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RELATIONSHIP BETWEEN GOVERNMENT POLICIES AND KNOWLEDGE MANAGEMENT (KM) IN KNOWLEDGE BASED AND HIGH-TECH FIRMS

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ABSTRACT

The present paper examines the relationship between government policies and knowledge management in knowledge-based and high technology firms and evaluates government policies within them. This is a descriptive research in terms of strategy and purpose, fundamental in terms of audience, and cross-sectional in terms of time. The statistical population included 51 expert managers of 7 knowledge-based and high-tech firms. The data was gathered by probabilistic (qualitative) judgment and availability sampling. Finally, government support policies in the areas of knowledge transfer, knowledge sharing, architecture, networking, and guidance were explored and the successful policies as well as those which fail to meet the expectations of knowledge-based and high-tech companies were determined. In addition, criticisms against the government's performance and suggestions for more successful implementation of the policies were presented according to science and technology policies. The findings show that high-tech firms gain diverse government support, mostly in dimensions of financial and tax incentives, organizational architecture, knowledge transfer and guidance, and to a lesser extent in the dimensions of networking and sharing knowledge. The researcher contributed to add to the fundamental knowledge of government support policies in firms with high Iranian technology. The researcher also tested the hypotheses that make a connection between the type of government support policies and the need for knowledge management in high-tech firms.

INTRODUCTION

Experts are attentive of the crucial role of science and technology policies in realizing Iran's 20-year vision. Undoubtedly, the promotion of IT productions can pave the way for the rational progress of the country towards the lofty goals of the political system. However, the development of information and technology is slow and there is not much satisfaction with its application (Danaifard, 2009)

The science and technology policies of the Islamic Republic of Iran seek to achieve goals such as the production of science and the

development of innovation and theorizing, the promotion of the country's global position in science, and access to advanced science and technology through a certain policy-making and planning as well as knowledge and research management and its integration into policy-making with regard to scientific and technical developments in the region and the world. Moreover, these goals are to be realized in the form of government support policies as supporting the establishment and development of science and technology towns and parks and identifying elites, fostering talents, retaining and attracting human capital, increasing the research budget to at least 4% of GDP by the end of 1404 with emphasis on the increased share of science and technology in the economy and national income, increasing national power, and improving efficiency. Therefore, evaluating the success of support policies in knowledge management (KM) of high-tech firms, along with the required tools and the barriers, prompted the researcher to share the product of his study with experts.

Emphasis on investing in high-tech firms is a process that includes actions by the government as a support, policy-making body, and firms' potentials. Due to the importance of competitiveness and knowledge whether in development or commercialization, the high-tech companies require support from governments. This study examines the impact of government policies on the development of KM in high-tech firms and discusses other tools that a government can use to support. The study also argues the government's success or failure extent in implementing the policies, the reasons for failure, and lack of meeting the demands and expectations of knowledge-based and high-tech companies. Hence, the researcher is to evaluate and critique the policies to provide guidance for policy makers, knowledge-based and high-tech firms' managers, and researchers.

Research literature

Having government support policies is often a necessity for growth-focused high-tech firms. Today, despite the limited experience and resources, many knowledge-based and high-tech companies that seek to enter global markets need support policies of their governments.

The governments of the world have begun to use KM as a main tool to formulate and implement strategies in the development of infrastructure policies and public sectors of organizations. Accordingly, government support policies as a facilitator and mediator in the development of various economic, technological, employment and entrepreneurship dimensions, and elimination of external dependence can be effective through knowledge-based high-tech technology. Studies on public sector KM have been conducted mostly in developed countries, specifically in the United States, Canada and the United Kingdom. However, the issue has been rather neglected in Asia, while over-examined in North America and Europe. Masaru et al. (2015) acknowledged that only 27% of the studies on KM in public sector were conducted in the Asian countries; in particular, India and Malaysia account for the largest studies while there is still room for exploration and research in other Asian countries. Therefore, this study is to collect data from Iran (Shojhet et al., 2017: 174).

Government support policies emphasize experience and knowledge as key determinants and expect knowledge-based and high-tech firms, as the specialized manufacturers of products with a short life cycle and focused target market, to augment their experience and knowledge. Hence, they often rely on external resources in their business networks. A special type of such networks include government organizations and institutions whose main job is to facilitate the needs of these companies (Mainella& Tahtinen, 2006: 319)

Much of the success of knowledge-based high-tech companies is defined by external factors such as new market conditions and technological advances, and government policies in various fields. However, internal factors such as the individuals' capabilities, the characteristics of the entrepreneurial team and global entrepreneurial tendencies also have a significant impact. The internal factors are the same factors that government policies seek to strengthen. Government support can also make opportunities to build new networks and strengthen new market knowledge (Tran, 2017: 2052).

High-tech firms are more vulnerable than other domestic and international firms, as they face more challenges for the following reasons:

- They have fewer resources.
- They have unique knowledge.
- They are attacked and harmed by foreign and hostile governments.
- They have professional and specialized human resources that are very difficult to manage, because basically the specialists and elites of such companies refuse to share their specialized knowledge for an organization. This is a critical issue for high-tech companies in the world, even in Silicon Valley.
- Documenting and sharing is a very difficult task in these companies.
- In practice, many high-tech companies depend on only one product

Given these conditions, they are commercializing their activities, products and services in leading markets. Also, due to the lack of resources, the companies are either looking for partners who complement their competencies or skills, or seek government support to alleviate the above-mentioned challenges, the main task of which is to provide market knowledge, help to expand networks, and evaluate technological innovations with the aim of providing other specific services.

Knowledge management processes

Liu defines a knowledge strategy as a set of guidelines that shape an organization's decisions about identifying, acquiring, developing, storing, managing, retrieving, and applying its knowledge (Lyuo, 2016: 41)

Researchers and experts have identified several processes that are part of KM strategies. These processes can be organized in three main areas (Slagter, 2007: 63):

1. Development of the knowledge that includes the production of new knowledge within the organization. Nonaka (1995) claimed that knowledge is created by transferring information from experienced employees to less experienced ones. This process is manifested as individuals' exchange and the knowledge is combined using various social

mechanisms. This reconstruction and re-creation of knowledge is the means by which knowledge is developed (Nonaka, 1995: 179).

