A Conceptual Model Of Linkage Between Innovation Management And Controlling In The Sustainable Environment

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ABSTRACT

The main objective of this research is to investigate the role of controlling in the innovation management process respecting sustainability. The question of interest is whether controlling is involved in the innovation management process and how to measure the effectiveness of innovation process using controlling as analytical and informative function and support to the management of the company. Today's approach to strategic management emphasized concept of sustainability and innovation. For that reason there is a need for a broader role of controlling in decision making process, especially for the purposes of efficient measurement system. In order to develop conceptual model of the relationship between innovation management and controlling research is done on Croatian enterprises that has controlling department. The involvement of controlling function in innovation process is analyzed using interview method and results confirmed insufficiently developed linkage between controlling and sustainable innovation management. The conceptual model which is proposed is developed with regard to sustainable innovation process and management performance within which controlling place coordinative and integrative role. A model suggests five stages of the innovation process in which controlling is included as analytical and informative function. Also, a model provides a framework for further elaboration of controlling effectiveness, when it is included in innovation management process.

Keywords: Innovation Management Process; Controlling; Strategic Management; Sustainability; Measurement System

INTRODUCTION

The concept of innovation as a key driver of economic growth has been recognized in the theories of economic growth since 1950's when economist Robert Melton Solow supplemented Adam Smith's input factors of labor and capital with third- technological innovation, which he termed «total factor productivity.[1] Knowledge, technology, entrepreneurship and innovation are the center of the growth model (Solow, 1957). Another famous economist Joseph Schumpeter recognized innovation activity as an independent productive factor and showed that innovation has an influence on the growth of business and economies. He also emphasized the entrepreneurial function as an important fact for effective innovation but also regarded the innovative activity of entrepreneurs as a process of «creative destruction», which leads to change in economy or transformation of society. However, as Schumpeter emphasized, innovation also leads in economic structures, which is named «creative construction». (Lambooy, 2005)

Innovation is mainly defined as a change or novelty induced by human creativity, resulting in the adoption of new ideas, new products or services, systems, processes, policies or programs (Zaltman, Duncan & Holbek, 1973, Daft, 1982; West & Farr, 1989, Dory, 2005). It is the result of interaction between individuals and various

[1] Solow model was awarded the Nobel Prize in Economics in 1987. His theory is related to correlation between increased economic growth and increased total factor productivity and vice versa and was confirmed by many empirical studies.

organizations, systems and institutions, using price or other signals to find the direction in which to develop (Lambooy, 2005). Innovation can be also viewed as incremental or radical, based on or introduced by new technologies or processes, which are marginally or significantly different from the predecessor (Bleischwitz, Giljum, Kuhndt & Schmidt-Bleek, 2009), component or architectural (Hellström, 2007). OECD's Oslo Manual (1997) narrows the definition of innovation only to the application of technologically new products and processes and their significant technological improvement, but also emphasizes that innovation is a complex, diversified activity with many interacting components.

In today's sustainable economy, innovation plays a central role in creating value and sustaining competitive advantage (Baregheh, Rowley & Sambrook, 2009) and in the EU 2020 growth strategy, innovation is one of the five main objectives, which should help EU to become a sustainable and inclusive economy. (Europe 2020, 2012). According to the concept of sustainability, innovation should be socially, environmentally and economically sustainable, optimizing these three pillars, which is not an easy task. There is a need for more open innovations as well as more room for social innovation experimentation: "Social innovation is an important new field which should be nurtured […] to find new ways of meeting social needs which are not adequately met by the market or the public sector […] (European Commission, 2010)

What is the link between innovation and controlling? Realization of the EU's new development strategy, Europe 2020, requires sustainable management which will be achieved by the use of specific toolset and steering instruments. A steering cycle which includes clearly set targets, planning and measurement system is the main component of business controlling. Sustainability business is creating new targets or modifying the existing ones, and controlling tools have to be adjusted. Controlling, as one of the important management functions, supports innovation management to meet the requirements of sustainability through expanded and additional assessment of measurement system. Innovation indicators should be implemented for measuring the effectiveness of new sustainable innovations. In the literature on innovation management, measures are frequently proposed but empirical studies have found many organization tend to focus only on the measurement of innovation inputs and outputs and ignore the processes in-between (Cordero, 1990).

