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Commercialization of Scientific Research Results of Knowledge-Based Companies in the Field of Medical Sciences (Case Study: Iran)

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ABSTRACT

In today's world, commercialization of scientific research results significantly contributes to development of most countries besides generating revenues and assisting in economic growth. Hence, the present paper aims at studying effective factors on commercialization of scientific research results through knowledge-based companies in the field of medical sciences. Methodology: The present survey – descriptive research is of correlation type in which questionnaire is used to gather required data. Population is composed of managers of 74 knowledge – based companies acting in the field of medical sciences selected on a random basis. Realized questionnaire is used to collect data. Gathered data is analyzed using LisRel and SPSS statistical software. Findings: Findings indicate a positive, significant correlation between personal, organizational, economic, legal, juridical and environmental – organizational factors of commercialization of scientific research results in knowledge-based companies and technological units. Bases on rankings, cultural – social (mean: 3.82), environmental – organizational (mean: 3.68), legal (mean: 3.65), economic (mean: 3.50), organizational (mean: 3.38) and personal (mean: 2.97) factors had the highest effect on commercialization of scientific research results of knowledge-based companies in the field of medical sciences. Discussion and Conclusion: Based on results, and since knowledge-based companies may, especially in the field of medical sciences, paly a valuable role in preparing and providing productions, authorities and economic policy-makers are suggested to pay more attention to problems and issues of such companies.

KEYWORDS: Commercialization, scientific research, knowledge-based companies, medical sciences

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1. INTRODUCTION

The information of education and knowledge are now the raw materials of new economy which will provide the infrastructures of progress of communities. In the past era, the physical factors such as the financial capital and labor play the main roles in creating the economic value of national production, but now the production has been enhanced and "knowledge" plays a major role in creating economic value (especially, added value) in most developed economies of the world (Nobakht, 1998).

Recent decades have witnessed significant growth and increasing speed of knowledge creation and improvement of Iran in concerning rankings. Nowadays, scientific and technical potential is the most obvious index of development in a country. Increased capacity and scientific and technical efficiency and optimal use of it require detailed understanding of its components. These components include a set of human resources, financial and capital resources, equipment and physical space which are applied under an organized coherent management in the field of science and technology. As long as research findings are not practically established and have not had the proceeds for society, they cannot be considered as sources of human welfare and prosperity (Yadollahi-Farsi & Kalatehaei, 2012).

Iran is a developing country and has taken major steps in this regard, and its progress in the field of health is very impressive. The establishment of knowledge-based companies in these fields led to the commercialize results of scientific research and this indicates the role of such companies. However, it seems that the situation of knowledge-based companies with the effective and prominent role in the global economy especially the economies of developed countries, is not properly defined in this trend. According to official figures and statistics, there are numerous active knowledge-based companies across the country, but the major challenges and concerns prevent them from achieving basic goals, and knowledge-based companies of health sector are not exceptions in this regard. Each of available limitations such as rules and regulations, and political, cultural and social issues, etc. can affect activities of these companies.

Several thousand articles and scientific achievements are conducted by researchers in academic and scientific health centers and most of them are published in national and international credible journals in Iran every year, but, apparently, these scientific products will rarely lead to commercialization. The investigation of problems at the national level can unravel most of the problems in knowledge-based companies including the active health companies in order to play more prominent roles in economic development and thus the independence of country. Therefore, it is very valuable to find the ways which can commercialize the results of internal studies.

In a research on outputs and commercialization of research plans in pharmaceutical college of Shahid Beheshti University of Medical sciences (2001 – 2011), Razavi et al (2013) concluded that from 193 research plans, 190 cases (98.4%) had files, 100% of plans had proposals and 100% of them had a written final report. In 80% of plans, performers believed that it is possible to apply research results. Moreover, 40 new pharmaceutical products, one case of registered invention, 5 generative companies, a growth center, and 23 cases of common plan with industries and gaining 20 billion Rials of income were among the most important achievements of pharmaceutical college. All above indicators were higher in 2011 than all other studied periods (Razavi, Emami, Valaei, 2013).

Hejazi and Hoseini (20104) performed a research on environmental prohibitory factors of transmission and commercialization of results of Nano medical research in Iran found that environmental factor prohibit commercialization in the field of Nano medical research. The most important obstacles include receiving required permissions, lack of consumption culture and lack of invest.

Nasiri – Koohpaye (2011) investigated knowledge commercialization in the field of biomedicine in Iran. Their results indicated that policy-making, regulations and management development are among effective factors on practical model of commercialization.

