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Technology Management Process and Encountered Problems in Organizations

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Abstract – In a fast developing world, the technology -which effects human life in various subjects such as production, planning and marketing- is an important factor to meet the highest level of requirements. This situation has drawn attention of the organizations; identifying and using the technologies to suit their own needs have yielded positive results. However, in order to benefit from the used technology at an optimum level, technology management activities must be performed effectively. Especially, quality-focused competition and technology being the most important component which determines quality clearly prooves that technology management concept is very important for the organizations today. At this point, organizations' scarcity of knowledge about technology management has been effective in both indicating the importance of the subject and preparation of the study. In this study, the meaning of technology management in organizations, its importance, technology management process and the problems encountered during this process are examined in detail. Certain determinations and propositions about the subject are made by focusing on the causes of such problems. It is seen that organizations to restructure the technology management strategies in the light of such propositions is important. (Abstract)

Keywords-Technology, Technology, Management, Organization. (key words)

I. Introduction

In chronological order, the advances in technology has been as; new developments by scientific research in the 1960s, the advance in information through technology in the 1970s and tecnology's intense influence on commercial life since the 1980s. Today, high impact power of technology shapes the organizations in economical life.

Organizations now prioritize high technology in production, planning, marketing and competition stages and develop technological globalization. Technology advances instantly and enables us to make a decision in every aspect of our lives. As a result, technology and its management are the most important phases of organizations in terms of developing the economical activities of the globe [1].

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The increased rate of globalization makes it inevitable for a technological innovation emerging anywhere in the world to effect the rest of the world. If the organizations producing goods, service and information cannot adjust with these changes and make the right decisions and implement them at the right time, they may face many problems, including extinction. With the new production technologies emerging each day, organizations may become weaker against their competitors. Nonetheless, the obligation of adjusting to a rapidly changing environment and sufficiently responding to customer demands requires to predict the changes and to adjust with them [2]. In a very fast changing and indefinite atmosphere, organizations need technology management in order to adjust with the technological changes in a way which makes them both competitively superior and sustain such superiority. Technology management gains more importance as the speed of technological progress increases at an astonishingly accelerated rate. It is inevitable for technology management to become a major part of administrative sciences in the future.

The study features the definition and scope of technology management in the second part, technology management process in the third part, the problems encountered in technology management process in the fourth part and lastly the obtained results and suggestions in the fifth part.

II. The definition and scope of technology management

Technology management is defined as interconnecting the disciplines of engineering, science and management for planning, development and application of an organization's technological abilities to identify and achieve strategical and activity based targets [3]. According to Kurtulan, technology management also utilizes economic science for studies about technological infrastructure and innovation, technological prediction and planning and execution which take place in economic production factors and more generally a country's economic structure [4].

The concept of technology management is usually treated with a narrow perspective and defined as the management of R&D activities. A broader definition of Technology Management is, making the connection between management and technical specialty and the entire activities about planning, organizing, coordination and control of actions to obtain and develop technology such as transfer and marketing of

technology, technological planning, R&D, design, production, prototype creation and testing [1,5,6].

Technology management aims to answer questions such as:

- How to develop technology policies and strategies?
- How to benefit from present technology?
- How to track changes which have the power to affect competition in the market and technology?
- How to produce technology?
- How to protect technology?
- How to purchase new technology?
- How to evaluate and choose technology which will contribute to business processes?
- How to transfer technology?
- How to manage technology producers?
- How to integrate and effectively use technological assets?

In summary, the scope of technology management involves subjects such as technological prediction, planning, risk analysis, R&D management, innovation management, strategies of technological competition, transfer of technology, managing engineers and scientists and technological and organizational changes [7].

III. Technology Management Process

Today, technology management approaches express the need to systematically manage technology within a strategical and operational perspective [8,9]. In this context, technology management is the integration and application of business strategies and technological strategies [10]. Georgy models the technology management process as stages of identification, selection, acquisition, exploitation and protection [11]. Figure-1 shows Georgy's technology management process.

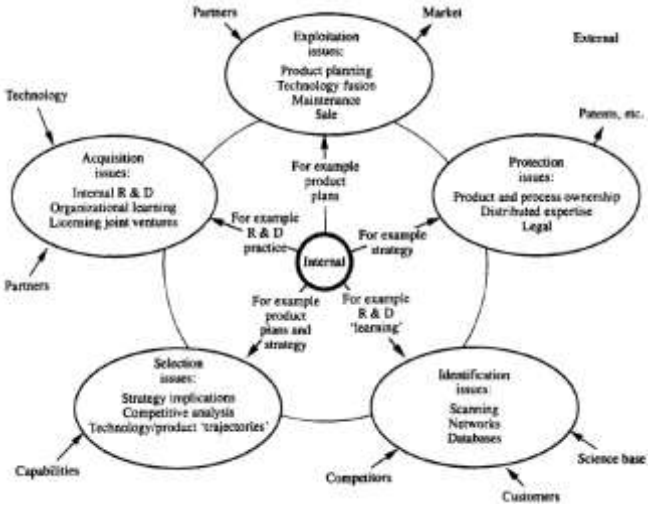

Figure 1. Technology Management Process [11].

Later, Yıldırım (2000) added *"abandonment (dissolution)"* to these stages (Figure-2).

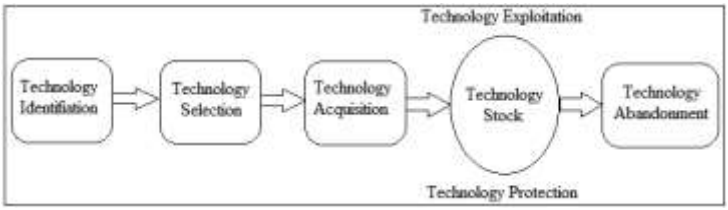

Figure 2. Technology Management Process Model [8,12].