Although people generally assume that innovation is a more technical task, it is a function carried out by all the core process areas in the company. For that reason, innovation management and controlling has become increasingly important for business. Controlling as a management service has to follow changes in management's activity and become proactive driver of innovation. Controllers and the management have a joint responsibility to reach the objectives because they help design management process.

The aim of this study is to investigate the role of controlling in the innovation management process respecting sustainability orientation in the enterprise's performance. This research is motivated by the fact that neither theoretical nor practical approach to this issue is sufficiently investigated. In Europe, the German approach to the function of controlling is dominant focusing on strategic and operational role. At the same time EU strategy encourages the development of enterprises on the concept of sustainable innovation. Empirical research and practice, especially in the CEE countries indicates the still insufficient involvement of controlling in the innovation process and strategic management. Our research confirms that controlling is mainly focused on financial measurement and reporting system and its broader role is still missing. Therefore, we believe our conceptual model to be useful and contributing to the development of this field of science. To answer to our research question concerning whether controlling is involved in the innovation management process and how to measure the effectiveness of innovation process using controlling, we used interview method for the purpose of exploratory research.

The research is structured as follows: firstly, the relation between management innovation and controlling is theoretically explored, taking into account sustainable environment. Secondly, to confirm insufficient involvement of controlling in the management of innovation we used interview method. Sample is consisted of 84 large and medium Croatian companies and financial institutions that have controlling department. There is no official data about number of companies that have controlling department but according some assessment there is around 120 (sample of 70 per cent). Thirdly, based on the interview results and available literature review we placed a conceptual model which highlights the need for expanding the role and tasks of controlling in the process of

introducing innovation and during its implementation. By setting up the conceptual model connecting the most common stages of the innovation process with the updated function of the controlling in the sustainable environment ("controlsustainovator"), we believe our contribution to the science is valuable.

INNOVATION MANAGEMENT AND CONTROLLING IN THE SUSTAINABLE ECONOMY

When talking about sustainable economy in the environment of sustainability, terms corporate social responsibility (Carroll, 1999), corporate social performance (Wood, 1991), corporate citizenship (Crane, Matten & Moon, 2008) are frequently used. In such environment the scope and commitment of management and owners, as two main stakeholders, expand. A company can realize its mission, vision and objectives only by adapting to the demands of the broad concept of sustainability where, beside economical, mostly financial aspects of performance, environmental and social aspects are at the same level of importance. «Social enterprise» (Gray, Owen & Adams, 1996), described also as «moral person» (Monks & Minow, 2004), or «collectivist entity» (Capaldi, 2005) has rights but also obligations to perform with the purpose of satisfying interests of all stakeholders (Freeman, 1984). Thus, «triple bottom line» (TBL) concept (Elkington, 1997), often called 3P – «people, planet and profit» presents a standard of sustainability and sustainable economy. Regarding the link between sustainability and innovation there are many studies which confirm their positive relation because many aspects of CSR create a new products or processes. CSR could be viewed as a form of investment and a mechanism for product differentiation.

Today companies are finding themselves challenged by various stakeholders, primarily customers, for aspects of TBL commitments and performance. They are faced with a need to build sustainable competitive advantage to stand out from the competition. Over 30 years ago Porter (1980) emphasized that the main competitive advantages are innovation, new business models (Grant, 2005), research and development in general. Innovation as a necessity for competition is emphasized in much of the earlier scientific research (Drucker, 1998, Levitt, 1963, Pearson, 1988, Porter, 1980) and it is evident in the last two/three decades that there have been a significant number of innovations in the area of products, services, manufacturing, IT industry, process systems and other. There is a need for new business models (Grant, 2005), research and development in general. Recent orientation to sustainable products meant adoption of new innovative strategy and acceptance of additional expenditure for R&D. Lopez, Perez & Rodriguez (2008) found that company R&D expenditure is affected positively by adoption of CSR oriented goals and that the companies which have adopted CSR practices tend to be associated with R&D expenditure. Regardless, CSR driven innovation is aimed to align social processes but also to enhance value.

