

Management of Research and Development and Technology Transfer in Banking System

(Case Study: Ansar Bank)

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Abstract: Technology has an important and fundamental role in today's world. Therefore, decision-making about the appropriate technology can make the competitive advantage for our competitors. So, identification of effective factors in technology transfer in every industry helps us. In this regard, we identify and rank the effective factors in technology transfer and its relationship with R&D in Ansar Bank. As appropriate technology can be a significant factor affecting the success or failure of an organization, therefore appropriate technology selection is an important issue that organizations face with them. Many factors influence the technology and the pace of change which these factors are internal and external in some cases. The internal factors include the consideration of research, the importance of technology and its relation to research and development, the risk managers and external factors such as economic, political, cultural factors. In this study, according to previous studies, we attempt to extract the factors affecting technology transfer; the indexes by preparing the questionnaire which is based on Morgan Table are presented to the experts. We filter the important indexes according to their views. In the following, we prepare the questionnaire based on the selected indexes and rank them. After analysis of our data, we analyze and rank the indexes. Finally, we calculate the validity by Cronbach's alpha.

Keywords: Technology, Research and Development, Technology Transfer.

Introduction

Changes in external and internal environments of enterprises were so fast, multi-faceted, complex, and comprehensive that the enterprises cannot survive without foresight, proper planning, and appropriate strategy. In two decades ago, due to market conditions and the lack of competition in it, many enterprises could have acceptable progress in the domestic market. But today, with the competition in market and economic conditions prevailing in the world, no development cannot be achieved appropriate reaction and reasonable response to changing environmental conditions. Respond appropriately and wise response to the complex developments make the social and economic enterprises in theoretical open systems; the systems that permanent change becomes the integral part their nature. Nowadays With the spread of knowledge and breadth of its application in solving many of the problems, research and development are the important issues in various industries. This process can only be won in

the arena of international competition which is perceived as an organized unit and investments need to be done on it. R & D unit loses its true meaning without innovation. Innovation in technology means to achieve the important and efficient progress, and as a result, the correct use of the funds or economic growth (Encyclopedia of Technology, 1970). We now live in an age of knowledge. Technology is knowledge to build goods and services and improve the use of limited resources. Whatever technology is used leads to the development of knowledge. In the late twentieth century, information age has led to the development of knowledge and has had a huge impact on the rate of technological change. Accelerated rate of technological change can have a profound effect on society and on living standards. It is not enough to just produce, but also producing better and cheaper goods and services that would defeat their rivals and go out of the realm of the economy is also important. According to the mentioned points, the study is intended to explain the relationship between R & D units with technology transfer and value creation in the banking system of the country (Aqaei, 1989).

Review of literature

Continued economic growth mainly explained by developments in science, technology, and human capital. Research and development activities (R & D) are also major sources of knowledge and technology developments; so many countries to sustain economic growth expand their R & D activities. According to the OECD, research and development would be far more productive activities on the demands of a foundation which aim to increase human knowledge, social culture, and taking advantage of this knowledge in new applications. One of the features of modern economic growth is a significant role played by technological change is and sustainable economic growth of the developed and developing nations. Therefore, following the emergence of high tech industries, industries that require advanced technology and rapid change, high research and development costs and stress on product design, including information technology, new materials, biotechnology, electronics and aerospace industries etc. their share in industrial production is growing at a high rate. Twenty-first centuries is described as the era of knowledge-based economy; an economy that is based on scientific research and development activities. R & D activity is an organized process of knowledge creation, production, dissemination and application. Research and development activities lead to scientific technological innovation, management measures and social and political systems (Haj Fathalian, 1993).

Based on models of endogenous growth, investment is known as the main engine of growth in research and development. Models indicate that the economic and institutional factors explain how technology can progress. The endogenous growth models such as models presented by Mankiw and Romer and others argue that human capital and knowledge accumulation resulted by education and knowledge creation, are a major source of long-term growth. So the recent studies focused on economic growth and technological progress, a prominent role for investment in research and development is emphasized that Roudriguez-Claire's study can be called. Since the investment in R & D is one of the basic elements in the advancement of knowledge, increasing productivity, and spurring growth; a State which invest sufficient resources in R & D activities and is engaged in research and development activities has the potential to achieve good growth as a result of research and development. On the other hand, an important point is that there is a technology gap between developing countries and developed countries that this gap is a significant part of the large differences in per capita income which separates the rich and the poor economies. An important effect of technological gap can be seen in rich and poor countries in varying degrees of investment in research and development activities and the production of knowledge. For example, countries that form the Group of Seven in 1995, 84 percent of global spending is on R & D and approximately 190 countries spend only 16 percent of the remaining; 92% of inventions is recorded for the countries that are membered at Seven Group (Tabatabaeian, 2005).

