

# The Role and Influence of Government Economic Policies in the Process of Transferring or Developing the Required Technologies in the Aviation Knowledge - Based Industries and Aeronautics

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## ABSTRACT

*The technology transfer can be defined as the knowledge transfer, new products or processes from an organization to other organizations for commercial profit. Governments and politicians play a significant role in transfer and development of technology. One of the main criteria in the transfer of technology is the economic efficiencies due to modern technologies compared to existing technologies. Every modern and advanced technology has its own economic comparative advantage. In this study, we will consider that what the technology transfer is in the aviation knowledge-based industries and aeronautics, what the different methods of technology are and how much the economic governments are effective in the development of this technology.*

**Method:** *This research is descriptive-survey as well as a practical type, since its results are practical and effective for politicians and managers of technologies related to aviation industry and aeronautics. The basis of every model of technology transfer is the criteria. In the present study, reviewing of previous researches are used in order to identify impressive factors on the economic policies which affect the technology transfer in the aviation industry and to provide a practical and research proposal. In this regard, in this study, the executive process of government policies is considered as one of the important dimensions that can play a mediator role in the utilization process of opportunity and eventually offer future suggestions.*

**Conclusion:** *Governments, especially in the economic field, have a significant role in the improvement and advancement of technology transfer. Vice-President of science and technology in the headquarters of development of technology and the aviation knowledge-based industries and aeronautics are responsible for executive policy, leading, coordinating and creating of communications and this is implemented among the required devices for extension of technology and knowledge-based industries in the field of aviation and aeronautics; which has to be within the framework of comprehensive document of country aerospace development. Hence, in the economic area, it is suggested that governments provide the economic growth requirements by presenting necessary facilities for improving of the technology transfer.*

## I. INTRODUCTION

Globalization leads to worldwide competition and forces the government to accept market-oriented policies both inside the country and the international level. However, not all the companies and industries can achieve the required technology. This hinders their ability to develop flexible relationships with other firms, and most importantly, knowledge-based institutions. Therefore, the procedure of research progress over the past 25 years has included the transfer of technology and knowledge from educational institutions to the private industry. (Schoen, 2013) The first wave of scientific research on the technology transfer and globalization began in the 1990s after the collapse of the Berlin Wall. Technology transfer from developed and industrialized countries to underdeveloped and poor countries has accelerated economic, industrial and social development. Since that time, the integration process of international economics with open economic policies has been implemented and business liberalization and technical progresses in the transportation field and communications are facilitated. (Westphal, 2002) One of the main criteria in the technology transfer is economic efficiencies due to modern technologies compared to existing technologies. Every modern and advanced technology has its own economic comparative advantage. (Yu, 2011) its sub-criteria consist of increasing in expected sales, higher profit margin and cost effectiveness. Joint venture along with strong technology participation may help to develop a unique technology capability in order to create advantage over other competing companies in the

foreign markets which is in terms of expected sale growth. (Johnston, 2004)

For transferring the technology and implementing it, it is necessary to spend money. In terms of the cost, the first thing to consider is the effectiveness of it and the yield of spending the cost. Technology, with its dynamic nature due to speed and customization, can increase profit margin and so, the achievement of higher profit margins is one of the motivations for managers to transfer technology. (Lee, 2012)

Technology transfer is still a public issue not only among the researchers but also among the managers and entrepreneurs which can be used by scientific literature and knowledge. Similar to many popular research topics, especially those which researchers have been considering from a wide variety of fields, research findings and theoretical developments in technology transfer are changing rapidly. (Bozeman, 2015) By study of the history of developing countries especially East Asian countries, it is noted that in the route of development, these countries have reinforced their technology foundation through technology transfer from other developed countries; then by creating the appropriate economic infrastructure, they sought to strengthen their academic and research centers. If developing countries, as another solution, intend to acquire scientific and technological knowledge that is necessary for economic development; and if they want to acquire this solution without using existing knowledge which is the result of investigations by researchers and scholars; so not only it is a difficult task, but also it is an irrational waste of forces and resources. (Naseri Gigloo, 2010)