In research, there have been many different views regarding the types of innovation. Some (Reichstein & Salter, 2006, Becheikh, Landry& Amara, 2006) find that process innovations are considerably understudied, emphasizing that 37 per cent of authors investigate product innovations, while only 1 per cent process innovations. From the aspects of Croatian companies and its innovations Veža & Prester (2007) came to the conclusion that there are some innovations in the products and processes but with low innovativeness that the main innovation activity is acquisition of new innovative technologies and these innovations have the greatest impact in return. According to one study (Aboody & Lev, 2001), investment in innovation is often the only type of investment to provide returns above costs of capital. Thus, the growing importance of innovation for business success and competitiveness in the so called sustainable economy is not accidental.

Along with many models of innovation (radical, products and processes), there are also various approaches in the innovation phases or stages (Cormican & O'Sullivan, 2004, Andrew & Sirkin, 2006, Hansen & Birkinshaw, 2007). In terms of company, the application of the innovation is a project task regardless of whether the innovation is operational or strategic. All models of innovations start with initial phase or idea generation, the next step is selection of ideas where has to be decided which idea to track, third step is realization or prototyping where selected ideas are tested, fourth phase is implementation or launch of innovation which passed all the tests and it is ready to find its place on market and the last, post launch phase, is monitoring for the purpose of learning how the process went and how to avoid some observed errors. Besides that, there are some contextual factors like strategy, organizational structure, leadership, culture, skills and other, which are important to consider when analyzing innovation process. The most common stages in the innovation process are shown in the Figure 1.

