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MANAGING PUBLIC INNOVATION: TOWARD DEVELOPING A NEW MODEL FOR PUBLIC ORGANIZATIONS

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Abstract

Models of innovation take a number of forms, each of which is helpful in highlighting particular aspects and enabling better understanding and practice. There are some models are designed for public organizations in the literature. However, they are not appropriate for Turkish public organizations because dynamics of the innovation process such as drivers, sources, and barriers show significant differences among different regions. In addition, in Turkey, no comprehensive technological innovation model has emerged for public organizations. The research study attempts to address this gap through the development of a new technological innovation model for Turkish public sector. Ongoing innovation projects that are performed by public organizations are analyzed to identify technological innovation process. In the scope of the study total twenty public organizations; all of the ministries and pioneer public organizations that perform technological innovation projects are analyzed. Case study is used as a research strategy and interviews, documentation, and observations are used as data collection methods. In accordance with the findings achieved by the analysis, technological innovation process is identified. Moreover stakeholders of the process, inputs and outputs of the process are identified. The results of the study will light the way for innovation projects and enable successful management of innovation process in public organizations.

Keywords: *Public Innovation, Innovation Management, Public Organizations*

1 INTRODUCTION

“Processes” can be defined as the particular ways in which an individual organization has learned to behave, and include the routines which characterize the culture of the organization (Schein, 1984). Many researches were performed on innovation processes in enterprises and regional competitiveness. With the increasing innovation process research, numerous studies and extensive research in innovation management have descriptively linked innovation with competitiveness and economic outcomes at the national level (Porter, 1990; Nelson, 1993). Moreover these researches attributed to the recognition of innovation as a key determinant of economic growth and a basis for competitiveness (Porter, 2003). Now, it is widely accepted that technological innovation and its effective diffusion are central and crucial to the growth of economic output, productivity and employment (Sternberg and Arndt, 2001).

According to OECD (1997) innovation is the process of making change, difference and novelty in the products, services and business manner to create economic and social benefit. Innovation has a different meaning from a management perspective, it is not a single action but a total process of interrelated sub processes. It is not just the conception of a new idea, nor the invention of a new device, nor the development of a new market. The process is all these things an integrated fashion (Myers and Marquis, 1969).

According to Trott (2002) an organization manages its resources over time and develops capabilities that affect its innovation performance. Innovation process includes an economic perspective, a business management strategy perspective and an organizational behavior to manage internal activities. Organizations form relationship with other firms and trade, compete and cooperate with each other. Individuals within the organization affect process of innovation. Organizational architecture clarifies its way of innovation over time. The organizational architecture contains firm’s internal design including its

functions and relationship with suppliers, competitors and customers. All of these components consist of micro environment. Finally micro environment effects the macro environment.

According to Betz (1998), technological innovation process includes some stages. First, a new technology must be invented. Second, the new technology must be developed and embedded into new products, process, or services. Third, the technological innovation must be designed, produced, and marketed. Technological innovation represents an important source of global competitive advantage in today's technologically intensive competitive markets. To compete in today's technologically intensive competitive markets, companies must create new products, services and processes and they must adopt innovation as a way of corporate life (Tushman and Nadler, 1986). Technological innovations in a firm help it respond quickly to new product offerings and shorten product development time. As technological competition intensifies, it becomes more and more important that firms recognize, protect, and reinforce their technological capabilities as the sources of global competitive advantage (Guan and Liu, 2007). Technological innovativeness plays an important role in developed economies, it is also important in the revitalization of transition economies since it is the driving force behind the process of restructuring and catching up (Gunther and Gebhardt 2005).

Innovation is widely recognized as a core renewal process within organizations. Unless managers continuously look for ways to change or at least improve offerings or create and deliver those offerings, organizations risk becoming increasingly vulnerable to hostile and turbulent environments (Bowen, 1994). For this reason growing attention has been paid to the challenge of innovation management in trying to understand the generic and firm-specific issues surrounding the problem of dealing with this challenge (Tidd et al, 2001). To overcome these challenges organizations need to be prepared for innovation, managers need understand the nature of innovation, organizations need to develop a strategic portfolio of innovation projects (Tranfield et al, 2003). Understanding the nature of innovation in the life sciences is critical to manage innovation process. Developing such an understanding requires a careful examination of the nature of innovation in the life sciences, the innovation process that spans academic institutions, healthcare systems and multiple industrial organizations, and involves a wide range of stakeholders (Atun et al, 2007).

