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Adaptation Approach to Technology Transfer Strategy

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Abstract

Technology transfer is an important way for enterprises to gain competitive advantage. For the customer satisfaction and profitability, the process after the decision is as important as the transfer itself. In technology transfer, which brings significant costs and risks for enterprises, these processes must be carried out in an adaptive manner and an appropriate strategy should be developed. Sustainable company strategies should be determined in terms of sustainability, profitability, adaptation to developing technology, and technology to be transferred to maintain competitiveness with regards to strategic management. Developed strategies to be open to change and improvement and assigning them to the enterprise and its environment are important for sustainability. In this study, the approach of adaptation to technology transfer strategy is discussed with the content analysis method and the

theoretical and strategic approaches related to the research subject are examined. The basic information and suggestions for developing adaptive strategies on the basis of production strategies in technology transfer have been introduced. With this study, it is aimed to contribute to the literature about the importance of adaptation in the transfer process, strategy formation, and in-house information flow in technology transfer. The fact that the adaptation issue is not included in the technology transfer strategy literature reveals the importance of the study.

Keywords: *Technology Transfer, Adaptation Approach, Technology Transfer Strategy, Technology Transfer Stages.Muhammad Family, Alms/Zakat, Prophet, Economic, Analysis.*

Introduction

The need to determine the elements that add value to an enterprise requires developing different strategies with technological developments, customer needs, differences in customer perception in many aspects, business profitability, the needs of the enterprise, the acquisition of sustainable competitive advantage, the business analysis, and the value

chain. These strategies will be possible with the adaptation to the internal and external environment of the business. Technology transfer is an area where these strategies need to be developed.

The existence of new technologies that have achieved success brings the efforts of enterprises to transfer them to gain a competitive advantage. However, the fact that the environment of the enterprise differs from the environment in which new technology is applied constitutes a risk factor for enterprises in developing countries. For the minimization of risk, specific strategies should be developed and the transfer process should be carried out in adaptation.

1. Technology Transfer

Technology transfer is the transmission of knowledge and skills (Kumar, 1995; Tsang, 1997). In other words, technology transfer is the process of providing knowledge and skills from one side to the other. Production technology transfer is the process of transferring the system including the knowledge and skills necessary for the production of a specific product and the provision of related services.

Transferring technology with all the details together can cause some problems. The technology designed according to the climatic conditions of the transferred country or region may not adapt to the characteristics of the country, region,

and business being transferred. Auxiliary machines and spare parts must be provided where the transfer takes place.

1.1. Reasons for Technology Transfer

There are several reasons for technology transfer. Technology can be transferred for acquiring efficiency and market share (Caves, 1974; Xu, 2000; Yin and Bao, 2006) as well as a competitive advantage (Liao and Hu, 2007; Rodriguez and Rodriguez, 2005). Business and transactor efficiency are among the reasons for this transfer. In particular, product quality and customer satisfaction (Lane et al., 2001; Tsang et al., 2004), increasing technological competencies are the reasons for an enterprise to transfer technology (Kumar et al., 1999). Technology transfer can provide the company with negative features in terms of adaptation as well as its ability to benefit from innovations. Mismatches that may occur in technology transfer may cause great harm to the company.

There are four basic stages of technology transfer: research and selection, measurement and acquisition, adaptation, and implementation. The technology to be transferred is first investigated. A detailed study is carried out on technologies especially in developed countries or global companies. This research is carried out by considering the product, the geography and climate characteristics of the production, the situation of the market, the target customer environment and

characteristics, the financial data and economic capabilities of the enterprise. The acquisition of technology without considering these factors may result in an inability of the desired in the adaptation of the enterprise and in the efficiency of the outputs (Rodriguez and Rodriguez, 2005). The selection is made for the transfer of the closest technology which complies with the needs obtained as a result of the studies and the factorial comparisons. The technology transferred by this selection is passed through a final measurement process. This measurement will be carried out at operation, product, and cost dimensions. Legal obligations are also measured in this context. Finally, the technology to be transferred is put into operation. Nevertheless, the benefit and adaptation process to be achieved after this acquisition is also important. The adaptation process goes through the assimilation and diffusion process. Technology introduced to the business must be appropriately transferred (assimilation) and this technology must be spread, i.e. distributed, to all units (diffusion). Efficiency should be measured after in-house compliant acquisition and distribution to all units and development practices should be initiated according to the findings (Kumar et al., 1999).