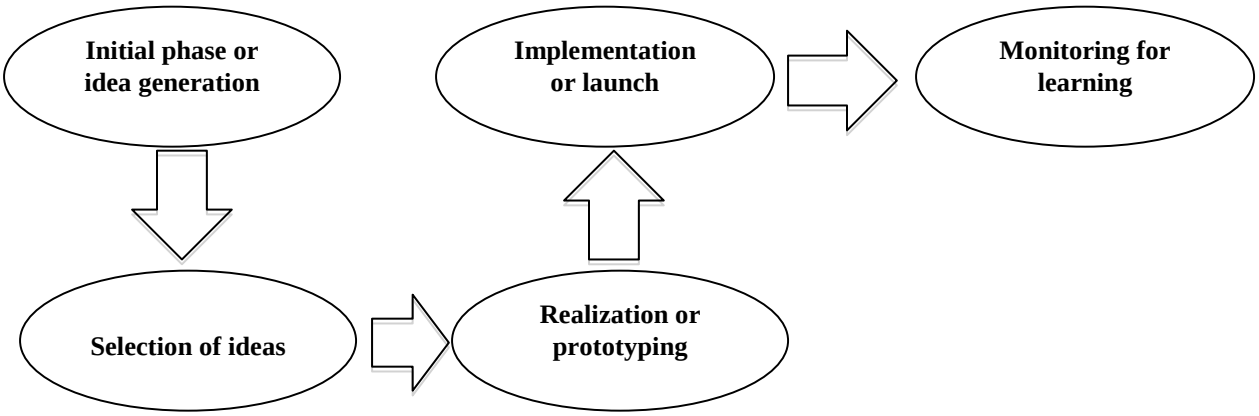

Figure 1: The Most Common Stages In The Innovation Process

Converting ideas to realization i.e. usable products or services, processes and others kind of innovations requires high levels of inter-functional co-ordination and integration. In other words there is a need for controlling which can be viewed in each of these stages as managerial tool for decision making process. In the literature and also in practice controlling as a subsystem of management and one of the management functions is not uniquely defined. There is difference from etymological aspect (process, concept, guidance, supervision, assessment) conceptual (planning, control, analysis, coordination and integration of management functions), ethical (company "economical conscience").It is primarily an analytical informative function that assists management in the implementation of the set objectives, result-oriented coordination of planning and control, along with transparent information provision (Horvath, 2009), reasonable assurance of leadership (Weber & Schäffer, 2011), or management control…. the process by which managers influence other members of the organization to implement the organization's strategies. (Anthony & Govindarajan, 1998). Manager is responsible for the strategy, processes and performance results, while controller is responsible for their transparency. In the environment of sustainability, manager is responsible for the ethical aspects of overall performance and controller~~s~~ for including sustainability indicators in their information system. Through their development stages from "recorder", through "navigator" to the "innovator", controllers are today the ones that need to optimize the operations for the benefit of stakeholders. Considering sustainability orientation of controlling it is realistic to highlight controller as sustainability oriented innovator or "sustainnovator" or more precisely "controlsustainnovator"! According to sustainability orientation we propose the following controlling functions (See Figure 2):

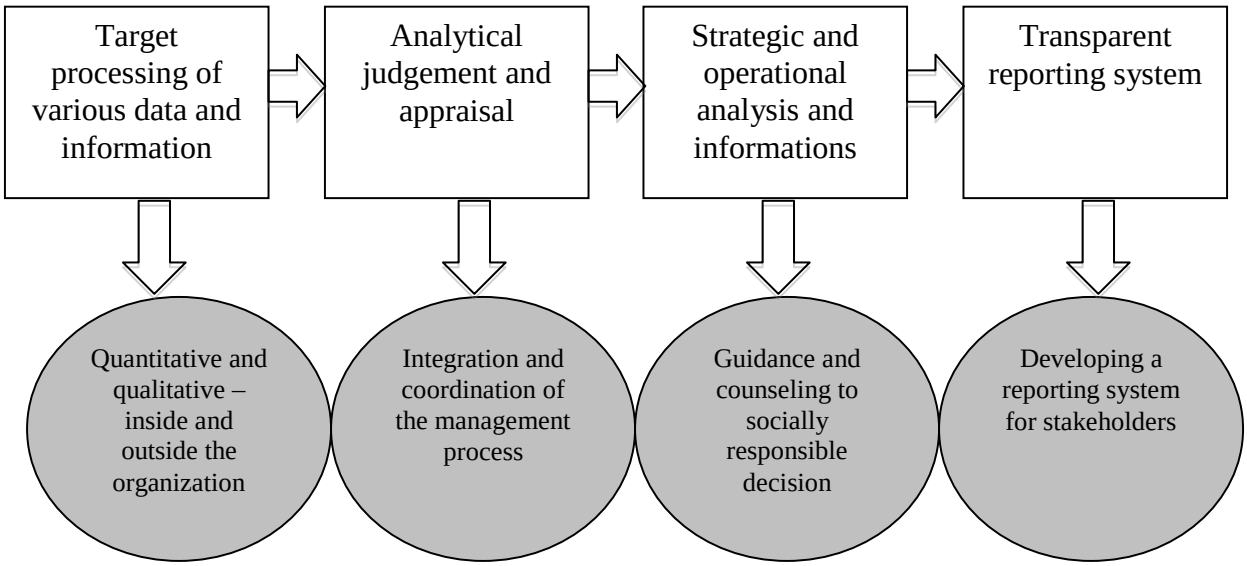

Figure 2: Controlling Functions In The Sustainable Environment

In today's sustainable environment, controlling as a managerial function needs to adjust its instruments and develop an information system that would meet the interests of potential stakeholders. Thus, sustainability oriented controlling, often called sustainability controlling, represents a forward-looking management instrument for business leadership. With regard to innovation management, controlling and its tools should be included in the individual phases. That means to find measurement and reporting system aligned with sustainability concept (like Global Reporting Initiative Sustainability Reporting Framework). Analytical and diagnostic role of controller is particularly important and according Simons "lever of control" (1995) the main actors in diagnostic control system are the gatekeepers (controllers, planners, accountants). Proposed controlling function emphasizes the essential role of controller:

- Collection and statistical analysis of data - controller have to use various quantitative and qualitative data and information inside and outside of the organization
- Analytical - controllers are the one who need to clarify, asses, evaluate and make conclusion on various issues of business performance
- Informative - use analytical skills to develop reporting system primarily for management control purposes but also for all others stakeholders needs
- Coordinative and integrative - controllers coordinate and integrate the main management function planning, organizing, staffing and control in order to make socially responsible decision.

