



Introducing ICT-based innovations in management process of small and medium enterprises

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Abstract

This paper takes a closer look at the concept of innovation based on information and communication technologies (ICT) regarding the specificities of small and medium enterprises. The starting point of this article is the general definition of innovation understood commonly in the context of entrepreneurship. The characteristics of innovative process will be introduced in selected aspects of management. Author carries out a review of literature concerning innovativeness based on ICT among the firms from SMEs sector.

Keywords: ICT, innovation, SMEs, management

1. Introduction

1.1 The meaning of innovation

The term of innovation is widely used in many scientific disciplines and in the daily life. Starting from general meaning, in the dictionary of foreign languages the following explanations could be found [Sobol 202]: innovation originates from Latin language, it means renewal, novelty, an introduction or implementation of something new, something newly introduced. Definition taken from WordNet dictionary [WordNet 2005] ^[16] underscores the creative character and nature of innovation (creating new things or new process due to the thorough considerations and experiments) and nature of precedence (act of starting something new for the first time). At the general level it is recommended to think about innovation as about the realization of certain new idea. The originality of the idea itself may be, in that sense, fairly relative, considered from a given point of view and in a given context.

1.2 Innovations in economic context

One of pioneers of the researches on innovations was Rogers. He proposed a model treating innovation as an idea, an activity or a thing which is perceived as new by a person or subject applying innovation [Rogers 1976] ^[13]. Innovation is communicated using certain determined channels in a given period amongst community members.

Similar approach was proposed by Kotler [Kotler 1994] ^[9] admitting that innovation refers to any of goods, services or idea which is perceived by someone as new and original. The idea may have been existed for a long time, but is treated as innovation for person who perceives it as totally new.

The two mentioned classical approaches to innovation treat this issue very broadly. Researchers are interested in not only changes of economic nature, but also social and natural nature. The scope of elements being subjects of innovative changes is one of dimensions of innovation and in the area of economy may encompass products, processes, organizations and the ways to reach target segment of customers.

1.3 Understanding innovativeness in contemporary economy

According to P. Drucker, entrepreneurship and innovativeness may be identified with each other [Li-min Hsueh, Ying-Yi Tu, 2004]. The bottom line of entrepreneurship is innovation that is the effort undertaken to assure useful change within possessed economic and social potential of enterprise. Innovation is certain kind of tool used to develop entrepreneurship, enabling the achievement of new possibilities within the possessed constrained resources. Not all the small businesses is perceived as innovative and innovation-oriented. Some of enterprises reiterate only their past experiences. Undertaking risk, they are trying not to impact customer demand generation and avoid using resources more effectively.

Regularly conducted process of innovation always starts from analysis of potential sources of innovation. Depending on the firm's concrete circumstance and the context of its activity, there are different places to look for new possibilities. The sources of innovation may be as follow [Drucker 1998] ^[6]: unexpected cases (success or failure), inconsistency in the logic of process or between expectations and results, process' needs, market changes, demographic changes, changes in perception, new knowledge.

1.4 Varieties of innovations

Innovations may be classified in many ways. Approaching very universally it is possible to accept both the criterion of level of the depth of change and the criterion of object of change.

Considering the level of innovativeness of a given change, it is possible to talk about the radical character of change (radicalness) or its gradual character (gradualness). Radical innovations consist in introduction fundamental changes and total replacement of previous elements, e.g. products, technologies. In accordance with the rule of creative destruction of Schumpeter [Schumpeter 1975] ^[14] the new replaces the old in the process of continuous economic change. Radical innovations require organization to develop completely new modes of action, usually in combination

with changes in standards and values system. Gradual innovations have character of modification. They do not give organization a great competitive edge but they do not require considerable effort and taking risk typical for radical innovations. Product innovations are changes of physical feature or changes in performance of existing products and services or creating completely new products and services [Griffin 2002] [7]. Product innovations consist in the formation or the generation of new product or the improvement of products already existed. Product innovations give us chances to enhance profit majorly thanks to the inclusion in price the so called the newness annuity. Process innovations are changes in the way products and services are created and delivered. The sources of benefit are low cost, enhancing productivity, minimizing the usage of resources.

2. IT-Based innovations

2.1 Character of change related with information technologies

ICT are area of the highest coefficient of innovativeness measured by awarded patents. According to European Patent Office (EPO) [Dernis 2004] [5], more than one third of registered patents is related with ICT. Also the dynamics of growth of patents' number is the highest for this group. For example, in the years of 1991-2000 this growth is at level of 9.5% year on year compared to 6.9% growth of all the patents number.

Innovative solutions in the field of ICT become basis for developing innovations in organization, encompassing:

- Creating new products and services;
- Redesigning business process to achieve competitive advantage due to the speed, flexibility or functionality;
- Creating new ways of customers' contacts and services;
- Creating transparency in relations with suppliers.
- Changes introduced through innovations may concern each element of business system:
- Customers – thanks to innovations a company reaches to new recipients, broaden just conquered market segments;
- Products – innovation induces new product or modifies current product;
- Processes – innovation enhances effectiveness of processes, introduces new processes or modifies current ones.

ICT based innovations have character of changes related with the area of information systems and business activities supported by them. If the innovation change concerning business element (customer, product, process) requires innovatory application of ICT we could also talk about innovation in ICT (innovative application of ICT systems and tools used before). Relation may also works on the other side that is the novelty in the area of ICT delivers foundations to innovative change in the field of business.