The competitive advantage and technological competence in technology transfer depend on the networking and

cooperation strength between agents of the national system of innovation. The national system of innovation refers to the corporate competence of an enterprise and the competitiveness of suppliers, customers, and information institutions (Freeman, 1987). This systemic process can take place through technological and institutional infrastructure interaction, networking, and collaboration between companies and institutions (Filippetti and Archibugi, 2011). This network and collaboration may lead to unsuccessful outputs as well as can improve the adaptation process of an enterprise in technology transfer. However, an enterprise's network being national only indicates the strength of its network. In this context, the wideness of the international cooperation network can be effective in choosing the right transfer of the enterprise. Especially multinational companies are advantageous in this regard. Tax benefits, regional competitiveness, and easy and accurate access to information about the technology to be transferred will ensure that decisions are made in the right direction.

2. Strategy in Technology Transfer

Technology transfer is an important process in which a specific strategy must be developed in the acquisition of knowledge and skills and in converting it into a production output benefit. Maidique and Patch (1988) point to six important factors in developing this strategy:

a) Selection, specialization, and concretization,
b) Competition level,
c) The source of technology,
d) R & D investment level,
e) Competitive timing,
f) R & D policies of the organization.

In long-term business strategies, these four factors are important in terms of predicting the risks that may occur due to technology transfer. Meanwhile, Porter (1985) describes this strategy-building situation as the transformation of technology into a competitive instrument and states that this strategy will take place in six steps:

- Identify different technologies and their place in the value chain.
- Identify related technologies under scientific development or in other industrial enterprises. Identify ways to change key technologies.
- Identify what technologies are important and necessary for the competitive advantage and industrial structure.
- Investigate capacities and improvement costs related to businesses in terms of key technologies.
- Choose a technology strategy that will strengthen the company's competitive strategy.

- Strengthen business unit technology strategy at the corporate level.

It is necessary to pay attention to the above steps when creating a technology strategy. Burgelman and Rosenbloom (1989) considered the technology strategy approach as an evolutionary process. Strategies arise from the capacity and competencies of the organizations, the productive and effective strategic behavioral forces of the enterprise, the change of the technological environment, and the environment in the field of management. The strategy should mainly be formed by the plans to be established as a result of the measurement of technical qualifications with feedbacks. Burgelman and Rosenbloom's (1989) technology strategy is a framework approach for production, retail, banking, and administrative systems.

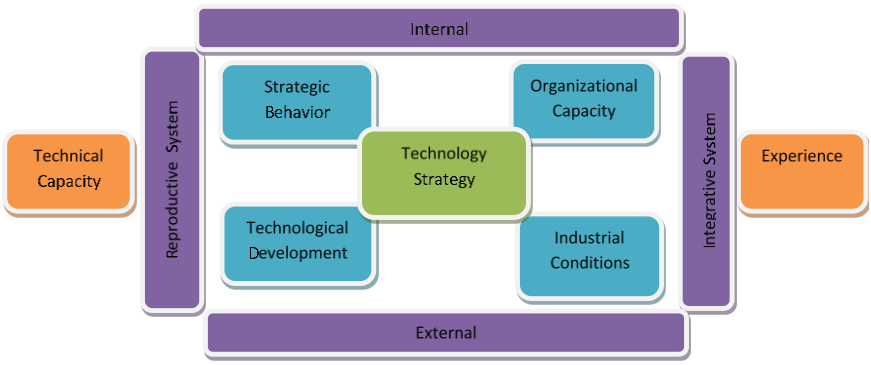

Figure 1. Evolutionary Process Framework for Technology Strategy

Source: Burgelman, R. A., Rosenbloom, R. S. (1989). *Technology Strategy: An Evolutionary Process Perspective. Research on Technological Innovation.* Management and Policy, 4, JAI Press Inc., Greenwich, Conn.

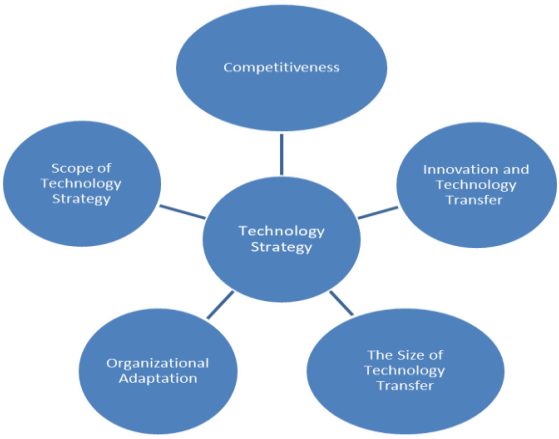

Figure 2. The Scope of Technology Strategy

Source: Hampson, K., Tatum C. B. (1997). Technology strategy and competitive performance in bridge construction. *Journal of Construction Engineering and Management,* 123 (2): 154.