According to the conducted domestic and foreign studies, as mentioned in literature review section, various factors affect commercialization of scientific research results the most important of which include personal, organizational, institutional, environmental, cultural, social, legal and economic factors. The

investigation and prioritization of these factors provides for improvement of commercialization. Especially in the Field of health.
This study aims at identifying and ranking factors affecting commercialization of scientific research results in knowledge-based companies in the field of medical sciences.

2. LITERATURE REVIEW

According to the current changing circumstances in business, companies are faced with the challenge of competitiveness in the global arena. The effort for competitiveness and identification of useful performance of information and communication technologies is a vital component for survival and usefulness in the knowledge-based economy. Furthermore, companies are increasingly faced with issues such as the technological changes, short product lifecycle, miniaturization and high market volatility. To overcome such challenges, companies need to be able to manage the diverse and dispersed knowledge. Most of the people consider knowledge as a key source of competitive advantage and creativity in an organization (Edvinsson and Malone, 1997). Therefore, it is obvious that companies need to maintain the knowledge as their asset (Arntzen & Nkosi, 2013).
In the twenty-first century (Knowledge-based economy (KBE) century) the knowledge has become a vital commodity for countries, businesses and individuals. The tangible evidence and document suggest that knowledge and information are able to help people to achieve their own development objectives. To invest in knowledge revolution for improvement, competitiveness and prosperity, developing countries should rely on their strengths and accurately plan for investment in human capital, useful institutions, appropriate technologies and competitive and innovative companies (Kefla, 2010).
Those countries having changed their economy to a modern one, are reaping the great benefits that lead to generation of products and tangible and intangible values through the knowledge. A knowledge-based economy gives the increasing force and energy to economy of a country and puts it in a situation of strategic competitive advantage. Furthermore, this increases revenues. Due to emerging trends, globalization, and international trade, economies need the effective adaption in order to develop in a growing competitive world. Therefore, the countries invest in research, development, and education to maximize the benefits and maintain the competitive advantage. In other words, the basic requirement for a knowledge-based economy is a driving force for such investments which are essential to economic growth (Salem, 2014). The knowledge is a key factor in organizational efficiency and economic development of each country in terms of dynamic competitive struggle in the global market. The demand for improved competitive position creates the need for knowledge resources, so that they can participate to improve their position in global ranking as far as possible (Krstic, Stanisic, 2013).
Knowledge-based economy is a new form of economy in which production, distribution and use of knowledge are the main sources of growth and wealth creation. Knowledge-based companies are the main driving force of knowledge-based economy. Such companies are private institutions or corporations established to enhance science and wealth (simultaneously), develop knowledge-oriented economy, realize scientific and economic objectives (including expansion and application of innovation), and to commercialize results of research and development (involving designing and producing goods and services) in the field of premier technologies with high level of added value, especially in the area of producing related software (Allahyarifar – Dand Abbasi, 2011).
Knowledge-based economy is a vital component of modern economies. Growth in most economies of the world, especially developed ones, in increasingly based upon knowledge. In a knowledge-based economy, economic development depends highly on investment in education, learning and training among other factors. Nowadays, universities are becoming aware of the essential role of higher education in constructing knowledge-based economies (Salem, 2014:1047).
Technology commercialization (TC) helps companies with higher technologies maintain their competitive advantage. Although researchers demonstrated that product innovation and developing new products through mutual cooperation and organizational knowledge activities has increased, but thus may not be the main issue in technology commercialization (Lin, Wang, Kung, 2015).

On the other hand, the research findings can play important roles in production of economic development of communities and help increase the living standards and social welfare in a society. However, these findings will not be important unless they become practical and available for applicants, and thus they will not compensate high costs of research and knowledge generation. The low-income countries are faced with serious challenges for making the knowledge applicable Santesso, Tugwell (2006).
Commercialisation is a process through which results of scientific research and/or novel ideas are transformed to a product (goods or services) and is followed by financial profit. This process is the key to development and progress since it provides countries with the opportunity to turn their researchers' scientific achievements into material and product and, in this way, prepare for economic growth and development. Despite the direct relationship between commercialization and economic development and growth, it should not be neglected that prerequisite of this effect is presence of proper conditions, equipment and space for commercialization. In other words, economy is favorably developed when each involved factor (including commercialization) are implemented in the best way.

