers to rapidly and efficiently assess how business activities support corporate strategy and show when they are unbalanced.

A great problem is the choice and advancement of key measures on the basis of which the contribution of innovation to business success can be considered. Considering that achieving sustainable competitive advantage implies the need for creating superior value, it is necessary to differentiate activities that create value in contrast to those that destroy it. Not all the resources are equally significant for enhancing competitive advantage and enterprises' business performance. Many valuable resources are generated by supporting innovation (Hooley et al., 2005) and potentially are important as generators of competitive advantage. Resources such as market orientation, the way of strategic response, innovativeness and organizational competence are key factors of business success of enterprises (Gonzales-Benito et al, 2005).

3. ENHANCEMENT OF INNOVATION EFFECT MEASUREMENT SYSTEM

Traditional approaches to business performance measurement are mainly one-dimensional, focused on financial measures, oriented on short-term aims, statically, unadjusted to specific needs of enterprises. Proactive response of enterprises to changes in the environment has conditioned the need for innovation in different areas and management stages. The important changes in the area of evaluation and business performance measurement are evident. Traditional focus has been changed by balanced approach and application, first two-dimensional and then multidimensional models that have diagnostic character because they contain mechanisms for identifying cause-effect relationships. The strategic measurement systems are developed through whose application it is possible to explain the changes in internal and external environment.

Through analysis of reference literature³ it can be concluded that there are no universal and best systems of business performance evaluation. It is possible to define the conceptual framework that can be adjusted in relation to:

- The needs and purpose of measurement in each concrete enterprise.
- Analysis level (functional area, process, business unit, enterprise as a whole).

³ We have analyzed numerous papers which discussed the evaluation of business and innovation performances. Detailed information can be found in the reference list.

- Chosen criteria and their stability (evolution and capability of adjusting to organization's needs).
- Time dimensions (short and long term).
- The number and reliability of measures.
- The possibility of generalization and comparison with other organizations and institutions.

The basic characteristics of strategic performance measurement systems are the following: alignment with aims and strategies, connection of operational and strategic aims, multidimensionality of measurement, choice of measures within each dimension depending on aims, identification of cause-effect relationships within and between different measurement perspectives (Gimbert et al: 2010, 477-497).

Innovation effect evaluation is always a current problem and gains in importance under the conditions of global environment. Through connecting different stakeholders into different forms of relationships and networks the innovation approach is changed, which demands the change in innovation performance evaluation. Traditional systems of innovation evaluation are focused primarily on effect measurement of research and development function as the areas that are primarily responsible for innovation creation. However, the activities of research and development represent only a small part of all innovation activities in an enterprise.

The problem of innovation effect evaluation stems from the fact that the notion innovation has different meanings both in theory and practice. According to OECD whose definition is used for assessment of national innovation capacities (OECD, Oslo Manual, III ed. 2005) "*innovation is the application of new and significantly improved product, service or process, marketing method or new organizational method in business, work organization or relationships between business subjects and the environment.*"

Starting from the mentioned definition in creating a model of innovation effect evaluation, it is necessary to define measures that are directed to the following innovation types:

- Product innovation – encompasses all product innovations, including design and package
- Service innovation
- Process innovation – aside from production and delivery, other business processes are included that contain different activities in the value chain. The value chain consists of the collection of activities to be performed in order to design, produce, sell and deliver the value. Through analysis of these activities, the enterprise acquires information, which is the base of redesigning internal and external processes of the enterprise with the aim of improving effectiveness and efficiency.

Aside from identifying the indicators of innovativeness in company in the area of product, service and process, it is necessary to analyze the correlation between resources and outcomes.

The chosen evaluation model of innovation performance should contribute to continual strategic advancement. In compliance with the chosen priority aims, the process of continual strategic enhancement implies constant examination of identified performance measures. It is necessary to define the measures for chosen strategic aims. The process of continual strategic enhancement secures the flexibility of the system.