The entire stages of technology management process in this scope are explained briefly below.

A. Technology Identification

Identification of technology involves technological intelligence operations. In an organization, it is inconceivable to perform technology management by being indifferent to developments outside the institution. These activities named as technological intelligence are without doubt conducted in certain measures by every institution. Effectively managed technological intelligence operations will supply the organization with the qualified information that will be necessary during the selection of technology. This activity will also function as an early warning system against newly developing technology which can be threatening to the organization [8,13].

B. Technology Selection

Selection of technology is the determination of technology to be supported by the organization from the alternatives. The decision has great importance for it will designate the technology to which the funds will be transfered. The results of this stage are taken as input for the acquisition of technology process [8,14].

Selection of technology is agreed to have four components. As shown in Figure-3; technological strategy, production and marketing properties, organization substructure and environment factors are the main components in the selection of technology [8,15].

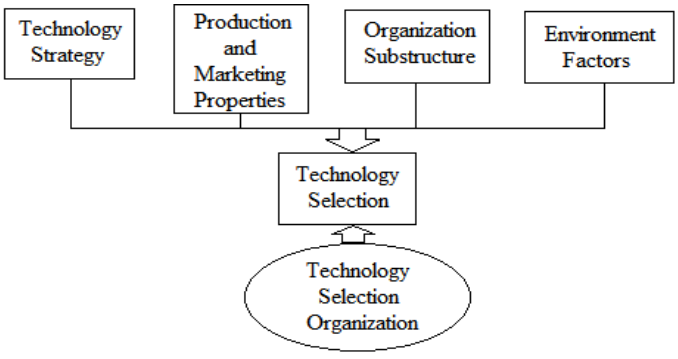

Figure 3. Technology Selection Components [8,15].

C. Technology Acquisition (Technological Transfer)

Organizations decide on which technology to acquire and how to acquire them when implementing their technological strategies [16]. In this context, technological transfer can be defined as a method to relocate or carry over a technology in the phase of making a technological decision. This transfer occurs as the international or interorganizational transfer of newly developed technology to another organization [8,17].

D. Technology Exploitation

An institution uses a technology, which is acquired through development or purchase, in its own production processes usually to gain competitive advantage. Organizations acquire such technology already for this purpose [8].

E. Technology Protection

A section of the technology used by the organizations in relation to their production processes qualifies as public information. Some other section of the technology, however, is private to the organization only and constitutes an important part of organization's competitive power. In this context, protection of technology is arised from the necessity of protecting organization's property rights and commercial advantage. In general, the foremost precautions include patent/utility model registration and design registration [8].

F. Technology Abandonment

Dissolution of technology is the final stage of technology management. Dissolution of technology aims to acquire new technology and react to technological changes in a timely manner. There are two reasons which drive organizations to dissolve a technology; traction effect of the market and retraction effect of the technology. Traction effect of the market involves progressive importance loss or entire abandonement of existing technology because of organization's sectoral needs. Retraction effect of the technology is the replacement of existing technology with a newly developed one. Contextually, technological advancements may cause the dissolution of technology [8].

IV. The Problems in Technology Management Process

Technology management is an area with a variety of conceptual confusion and there can not be a common understanding about its scopes and boundaries, as it is an interdisciplinary branch of science. Some problems are encountered in technology management process as well as in all management processes. Problems faced by organizations can be summarized as follows:

- To start lots of projects where available resources will not be sufficient,
- To allocate critical resources for multiple projects,
- Lack of discipline,
- Managers avoiding tough decisions,
- Organizations experience some difficulties in process of defining and evaluating their technology management process because of the significant lack of knowledge,
- Difficulties experienced in maintaining participation to organizations,
- To be faced with many problems such as cultural and personal differences, incompatibility of people during team work,
- Clash of different opinions,
- Communication and understanding problems,
- To experience problems in technology acquisition process, on supplying some technologies and subunit [1,7].

V. Conclusions and Suggestions

In this study, what technology management means in organizations, importance of technology management, technology management process, problems encountered in this process are examined in detail and significant findings and recommendations have been made by focusing on the causes of these problems.

According to the obtained results, with the right technology management, organizations can predict what technological development will lead to and can organize investment and production by taking these developments into account. Even the organization itself could be the cerator of technological development and could be pioneer in something unknown. Also as another subject, making tecnology selection and acquisition processes healty still requires collecting correct information about current and new emerging technlogy. In terms of the use of technology, organizations can also provide income by opening technology in hand to other businesses. Organizations can enter closed markets for direct sales through licensing or building joint venture. In addition, especially for successful technology management, the person who is in group's chairman position and performing technology planning process should organize teamwork, creative brainstorming session and should do time management and calculation. Nowadays with the increasing intensifying competition in order to provide the expected benefits of technological intelligence activities, these activities should be done planned, organized and continuously for the specific purpose. Moreover, the evaluation of alternative technologies should be done according to the objectives of organization and the expectations of the technology to be chosen. Additionally, independently of the overall organization, Technology Selection Organization should also be considered an important part of this process. Within the scope of protection of technology, a number of measures should be taken to ensure database of organization and security of property rights and to prevent the use of organization's technologies outside of the organization. As a result, maintaining technology management activities, in the

light of significant results mentioned above and recommendations, will be beneficial for the management process as in not to be affected adversely.

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