Business orientation to sustainability requires the controller to monitor effectiveness of decision-making process and optimize stakeholder interests.

METHODOLOGY AND RESEARCH RESULTS

Croatia as a post- transition country went through privatization process in which contemporary forms of leadership and management were accepted. The concept of sustainability accepts an increasing number of enterprises under the influence of foreign, especially German and other EU investors. They introduced controlling as subsystem of management mainly in large and medium-sized enterprises. Also domestic companies increasingly introduced controlling in the last ten years as a replacement for the former departments of planning and analysis, or as an entirely new department. The controlling department is independently organized in most of the successful companies but it still does not exceed 50 per cent from estimated companies. (Špac & Mošnja-Škare, 2009), Previous research (Vitezić, 2006) and this research by interview method showed that controlling department is usually centrally organized in the large and medium companies and employs three to five people. It is mainly focused on financial aspect of the business and therefore uses financial indicators and some other quantitative

indicators. In addition to annual reports, controlling is commonly reported monthly and quarterly. Controlling department is usually established because of the need for fast and high-quality information, which should assist management in decision making process for the purpose of the objectives realization. Studies (Vuko & Ojvan, 2013) have shown that Croatian companies with controlling department have an average higher profitability than companies without controlling department. Doubtless, effective controlling has positive effects on the business efficiency and therefore is a useful function within a management system.

In order to make a conclusion about the involvement of controlling in innovation management, explanatory research is conducted. Firstly, large and medium companies that have controlling departments were selected. Companies are from various sectors – mostly industrial, services, trade and financial sector (banks and insurance). The sample includes 84 or 70 % companies of approximately 120 that have a controlling department (there is no official database on the number of controlling departments). With each of 68 controlling managers an oral interview was conducted. The questions referred to the existence of a separate R&D or other department, involvement of controlling in the innovation process, the role of controlling in measurement and reporting system (especially from the point of measuring and reporting).

The results of the interviews are as follows:

- 42% do not explicitly have research and development department but have a department that performs some kind of research in the domain of strategic development, technical department, market research, marketing or working groups for innovation
- Controlling is directly involved in the innovation process in 36% of the companies, is not involved in 40% of them, while in 24% of the companies included partially involve controlling
- In those cases where controlling is involved in the innovation process, it is usually employed for the purpose of assisting in the preparation of feasibility studies, the calculation of prices and costs, and in the later stage when innovation is launched, controlling department monitors revenues costs and their profitability
- Mostly oriented to financial information (sales, profitability) which are reported on a monthly or quarterly basis and sometimes occasionally, depending on individual case

It is evident from the interviews that controlling is rarely included as a team member in the overall innovation process. Coordinative function of controlling is very rarely featured in the process approach to innovation. Effectiveness of individual innovations is also rarely monitored in all stages of the innovation process. Controlling is mainly involved in measuring the effectiveness of innovation upon its implementation as a kind of follow up**.** The financial aspect of measurement as the most common instrument in controlling is evident through the measurement of costs, revenues and profitability of individual innovations.

Proposed Conceptual Model

Innovation process is not strictly set, depending on how it is managed and what the type of innovation is. Likewise, controlling is not determined unambiguously but its concept is derived from the need of management structures of individual companies. The problem is that every manager has their own idea of what controlling is and how to implement it. Very often controlling is identified with control, managerial accounting or with plan and analysis. Over the last twenty years in the Croatian economy, research and development departments have, due to privatization and the lack of industrial development, gradually extinguished. Therefore, a different approach is observed in organization and involvement of controlling in the process of introducing new products, services, processes and other types of innovation.