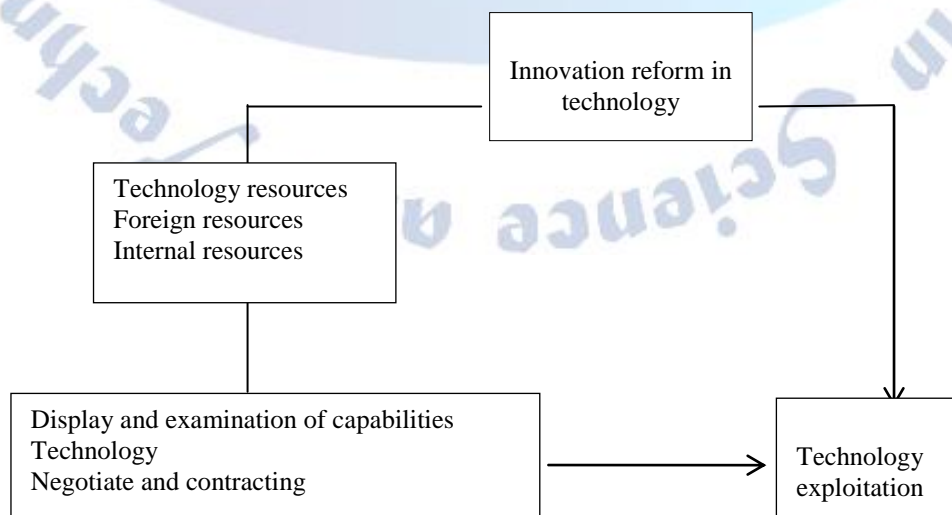


Figure 1. The overall process of the technology transfer

Technology can be defined as all the knowledge, products, processes, tools, methods and systems which are employed to create and manufacture goods and to provide services. (Khalil, 2013) In the recent decades, production growth on a global scale has given a great significance to the technology transfer as one of the most important progressing process of competitiveness. (Haji Hosseini, 2013) Technology transfer is not merely the transfer of rights and particular information of a company to another company, but the technology services must be provided to make the transfer facilitate and effective. (Iyer, 2018) Transfer is the relocation of a place to other place that this transfer may be in the form of products or processes. Technology transfer depends on various factors. (Mohaghar, 2012) Transmission of international technology has negligible impact on learning unless it is accompanied by local politics, promotion of human capital and learning of technical capabilities. (Iyer, 2018) transfer of technology is a complex and difficult process. Purchase and transmission of technology without required study and review, not only will not be useful but also may be in addition to waste of capital and time, they can also lead to weakening of national technology. Transmission should be viewed as a process which the imported technology is obtained through it in such a way that, it will be employed in producing of the product and also being a background of modern technology creation. (Ma, 2016)

Methods of technology transfer, depending on the type of technology and the conditions of its receiver and the provider, are different and in some cases, they are very diverse. However in the general category, they are implemented in two forms of formal and informal. (Taghavifard, 2015) Technology transfer is performed in two ways: vertical transmission and horizontal transmission. In the vertical transmission or research and development transmission, technical information and findings of applied research transfer to the stage of development and engineering design, and then enter to the production process by commercializing the technology. (Kalasangiani, 2012) in 2000, Bozeman released a comprehensive scale on reviewing the transfer of domestic technology. To this moment, the model has been adopted from several analyses or evaluation of technology transfer. (Bozeman, 2013) Models of technology transfer are an interesting topic in the industry. Among the various types of technology transfer,

including conventional methods of technology transfer, it can be referred to foreign direct investment, joint venture, royalty and reverse engineering. (Lehmann, 2014)

Mahdi Zadehet al. (2010) identified factors affecting technology transfer. In this survey, they tried to find main factors and sub-factors. So the information was analyzed through interviewing with reporters and questions of questionnaire which showed that the important criteria in effective transfer of technology is a complete transfer of information regarding to equipment and technology of suppliers, then reviewing of efficiency and continuous evaluation of the technology. Zafari and Nazari Asl (2011) in their study have identified and prioritized methods of technology transfer in order to create higher added value for product of raisin. In their research, they have used TOPSIS method to prioritize. The results of this study showed that the most important and effective way to transfer the technology is purchase of technology and then joint production and licensed production. This research is focused on ranking of methods and did not give any point to these ranks. Farsijani and Tarabandeh (2013) reviewed and explained the role of the technology transfer by the method of fuzzy QFD (quality function deployment) in order to product competitiveness in Iran Transfo Rey Co. In the process of house of quality matrix, for weighting to requirements of customers, Fuzzy hierarchical analysis has been used and then the software of advanced decision making has been employed for reliability calculation. In the output of house of quality matrix, the importance of the technical requirements of design have been stated based on customer requirements, but there are contrasts among these technical requirements, which according to the importance of these requirements, in order to eliminate the contrasts in the shortest possible time, the TIRIZ tool were used, which means the complete transfer of technology. In a research, Toghifard et al. (2015) selected a suitable technique from DEMATEL technique and applied the network analysis process in two major manufacturing companies of Khorasan porcelain containers. For this purpose, they used the network analysis process and DEMATEL technique in order to choose appropriate method of technology transfer from foreign direct investment methods. According to this study, they concluded that weight analysis of manager's criteria helps them to select better way of technology transfer. Ebrahimi (2016) in a study, focused on the