The purpose of this study was to investigate the relationship between research and development and process of technology transfer in Ansar Bank.

Technology word composed of two Greek words *Techne* meaning to the concept of wisdom that there are many different definitions for in art and literature of technology management. In a simple definition, technology can be defined as all the knowledge, processes, tools, methods and systems used in the manufacture of products and services. In other words, technology is practical application of knowledge and tools to meet human needs (Abdolhosseini, 2013).

Although the technology is closely related to science, considering this issue a very important that these two concepts are very important. The science is knowledge, while the technology is capability, not every type of ability, but also those that take advantage of the knowledge and abilities to solve a problem or achieve the objectives. It should be noted that due to various social conditions, a set of necessary abilities used an extensive range of science to achieve the goals.

To clarify the distinction with the concept of technology and science, we review the component of technology.

Zeleny divided technology into three distinct, yet equally important component (of course, to their opinion, but all three are equal, however, for some technologies, a component may be more important than the other components):

- Hardware: the physical and logical deployment of equipment and machinery to perform the necessary tasks.
- Software: knowledge of the hardware to perform the necessary tasks and directing and guiding, in other words, the application hardware.
- Brain ware: indeed, determine the reasons for using technology in their path and can be called reason knowledge (Fahim Yahyaie, 1997).
- However, in other sources, brain ware divided by the other two parts of the human ware and organization ware, researchers have tried to emphasize on implicit knowledge that management skills are distinct features of human (Ali Ahmadi, 2000).

Another course has provided a comprehensive definition of technology: A set of information, tools and techniques that derive from science and practical experience and it is used in the development, design, production and use of products, processes, systems and services (Aqaei, 1989).

What is science?

Science is a series of human studies that observe, study the facts and the mental and the physical nature and behavior of the natural world. With the goal of knowledge and understanding as new evidence and prove the general rules, science and technology have emerged at the heart of the natural philosophy of science. Science is trying to find reason. Scientific efforts lead to the books and articles that will be published. Science continues to grow steadily. Scientific discoveries publish without delay and national aspects and its implications pass freely geographical boundaries of science and scientific concepts are the same all over the world. Another point is that science is used as a means of stimulating the human mind to solve specific problems and to understand the different trends that happens in the world around us (Fadavi Asqari, 2001).

Technology

As it was already mentioned, technology is emerged by the heart of science that seeks to the phenomenon. The final result of technology is the goods that is sold in market. Likewise science, technology is different in every country according to the political-economic capability (Kazemi Nejad Vaghefi, 2005).

There are many definitions from the word technology that some include:

In the texts referred to technology, the word root is referred that is composed of techno and logy: Techno is defined in Random House dictionary as: a wise that governs the world. The best equivalent for the word "logy" that means to recognize. Thus, technology is translated as the skill of recognition (Kazemi Nejad Vaghefi, 2005).

Technology sometime means the method of production that transfers the theories and technical knowledge to the fact of production.

Galbraith believes that technology means the systematic application of science and other organizational knowledge for practical tasks.

Materials and Methods

The present study is applied in terms of objective and it is descriptive-correlation in terms of nature because it studies the present time and describes what it is. The descriptive study refers to a set of methods that describes the condition. The implementation of descriptive study is for better recognition of condition or as the aid to the decision-making process.

One of the types of descriptive study is correlational study. In this type of research, the relationship between the variables is analyzed based on the objective. The correlational study can be divided in to three categories according to the objective.

The correlation between two variables

Regressions

Covariance Matrix

The correlation between the two variables: The aim of this study was to investigate the relationship between the two variables in research.

Regression: in regression, we aim to estimate the relationship between mathematics and analysis, as we could determine an unknown variable by the known variable or variables.

Covariance matrix: it's a matrix that shows the correlation between various parameters of the system. Therefore, the present study is applied in terms of objective and it is descriptive-correlation in terms of nature.

Statistical population

The population of this study consists of 90 people of managers, assistants, and experts of office and Ansar Bank branches.

Analysis

In order to analyze the data was collected, after the valuation of options from number one to five, respectively scale from strongly disagree to strongly agree with the software Spss, data were analyzed in two parts: Descriptive methods: In this section, information should be analyzed by using descriptive statistics and related analysis. Frequency tables, percentages, a bar graph, and description of the overall sample (questionnaire responses) have been presented. Analytical methods: In this section, according to the questionnaire and their responses Kolmogorov-Smirnov test for normality assessment, the simple linear regression coefficient and Spearman correlation coefficients were used to assess the significance and hypotheses.