2- Knowledge transfer along with knowledge integration processes requires knowledge shift from one group to another. Thus, knowledge sharing involves both transfer and integration. Knowledge can be transmitted through a variety of media, including verbal communication and information technology tools (Lianageh & Et al. 2009: 211). Through the knowledge sharing process, knowledge is accessible to all members of an organization.

Knowledge retention means its maintenance for use in an organization. This process is essential for maintaining, retrieving, and endangering critical organizational processes, including problem solving, decision-making, innovation, and other knowledge mission activities. Knowledge exists in individuals, but is used to achieve organizational goals; thus, the knowledge retention process ensures access to knowledge for organizational needs (Delang & Davenport, 1998: 4).

In short, KM are tools that enable the use of knowledge to develop organizational expertise and insight. Through coordinated KM processes, organizations use knowledge to adapt to environmental changes (Santarelli, 2017: 1052)

Knowledge-based high-tech firms

Knowledge-based firms do research and develop in order to expand knowledge economy and synergize science and wealth in the field of technology. They apply the research findings and creative ideas with precise planning.

At the abstract level, technology is defined as synonymous with the information, equipment, techniques, and processes needed to turn data into output. Technology has Greek roots and is made up of the words *techno* and *logy*. *Techno* means skill and whatever made by man. In ancient Greece, *logy* was used to mean science, knowledge and wisdom. In this way, technology evokes art and skill in knowledge. Given that the identity of high-tech-based industries is the result of emerging and evolving knowledge and technologies, the competition in this category of industries lies in technology and solutions based on technology development (Hao & Sang, 2016: 751)

Advanced technology is often seen as a high-risk phenomenon but offers diverse opportunities with many benefits. These technologies enjoy advanced and fully automated executive and operational systems and computer design that aim to provide products, services and solutions with high quality, low cost and in the shortest possible time (Azizi, 2011: 179).

The most important and obvious features of advanced technologies are the following:

- Long life cycle
- The need to develop investment in years
- Numerous intangible benefits
- Increasing return on investment over time (Andries, 2013: 288)

High-tech firms generally emphasize customization, which is based on relationship design that allows trial, error and simulated feedback in

order to achieve goals. Toolkit or customization in advanced technologies must meet the following requirements (Zahra, 2015: 323):

• Provision of adequate space for solutions: The space of experience and solution design should be given to employees and customers.

•Learning through trial and error: The opportunity needs to be provided so that customers and employees relate the results of their decisions to feedback on their mistakes.

• Ease of use: The use of technology has to be facilitated for customers, companies, and knowledge and non-knowledge human resources.

• Shared library: Given that the solutions in question often consist of a custom combination of different common components, customization provides shared library to users and customers for convenience.

• High-tech translation: The results from customization needs to be supported by the instructions in question.

Support policies for knowledge-based ad high-tech firms

Networking policy: Today, all knowledge-based and high-tech firms mainly require domestic and foreign networking to be able to get the needed resources and offer their commercialized products there.

According to the science and technology policies of the Islamic Republic of Iran, the supportive role of the government in networking is shown as follows:

• Development and strengthening of national and transnational communication networks between universities, scientific centers, scientists, researchers and domestic and foreign technology and innovation development firms, and expansion of cooperation at the governmental and popular institutions with the priority of Islamic countries.

• Expanding active, constructive and inspiring cooperation and interaction in the field of science and technology with other countries and prestigious regional, global and technical centers, especially the Islamic world, along with strengthening the country's independence.

Therefore, creating and maintaining appropriate, superior and effective networks is an integral part of a successful government support policy. Networks help the companies discover opportunities by testing ideas and gathering resources to build new organizational structures. Networks provide information that lowers the level of risk and uncertainty in international activities and facilitates access to complementary knowledge and resources (Viravardna, 2007: 169).

However, companies don't have the same performance on networks and moving towards them. McAuley and Zahir (1999) stated that although firms in a region have similar resources, cost structures, and competitive behavior, they differ in terms of ability to achieve and maintain competitive capabilities through their networks.

As these companies move forward, the role of support policies becomes more and more important to them, and they seek to build long-term relationships with other members and networks that governments have established for them in order to cope with global markets turmoil in global operations to strengthen themselves through the network relationships.

High-tech firms, particularly through social capital in communications networks, generate knowledge and provide access to global markets (Prashantam & MC Naughton, 2006: 447).

*Financial and tax incentives***.** Since, in line with science and technology policies, the government seeks to provide financial and spiritual support to the process of turning ideas into products and increased share of products and services (by 50%) based on advanced knowledge and domestic technology in GDP, financial and tax incentives can be very effective for knowledge-based high-tech companies' KM.

Nomla (2000) emphasized network performance differences in high-tech firms. According to him, at first, when a high-tech firm thinks about networking, it seeks policies to gain the government's financial and tax incentives that can fill the company's resource shortage.

Regarding financial incentives, direct support is provided to businesses for product development, design promotion, prototype production, process innovation, technology acquisition, organizational change, product marketing improvement, etc. This is probably the most common innovation measure in industrialized countries. Such supports differ in terms of types and forms, but they all aim to reduce the innovation risk in the intended business. The followings are the most important ways to provide financial incentives:

A) Grant that covers a percentage of business R&D costs that can be awarded for activities defined by priority or competition.

B) Soft loans provided directly by a government agency or through commercial banks or other financial intermediaries. In some cases, these loans may only be repaid in certain circumstances, such as if a product development project is successful and the company has a new sale.

C) Government loan guarantees intended to facilitate business loans by commercial banks or other financial intermediaries that reduce the need for collateral when applying for a loan.

D) Government support for start-up capital that business angels and risky investment pass through the early stages of business, and may be done as establishing investment funds, mutual investment, etc.