In Figure 1, there are factors to be considered in the strategies to be developed for technology transfer. These factors are effective on the decisions of the managers and the enterprise in the formation of strategies. The scope of the technology strategy is shown in Figure 2. In particular, the technology transfer of the enterprise should be established by taking into account a sustainable strategy (factors in

Figure 1) and should be developed within the framework of Figure 2. In developing these strategies, differences in sectoral characteristics, adaptation of the product with the technology to be transferred, and the customer environment and preferences should be taken into consideration.

3. Type of Information in Technology Transfer

Information in technology transfer is important to gain competitive advantage, to develop a good strategy, to ensure that the transfer takes place in a correct way and that this situation is reflected in the final production outputs is important for customer satisfaction. In this context, it is necessary to know the types of information and to draw a path according to these types in practice.

3.1. Formal Information

Formal information is a kind of information that provides clear and understandable ideas to users with explicit symbols and explanations (Kogut and Zander, 1992). Formal information provides an understanding of the effects of transfer and the degree of adaptation in technology transfer. However, systematic and clear information may not always be descriptive. Formal information being complex can cause misperceptions about the technology to be transferred. For this reason, formal information should be created by considering the country or regions to be transferred.

3.2. Indirect Information

Indirect information is a type of information that does not provide an idea to users in a clear and systematic manner. This type of information is obtained through methods such as intuitive, experience, and researching the similar (Zander, 1991). The source of indirect information, accuracy, and degree of complexity are important in the assimilation and diffusion stages of technology. Indirect information based on inaccurate and pure experience may not comply with the business to be transferred.

Technology transfer takes place in three main streams:

* Transfer of fixed assets and technological, technical, and administrative services,
* Transfer of art, technical knowledge to implement and sustain new production technologies,
* Transfer of knowledge and expertise to implement technical changes (Bell, 1987, p. 14).

Technological competencies can be divided into four main types of competence: competence to purchase the technology, management, expansion, and innovation (Desai, 1984). Investment, management, and dynamic learning competence are also among these types (Bell, 1987; Desai, 1984; Lall, 1982). Investment competence includes identifying appropriate investment projects, spending and placement on appropriate technologies, and engineering and design of the structure. The system setup and the mode of

management of the realizing in the enterprise are related to the investment competence. Management competence is the knowledge and skills required to carry out activities. Increasing production and competence depends on the adaptation to new technology and the realization of some corrections, i.e., management competency. Work, staff exchange, and administrative and technical support by suppliers can be brought by transfer to the enterprise (Bell, 1987). Dynamic learning competence consists of the knowledge and skills needed for dynamic, technical, and organizational changes and change management (Bell, 1987; Wei, 1995). Dynamic learning competence is formed by internal and external mechanisms. Learning with internal mechanisms is an in-house learning form. R & D studies, quality control, and recommendation groups can be given as examples of internal learning. For external mechanisms, universities, country or regional R & D studies, and technical and scientific studies can be given as examples (Derakshani, 1984). Cohen and Levinthal (1990) observed that the adaptability of enterprise in technology transfer depends on R & D investment and knowledge and skills, and these skills are especially important in terms of the changes to be made in new products and processes. Technological competence is the functions of access, adaptation, and management capabilities. Providing sufficient technical infrastructure to

gain new customers and gaining competitive advantage as well as training of managers and engineers depend on gaining technological competence.

4. Technology Transfer Stages

Gilbert (1992) proposed three stages of technology transfer: acquisition, mutual adaptation, and initiatives. Baark and Heeks (1999) reported on the existence of five stages in the research carried out on Chinese technology transfer projects: technology selection, purchasing and installation, assimilation and use, and innovation. Nahar (2001) evaluated this process in eight stages as international market research for technology, promotion/advertisement, selection of technology buyer, selection and determination of technology transfer, discussion/negotiation and agreement, providing technical and technological support in financial matters, commissioning and implementing the transfer project, and evaluation.