3. THEORETICAL FRAMEWORK

At the beginning of 1990s, the world clearly found out that a new form of economy is emerging which bases upon knowledge. The result was globalization of knowledge development and transformation. In such an economy, accumulation and application of knowledge in economic activities and in the process of globalization is the key to create economic value or wealth and achieving high life quality. This change has also had a deep impact on conducting the theory of economic development. Now, it is obvious that knowledge gap between rich and poor countries is not less important that savings gap. In fact, in today's world, economic conditions differ significantly from past. Applying terms such as infra industrial economy, information economy, knowledge economy, and modern economy indicate changes of these conditions. Of course, undoubtedly, knowledge is the main factor in generating such conditions, namely, passing traditional economy and moving toward modern economy. In this new atmosphere, resources and factors of creating economic value and, even, economic goods and transaction modes are significantly different (Hosseini, Hcaharmahali, Bighash, 2003:55).
Dialogue of knowledge economy is obtained from reports of a group of thinkers of the 1960s, including futuristic and information economists such as Firenze Jelapp (1963), Peter Drucker (1969), and Daniel Bell (1973) and indicates that industrial communities are Turing into capitalist, industrial communities with knowledge-based economy. Manuel Castells (1996) is an outstanding writer who believes that knowledge is the base of new production and this is in conflict with traditional discussion which introduces the earth (natural resources), work (human effort) and investing goods (machinery) as three main factors of production (Robertson, 2008:4).
The term "knowledge-based economy" refers to the role of knowledge and technology in economic growth. Knowledge has always been important in economic development, but its relation to economic growth has increased in recent years. Certain factor such as technology development, economic globalization, importance of expertise, enhancement of awareness of knowledge importance in economic development of a country and creation of new jobs are concerned with economic growth. This suggests that knowledge-based economy describes the positive effect of knowledge on economic growth (Kurtic, Denlagik, 2012:404).
The knowledge-based companies are research organizations which not only should develop new technologies in line with their mission, but also have to provide appropriate infrastructure consistent with commercialization of research findings. In such companies, the capital is usually received from the venture capital and it is managed by professional organizations; in fact, they focus on a special commodity market. Knowledge-based companies are established according to the knowledge economy and trade and earn money in this way. The companies are private and different institutions or companies which are established for synergy of science and wealth, knowledge-based economic development, achievement of scientific and economic goals, and commercialization of research and development results in superior fields with high value-added and especially in production of relevant software (Zhang, 2005).

The facilitated development of knowledge and technology-based businesses is one of the key strategies of sustainable development. In recent years, establishment of such firms has been taken into account and the facilities are provided to support them in Iran. The qualitative and quantitative development of incubators and technology parks, naming 2008 (the year of innovation and development,) efforts to develop a comprehensive scientific map, creating innovation and development fund, and establishing research and technology funds, and the law on protection of knowledge-based companies have been associated with the policymakers' efforts and willingness to integrate the process of science and technology generation as well as creating the innovative spirit at the national level (Shafiei, 2013).

The knowledge economy indicates an intangible economic structure through which knowledge becomes valuable as a key factor in production. The economic growth is increasingly based on knowledge; and the tangible assets such as the capital and labor are effective along with it. Knowledge has the function of creation, and thus it can become operational by innovation for empirical analysis (Yeo, 2010).

Khayyat (2015) investigated effective factors on technology transmission in food industries of Philippines and found that technology added value, structural factors, factors pertaining technology transmission, factors concerning the government and technology properties affected technology transmission (Khayyat, 2015:1).

Respecting research background and theoretical framework, one can easily understand the importance and place of knowledge-based companies in commercialization of scientific research results and, consequently, in economic growth of various countries. Although different countries pay different levels of attention to such companies, but the role of these companies in improvement of economic status is significant. A main function of knowledge-based companies is to meet requirements of commercialization of ideas and research results in various manners. Research results inside and outside a country reveal that such companies are faced with issues including rules and regulations, virtual ownership, idea screening, competitiveness, knowledge management, supporting research activities, encouragement system, organizational structures, social issues, technology infrastructures, etc. Hence, it can be said that knowledge-based companies of Iran, also, face obstacles and limitations each of which must be identified and eliminated as soon as possible.