evaluation framework of transmission of equipment technology related to aircraft manufacturing industry. Regarding to the importance and necessity of acquaintance with the technology transfer processes especially for organizations and developing societies, he has considered the evaluation framework of transmission of equipment technology related to aircraft manufacturing industry. The DEMATEL technique was used to extract the effective relationship between factors and the plan resulted from DEMATEL was used for ANP modeling to weigh the factors.

### **The annual conference of the technology transfer society**

At this conference (2011), technology transfer in the world economy was connected to the academic specialists, research institutes and business professionals. However, the technology may have several purposes in terms of resources, user or mechanism, but the main purpose of this conference was to propagate movement of ideas, knowledge and developed technologies, which produced in governmental institutions, for commercializing in the market. Audretsch et al. (2012) in the study of technology transfer in the world economy, consider the emergence of modern technologies as a driving force and a powerful factor for globalization. In this way, the technology transfer from scientific institutions has turned into a strategic variable for companies and nations which this variable is used to cope with the challenges of the world economy. Iyer et al. (2015) have surveyed on inhibitors of technology transfer projects in different sectors of developing countries. To achieve success in the technology transfer projects is a hard task in the economy of developing countries. This scientific study provides multiple ways of basic theories consist of argumentative, Inductive, endurance and inferential which is applied for extraction of the data required in the project. The findings of this study can help policymakers and leaders to improve the effectiveness of technology transfer programs on a large scale.

In this research, initially we tried to define the concept of transmission and introduce various methods of technology transfer. Subsequently, by

collecting data and indicators expressed in order to select the method of transmission, the category of indicators will be presented. This can be considerable for choosing a method to transfer technology in the aviation knowledge-based industries and aeronautics. The transportation industry of any country represents the economic situation and the level of its industrial development, so that this industry should be considered as one of the important factors in economic, cultural, social and ... development in any society. The aviation industry as one of the industries that has a great economic attraction and due to creating national income through providing services to the public, has attracted the attention of many governments. Technology transfer in the aviation industry was begun at the middle of fifth decade of current century. The formation of industry and in fact, the technology transfer of repair and maintenance of fixed-wing aircraft and variable-sweep wing aircraft lasted about a decade. Aviation industrial activities continued with the investigation-oriented pattern for technology transfer, as well as with a mixture of empirical research such as repair and maintenance, reverse engineering and applied research; then these activities developed the creation of sustainable capabilities.

## **II. MATERIALS AND METHODS**

This research is descriptive-survey as well as a practical type, since its results are practical and effective for policy-makers and technology managers related to aviation industry and aeronautics. The basis of every model of technology transfer is the criteria. In the present study, reviewing of previous researches are used in order to identify impressive factors on the economic policies which affect the technology transfer in the aviation industry and to provide a practical and research proposal in this regard. In this study, the executive process of government policies is considered as one of the important dimensions that can play a mediator role in the utilization process of opportunity and eventually offer future suggestions.