There are two main sides in technology transfer. One of these parties is the supplier/provider of technology and the other is the buyer who acquires the technology. They should not be considered simply as buyers or sellers. Because, although their relationship includes an economic exchange, in fact, the situation provides the transfer of the culture, information, technological infrastructure, and technical characteristics of the enterprise and the region of the transferred technology.

Thus, more than a normal purchase could be obtained. Nonetheless, this may not always result in over-earning. The operation of the adaptation process in the other way during the process of technology transfer may damage the transfer operation and/or the region. The wide range of domains takes this far beyond a normal trading relationship.

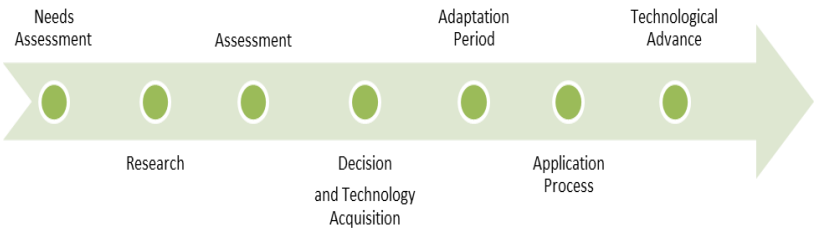

Figure 3. Stages of Technology Transfer

4.1. The Emergence of Need/Problem

In order to realize a technology transfer, it is necessary for a company to need this technology and make an organizational decision to meet this need. The fact that the firm makes this decision for investment is also essentially an organizational need. Many reasons such as taking place in a market that does not meet the expectations of customers, increasing and maintaining a competitive position, insufficient technological infrastructure for product and/or diversification, and taking place in national or international markets. In addition, brand creation and brand familiarity

activities, efforts to create awareness, being new in the market, strategies for the future, cooperation with other enterprises, and legal obligations may trigger the transfer as well. In such cases, the company management must adjust the business and related production strategies according to this need.

4.2. Research

At this stage, new technologies are explored in order to obtain information about the geography and enterprises where technology is used. In the research stage, the technologies that are suitable for the needs that have emerged earlier are examined in the light of certain criteria. In particular, the institutions, enterprises, and countries where the needed technology is utilized are taken under a focus. The aim is to determine the final outputs such as the problem and success that arise with the application and to learn about the problems that have been experienced (Hay, 2003; Cohen 2004). Especially with R & D, approximate information is available for the correct destination. At this stage, goals and targets are determined and the relation between the outputs and technology is examined. Technical research should be carried out to determine the adaptation of the necessary technological system infrastructure with the enterprise. However, it is important to note that the technology to be transferred is not clear yet. Research is not

conducted on a specific technology. All technologies close to the needs are filtered.

4.3. Evaluation

As a result of the researches, the right technology features that will meet the needs of the enterprise are determined in this process. Companies, countries, and institutions that can transfer the technology with these characteristics are investigated and subjected to an evaluation. The aim is to select the technology to be transferred in the most appropriate way for the business. All options are filtered according to cost, technical competence, and suitability criteria. Making the evaluation correctly is important for not missing the opportunities.

4.4. Selection and Acquiring Technology

In this process, the enterprise selects the technology to be transferred according to the criteria it has determined. This stage is essentially an important decision phase. Often the return from this process can cause serious damage. The selection is made and the technology is introduced. The top executives of government and business have a great role in making this choice right. The enterprises should be guided by these people in determining the sectoral needs and the technologies appropriate to these needs. It is necessary to carry out the necessary research to determine the benefits and losses of acquiring the technology selected and whether

it will be a strategic element in the enterprise investment incentives to be created in the national strategies.

4.5. Adaptation Process (Absorption/Adaptation)

In this process, called adaptation, the technology transfer project is managed. The process of adaptation is a process after acquiring, but at the same time, it is the outcome of the technology transfer output to adapt to the conditions (Hampson, 1993). Adaptation period includes processes like the commencement of the operation of the transferred technological system, capacity development, risk assessment, system regulation, implementation, inspection, and final evaluation. Therefore, it is possible to say that the adaptation process of the technology covers all processes after the acquisition of technology and that the whole process of technology transfer is the key process.