Tax incentives are also defined as tools that, by reducing the corporate tax burden, encourage firms to invest in projects or sectors. Tax incentives includes reduced profit tax rates, tax breaks (tax exemptions for a limited time), legislation to allow accelerated depreciation for tax purposes, and reduced tariffs on imported equipment, components and raw materials, or increased tariffs to support the domestic market against the imports of alternative investment projects. By tax incentives, the governments are to improve performance in exports, technology transfer, employment, education, domestic value-added, and to encourage investment in specific sectors and regions.

Knowledge sharing policy: Government policies can play a role in sharing experiences, both implicitly and explicitly. These policies transfer experiences from one place or subject to another. Hence, the supports may allow a company to rely on the knowledge of others instead of developing internal empirical knowledge. Again, these measures build capacity in high-tech companies and help them avoid failure.

Knowledge transfer policy: Besant and Rash (1995) present three policies in developing the key management capabilities of high-tech companies. The first role is the direct transfer of expert expertise, which has also been emphasized by McOwill and Zahir (1999) and Welch et al. (1996). Besant and Rash (1995) divide expert expertise into market knowledge, situational knowledge, technology knowledge, and consulting. Quite similar to this division, Fletcher (2007) in the globalization process of companies emphasizes the need for market knowledge, general knowledge of globalization and knowledge about the product and technology. Through knowledge transfer, external facilitation helps companies build and strengthen their capabilities and prevent failure (Besant & Rash, 1995, 97).

Besant and Rash (1995) have called the role of the second policy as the unity agent. In order to access professionals and business partners' services, the government creates a point of contact. McOwill and Zahir (1999) consider the unity agent as a link and solidarity with economic, professional and social circles, which would not otherwise be available to these companies.

Guidance policy. According to Howells' (2006) theory, at the practical level, governments can help companies identify partners, support decisions, and facilitate contractual arrangements between the parties. In addition, the role of mediation in relationships and network opening is emphasized. Also, this policy as parties' active mediator, may play a role in targeting actions in high-tech firms and thus reducing R&D and KM costs, which is reflected in the knowledge transfer support as the below:

- Efforts to transfer technology and acquire design and manufacturing knowledge to make products in the country using the national market capacity in the consumption of imported goods.
- Utilizing the scientific and technical capacities of Iranians living abroad and attracting prominent experts and researchers from other countries, especially Islamic countries as needed.
- Changing Iran into a center for registering scientific articles and attracting the researchers' findings, elites and innovators from other countries, especially the Islamic world.

Architectural support policy: The government plays a diagnostic role in this policy. It help companies define and articulate their specific innovation needs; or, directly, help them in evaluation and development of innovation. This means activating the firms' innovation potentials or, possibly, creating an institution to absorb a wealth of vital knowledge and skills to support specific technologies (Holwes, 2006: 723).

This policy can be achieved by the establishment of facilitating organizations in the development of industries and services based on new sciences and technologies as well as supporting the production and export of knowledge-based products that rely on local technologies, especially in areas with advantage and capacity, by reforming imports and exports. Such a policy acts as an institutional architecture in the country's science and technology policies. However, we are at the beginning of the road and parallel and imperfect institutions are a big problem for the architectural support policy.

Table 1. The role of governments' support policies in knowledge-based firms' success

Role	Description
knowledge transfer	Transfer of experts' knowledge in markets, product / technology globalization with the aim of helping to create capabilities in target companies.
Sharing experiences	Transfer experiences and ideas from one context to another with the aim of helping to build capabilities and prevent failure in target companies.
Architecture	Identification of organizations with complementary capabilities and search for potential partners to allow visibility, efficiency and intimacy at the macro level
Networking	Acting as a channel to introduce and satisfy audiences and relationships with the aim of helping to target small networking actions of small firms and thus to reduce research costs and increasing visibility, efficiency and intimacy at the inter-organizational level.
Guidance	Ensuring that collaboration between partners is coordinated and balanced with a small firm's strategy to help prevent failure and increase visibility, efficiency and intimacy at the team level
Financial and tax incentives	Financial-tax incentives seek to compensate for the lack of financial resources of institutions and allow them to provide the other resources needed and to achieve the goals of commercialization and knowledge transfer.

Factors affecting the failure of government support policies for knowledge-based high-tech firms

Full implementation of support policies in the knowledge management of knowledge-based high-tech companies is usually not possible due to the numerous and diverse barriers and factors, some of which cannot be fully controlled. Therefore, in research on the failure of government support policies for high-tech firms' KM, the following reasons can be mentioned:

1- *Prioritizing problem*: One of the obstacles that prevents the government to properly implement support policies is the difficulty of prioritizing science and technology fields by the type of advanced technology industries (nanotechnology, biotechnology, agriculture, renewable energy, advanced materials, etc.), the type of support (finance, architecture, networking, sharing knowledge , knowledge transfer, etc.), and the pressures from different groups (political, military, etc.) that change priorities. On the other hand, the tendency to include good things in the country's documents, regardless of the need to limit the goals number in certain periods, has led to the inability to achieve the goals and thus recurrence of policies without progressing. From the policy literature it is given that the lack of prioritization in upstream documents confuses policy makers.

2- *Not using futurism in compiling documents*: The lack of futuristic vision is seen as a serious challenge in formulating, implementing and evaluating government policies, especially in knowledge-based high-tech

firms' KM and newness of the firms and their technological fields. Emphasis on short-term results, modeling of countries such as Turkey and Malaysia as reference and non-use of national and international strategists by specialized policy-making working groups are the most important factors that cause deficiency in the quality of formulating, implementing and evaluating knowledge management as well as the related support. .