Exhibit 1. Dimension and indicators of innovation measurement effects

Dimension	Indicator
Financial dimension	<ul style="list-style-type: none"> ▪ Achieved rate of return ▪ Revenue percentage from sales of new products and services ▪ Revenues from sales of products and services with high technology ▪ Revenue from sales of licensing and patents ▪ Business costs reduction percentage (work costs, raw and other material costs, energy costs) as a result of innovation ▪ Revenue percentage in the international market as a result of innovation ▪ Costs of servicing consumers with new products ▪ % of sales of new products as a result of the recommendations of satisfied consumers ▪ External resource percentage of innovation financing ▪etc.
Consumer dimension	<ul style="list-style-type: none"> ▪ Index of satisfaction of consumers with new products and services ▪ Market share percentage as a result of innovation commercialization ▪ New consumers obtaining rate ▪ Consumer retention rate ▪ The number of consumer complaints about new products/services ▪ Number of complaints and complaints of consumers of new products and services ▪ The change in image and reputation (brand and enterprise) according to innovation ▪ Innovator's image ▪ etc.
Internal process dimension	<ul style="list-style-type: none"> ▪ The number of complementary development programs ▪ The number of commercialized new products/services ▪ The fastness of development of new products and services ▪ Leading time from order to delivery ▪ Leading time in production ▪ IT capacity per employee ▪ Average time necessary for making decisions ▪ Etc.
Learning and growth dimension	<ul style="list-style-type: none"> ▪ Research and development costs ▪ The number of new ideas/inventions ▪ Investment in the development of new products (absolute and relative in relation to overall investment) ▪ Investment in the development of new markets (absolute and relative in relation to overall investment) ▪ The number of technical solutions ▪ The number of protected patents ▪ The number of commercial patents ▪ The number of protected seals ▪ The number of protected rights of industrial design ▪ The number of protected products with geographical origin ▪ The share of new products in the overall product portfolio ▪ Investment in employees' training at annual level ▪ The number of training hours for employees for the purpose of enhancing knowledge and skills ▪ The participation of employees younger than 35 years of age ▪ The participation of employees with higher education ▪ Networking into different network modes ▪ Etc.

Based on results of theoretical research on numerous models that have been conceived for the purpose of measurement of enterprises' business performance first of all, it can be concluded that for evaluating innovation performance the concept of the balanced scorecard adapted to specific measurement needs could be used. Within each dimension it is possible to choose several specific measures by means of which the innovation is evaluated. Innovation effects are multiple and it is necessary to connect them not only to financial dimension but other dimensions as well: consumer dimension, dimension of internal processes, learning and development. The number of measures is different. Depending on the specific needs and purpose of measurement, it is possible to choose optimal combination within each dimension (Exhibit 1)⁴.

The chosen measurement system should enable (Rayport, Javorski, 2001, 269-271):

- Definition of innovation strategy and its alignment with business strategy as well as translation of innovation strategy into wanted outcomes;
- Identification of specific measures that reflect wished outcomes.
- The choice of leading and supporting indicators and their mutual adjustment and connection. For example, financial measures (percentage of revenue based on innovation, reduced costs as a result of innovation process, etc.) as supporting indicators of innovation as well as business performance should be clearly connected to leading indicators (launching a new product in the market, business model innovation, connection with consumers, etc.) and establish the direction and intensity of effects.
- The choice of standards for comparing (target measures) the achieved outcomes and establishment of deviations in relation to the achieved aims.

The conclusion that stems from the analysis is that there are no universally best systems and that the adjusted systems that are aligned with business mission, aims and strategies should be developed. Numerous purposes of creating strategic measurement system point to the importance of extraction of the role of each dimension in relation to the performance measurement system as a whole. In that sense, it can be concluded that the design of these systems should result in one intelligent and purposeful construct. The key questions that the management should answer are related to (Michele, Manzoni, 2010, 474):

- Why do organizations include and continually enhance the defined system?
- What are the roles they are assigned to?
- Will their characteristics be consistent and aligned with the defined aims?