4.6. Assimilation and Diffusion

These two processes involved in the adaptation process help to demonstrate the success of the transfer. The assimilation process serves to see the capacity of the transferred technology in the context of the benefit achieved. The degree of adoption of technology by business is determined by assimilation. The technology transferred in this has an impact as well. For this reason, both the technology and the enterprise (the receiver) must show adaptation. For assimilation to take place:

- The business must be suitable for the technology. This means that the technology is compatible with the technical structure of the company, the product, and the geographical conditions in which the enterprise is located.
- Management strategies and legal status should be compatible with the technology. The environment, management structure, and strategy of the enterprise as well as the laws of the region where the company is located should enable the technology to function correctly.
- Technology must be accepted by the enterprise and its employees. Cultural differences, personal thoughts, brand and image, business culture should not contain elements that would hinder the transfer of technology (Cohen, 2004).

Furthermore, diffusion is related to the use and time dimensions of transfer. Over time, the use of assimilated technology begins to affect the entire society, government policies, industry, and service sector by diffusion. The technology transfer, which continues its effects in an expansive manner, exceeds the effects in the company. The spread of applications can disperse quickly through communication channels. The spread through diffusion of the technology becoming evident to be compatible with

assimilation in developing countries provides experienced information about technology for many businesses. This helps to sustain sustainable systems and prevents the loss of financial and manpower losses in large R & D activities.

4.7. Application

With the implementation of the best technology transferred to the needs of the business, a process of gain or loss starts. In this process, problems such as the lack of experience and knowledge of the people managing the technology transfer process, the lack of confidence in those transferring the technology, the lack of quality targets, the delay in the acquisition of complementary materials from the local environment for rapid adaptation, the high fee and low quality of the materials resulting from the application of technology transfer, inadequate follow-up during the application, and causing harm due to bad applications (Ramanathan, 2008).

In fact, the application requires good management and information flow. Most of the time, incomplete sharing of the information and the experience by the company to transfer the technology to the receiving business will bring problems in the transfer process. Making the transfer project in accordance with the business functions requires working with the right manager and employees. The adaptation of production planning and control with the transfer process

can provide a successful implementation. Providing training programs through in-house or via the transferor can bring success in practice.

Five basic operations must be carried out in strategy transfer applications:

- The local environmental conditions in which technology transfer will be applied should be determined, necessary measures should be taken to ensure adaptation to these conditions. In most cases, these measures can be taken by the correct positioning of the physical location taking into consideration the adaptation of the factory and its environment with the technology, and the replacement of the parts that do not comply with the local environment with those that do comply.
- The personnel who are adequate for the technical specifications of the transferred technology must be selected, recruited, and trained.
- Business strategy, customer, environment, product or service characteristics, production strategies, the internal and external environment of the enterprise should be compared with the technology to be transferred in terms of adaptation. Possible mismatches and costs and damages that may occur as a result of mismatches should be identified.

- It is necessary to develop strategies with the suppliers related to materials, parts, and services that the technology transfer may need especially for this technology.
- It is necessary to closely follow the legal regulations and rules of the local environment/country that encompass the relevant technology and to take measures that adapt to changing rules. Technology should be implemented in the light of the developed strategies of the enterprise and potential errors should be recorded as a risk by investigating the experiences in the places where this technology was applied before. Risk elements should be known by the personnel involved in technology and these issues should be considered when developing strategies. (Ramanathan, 2008).

4.8. Technology Improvement/Development

The final process in technology transfer is improvement/development. With the acquisition and implementation of technology, a projection is created against the technology in the enterprise. The assimilation, diffusion, and application stages of technology play a guiding role in the measurement of benefits. Problems arising from the application, recorded risks, and errors provide information on whether the technology is suitable for the enterprise,

customers, and consumers. In addition, the positive feedback from the customer contributes to the enterprise in terms of profitability, strategic management, and sustainable competition. Problems arising from the implementation can be addressed through improvement or development activities. Yet, sometimes the costs and losses associated with the elimination of the problems may be above the expected benefit with improvement. In such cases, the existing system may need to be replaced instead of improvement. This situation should be determined through assessments made through certain operational criteria that are specific to the enterprise such as earnings, benefits, losses, costs, and profitability. The positive and negative consequences of the technology transfer and the possible results from the change of this system should be evaluated together and a decision should be made.