3- *Incompatibility of policies with the existing challenges*: In order to define the problem and making a policy to solve it, the current situation must correctly and transparently be agreed with the policy makers and the desired situation must be subject to their relative consensus. But now, an unrealistic understanding of the current situation has distorted policy-making. There is a huge gap between policymakers in understanding the status quo so that some have a very optimistic view of the current situation in the country, so they formulate ideal and unattainable policies. However, some have a very pessimistic view and consider everything lost. In this situation where the understanding scope of the current situation is scattered and wide, policy-making will be very difficult. On the other hand, policymakers lack a consensus on favorable situation of the country and there are different and sometimes conflicting views and approaches between policymakers and practitioners regarding the favorable situation. For example, the community and even country's map steering headquarter still lacks an institution to identify obstacles to the implementation of the science and technology policy documents.

Non-sovereignty of Meta policies: Non-sovereignty of long-term meta-policies (such as the vision document) is one of the main issues in making specific and long-term policies. The 20-year vision is the only long-term document that has been drafted by the Expediency Council and has been well-constructed. However, it has not been interpreted for different layers of science and technology, and as a result, the lack of long-term policies over sectorial and short-term policies is one of the problems in the country's policy-making system. Therefore, due to such a lack, the country's policy system does not have a clear general direction.

5 - *Lack of cross-sectorial vision*: The dominance of the engineering view on the country's scientific policies has caused the approach of Indian and Malaysian research-oriented universities to overshadow the country's higher education. On the other hand, the organizations' mere attention to their own interests and tastes, instead of following a policy-centered manner leads to the improper implementation of the policies. Not observing the logical sequence of policy-making steps is the other challenge. It means that sometimes policies do not come from the value bases and macro policies of the system and sometimes plans are not formulated based on these policies. In many cases, if the policymakers' intentions pass safely through these stages, the implemented product/service for which the budget is allocated lacks the necessary consistency with what the policymakers intended from the beginning.

6- *Bureaucratic and island structure and lack of related institutions or weakness of institutions*: A gradual move to create or strengthen the necessary institutions should be emphasized for the effectiveness of science, technology and innovation policies. To this end, the status of two

important criteria, namely the level of institutional capabilities and scientific-technological capabilities should be examined.

By determining Iran's position as a country with limited and fragile institutional capabilities as well as moderate scientific and technological capabilities, referring to the experiences of similar countries, the general guideline for policy-making is to increase research and development (R&D) in commercial firms through the recombination of scientific and technological capabilities. In this regard, some of the serious obstacles from an institutional perspective consist of: lack of government attention to commercial firm R&D investment for economic development, weak legal standards, underdeveloped financial systems, lack of infrastructure suitable for business, unfavorable economic conditions, lack of flexible and independent organizations to support different groups of commercial firms, and enactment of redundant and cumbersome laws. Each of the obstacles can be removed using appropriate solutions (Momeni & Ailzadeh, 2013)

7- *Ambiguity in effectiveness, analysis and tools*: A review of the empirical literature on evaluating the impact of government interventions shows that with increasing access to appropriate data, there are criticisms about the effectiveness of the interventions because of community pressure to use the public budget efficiently. Therefore, in order to understand and review government policies, policy-making tools and their impact and implementation must be evaluated. In most countries, there is a codified program to evaluate policies effectiveness based on micro and macro industry data and periodic surveys such as the innovation survey and the R&D survey. The evaluations are done through various indicators and methods.

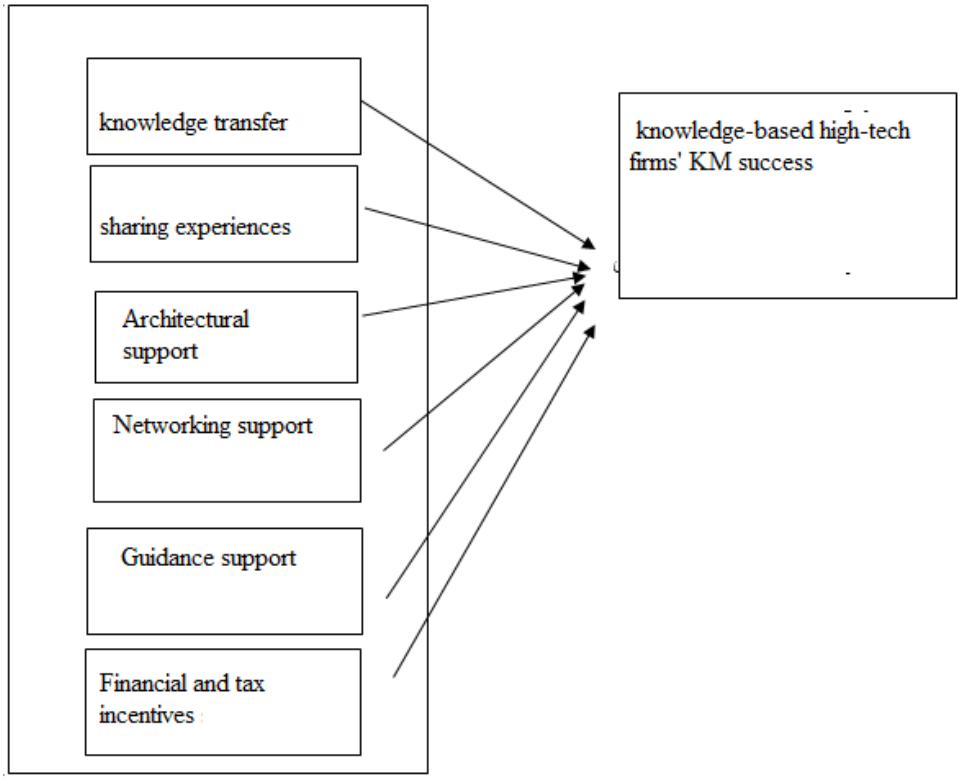
The results from evaluations, while generating knowledge and determining the value of supportive policies, will enhance the ability to learn from ongoing policies. However, the evaluation of the effectiveness of supports included in the Knowledge-Based Law has not received much attention, and apart from providing statistics on the growth of the firms' number, sales and employment, no analytical report has been published on the tools effectiveness.