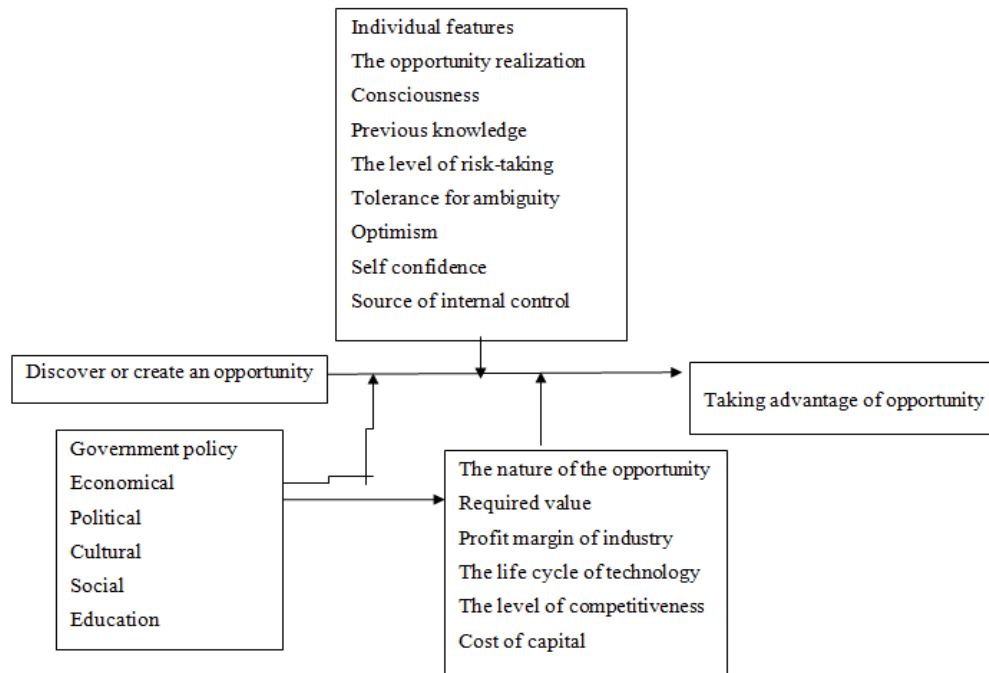


Figure 2. The conceptual model of the role of governmental policies on the technology transfer in the aviation knowledge-based industries and aeronautics

### III. FINDINGS

Technology transfer in the knowledge-based industries has a positive link with the performance which does not justify the intervention of government policies. Indeed, Audretsch (2004) implies that the intervention of government can be justified only in the situations of fundamental market failures. The government policies can provide a background which is useful in the technology transfer. Therefore, the government should emphasize on creating an environment which is advantageous for technology transfer, commercializing of inventions and interchange. At the same time, the degree of economic development of the country is also important, and the relation between government policies and the activity of knowledge-based industries among the countries will be different. Acs and Szerb (2007) have argued that the countries with average revenue should focus on increasing of human capital, promoting of technology availability and propagating of the corporate development. They expressed that highly growth of knowledge-based industries is a proper investment in developed countries. In these countries, the reduction of entry regulations won't be of any help and in fact, the reforms of the labor force market and regulations of financial market will provide better opportunities for the growth of these industries.

### IV. DISCUSSION

One of the industries with advanced technology, which has a great complexity, is the aerospace industry. In the last few years, special attention has been given to the aerospace industry, and this industry has played a great role in creating high-quality businesses and technological innovations; as a result, direct and indirect capabilities have been generated in the other industries. So far, the country's aviation industry has relied on the public resources more than required. It seems that now the industry has reached to a stage of growth that needs to own larger and more flexible resources in the domestic and international market in order to use mentioned stimulants for earning chance of entering to a different level of evolution and effectiveness in the national economy. Understanding what technology is appropriate for the production of goods and also what industrial supports are needed, will clarify that in what way some of countries succeed in industrial development and some countries fail. Norway and Nelson have expressed that in the comparative study there are three needs with different level of technology, which we expect various performance of them for success in aircraft manufacturing technology. First advantage over scale, second the integrated production system,

third the development, customization and the relation between producer and customer. There is a more moderate variable named policies of government which affect the nature of the opportunity and also its exploitation. Such policies can be involved in various fields of economic, political, cultural, social and educational in order to accelerate or prevent the improvement of technology transfer in the knowledge-based industries. Different methods of technology transfer and its development are very important in the rate of country's revenue as well as economic growth and the method used in one stage may not be efficient at another stage.

## V. CONCLUSION

The transmission of technology among the countries or international transfer of technology can take place in a variety of ways. Methods of technology transfer, depending on the type of technology and the conditions of its receiver and the provider, are different and in some cases, they are very diverse. The importance of this issue is the need of consideration to the research centers and economic and political supports for such activities. Governments, especially in the economic field, have a significant role in the improvement and advancement of technology transfer. Vice-President of science and technology in the headquarters of development of technology and the aviation knowledge-based industries and aeronautics are responsible for executive policy, leading, coordinating and creating of communications and this is implementing among the required devices for extension of technology and knowledge-based industries in the field of aviation and aeronautics; which has to be within the framework of comprehensive document of country aerospace development. Hence, in the economic area, it is suggested that governments provide the economic growth requirements by presenting necessary facilities for improving of the technology transfer.

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