5. The Relationship between Technology Strategy and Technology Transfer

Grosse (1996) focuses on why technology transfer processes and methods differ according to business, industry, and country. Indeed, each country, business, or industry has a different phase of technology transfer and the methods they apply in these phases are different. The main reason for this is the degree of alienation and adaptation of the technology to be transferred to the country, enterprise or industry where

it will be transferred. Many factors such as geography, economic and social conditions, customer expectations, culture levels, climatic conditions, spare parts, and time constraints of the countries are the main reasons for these differences.

6. Appropriate/Intermediate Technology

The suitability and compliance processes of the countries that will transfer the technology according to the countries to be transferred are explained by appropriate technology. The adaptability of technology to the environment of underdeveloped countries may require research and development activities. Most of the time, the facilities where these activities will be carried out are established by multinational companies. Technology transfer operations of multinational companies should be closely monitored in technology transfer.

7. The Relationship between Technology Strategies and Production Strategies

The operation of the design and management of the production function depends on the establishment of a business and production strategy. As competitiveness can be achieved through production opportunities, these opportunities should be focused on. First, the objectives should be determined to establish the business and production strategies. Because the objectives determine the

direction of the plans (Kobu, 1993, p. 45; Raia, 1963, p. 30). To achieve business objectives the enterprise should be successful in quality, cost, delivery, flexibility, customer-orientation, and technical knowledge issues (Phusavat and Kanchana, 2007). This clearly demonstrates the effects of the adaptation in the transfer process and the success of the transfer. Six factors must be taken into account before and after transfer. If the technology obtained as a result of the transfer affects the six factors of the business and the product, i.e., quality, costs, delivery time, flexibility, customers, technical information equipment, then, an important economic bottleneck will be unavoidable. In particular, a technology transfer that could lead to stock accumulation, which would reduce the flow of benefit, could bring losses to the enterprise.

It is necessary to consider the customer-oriented approach and not to think about this approach towards the customers of the business only. Current and prospective customer environments should be considered together when developing production and technology strategies. In this context, considering customer orientation as a consumer orientation can provide positive value to the enterprise.

8. Strategy in Technology Transfer

Technology is an important factor in competitive advantage. Activities to reduce costs can be realized with the technology

development. Activities such as research and development, specialization, methods, and process management are among the technology development activities. Especially in the process of improvement, product based development activities are affected by technology development. Technology development activities are used in accessing information sources, information management and information confidentiality in service delivery or product production (Porter, 1985).

Technology strategy is also called technology application or positioning (Friar and Horwitch, 1986). Competitive advantage is the determinant of industrial structure (Porter, 1985). Benefiting from the capacity, timing, positioning, and technological innovations for the company depend on the creation of an appropriate technology strategy in the transfer (Freeman, 1976; Teece, 1986). The strategy is created for the development of products and services. Factors such as products and services, customer environment, internal and external environment, technological and institutional infrastructure, strengths and weaknesses, and goals of the business are effective in developing transfer strategy. The strategies to be developed vary for each enterprise. When developing a strategy, it is necessary to make sure that it is compatible with other strategies of the business. Because an enterprise's realization of its objectives depends on its

systemic harmony. A balanced strategy should be followed with regards to production technology, management, and existing competencies. The development of a balanced and harmonious strategy in technology transfer also depends on the correct operation of the accounting information system. The correct feedback of the cost, profit and loss data along with its sources will ensure the adaptive orientation of the management strategy. In fact, transfer of the systematic information flow with the correct data to the related unit should be among the priority objectives. Any errors and data obtained should be reported to the relevant department along with the sources.

8.1. Kaizen Approach to Problem Solving and Six Sigma

The Kaizen approach is a lifestyle and management philosophy consisting of the Japanese words "Kai" and "Zen", which express the continuous improvement process. Not wasting the time, on-time delivery, the production of the product load balance according to the type and amount, and the existence of standardized work with the right equipment are important in the problem solving (Takahashi et al., 2007, p. 1; Imai, 2012, p. 59). With this philosophy and management technique, the enterprise adapts its activities to a continuous improvement process in a way that adapts to development and change. Inspired by William Edwards

Deming's 14 management principles in the process of improvement, the following 15 principles can be applied when creating a technology transfer strategy:

- Create continuity to ensure business continuity and provide work to create competitiveness and improve the product and service depending on technology transfer.
- Accept and implement the new philosophy and be open to change.
- Stop adhering to the audit to achieve quality.
- Continuously and permanently improve the production and service system to improve quality and productivity, and thus, reduce costs. Make the necessary changes so that the transferred technology can be adapted to the organizational climate.
- Create training programs related to technology transfer.
- Build leadership to people for helping tools and machines to operate well and the work is done properly.
- Move away from fears for effective and efficient operation.
- Remove the barriers between departments. To determine the problems in production or service delivery depending on the technology transfer,

research, design, sales, and production people should work as a team.