Policy evaluation research mostly use a microeconomic framework, because such data are more focused on economics, and often studies using a macroeconomic framework are scarce but important, because macro data allows attainment of innovation spillovers effects between countries.

Evaluation studies often analyze the effect of incentives by econometric panel data, and are usually based on firm-level panel data, covering periods before and after the introduction of an incentive, or analyzing the effects of incentive changes. In recent years, control group methods have also been used in order to compare companies that do not use incentives.

Research conceptual model

According to the studies on government policy and knowledge management and review of research background, the conceptual model of research can be presented as follows:



RESEARCH METHOD

The current article is an attempt to investigate the relationship between government policies and KM in knowledge-based high-tech firms. This is a descriptive research in terms of strategy and purpose, a fundamental research from the audience's point of view, and a cross-sectional research in terms of time.

The main hypothesis of the research is:

There is a direct relationship between government policies and KM success of knowledge-based high-tech firms.

The sub-hypotheses are as follows:

1. There is a direct relationship between the knowledge transfer and KM success of knowledge-based high-tech firms.
2. There is a direct relationship between sharing experience and KM success of knowledge-based high-tech firms.
3. There is a direct relationship between architectural support and KM success of knowledge-based high-tech firms.
4. There is a direct relationship between networking support and KM success of knowledge-based high-tech firms.
5. There is a direct relationship between leadership support and KM success of knowledge-based high-tech firms.
6. There is a direct relationship between financial and tax incentives and KM success of knowledge-based high-tech firms.

Government policy is considered as the main variable and KM success as the independent variable. The research is conducted based on archival studies and field research.

Validity of the questionnaires was checked by the KM questionnaire in the research by Hans and Nouria, Nonaka and Take Ochi, and validity of the government support policy was checked using the questionnaire made by Mr. Rhodes. Questionnaires reliability was examined via Cronbach's alpha which is used to calculate the internal consistency of the instruments. In this study, the reliability coefficient of standard questionnaires was obtained to be approximately 73% after the necessary adjustments in the standard questionnaire.

The statistical population included the firms with the following criteria:

- Having high technology
- Non-profit and knowledge-based manufacturing firms
- Firms with a history of establishing KM systems

Qualitative sampling was done by purposeful or judgmental method, so the researcher selected the experts who had the most knowledge. The experts include factory, production, design and planning, engineering, R&D, IT, quality assurance, finance, and investment managers.

The statistical population consisted of 51 expert managers in 7 knowledge-based and high-tech firms (working in the fields of biotechnology, nanotechnology, hardware and software information technology, advanced materials and semiconductors).

Inferential statistics and Spearman correlation coefficient were used to analyze the data from the questionnaires.

Table 2: Research reliability

Row	Independent variable	Questionnaires number	Accuracy	Cronbach's alpha coefficient
1	Knowledge transfer	51	100%	0.887
2	Experience sharing	51	100%	0.822
3	Architectural support	51	100%	0.835
4	Networking support	51	100%	0.861
5	Guidance	51	100%	0.827
6	Financial and tax incentives	51	100%	0.847

FINDINGS

In the case of gathering rank data or converting the data to rank type, the Spearman or ρ Spearman rank correlation can be used; hence, the following results are presented:

In examining the main hypothesis "There is a direct relationship between government policies and KM success of knowledge-based high-tech firms", the impact of all independent variables as the government support policies was calculated and finally the Spearman test was done and the following results were obtained:

Table 3: Spearman test for government support policies and KM success

Correlations		
	Government support policies	KM success

Spearman's rho	Government support policies	Correlation Coefficient	1.000	0.819**
		Sig. (2-tailed)	.	0.000
		N	51	51
	KM success	Correlation Coefficient	0.819**	1.000
		Sig. (2-tailed)	0.000	.
		N	51	51

According to the table, the decision criterion is less than 0.01. Therefore, with 99% confidence, the null hypothesis is rejected and there is a direct relationship between government support policies and KM success with Spearman coefficient of 0.819.

Examining the first sub-hypothesis “There is a direct relationship between the knowledge transfer and KM success of knowledge-based high-tech firms", the following results were obtained.

Table 4: Spearman test for knowledge transfer and KM success

Correlations				
			Knowledge transfer	KM success
Spearman's rho	Knowledge transfer	Correlation Coefficient	1.000	0.815**
		Sig. (2-tailed)	.	0.000
		N	51	51
	KM success	Correlation Coefficient	0.815	1.000
		Sig. (2-tailed)	0.000	.
		N	51	51

As seen, the decision criterion is less than 0.01. Therefore, with 99% confidence, we can say that there is a direct relationship between the knowledge transfer and KM success with Spearman coefficient of 0.815.

Examining the second sub-hypothesis "There is a direct relationship between the sharing experiences and KM success of knowledge-based high-tech firms", the following results were obtained:

Table 5: Spearman test for sharing experience and KM

Correlations				
			Sharing experience	KM success
Spearman's rho	Sharing experience	Correlation Coefficient	1.000	0.643**
		Sig. (2-tailed)	.	0.000
		N	51	51
	KM success	Correlation Coefficient	0.643**	1.000
		Sig. (2-tailed)	0.000	.
		N	51	51

According to the table, the decision criterion is less than 0.01. Therefore, with 99% confidence, there is a direct relationship between sharing experiences and success of KM with Spearman coefficient of 0.643.

Examining the third sub-hypothesis "There is a direct relationship between architectural support and KM success of knowledge-based high-tech firms" the following results were found:

Table 6: Spearman test for architectural support and KM success

Correlations				
			architectural support	KM success
Spearman's rho	architectural support	Correlation Coefficient	1.000	0.719**
		Sig. (2-tailed)	.	0.000
		N	51	51
	KM success	Correlation Coefficient	0.719**	1.000
		Sig. (2-tailed)	0.000	.
		N	51	51

According to the observations, the decision criterion is less than 0.01. Therefore, with 99% confidence, there is a direct relationship between the architectural support and KM success with Spearman coefficient of 0.719.