Innovativeness based on ICT may be considered broader as a phenomenon of organizational vision. Organizational vision is defined as publicly functional idea of a given application of ICT in organization. The impact of organizational visions on the implementation of innovativeness has both positive and negative character. The desirable activity appears in form of innovation diffusion that is the spread of information about novelties in generally available channels. For firms of SMEs' sector deprived from own resources in the area of research and development it is especially attractive source of innovation.

From other hand, the organizational vision appears frequently in the form of fashionable phenomena about which a lot of thing is talked, written and discussed about. Companies being under pressure of novelty decide to implement the solutions currently popular although not always suitable. Amongst such organizational visions are CRM, Web services and e-commerce.

2.2 IT based innovation process

In the SMEs' sector the process of innovation in general is not subject to be separated in organization and does not acquire formally certain determined frameworks. However it is possible to distinguish individual phases with own specific and scope of activities undertaken. For the processes related with innovations based on ICT one may distinguish the following stages [Rogers 1976] [13]:

- a. Understanding: organizational vision gets to the firm (through contacts with other firms, suppliers, consultants, media, scientific world); the effect is getting to know the idea and its preliminary acceptance.
- b. Adjustment: the application of the idea to the reality of concrete firm: rational justification of the innovation's introduction is the basis to take implementation decision.
- c. Realization: innovation's production start-up; there is some possibilities to make use of other's experiences in case of imitating companies; important are time framework, budget and available resources.
- d. Assimilation: the use of innovation regarding openness and readiness to continuous learning, drawing conclusions, reacting to unexpected situations; careful and mindful analysis of the achieved benefits due to innovation's implementation.

The term mindfulness originated from psychology was developed from individual to organizational dimension. Mindfulness in activities is characterized by the following features:

- Openness to novelties;
- Readiness to see diversities;
- Skill to analyze surrounding context;
- Awareness of the coexisting many prospects;
- The NOW orientation.

The mindfulness in the process of innovation plays double role. From one hand it improves the identification of circumstances that require using innovation, from other hand it favors the effectiveness in innovation implementation. Mindful taking decision in context of innovation consists in rational choices which are compatible with specific organizational conditions, not with behaviors based on others' activities. Firms show mindfulness in innovations based on ICT if they approach innovation with reasoning rooted in facts and organization's specific. Decisions and activities in innovative process should take under consideration specific of organization, because the context is important upon expression any opinion in this area.

3. Managing innovations in small & medium enterprises

The success factors of introduction of innovation based on ICT are to a large extent in convergence with success factors of implementation of IT solution. Yap [Yap 1992] grouped the success factors of application of information systems in SMEs

into categories: characteristics of organization, the way the organization works, characteristics of the system, internal specialist resources, external support of experts. In further parts the examples of concrete factors and limitations influencing innovativeness of MSEs will be presented, namely strategic management, the limitation of resources (internal and external specialist resources) and decisive influence of the owner.

3.1 Innovativeness and strategic management

The relation between corporate strategy and innovativeness for SMEs was investigated by Aragon-Sanchez and Sanchez-Marin [Aragon Sanchez *et al* 2005] ^[4], point out to the right of hypothesis that companies applying finder strategy are more innovative than companies with analyzer and defender strategy. As a measure of innovativeness researchers accept the reference to the number of areas in which company has performed its innovation over the last two years and the number of cases of new ICT application within its structure.

Innovation strategy to a significant extent is derived from capability and personal traits of the owner/manager [Hadjimanolis 2000] ^[8]. In order for the strategic plan worked out by the owner to be successfully implemented the workers should know in detail about that. Decisions related with designing and implementing innovation engaging people as much as possible: the owner/manager, key staff members and other workers certainly will bring about the best possible results [Matley, Martin 2003]. One of the objectives of management in terms of innovation should be to stimulate workers to engage more in the innovative process.

Factor impacting to a significant measure on the success of the innovation process is the adequate management system with developed related instruments. Adequate level of management impacts on setting a working environment and culture that favor the innovation and innovativeness. Researches show that management system should consider the following things: setting goals to improve efficiency, supporting creative workers, analyzing innovations portfolio, setting formal technological committee, encouraging innovative behaviors [Motwani *et al*, 1999] ^[12]

3.2 Organization of limited resources

Engaging the workers in the innovation process is much needed and often brings about unexpected benefits as additional internal source of ideas and innovations. However in order to initiate innovations in area of ICT the engagement of external suppliers is critical. Their role is much appreciated in the absence of own specialist resources [Matley and Martin, 2003].

In the frameworks of innovation process the conducted development of workers' competencies tied to implemented technology may facilitate the support for given solution and enrich internal competencies and technological knowledge [Hadjimanolis 2000] ^[4]. This is especially important for SMEs whose competitive advantage may be strengthened right through the development of technological resources.

3.3 Decisive role of the owner

The characteristic feature of SMEs is in general the decisive impact of the owner on business activities both at strategic level and operational level [Hadjimanolis 2000] ^[4]. It is easy to observe the relation between knowledge and competencies of the owner in terms of ICT and innovation related decisions. The

owner often as the only strategy maker is capable to properly assess potential strategic chances related with given innovation. It is good if such assessment comes and as a result innovative directions are defined. It is much worse, that is unfortunately typical, if too much engagement of the owner is put on current operational activity result in the lack of strategy, especially when it comes to innovation.

4. Recapitulation

For the SMEs, introducing the innovative business solutions based on information technologies becomes most important factor impacting on their competitive advantage. For them, introducing innovative solutions is bound to large organization effort. The result of successful changes is a significant entrance barrier for competition.

Entrepreneurship and innovativeness as its main manifestation require undertaking management effort. Limitations due to the specific of SMEs should be conquered by effective counterweights offered by instruments and the ways to manage the process of innovation.

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