Successful innovation occurs when an invention, related to a product, service or process in some part of the organization's value chain, is joined with a business design, which in turn is implemented with discipline and skill through innovation management (Maital and Seshadri, 2007). This research aims to detect technological innovation process in the public organizations, inputs and outputs of the process, and stakeholders of the process. The findings will help effective management of innovation processes in the public organizations.

2 METHODOLOGY

There are five major research strategies used in the social science; experiment, survey, archival analysis, history and case study (Yin, 1994). Case study is one of the major research strategies. "Case study is an empirical inquiry which investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used" (Yin, 1984). Compared to other methods, the strength of the case study method is its ability to examine, in-depth, a "case" within its "real-life" context (Schell, 1992). The case study method helps you to make direct observations and collect data in natural settings (Bromley, 1986).

The purpose of this study is to identify innovation process and stakeholders, inputs, outputs of the process. This study used case study as a research strategy and data gathered through case studies are qualitative. In this study interviews, documentation, and observations are used as data collection methods. The interviews performed during the study were semi structured or open interviews. The research process consisted of six steps: literature review, setting the research questions, case and interviewee selection, data collection, data analysis, identification of the innovation process.

Twenty organizations are participated in the study. On the other hand twenty eight technological innovation projects are examined. All ministries, two governmental organizations, one nongovernmental organization and two private firms that are project partners of the public organizations are analyzed as cases. The selection criteria for the cases and projects were:

- The cases are public organizations located in Turkey
- Case study projects must contain a technological change at least for the organization
- Case study projects must contain an economic or social value

Research questions that meet objectives of the study were answered by top level IT managers during the research. Twenty one managers are interviewed during the study. The selection criteria for the interviewees are:

- They hold executive positions in the public organization
- They have experience in strategic management at business or technology level
- They are willing to allocate minimum of 45 minutes to discuss the matter

In this study interviews, documentation, and observations are used as data collection methods. The interviews performed during the study were semi structured or open interviews. Researcher utilized a MP3 player that has recording option during the interview to record conversations. Information about the technological innovation projects performed in the public organizations accumulated from documents, books, governmental reports, and booklets. The researcher took observation notes during the case study. Following research questions were prepared to guide data collection:

- What are the technological innovation projects that are performed by the organization?
- What are the stages and processes of the technological innovation projects?
- Who are the stakeholders of technological innovation process?
- What are the sources of new ideas and innovation?
- What are the obstacles in front of the innovation?
- What are the drivers of innovation?

The interview process methodology was as follows:

1. The interview procedure was initiated by a telephone call or e-mail. The interview reason and purpose of the research were discussed, the time and place for the interview is set.
2. Interviews were performed face to face in the interviewee's office when the time comes. The interview was initiated with a short explanation of the topic. The interview was semi structured; questions were preplanned. All of the questions were asked to the interviewee.
3. The researcher throughout the conversation recorded the interview on a MP3 player. The interviewee was aware about this.
4. The interview time range was from forty-five minutes to two hours. Only in one case a follow up meeting was arranged to complete the interview.

Twenty eight technological innovation projects that lead innovation in the public services are examined in the study. Table 1 illustrates examined technological innovation projects which are performed by the public organizations.

Organization	Technological Innovation Projects
Metu-Technopolis, Ankara Chamber of Industry, SMIDO	Innovation Relay Center Anatolia, Business Support Network Anatolia
Ministry of National Education	ILSIS, E-School
Ministry of Public Works and Settlement	Remote Sensing and Geographical Information Systems Project, Land Registry and Cadastre Information System, Disaster Information System
Ministry of Finance	Finance SGB.Net Project, Strategic Management Project
State Planning Organization	E-Transformation Turkey Project

Ministry of Transport	Land Automation Project, National Transport Portal
Ministry of Energy and Natural Resources	ENEBIS, Ministry of Energy Portal
Ministry of Agriculture and Rural Affairs	Farmer Registry System
The Ministry of Industry and Commerce	Electronic Commerce Project, SME Information Collection Project
Small and Medium Industry Development Organization (SMIDO)	KOBI-NET Project, KOSGEB MIS
Ministry of Health	Sağlık-NET Project, TELETIP
Ministry of Culture and Tourism	Turkey Tourism Portal, Turkey Culture Portal
Ministry of Justice	Better Access to Justice, National Judiciary Informatics System
Ministry of Labour and Social Security	Worker Entry and Exit Declaration Project, Work Inspection Project, Zone Automation Project

Table 1: Technological Innovation Projects

Case study tactics used to increase reliability and validity of the study. Multiple sources of evidence (interviews with multiple organizations and departments, governmental documents, books, observation, web sites) are used in data collection phase to increase construct validity. Research questions are prepared to guide data collection, findings and results are derived from the collected data. The report is reviewed by participants. For internal validity, pattern matching technique is used to analyze case study evidences in data analysis phase. For reliability of the study, case study protocol and case study database are prepared.