Examining the fourth sub-hypothesis "There is a direct relationship between networking support and KM success of knowledge-based high-tech firms", the following results were obtained:

Table 7: Spearman test for networking support and KM success

Correlations				
			networking support	KM success
Spearman's rho	networking support	Correlation Coefficient	1.000	0.689**
		Sig. (2-tailed)	.	0.000
		N	51	51
	KM success	Correlation Coefficient	0.689**	1.000
		Sig. (2-tailed)	0.000	.
		N	51	51

According to the observations, the decision criterion is less than 0.01. Therefore, with 99% confidence, there is a direct relationship between networking support and KM success with Spearman coefficient of 0.689.

Examining the fifth sub-hypothesis "There is a direct relationship between guidance support and KM success of knowledge-based high-tech firms", the following results were found:

Table 8: Spearman test for guidance support and KM success

Correlations				
			Guidance support	KM success
Spearman's rho	Guidance support	Correlation Coefficient	1.000	0.852**
		Sig. (2-tailed)	.	0.000
		N	51	51
	KM success	Correlation Coefficient	0.852**	1.000
		Sig. (2-tailed)	0.000	.
		N	51	51

According to the observations, the decision criterion is less than 0.01. Therefore, with 99% confidence, there is a direct relationship between the guidance support and KM success with Spearman coefficient of 0.852.

Examining the sixth sub-hypothesis "There is a direct relationship between financial and tax incentives and KM success of knowledge-based high-tech firms", the following results were found:

Table 9: Spearman test for financial and tax incentives and KM success

Correlations				
			Financial and tax incentives	KM success
Spearman's rho	financial and tax incentives	Correlation Coefficient	1.000	0.883**
		Sig. (2-tailed)	.	0.000
		N	51	51
	KM success	Correlation Coefficient	0.883**	1.000
		Sig. (2-tailed)	0.000	.
		N	51	51

According to the observations, the decision criterion is less than 0.01. Therefore, with 99% confidence, there is a direct relationship between financial and tax incentives and KM success with Spearman coefficient of 0.883.

RESULTS OF HYPOTHESIS TESTING

The results of testing the hypotheses in the form of Spearman correlation coefficient, chi-square coefficient, and significance of the tests are as follows:

Table10: Results of hypothesis testing

Row	Hypotheses (variables and KM success)	Spearman correlation coefficient	Chi-square coefficient	Test significance	H0 testing result
1	Government support and KM success	0.819	59.821	0.000	Confirmed

2	Knowledge transfer and KM success	0.815	63.154	0.000	Confirmed
3	Experience sharing and KM success	0.643	60.205	0.000	Confirmed
4	Architectural support and KM success	0.719	356.67	0.000	Confirmed
5	Networking support and KM success	0.689	231.61	0.000	Confirmed
7	Guidance support and KM success	0.852	793.64	0.000	Confirmed
7	Financial and tax incentives and KM success	0.883	201.66	0.000	Confirmed

DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

Numerous empirical studies in OECD countries over the past 15 years show that part of a country's economic performance depends on its capacity to provide appropriate policies to support knowledge-based and high-tech firms. They significantly improve the firms' performance. In most countries, policies of support, guidance, networking, sharing experience, knowledge transfer, and financial and tax incentives are intended to support knowledge-based IT firms.

Regarding the main hypothesis, using the inferential statistics, the researcher argues that government's regular and integrated support policies facilitate knowledge management in high-tech firms and can be successfully implemented. Mouler and Zenker (2003) point out that government support policies become more important when the intangible value of products enhances the role of knowledge. In general, the development of government support has been cited as an important reason for the recent economic transformation in industrialized countries based on high-tech firms' activities (Mouler & Zenker, 2001: 10511).

On the other hand, support policies allow the required conditions for the use of human resource knowledge in creating new capacities for creativity and innovation, updating latent knowledge, and developing human resource communications in high-tech firms so that this can be deemed as a competitive advantage (Newman, 1999: 422).

Also, knowledge transfer can provide the needed conditions for professionals to acquire knowledge to enter markets, globalize and commercialize products and technology for providing capabilities and preventing the outflow of human capital in high-tech companies.

On the other hand, transfer of experiences and ideas might help high-tech companies to obtain the necessary specialized information with the aim of business development and improvement as well as maintenance of competitive position and avoidance of failure.

Architectural policies can help high-tech firms identify leading organizations with complementary capabilities, potential partners for the development of skills and technologies, and global markets at the macro level. They also create appropriate interaction patterns within and among organizations.

Networking policies can help high-tech companies identify and introduce the required communication channels and establish relations with the required stakeholders (customers, suppliers, distributors, competitors,

facility institutions, etc.). In addition, by targeting networking measures, they might allow reducing R&D costs, entering international markets, and supplying the needed items including human resources, technology, raw materials, etc. at the level of national and international organization.

Guidance policies can help high-tech companies ensure that there is a coordinated co-operation among stakeholders that is in balance with the government's overall supportive strategies to help high-tech firms develop the activities. Guidance in a way includes a variety of government support in all of the dimensions that can ensure integration and movement in the direction of goals.

But the remarkable result is that despite the implementation of these policies, some of the IT-based firms, including small, new medium-sized and new startups, are located in science and technology parks. A small number of them have developed enough and have been able to move to industrial estates. Knowledge-based companies are mainly responsible for designing and manufacturing new products. In fact, due to the lack of production infrastructure, inability to enter the market, and brand issues, start-ups and small firms often avoid entering the market directly and cannot enter their products into the market. They do commercialization and access to markets by selling the products to large companies, which is a crucial challenge for Iranian firms. Therefore, the amount of sales and market development of these companies depends on their ability in establishing link to large industries. This indicates the inadequacy of these policies or, as stated in the study, the government’s weakness at policies for sharing experiences as well as internal and external networking, which ultimately prevents better knowledge transfer and commercialization of them.