The number and kind of chosen indicators within each dimension are conditioned by the answers to these questions. Indeed, organizations should make decisions on the flexibility degree that want to embed into the system depending on the specified usage in the short term and long term as well. The balance between leveling and enhancement as well as the frequency of monitoring and reexamining the systems defines their dynamics. Also, the design of the strategic measurement system should be conditioned by environment in which organizations do business, its strategy, and connections to key stakeholders as well as implications that the measurement system can have on maintaining and modeling new

⁴ Background of the definition of the innovation performance measurement system is the model by Caplan and Norton.

organizational culture. In the world where the tempo of changes has been significantly increased in the past few years, there is a growing need for designing an adequate innovation performance measurement system of enterprises not only to increase the alignment with the existing strategy but to support enhancement and continual adjustment to new strategies.

CONCLUSION

It is very difficult to measure the contribution of innovation by means of overall business performance of a company. It has been considered for a long time that it is enough to evaluate that contribution through qualitative primarily non-financial measures. However, it is well known that one can successfully manage only that that can be measured. Considering that the innovation costs constantly grow it is logical that consideration of the rationality of investment decisions in this activity area is demanded. The purpose of innovation performance measurement is not only control but motivation, reward and enhancement. Employees in these jobs try to connect their results as well as rewards to investment in an adequate manner. By quantifying the results, through connection with financial measures, it is possible to show what the real contribution of an innovation is like.

Efficient management of enterprises under contemporary business conditions implies designing adequate business performance measurement system and within it, innovation performance measurement. The creation of innovation performance measurement system is related to numerous problems. Theory and practice research show that there is not enough attention paid to the issue of designing, especially strategic innovation effect measurement system. Numerous researches primarily empirical shows that managers are not satisfied with the existing measurement systems. The used measures are one-sided, complicated and there is no clear connection between activity measures and strategic aims. They also do not express the aims of different constituents.

Information on innovation performance is used with the aim of showing the results within the very organization as well as in relation to key stakeholders. Consequently, if the information on performance is related to strategic aims of organization it is used in order to show the achieved advancement (progress) towards the aims. On the other side, performance indicators are often used for symbolical purposes and in this case their aim is to increase a relative power of concrete business unit or sector within the organization or to meet the requirements of external stakeholders.

It is unquestionable that innovation performance measurement is a powerful means. However, if we view it separately it does not represent a guarantee for success of the enterprise as a whole. Hence, it should be viewed as an integral segment of broader wholeness and benefit jointly with other mechanisms, including different dimensions and measurement purposes as well as the systems of reward and motivation and training programs. Performance measures represent indicators by means of which the fulfillment of planned innovation aims and the implementation of the defined strategy are considered. Different performance measures according to some perspectives of the proposed model can be brought into relation with certain stages in the process of development and innovation commercialization.

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UNAPREDJENJE SISTEMA MERENJA INOVACIONIH PERFORMANSI PREDUZEĆA

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Uslovi poslovanja u kojima posluju savremena preduzeća postaju sve složeniji. Kompleksnost poslovnog okruženja uzrokovana je delovanjem kako eksternih tako i internih faktora što nameće potrebu zaokreta u upravljačkom fokusu. Zaokret se ogleda, pre svega, u promeni poslovnih modela. Promene su izražene u svim fazama procesa upravljanja. Razvijanje i unapredjivanje sistema merenja poslovnih performansi je oblast gde su promene očigledne s obzirom na interesovanje akademske i stručne javnosti. Dolazi do promena u shvatanjima da je osnovna svrha merenja poslovnih performansi kontrola. Pored kontrole, svrha merenja poslovnih performansi je unapređenje, motivisanje i nagrađivanje, odnosno povezivanje ciljeva i strategija. Ne postoji univerzalni sistem merenja inovacionih performansi koji bi bio pogodan za sve organizacije. Stoga je potrebno kontinuirano unapredjivati sisteme vrednovanja i prilagođivati ih u skladu sa postavljenim ciljevima. U radu su analizirani savremeni sistemi vrednovanja poslovnih performansi i predlažen je model za merenje inovacionih performansi preduzeća..

Ključne reči: Poslovne i inovacione performanse, merenje, sistem merila, integrisani model.