Recorded interviews transcribed before analysis of the interview data. Analysis of the data collected from case study is performed using pattern matching technique. Campbell (1975) described "pattern-matching" as a useful technique for linking data to the propositions. He asserted that pattern-matching is a situation where several pieces of information from the same case may be related to some theoretical proposition. Several pieces of data collected from cases are classified into patterns. Then selecting the data from patterns, data matrixes are designed. In this way, we are able to get a mixture of qualitative and quantitative data. The following sections discuss these findings.

3 RESULTS

According to the results of the study, it can be stated that innovation process in the public organizations consists of four stages and six steps as illustrated in Figure 1. Stages of the innovation process are idea generation, project development, production and innovation. Six steps of the innovation process are idea, project study, project approval, project implementation, new services and innovation.

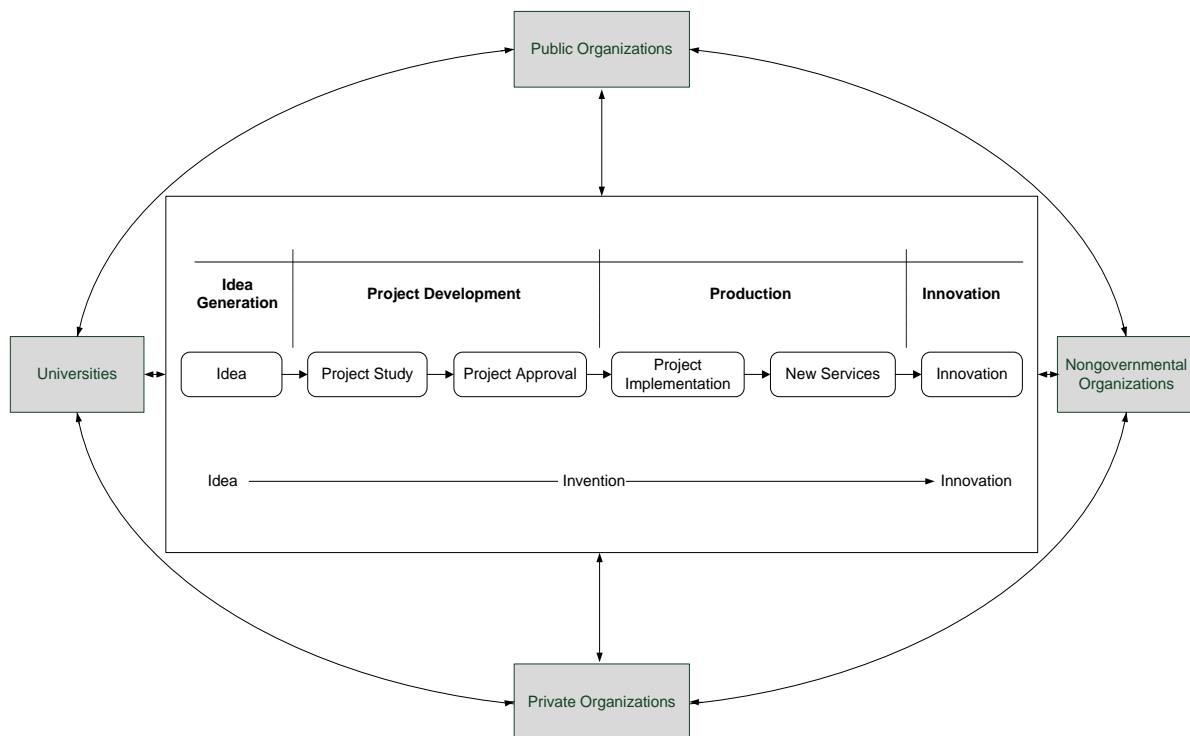


Figure 1. Technological Innovation Process in the Public Sector

Idea generation is the first stage of the technological innovation process, in this stage new ideas that will be transformed to new projects to lead innovation are generated. There are four different sources of new ideas and innovation in the public organizations. Table 2 illustrates sources of innovation in the public organizations. In the table, percentage shows frequency of the related item. According to results of the study show in the table, it can be stated that most of the innovations arise from personnel and legislation. Nevertheless some of the innovations are arise from citizens and other firms.