Considering that a significant percentage of knowledge-based firms are manufacturers, they also need to be reformed in terms of architecture and to develop organizational departments through experienced public, private, and academic consultants in order to have a better performance in development, sharing, and exploitation of their own knowledge and that of other similar national and international organizations; as well as, to pave the way for entering their products in to the commercial technology markets. The supportive policies can also provide production specialists with the necessary platforms for knowledge acquisition and prevent the outflow of human capital as a serious concern of the knowledge-based firms because most of the manufacturing companies confront with major challenges in maintenance of strategic forces.

Regarding financial and tax incentives, it can be noted that the nature of tax incentives distinguishes them from subsidies and other innovation policies. Tax incentives leave firms free to choose R&D projects and allow markets to select the most promising R&D projects. They also impose lower implementation costs for governments and firms than other innovation policies. Tax incentives for R&D are non-discriminatory and give companies maximum independence in choosing and conducting research and development and taking more risks. Effective use of tax incentives requires careful design. They are commonly used around the world and has been a popular policy tool in developed countries for the past twenty years. By the end of 2014, 26 of the 28 EU member states had

benefited from R&D tax incentives. They have also been developed in non-member countries such as Brazil, China, India, Russia, Singapore and South Africa. The main purpose of this policy tool is to encourage more investment in research and development, which can lead to more innovation, productivity and economic growth. The use of such a tool can be fruitful in Iran as well.

Tax exemption is also a common policy tool to support innovation and R&D around the world and is usually the first support tool considered by policy makers. Tax exemption is an important option for governments to support firms, as they lead to lower firms' costs. In most countries, start-up IT-based businesses are the main target audience for tax exemptions. In Iran, in 2010, in order to facilitate and promote the establishment and activation of such firms, the law on Support of Knowledge-Based Firms and Institutions was approved. They are stated in paragraph A of Article 3 of the law as being exempted from taxes, duties, customs duties, commercial profits and export duties for 15 years. The granting of tax exemptions to knowledge-based firms has begun in 2013.

In order to extract the logic and policy objectives of the tax exemption tool, the content of the law and the relevant supporting documents, including Law on Support of Knowledge-Based Firms and Institutions, Executive Regulations of the law, Executive Instructions of Article 22 of the Executive Regulations, and Commitments of Firms and Institutions applying for the benefits of the law was qualitatively analyzed. Providing financial facilities to companies in paragraph b of Article 3 of the law on the support of knowledge-based firms as "providing all or part of the cost of production, supply or application of technology and innovation by granting low or no long/short-term facilities according to sharia contracts. In addition, Innovation and Prosperity Fund has been established according to Article 5 of the law, in order to provide financial facilities to knowledge-based firms. The statute of this fund was approved in 2012. Financial facilities include loan facilities (prototyping), and pre-industrial production facilities, industrial production facilities, and working capital.

On the other hand, financial incentives affect high-tech firms' KM in such a way that financing knowledge projects leads to more innovation and in turn increased sales, profits, productivity, etc. Grants, credits, or loan guarantees (may be preferable than R&D tax credit) are provided directly to selected businesses (open to all applicants, but investment is done selectively on the best offers and teams) which are targeted based on promising opportunities and participants might be more diligent in pursuing their project goals. Such a selective approach creates competition between firms and may lead to an increase in R&D investment in a region or industrial sector.

Reviewing the results and shifting the impact of supporting policies is an important point in analyzing KM. Studies have addressed the effectiveness of government interventions and the impacts of policy tools from different dimensions. In most theoretical studies, additive effects has been assessed versus the effect of subsidy substitution on research, development and innovation. Providing government support for innovative activities can force firms to increase their innovation efforts, which is seen as an additive effect. In contrast, firms with government support may

replace their investment in innovation with government funding, in which case the amount of resources allocated to the private sector's innovation will be reduced or eliminated due to government support. This is an effect caused by substitution.

It is concluded that in order to transfer knowledge, inclusion of transfer reward criteria for elites, researchers and knowledge forces in knowledge-based firms, both within and between them, with the aim of accelerating and facilitating true knowledge can be motivating.

Also, sharing knowledge based on both documentation and knowledge personalization policies to transfer the knowledge hidden in researchers' hearts and minds is another recommendation that requires culture building and infrastructure technologies through recording experience and managing the relevant knowledge.

In line with the policies mentioned, in order to improve the knowledge architecture in all knowledge-based firms, it is recommended to include a unit or an author (as the knowledge manager) for the structure, process and task in order to integrate all organizational knowledge in different departments and, like a training unit, take the responsibility of transferring, sharing, developing, and even exploiting mechanisms.

Knowledge networking is also a marketing tool needed for high-tech companies to enter global markets with competitors and other stakeholders, and can also facilitate more effective knowledge commercialization outside the industry.

It is clear that, as stated, KM along with knowledge architecture makes a very good combination for the need to change the structure and mange knowledge -along with other organizational units- to guide a single firm. Interestingly, all large IT firms like Tesla enjoy maximum government support as an independent unit, such as supporting the Ilan Mask project for the US private sector astronauts to travel.

Moreover, the following steps are suggested to remove institutional barriers, as discussed in the article:

• The government should pay more attention to the importance of the investment level of manufacturing firms in R&D for economic development.

• Legal and governance standards should be strengthened and developed to control informal interactions between economic agents by amending and simplifying existing laws and regulations

• Laws related to intellectual property rights need to be amended and strengthened.

• The government should take accountability for the impacts of wrong policies or frequent policy changes on firm’s development.

• Bureaucracy needs to be reduced and transparency should be ensured in establishing, registering, and other business processes.

• The relationship between industry and academia needs to be strengthened.

• Financial systems tailored to the needs of companies should be developed; e.g. in the early stages of converting ideas into commercial products as subsidies for more costly stages of development and commercialization, in the case pf small failure risk as subsidies, repayable grants, or plans to attract venture capital

• Efficient legal institutions need to be established specifically for users of support policies; e.g. entrepreneurs to improve the services, increase transparency, reduce corruption and inhibit unfavorable economic conditions.