4. MATERIALS AND METHODS

The present descriptive research is of correlation type. Research population consists of 74 managers of knowledge-based companies in the field of medical sciences and they are randomly selected to respond to questions of questionnaire. In terms of approach, it is the exploratory mix (qualitative and quantitative) including the qualitative and quantitative data collection. According to the research objective, based on identifying and ranking scientific research results in knowledge-based companies, the first step of this research is to investigate sources associated with commercialization as well as topics concerning knowledge-based companies. The results of this study identify various factors affecting the results of scientific research in knowledge-based companies. After conducting these studies, 6 main factors are identified as the factors affecting scientific research results in knowledge-based companies: Organizational, personal, environmental-organizational, cultural-social, legal and economic factors. A questionnaire is designed on the basis of factors identified in qualitative research, after identifying and determining these factors. The content and nominal validity of questionnaire are investigated and approved at early stages. Furthermore, the initial questionnaires are distributed and collected in the pilot group of 30 subjects in order to evaluate the reliability of questionnaire and estimate the standard deviation of population. LISREL and SPSS software are utilized for data analysis.

5. RESEARCH FINDINGS

Table (1): Results of Pearson correlation test for determinants of commercialization

	Personal factors	Organizational factors	Environmental--organizational factors	Cultural-social factors	Legal factors	Economic factors
Commercialization	0.392**	0.285*	0.538**	0.440**	0.320 **	0.377**
	0.001	0.014	0.000	0.000	0.005	0.001
	74	74	74	74	74	74

As observed in Table (1), the results of Pearson correlation coefficient indicate that there is a significant positive correlation between the factors determinants of commercialization on the commercialization of scientific research results in knowledge-based companies in the field of medical sciences. The significance level of all variables is equal to 0.000 at the error level of 0.01. According to the correlation results, there is a correlation between the main variables at an appropriate level, and this provides the possibility of further analysis.

Table (2): Results of regression test for the impact of personal factors on the commercialization of scientific research results

Method = inter			Simultaneous entry method of variables		
0.392a			Multiple correlation coefficient		
0.154			Coefficient of determination		
0.142			Adjusted coefficient of determination		
2.23739			Standard error		
13.70			ANOVA		
0.000			Significance level		
	B	SE	beta	t	sig
Constant value	8.274	0.717	0.392	11.542	0.000
Personal factors	0.281	0.078		3.616	0.001

Based on the Table 2 and the obtained results of regression test for the impact of personal factors on the commercialization of scientific research results in knowledge-based companies of medical science, the regression coefficient with significance level of α =0.000 is equal to R=0.392. Since this significance level is lower than the target significance level of α=0.05, it is concluded that for one unit change in standard deviation of personal factors, 0.392 of commercialization of scientific research results can be predicted in studied companies.

Table (3): Regression of regression test for the influence of organizational factors on the commercialization of scientific research results

Method = inter			Simultaneous entry method of variables		
0.285a			Multiple correlation coefficient		
0.081			Coefficient of determination		
0.068			Adjusted coefficient of determination		
2.33148			Standard error		
6.34			ANOVA		
0.000			Significance level		
	B	SE	beta	t	sig

Constant value	8.910	0.757	0.285	11.774	0.000
Organizational factors	0.184	0.073		2.519	0.014

Based on the Table 3 and the obtained results of regression test for the impact of organizational factors on the commercialization of scientific research results in knowledge-based companies of medical science, the regression coefficient with significance level of α=0.000 is equal to R=0.2851. Since this significance level is lower than the target significance level of α=0.05, it is concluded that for one unit change in standard deviation of organizational factors, 0.285 of commercialization of scientific research results can be predicted in studied companies.

Table (4): Results of regression test for influence of organizational-environmental factors on the commercialization of scientific research results

Method = inter			Simultaneous entry method of variables		
0.538a			Multiple correlation coefficient		
0.289			Coefficient of determination		
0.279			Adjusted coefficient of determination		
2.05033			Standard error		
29.30			ANOVA		
0.000			Significance level		
	B	SE	beta	t	sig
Constant value	7.706	0.601	0.538	12.831	0.000
Environmental-organizational factors	0.266	0.049		5.413	0.000

Based on the Table 4 and the obtained results of regression test for the impact of environmental-organizational factors on the commercialization of scientific research results in knowledge-based companies of medical science, the regression coefficient with significance level of α=0.000 is equal to R=0.538. Since this significance level is lower than the target significance level of α=0.05, it is concluded that for one unit change in standard deviation of environmental-organizational factors, 0.538 of commercialization of scientific research results can be predicted in studied companies.