- Leave slogans, advice, and goals aside for labor. Slogans create oppositional relations. Focus on your business so that the transferred technology is worthwhile.
- Think of numbers, numerical objectives, quotas with customer environment and customer perceptions.
- Make employees proud of their mastery and eliminate barriers to their rights. Provide motivation for your employees with appropriate incentives.
- Create a dynamic self-development and training program. Ensure the continuity of this training.
- Record all necessary information (experienced, acquired from the environment, etc.) for the development of technology transfer. Compare the information you have recorded in terms of periods.
- Organize everyone to achieve the transformation. In fact, the transformation is everyone's work (Deming, 2000, p. 24).
- Focus on the source of every problem in technology transfer and identify the problem by observation. Because, even if the problems are the same, the reasons may be different. (Monden et al., 2013, p. 32).

On the other hand Six Sigma is a strategy to fulfill the mission and objectives of the business (Harry and Schroeder, 2000), a flexible system about the improved leadership and performance (Pande et al., 2000, p. 3), and a thought to achieve commercial success on the basis of customer needs (Harry and Schroeder, 2000). Determining and identifying a problem occurred, measuring the performance, analyzing the process, performing the necessary remedial actions, and ensuring the sustainability of the existing improvement through control constitute the main process of Six Sigma (Schroeder et al., 2008, p. 540). The common point of Kaizen and the Six Sigma is that the processes of both approaches are curative and adaptive.

8.2. Proportional Focus in Organization

The focus in the organization is the concentration of the strategy on a particular factor. High quality, low cost, flexibility, and ability to respond to customer needs in technology transfer should be introduced as factor analysis prior to transfer (Nieto-Rodriguez, 2012, p. 9). These factors which may be considered for pre-transfer will also be needed in technology development. In the focusing, horizontal and vertical organizational structure should be carefully examined (Gardner, 2004, p. 43). The management and information network structure of the organization should be transparent (Cochran, 2006, p. 36). The focusing is

advantageous but also risky. With unconscious focus, the enterprise faces risk factors. Organizational structuring, horizontal and vertical formation are the elements that should be paid attention in the focus. In particular, it should be considered that problems in the information network may cause problems in focusing. In the development of technology transfer strategies, it is necessary to ensure the focus is proportional.

8.3. External Environment Analysis

The environment is an important factor affecting the activities and structuring of organizations. The business must be able to monitor the external environment correctly to identify opportunities and threats offered by the business environment and other external environments. The economic and social environment in the market should be examined by the enterprise and the interaction between and within social classes should be considered. Especially social, cultural, and class expectations are important to perceive the environment correctly at the stage of production and delivery. One of the basic rules for having an advantage compared to the competitors in a competitive market is the correct analysis of the external environment. Opportunities and threats can be demonstrated by the analysis of the external environment.

The environment is an important element in technology transfer. Recognition of the environment provides managers

with information about the adaptation process of the technology to be transferred. The external environment, as well as the internal environment determined by business and production strategies, should be identified. The external environment can be divided into three as the real, the perceived, and the application environment (Albanese, 1988, p. 144). This distinction is necessary in terms of identifying the elements to be considered in strategy development. Being familiar in the environment is important for achieving the goals in line with the objectives. The process that begins with recognition is used to achieve the result with the activity and the desired positive outputs.

8.4. Real External Environment

The real external environment is the sum of the elements that are related to the enterprise but are located in the external environment of the enterprise. Competitive enterprises, legal regulations, and consumers are some of the elements of the real external environment. The real external environment affects the realization of the business plans. The technologies that the competitors have acquired in the transfer and the strategies they develop, the legal regulations to which the business is subject, and consumers are the elements that should be foreseen in the strategy to be created by.

8.5. Perceived External Environment

Each manager perceives the environment differently. Because, each manager may have different opinions about culture, language, religion, race, political, social, and other aspects. Therefore, each manager's perspective on events may not be the same. The events happening in the external environment can be perceived as a threat to some managers as an opportunity to others. How the external environment is perceived as well as the differences between perceived and existing reality affect the enterprise and production strategy. Before the transfer of technology, the perspectives of whether there is a need to make a purchase decision or not and whether the technology is suitable for business or not will vary according to the perceptions of the managers. In this context, developing a strategy with the idea that the perceived external environment carries risks due to considering the perceived external environment by a single manager may not have appropriate results for the enterprise.