• Crowded environment consisting of various public sector institutions that support formation of new firms, exports and foreign investment needs to be organized. The established firms should be strengthened in order to be independent. Further, the organizations that offer the necessary technical, financial, commercial, legal, etc. support in accordance with the target groups should be directed.

• Centralization should be reduced and decentralization should be launched: as the operational strategy for realizing the scientific plan of the country, the centralization system should tend to the decentralization system.

REFERENCES

Amiri, Mohammad (2006). An introduction to the cognition of challenge in the realization and implementation of the vision document. Journal of Strategic Defense Studies, p. 33-46.

Newman, William Lawrence. (2011). Social research methods: quantitative and qualitative approaches. Translated by Abolhassan Faghihi and Asal Aghaz. Termeh publications

Majidpour, Mehdi and Namdarian, Leila. (2015), Identifying barriers to the implementation of science and technology policy documents, Journal of Innovation Management, p.33

Momeni, Farshad and Alizadeh, Parisa (2013). Analysis of barriers to the effectiveness of innovation policy in Iran from an institutional perspective, Journal of Iran's Applied Economic Studies, p.74

Ajith Tom James& DeshmukhS.G., S.G. Deshmukh. (2017). Knowledge management of automobile system failures through development of failure knowledge ontology from maintenance experience. Journal of Advances in Management Research 14:4, 425-445

Albors, J., Hervas, J. L., & Hidalgo, A. (2006). Analysing high technology diffusion and public transference programs: The case of the European game program. Journal of Technology Transfer, 31, 647–661.

Andries, P., Debackere, K. and Looy, B. (2013), "Simultaneous experimentation as a learning strategy: business model development under uncertainty", Strategic Entrepreneurship Journal, Vol. 7 No. 4, pp. 288-310.

Barclay, O.R & Philip C.M.(2005).What Is Knowledge Management?. Knowledge Praxis.66-68

Baumard, P.(1999).Tactic Knowledge In Organization. MIS Quarterly, 25(2), 111-128.

Bessant, J., & Rush, H. (1995). Building bridges for innovation: The role of consultants in technology transfer research policy. Research Policy, 24, 97–114.

Bhatt, G. (2001). Knowledge Management In Organization: Examining The Interaction Between Technologies, Techniques And People. Journal Of Knowledge Management.5(1),68-70

Bhatt , Ganesh D. (2007). Knowledge Management In Organization, Examining The Interaction Between Technologies, Techniques And People. Journal Of Knowledge Management.5(1),68-75.

Carneiro, A. (2000). How Does Knowledge Management Influence Innovation And Competitiveness?. Journal Of Knowledge Management.4(2), 87-98.

Crick, D., & Jones, M. (2000). Small high-technology firms and international high-technology markets. Journal of International Marketing, 8(2), 63–85.

Davenport ,T.& Prusak ,L. (1998).Working Knowledge , How Know Organization Manage What The Know.(pp.34). Harvard College.

Ferreira, J.J., Fernandes, C.I., Alves, H. and Raposo, M.L. (2015), "Drivers of innovation strategies: testing the Tidd and Bessant (2009) model", Journal of Business Research, Vol. 68 No. 7, pp. 1395-1403.

Frow, P., Nenonen, S., Payne, A. and Storbacka, K. (2015), "Managing co-creation design: a strategic approach to innovation", British Journal of Management, Vol. 26 No. 3, pp. 463-483.

Galloway, T.L., Miller, D.R., Sahaym, A. and Arthurs, J.D. (2017), "Exploring the innovation strategies of young firms: corporate venture capital and venture capital impact on alliance innovation strategy", Journal of Business Research, Vol. 71 No. 2, pp. 55-65.

Gottschalk Petter, (2005) Strategic Knowledge Management Technology. Idea Group Publishing.

Hao, S. and Song, M. (2016), "Technology-driven strategy and firm performance: are strategic capabilities missing links?", Journal of Business Research, Vol. 69 No. 2, pp. 751-759.

Howells, J. (2006). Intermediation and the role of intermediaries in innovation. Research Policy, 35, 715–728.

Muller, E., & Zenker, A. (2001). Business services as actors of knowledge transformation: The role of KIBS in regional and national innovation systems. Research Policy, 30, 1501–1516.

Nam-Hong, Y& Soung-Hie, K. (2004). Knowledge Based Decision Making On Higher Level Strategic Concerns: System Dynamics Approach. International Journal Of Manpower.31(1/1),117-141.

Newman, B. & Conrad, K.W.(1999). A Frame Work For Characterizing Knowledge Management Methods(PP.322-346). Practice, And Technologies.

Nomaler O, Verspagen B.,(2017), Knowledge Flows, Patent Citations and the Impact of Science on Technology, Economic Systems Research, Jian-hua Liu et al. / Procedia Engineering 174 1036 – 1045 1045 2008(20):339-366.

Nonaka, L. & Takeuchi, H.(1995).The Knowledge- Creating Company(PP.179-211).Oxford University Press, Oxford.

Nonaka, L.(1994).A Dynamic Theory Of Organizational Knowledge Creation. Organization Science.5(1),81-93

Nohria,H & Tierney.(2004). Knowledge Strategy In Organizations: Refining. (PP.246-277).London,sage

Prashantham, S., & McNaughton, R. B. (2006). Facilitation of links between multinational subsidiaries and SMEs: The Scottish

Technology and Collaboration (STAC) initiative. International Business Review, 15, 447–462.

Sallis, Edward and (2002). Knowledge Management in Education, 3rd edn, Kogan page, London.

Santarelli, E. and Tran, H. (2017), "Young innovative companies: are they high performers in transition economies? Evidence for Vietnam", The Journal of Technology Transfer, Vol. 42 No. 5, pp. 1052-1076.

Zahra, S.A., Abdelgawad, S.G. and Tsang, E.W. (2011), "Emerging multinationals venturing into developed economies: implications for learning, unlearning, and entrepreneurial capability", Journal of Management Inquiry, Vol. 20 No. 3, pp. 323-330.