Sources of Innovation	%
Personnel	78.5
Legislation	64.2
Other Firms	14.2
Citizens	14.2

Table 2. Sources of Innovation

Personnel who think about how to serve better and how to ease business processes try to generate new ideas. New idea generation is performed in the public sector when there is qualified staff. Only skilled staff can generate new ideas in an organization. But employing qualified staff in the public sector is too hard because of the low wages policy. As a result, innovation and new idea generation get hard in the public organizations with lack of qualified employee. Government tries to overcome inactivity of the staff and force them to design new projects by legislation. New laws are introduced to force organizations to make innovation. Sometimes new ideas are generated by citizens. Citizens are the end users of the services for the public sector. When they are not satisfied from the existing services they make suggestions to the organizations. They generate new ideas in order to take a better service. Public organizations can demand new ideas and projects from other organizations especially from consulting firms to innovate in the organization.

Project development is the second stage of the technological innovation process. This stage consists of two steps. In the first step of the stage, project feasibility study, project plan, and project documentation are performed. In the second step, approval of the project is performed by approval

authority. First, approximate cost of the project is calculated in the project feasibility study. Approximate cost indicates the financial budget of the project. This indicator determines the approval authority. Approval authority is the authorizing officer who decides acceptance of the project. Authorizing officer can be head of the unit, undersecretary or minister according to the financial limit of the project.

Obstacles in front of the innovation prevent transformation of new ideas into projects and transformation of the projects into innovation in the public sector. Table 3 illustrates obstacles to innovation in the public organizations. According to results, the main obstacles in front of the innovation in the public sector found as bureaucracy, approval authority, legislation, and lack of qualified staff.

Obstacles to Innovation	%
<i>Bureaucracy</i>	100
<i>Approval authority</i>	92.8
<i>Legislation</i>	92.8
<i>Lack of qualified staff</i>	71.4
Work environment	35.7
Financial constraints	35.7
Management hierarchy	21.4
Low wages policy	14.2
Government program	7.14

Table 3. Obstacles to Innovation

Production is the third stage of the technological innovation process. This stage composes two steps; project implementation and new services. In the first step of this stage, implementation of the project is accomplished. The second step of this stage is gaining the new services. After implementation, a new service is acquired. The completed service is accepted by the examination and acceptance commission of the public organization. It is tested in the maintenance period. According to result of the tests, final acceptance of the service is done if there is no deficiency.

Innovation is the last stage of the technological innovation process. In this stage, diffusion of the new service is performed in order to innovate in the organization. Innovation includes not only the development but also the diffusion of the new services. From the perspective of innovation systems, it is not just the development of new service that is important, as the accessibility of new service is also of interest (Doloreux, 2006).

Verloop (2004) claims that successful innovation requires changes in organizational processes and conversion of an idea into a new product that is designed, manufactured, and adopted by users. According to Rogers (1995) there are different success rates of adoption. Adoption is a decision to make full use of an innovation as the best course of action available. Innovations that are perceived by its potential users as having a higher relative advantage, compatibility, trialability, observability and less complexity will be adopted more rapidly than other innovations (Tornatzky and Klein, 1982). Innovation offers new services for the organizations. Offering a better service or a new service provides easier, cheaper, quicker, and more secured services. Service innovation changes the business processes of the public organization. Mistakes in the processes are minimized because of the innovation.

Innovation can arise from universities, private organizations, nongovernmental organizations or public organizations. An important source of innovation comes from linkages between them. Table 4 illustrates stakeholders of innovation process as composing a complex system where an innovation may emerge from one or more components of the system or linkages between them. According to results of the study, it can be stated that public organizations, private organizations were participated almost all of the innovation projects. On the other hand, Nongovernmental Organizations (NGOs) and universities were participated a few innovation projects performed by public organizations.