In today's environment there is a need to innovate controlling function towards sustainability but innovation management also has to meet the requirements of sustainability. Controlling will support that concept through developing new assessment criteria for innovations i.e. adding new measurement and reporting system for innovation efficiency and effectiveness assessment purpose. Supported by the interview results which have confirmed the lack of controlling involvement in the innovation process, theoretical background of the role and

significance of controllers function to management decision making and according to the main stages in the innovation process, we propose the following conceptual model (see Figure 3):

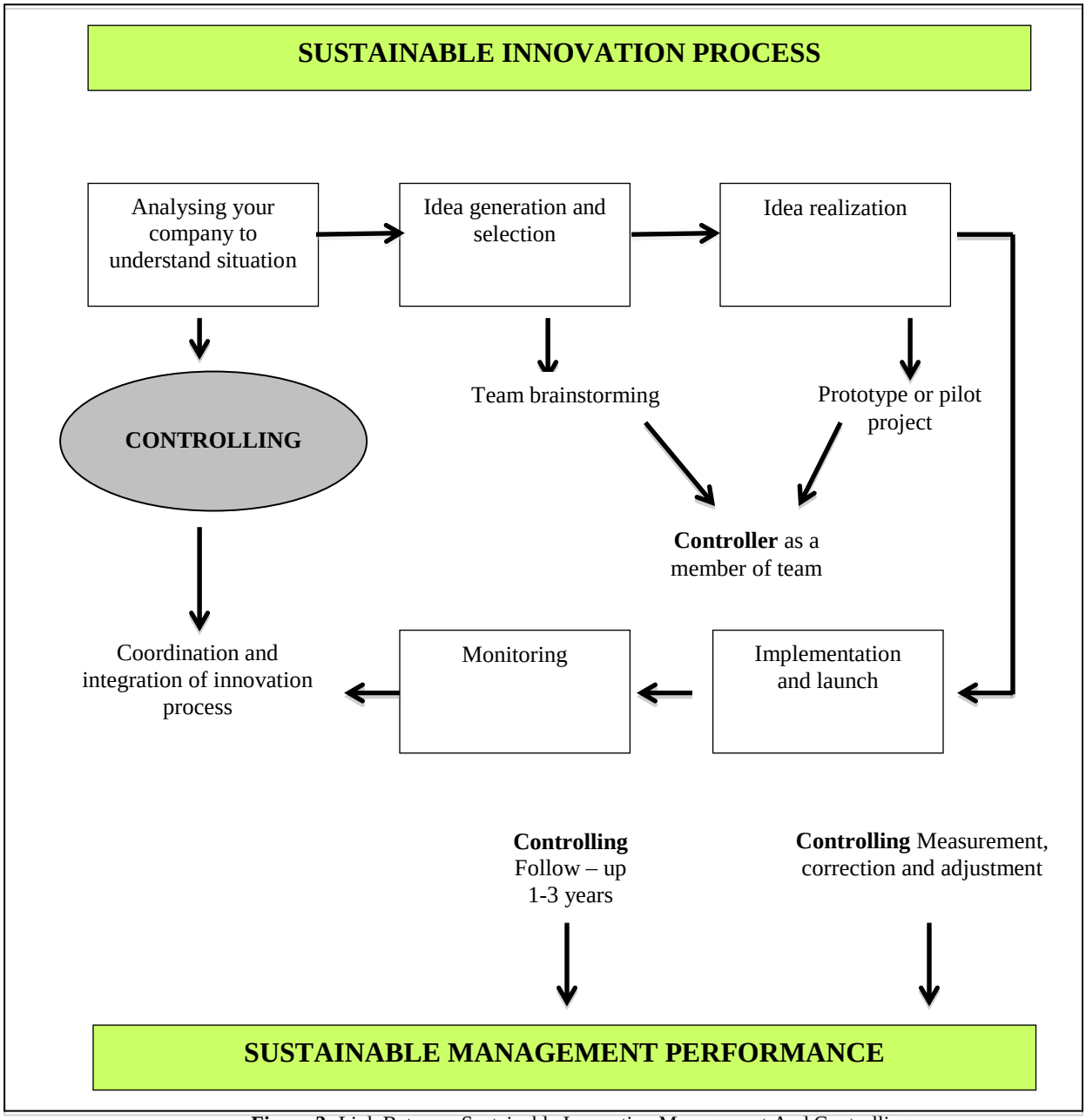

Figure 3: Link Between Sustainable Innovation Management And Controlling

The process of innovation in a company could be seen as a kind of project that is carried by the already mentioned stages. Controlling ensures meaningful and cost-effective operation of the innovation process, coordinating and linking individual tasks within the project innovation.