Validity and reliability of study

The validity is a term that test to achieve the goal that made it refers and is valid subject to measure to what is appropriate. Validity indicates the scope and elements of a concept of how much is covered, In other words, subjects with which to measure the validity of what is to be suitable. We therefore have to answer the question whether the tool measures something that should measure. To answer this question we should say that the standard questionnaires are used that indicate the validity of the test.

Reliability

The reliability of the measurement tool is one of the technical specifications and dealing with the instrument under similar conditions to what extent will yield the same results the tool accuracy, reliability, stability or reliability of test points. In other words, the reliability coefficient indicates the extent of Characteristics Measurement instruments and subjects with stable or variable features of the measures. Using data obtained from the questionnaire using SPSS statistical software was performed by Cronbach's reliability that the results are as follows:

Table 1. Reliability by Cronbach's Alpha.

Component	Coefficient of Alpha
Effective and efficient management	0.811
Export Development policy	0.856
The ability to adjust the transferor and the transferee	0.799
Sufficient market access	0.836
Good capability and capacity to absorb technology recipient country	0.846
Investment in research and development	0.824
Close cooperation between research centers and industry	0.803
Active government support	0.793
R & D management	0.781

Cronbach's alpha reliability coefficient was used which in total is 90.3%, indicating that the stability and internal consistency. In order to calculate Cronbach's alpha coefficient, variance of scores for each subset should be calculated.

In general, a relationship is calculated using Cronbach's alpha.

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum_{i=1}^k S_i^2}{\sigma^2} \right) \text{ or } \alpha = \frac{k\bar{C}}{\bar{V} + (k-1)\bar{C}}$$

K: the number of questions

S_i^2 : Variance of i question

σ^2 : Variance of all questions

\bar{C} : Mean of covariance of questions

\bar{V} : Mean of variance

Discussion and Conclusion

As a successful technology transfer has a dramatic impact on economic, technical, and financial development in a country, an inappropriate technology transfer has a negative impact on economic and organizational conditions and it is far from their competitive advantage. So it is important for managers that try to transfer technology in all aspects for organizations. To this end, managers need well known factors affecting the transfer of technology and consider them in decision-making (Sharif Navaz, 1988). Technology transfer is an important tool for improving living standards in developing countries, restructuring industries, creating jobs, and economic recovery. Access to technology through the transfer is often as a way to improve performance or to take advantage of new business opportunities.

The absorption of advanced technologies through technology transfer is important in achieving the objectives of the banking industry. So the proper management of technology in technology transfer activities should be strongly considered by policymakers in the banking industry. One of the essential steps in this regard is to select the appropriate technology transfer (Shah Abadi, 2015). According to experts, as there is no specific mechanisms for technology transfer in the organization, it is recommended to study comprehensively before concluding cooperation agreements in the field of technology transfer. In this regard, the consistency between the mechanisms for technology transfer and the transfer process in Ansar bank that involves the determination of requirements, select appropriate technology, the appropriate transfer method, choosing the appropriate source, drawing up of contracts, implementation of technology, application, absorbing, adapting, and developing seem necessary.

The complexity of technology has a great impact on research and development strategy, while the more complex technology needs more cooperation between transmitter and receiver of technology to achieve the best utility.

Another factor affecting transfer of technology is the nature of the staff. The ability of managers and employees has the greatest impact on technology transfer. This means that managers and employees should pay attention to their abilities to the transfer of technology.

Government policy has the greatest impact on technology transfer. Therefore, in technology transfer, managers should always pay attention to government policies that are the critical factors in the field of technology transfer. Although the research and development referred to as an engine of economic growth, developing countries have still marginal role in conducting research and development activities. While advancing development goals and economic goals and increase competitiveness, technology based on research and development is needed. Since most developing countries have not a substantial proportion of production based on research and development and they are always consumers; in order to increase competitiveness, to prepare the ground space of creativity and innovation that can enhance innovation, the knowledge gained from research and development activities is a serious need. Facilitating the movement of the developing countries towards a knowledge-based economy and reducing the technology gap, macro-economic policies consistent with management policies and educational way increase incentives for economic activity in order to expand the market and improve the research and development of human

capital to create additional role of foreign direct investment and trade sectors based on research and development activities.

Investment in research and development and the institutionalization of a culture of investment in this sector can enhance productivity through innovation. On the one hand, the experts can spread dimensions of innovation and R & D in the industry. It is suggested that the addition to providing financial support for the promotion of academic research and extensive nonfinancial, the government should try to develop economy in country through the improvement of the business environment and incentives in the long-term; and project performance can be evaluated with respect to research and development to take a better decision, and examine the projects that their productivity is low. If the projects are not cost-effective should be rejected.

Conflict of Interest

The authors declare no conflict of interest.

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