Table (5): Results of regression test for influence of cultural-social factors on the commercialization of scientific research results

Method = inter			Simultaneous entry method of variables		
0.440a			Multiple correlation coefficient		
0.193			Coefficient of determination		
0.182			Adjusted coefficient of determination		
2.18436			Standard error		
17:25			ANOVA		
0.000			Significance level		
	B	SE	beta	t	sig
Constant value	8.274	0.635	0.440	13.038	0.000
Cultural-social factors	0.223	0.054		4.154	0.000

Based on the Table 5 and the obtained results of regression test for the impact of cultural-social factors on the commercialization of scientific research results in knowledge-based companies of medical science, the regression coefficient with significance level of α=0.000 is equal to R=0.440. Since this significance level is lower than the target significance level of α=0.05, it is concluded that for one unit change in

standard deviation of cultural-social factors, 0.440 of commercialization of scientific research results can be predicted in studied companies.

Table (6): Results of regression test for influence of legal factors on the commercialization of scientific research results

Method = inter			Simultaneous entry method of variables		
0.320a			Multiple correlation coefficient		
103			Coefficient of determination		
0.090			Adjusted coefficient of determination		
2.30375			Standard error		
8.24			ANOVA		
0.000			Significance level		
	B	SE	beta	t	sig
Constant value	9.051	0.630	0.320	14.360	0.000
Legal factors	0.152	0.053		2.871	0.005

Based on the Table 6 and the obtained results of regression test for the impact of legal factors on the commercialization of scientific research results in knowledge-based companies of medical science, the regression coefficient with significance level of α=0.000 is equal to R=0.320. Since this significance level is lower than the target significance level of α=0.05, it is concluded that for one unit change in standard deviation of legal factors, 0.320 of commercialization of scientific research results can be predicted in studied companies.

Table (7): Results of regression test for influence of economic factors on the commercialization of scientific research results

Method = inter			Simultaneous entry method of variables		
0.377a			Multiple correlation coefficient		
0.142			Coefficient of determination		
131			Adjusted coefficient of determination		
2.25217			Standard error		
11.95			ANOVA		
0.000			Significance level		
	B	SE	beta	t	sig
Constant value	8.773	0.613	0.377	14.312	0.000
Economic factors	0.184	0.053		3.458	0.001

Based on the Table 7 and the obtained results of regression test for the impact of economic factors on the commercialization of scientific research results in knowledge-based companies of medical science, the regression coefficient with significance level of α=0.000 is equal to R=0.377. Since this significance level is lower than the target significance level of α=0.05, it is concluded that for one unit change in standard deviation of economic factors, 0.377 of commercialization of scientific research results can be predicted in studied companies.

Table (8): Results of regression test for influence of personal, organizational, cultural and environmental, legal, and economic factors on the commercialization of scientific research results

Method = inter	Simultaneous entry method of variables
0.856a	Multiple correlation coefficient
0.733	Coefficient of determination
0.709	Adjusted coefficient of determination

1.30319			Standard error		
30.62			ANOVA		
0.000			Significance level		
	B	SE	beta	t	sig
Constant value	0.721	0.781	0.397	0.924	0.359
Personal factors	0.285	0.046		6.164	0.000
Organizational factors	0.203	0.042	0.314	4.846	0.000
Cultural-social factors	0.234	0.032	0.473	7.427	0.000
Environmental-organizational factors	0.212	0.048	0.417	4.458	0.000
Legal factors	-0.019	0.048	0.140	-0.390	0.018
Economic factors	0.081	0.044	0.166	1.842	0.040

Based on the Table 8 and the obtained results of regression test for the impact of personal, organizational, cultural and environmental, legal, and economic factors on the commercialization of scientific research results in knowledge-based companies of medical science, the regression coefficient with significance level of α=0.000 is equal to R=0.856. Therefore, it is concluded that for one unit change in standard deviation of personal, organizational, cultural, environmental, legal, and economic factors, 0.397, 0.314, 0.473, 0.417, 0.140, and 0.166 of commercialization of scientific research results can be predicted in studied companies.

Table (9): Ranking the factors influencing the commercialization using Friedman test

Personal	2.97
Organizational	3.38
Environmental-organizational	3.68
Cultural	3.82
Legal	3.65
Economic	3.50
Statistical result	Value=13.74, df=5, sig= 0.000

According to the Table (9) and results of Friedman's chi-square test, it is found that there is a significant different between the ranks of factors influencing the commercialization of scientific research in knowledge-based companies in the field of medical sciences based on the respondents' views. Because P<0.01, (5) = 90.45 (N=77). Therefore, it is concluded that the cultural-social, environmental-organizational, legal, economic, organizational, and personal factors have the highest impact on the commercialization of scientific research results from the perspective of managers in studied companies.