Stakeholders	%
Public Sector	92.8
Private Sector	92.8
University	57.1
Nongovernmental Organizations	28.5

Table 4. Stakeholders of the Innovation Process

4 DISCUSSION AND CONCLUSION

Many scientists defined innovation as a process (Hargadon and Sutton, 2000; Buggie, 2001). Nelson and Winter (1978) suggest that innovation, as driven by competition, can be viewed as a process. It is suggested that the process that may successfully attain innovation and hence future organizational growth consists of stages (Rothwell, 1994; Buggie, 2001) such as: strategy development, ideation, evaluation and implementation. Fraser et al (2005) defined innovation as an increasingly distributed process, involving development webs of multiple, players and modular production networks with a variety of possible and dynamic value chain configurations. Thus, viewing innovation as a process provides a systematic model and process of how innovation can be realized.

Storey (2000) sees the idea of innovation as a planned, rational process. This meant that managing it entailed a series of stages with each culminating in a phase or stage review. Typical phases were: idea conception, specification of product, planning the project, prototyping and so on, through to final review. This type of understanding of the process of innovation and its management is closely allied to the idea of product life cycles.

Twenty organizations were conducted to the study and innovation processes that show how innovation is realized in the organization were investigated. The analysis results demonstrate that, in order to reach innovation all of the public organizations follow six identical steps: new idea generation, project study (project plan, feasibility study, and documentation), project approval, project implementation, new services, and innovation.

Findings indicate that, innovation initiates with new idea generation first. Wolfe (1994) claims that innovation process research focuses on the analysis of ordered steps involving the formation, redesign and implementation of new ideas. And Nonaka (1994) confirms that knowledge creation and innovation take place inside new product development projects. According to Zaltman et al (1984) innovation process starts with the generation of initial idea leading to the development of a new product or service. In addition Storey (2000) argues that innovation comes first and foremost from the ideas of individuals and from the way in which the ideas are captured.

Project study is the second steps of the innovation process. After idea generation, new ideas are selected to transform new projects. Cooper and Kleinschmidt (1986) see the idea development and idea selection stages as the 'fuzzy front end' of new product development. And deficiencies in idea development and idea selection are dominant factors explaining innovation failure (Khurana and Rosenthal, 1998). The idea development and idea selection phase is a fundamental stage of the overall innovation process because it represents the initial impulse for further innovation activities (Birkinshaw, 2000).

After project implementation new services enliven in the organization. After this step the last step named as "Innovation" comes. Diffusion and adoption of new service is realized in the last step. Innovation process includes not only the development but also the diffusion of new services. Because successful innovation requires changes in organizational processes and conversion of an idea into a new service that is designed, manufactured, and adopted by users (Verloop, 2004).

Findings indicate that, stakeholders of the technological innovation process are; universities, private organizations, nongovernmental organizations and public organizations. And an innovation may emerge

from one or more stakeholders or linkages between them. According to Doloreux (2004), innovation system is viewed as a set of interacting private firms, public authorities, research organizations, and other bodies that function according to organizational and institutional arrangements and relationships that are conducive to the generation, use, and dissemination of knowledge. In this context, there are multitudes of actors involved in the innovation process. The main partners for innovation activities are; other firms, universities, technical colleges, technology transfer organizations, government agencies, and financial organizations.

Inganas et al (2007) investigated new energy technologies in their research study and identified a number of stakeholders; research institutes, technology providers, energy companies, investors and policy makers. According to them an intensive interaction between technology providers, power companies and research institutes is highly important for the successful transfer of new energy technologies from research institutes to the industry.

According to results of the study stakeholders are significant part of innovation process. External relations with stakeholders enhance the innovation process. Innovation emerges as a result of interaction between the stakeholders. Doloreux (2006) confirms these ideas declaring, innovation is a process by paying attention not only to different stages of evolutionary development, but also to certain types of institutional arrangements, organizational forms, and configurations of relationships among organizations that are all related to the provision of knowledge, finance, and other inputs to innovating firms. Many studies in innovation stress the importance of external linkages and processes at all points along the technology transfer pathway (Tidd et al, 1997). Innovation is seen increasingly as a multi-firm networking process involving close collaboration between companies and a consequent linking of technology-push and market-pull factors (Rothwell, 1992). There is also a presumption that collaboration between universities and SMEs is desirable (Henry et al, 2000).

Successful innovation management is required in order to perform successful innovations. And identification of the technological innovation process is required in order to manage innovation in the public organizations. Technological innovation process in the public organizations was identified through the study. Moreover stakeholders of the process, sources of innovation and obstacles in front of the innovation were detected through the study.

Surely the findings represented in this paper will provide successful management of innovation in the public organizations that will increase national productivity and, as a result, enable to gain international competitive advantage. This study detected innovation process in the public organizations in Turkey. Further research would be useful to research innovation process in the private organizations.

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