8.6. Application Environment

Business managers determine which environmental area will be impacted by their business and manufacturing strategies. The decision is essentially a choice between alternatives. Executives apply duties, objectives, and strategies to the chosen environment. Sometimes the environment chosen with the desired environment may be different from each other. The administrator can determine whether the

environment they desire to choose from their window is not suitable for the enterprise as a result of researches or the nature of the business can direct them to this behavior. The strategy to be developed with the application environment can lead to parallel results. Since the strategies associated with the transfer will be carried out with the application environment in mind, technology may have harmful consequences for the environment and/or business, and environment may have damages to the business due to the selected technology. Therefore, it should be paid attention that the environment of application is not the desired or wanted, but the correct environment. When determining this, the objectives and goals of the business should be reviewed.

8.7. Determination of Basic Competencies

The enterprise should be able to identify its exclusive and distinctive strengths in determining its strategy (Ferrell and Hartline, 2012, p. 85). Competencies such as the internal business operation, the speed of being aware of the events happening in and around the internal and external environment, ensuring that the customer and supplier feedbacks are transferred to the business correctly, the flow of information in the right units, and the answers to the feedbacks are met are the competencies that constitute the skeleton of the basic competencies of the enterprise which

add value to the enterprise. A business should be able to identify its strengths and weaknesses both in determining its management strategy and through its environmental analysis. Opportunities and threats arising from environmental analysis should be correctly analyzed by the company, they should be evaluated in the right units, and the necessary measures should be taken or the way for the initiatives should be cleared (Böhm, 2008, p. 6). Determination of basic competencies is simply reflecting a mirror to the business. In this sense, the business seeing itself will enable it to take the right steps towards success and competition. Its use in the development of strategies gives the company an advantage. However, it is necessary not to consider the determination of the strengths alone, but, should be considered together with all other factors related to the enterprise such as the abovementioned environmental factors, the current situation of the enterprise, threats, alternative opportunities, production line, and customer environment. Thus, it is possible to say that the strategy is the plans to make decisions that try to see the objective and realistic situation. Particularly, the fact that the production line or all or part of the production system will be changed by the technology to be transferred reveals the justification of such a strategy. Similarly, this is situation centers in the turnkey factory import as well. Avoiding realism and

objectivity will bring with it the disadvantages that will be experienced during the transfer process and the irreparable damages. To disregard other elements by relying on the core competencies of the enterprise is to drag the enterprise to the edge of the abyss. The strategic approach will benefit when it is handled with all aspects.

Conclusion

The adaptation approach to the technology transfer strategy is based on the consideration of the business as a whole. The fact that the stages of technology transfer are often long, costly, and risky make it difficult to decide. All of the features of the business that will do the transfer, as well as the business that the technology will be transferred, should be considered together. In this context, a benchmarking can be considered. However, the comparison of data and situation with the benchmarking alone may not provide real data in terms of the benefit or loss of transfer technology. In this regard, handling the enterprise that the technology will be transferred as a whole with its environment and to develop a harmonious strategy with its existing strategies will be more beneficial for the enterprise. The characteristics of the transferor and its environment should also be considered as a risk factor.

It should not be forgotten that the decision on technology transfer can be made by an occurrence of a need, research,

evaluation, and selection. In the face of the fact that technology transfer is a process, compliance of the enterprise with the production or service system should be considered. Furthermore, it should not be overlooked before the transfer of technology that the most appropriate technology choice is not sufficient, but the implementation and adaptation process and the development process are important for technology to supply benefits to the enterprise. Therefore, the correct analysis of the technology transfer process and the development of a strategy in line with this process will be able to maximize the expected benefit. It is important to follow up the transfer process in harmony (along with other strategies of the enterprise) in terms of the flow benefit of the enterprise and to get rid of the bottlenecks. In the flow of information, it is necessary to evaluate the formal and indirect information together, to evaluate the inconsistencies between the information, and to gain knowledge in accordance with the strategy developed. Adaptation in the implementation and development of technology transfer depends on developing the right strategy with the right information. This requires a certain adaptation in each process of transfer.

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