6. DISCUSSION

Commercialization of scientific research results in knowledge-based companies has increasingly been emphasized in recent years. Emphasize originates from the fact that growth and development of such companies is significantly effective on economic development of the country. In today's rapidly varying world where all countries are trying to employ different strategies to develop their economies, neglecting the role of knowledge-based companies (the key to economic development) is followed by considerable losses the most important of which is lack of exploiting scientific capacities and, consequently, underdevelopment in the global market. Providing for commercialization of research results and presenting the knowledge to market and society creates significant economic values for the research organization and leads to technical and economic growth based enhancing well-fare of the society. Importance of this issue motivated a great deal of research on commercialization and market delivery of products originating from the knowledge generated in different institutes.

In a research entitled "Environmental hindering factors in transfer and commercialization of Nano-medical research results in Iran", Hejazi and Hosseini have concluded that the environmental factors prevent the implementation of commercialization in Nano-medical field. The most important problems are about the reception of certification, the lack of consumption culture and the lack of capital. The results of this research are consistent with the results of this study. According to the results of research by Jahed et al (2011), there is a correlation between the personal factors and commercialization of scientific research results in knowledge-based companies. The results of this research are consistent with this study. Arasteh and Jahed have also concluded that the organizational factors such as the presence of efficient researchers, the high quality of research, the patent and protecting it all affect the commercialization of scientific research results. This case is approved by the managers in knowledge-based companies in the field of medical sciences.

According to another research by Mohammadi (2014) on identifying and ranking the environmental factors affecting the commercialization of nanotechnology in food industry of Iran, it is found that the customers' lack of identification of Nano advantages and capabilities and the consumption culture in the country are among the major challenges of nanotechnology commercialization especially in food industry.

In another study, Nasiri-Kouhpayeh et al (2014) investigate the knowledge commercialization in biopharmaceutical sector in Iran. Their study indicates that the policy-making, regulations, and development of management are the determinants of practical model for commercialization. The results of this research indicate that the existence of such these cases are essential for success of knowledge-based companies in the field of medical sciences. In this research, the organizational factors affect the commercialization of scientific research results in mentioned companies.

Kajian (2012) has also studied the factors affecting the success of knowledge-based companies in commercialization of ideas in the market and has concluded that the idea test in the knowledge-based companies, building the commercialization concept from the idea, screening the ideas, applied-research activities, movement towards the market-orientation and the number of years or months spent on the idea of time in knowledge-based company are among the factors affecting the success in commercialization of idea in the market.

Hassanpour-Golafshani et al (2012) have concluded in their research that all factors directly and indirectly affect the commercialization of technology at Islamic Azad University of Aliaba Katul. The factors associated to the environmental conditions have the maximum impact on the commercial success of technology at studied university, and then the factors related to the industry, the technology transfer methods and the university affect the success of commercialization. The results of this research have also confirmed the impact of these factors on the commercialization of scientific research results in knowledge-based companies in the field of medical sciences.

The results of this study also factors in the impact of the commercialization of scientific research results in the field of health care knowledge-based companies have confirmed.

Lin and Wang (2015) have investigated the commercialization of inventions in Taiwanese companies. The results of their studies indicate that the available and complementary assets of innovation due to the patent have significant positive impact on the performance of patent commercialization. The results of this research have also confirmed the legal barriers and problems are the effective factors on the commercialization.

Given the theoretical principles and background, it can be concluded that the commercialization of scientific research results in knowledge-based companies in the field of medical sciences is affected by the organizational, environmental, cultural and social, economic, and legal factors, etc. and considering them can play a role dynamics of these companies and consequently the economic development of country.

The knowledge-based companies are the driving forces of economic growth and development. They receive the generated knowledge and innovative ideas from the universities and researchers and commercialize in a fully structured process. Such these companies are created with the aim of transforming the knowledge and idea into the products and intend to produce the new goods and products

proportional to the human society needs by taking the advantage of new technologies. They change the manufacturing process and seek to offer a variety of valuable products to market in a competitive environment.

Suggestions:

- It is suggested to consider and study problems of knowledge-based companies in other areas,
- It is suggested to more precisely investigate problems of such companies in different aspects,
- Future reviews may examine viewpoints of economic experts on knowledge-based companies and commercialization in an independent form.

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ETHICAL CONSIDERATION

Authenticity of the texts, honesty and fidelity has been observed.

CONFLICT OF INTEREST

Author/s confirmed no conflict of interest.