- In the pre-phase of the innovation process controlling analyzes the current situation in the company, advises management and encourages new ideas to improve business in accordance with stakeholder policy.
- In the first stage of the innovation process it is necessary to assemble a team of different experts - one of which should be a controller. Team members need to develop their ideas but also ideas of people who are in the company encouraged for innovation. (Brainstorming). The result is a selection of ideas. The role of controller is in financial, cost-effectiveness assessment of each idea.
- Realization is the phase where we want to ensure the implementation of ideas through testing and prototyping or performing a pilot project. Depending on the type of innovation controller is included as coordinator and evaluator of effects.
- In the implementation phase and launch, controlling compares the achieved results with the plan, identifies deviations, proposes measures and suggests a solution.
- In the last phase, controlling supervises the execution of the idea and advises if significant deviation has occurred. Monitoring or follow-up of ideas is usually limited to a certain period of 1-3 years.

So, we can say that the common controller tasks are related to the supervision of ideas, coordination among team members and between the team and other employees, synchronize and compare data, mainly monitoring costs and budget, revenue and profitability. Although, beside more favored quantitative indicators, controllers should also take into consideration the increasingly used qualitative ones, including those on corporate social responsibility and sustainability in general.

Finally, innovation management leads towards sustainability and thus the need for controlling support in metrics is developing. The controller as service provider for the management has an impact to decision making process and sustainable performance. Therefore, the controller and the manger are jointly responsible for the formulation and implementation of ideas and sustainable business goals.

CONCLUSION

Innovation is today the main driving force behind business value creation. Therefore the concept of innovation has become an integral part of established theories of economic growth. Market oriented innovation has became especially important to the companies due to need for effectiveness and adaptability towards customers and other stakeholders. Management's main attention has to be primarily focused on external effectiveness but also on the internal efficiency and investments for new innovations or R&D. Reinforcing the need for innovation as a key factor of success poses challenges for innovation management. A challenge in innovation management understands the innovation not only as a new product or service («the invention»), but as a function that permeates all key areas of the process. Given that innovation can be a combination of various factors - marketing, R&D, production capability, these should be integrated in the innovation process. Although there are different views on this, the main activities in the process of innovation management can be summarized in four basic stages: idea generation and selection of the best one, realization or prototyping, implementation, launching and monitoring for the purposes of correction and changes.

The importance of innovation for company's sustainability impacted also the practice of controlling. As a management service which provides transparent information for decision making process, controlling has to follow management's focus and activities. Thus, controllers design and accompany the management innovation process, helping to define ideas, analyzing the implementation of innovation, making corrections and monitoring the effects of new invention or process innovation. The obligation of the controller is to choose the appropriate instruments and customized metrics for analyzing the effectiveness of innovation.

A study on Croatian companies has confirmed still insufficient involvement of controllers in all stages of the innovation process. Controlling is mainly involved in the initial phase through feasibility study and upon the innovation implementation as a follow up analysis. Coordinative and integrative function of controlling is not

sufficiently expressed in the whole process of innovation. Therefore the proposed conceptual model highlights the need for controlling involvement which would include coordination, planning, control and analysis in all stages of innovation management. Adopting proposed model companies can more accurately measure the effectiveness of each stage of innovation process. Measurement of innovation is important not only from research perspective but significantly more from practical aspects. This research is based on current worldwide literature and practice in the post transition country, and should be extended to the other countries. The conceptual model is not scientifically confirmed and further research should be taken to prove efficacy of innovation through controller's involvements and their impacts in each of innovation stages.

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