

Journal of Academic Research in Economics

Volume 11

Number 1

March 2019



ISSN 2066-0855

EDITORIAL BOARD

PUBLISHING EDITOR

DRAGOS MIHAI IPATE, Spiru Haret University

EDITOR-IN-CHIEF

CLAUDIU CHIRU, Spiru Haret University

ASSISTANT EDITOR

GEORGE LAZAROIU, Contemporary Science Association

INTERNATIONAL ADVISORY BOARD

JON L. BRYAN, Bridgewater State College

DUMITRU BURDESCU , University of Craiova

MARIN BURTICA, West University Timisoara

SOHAIL S. CHAUDHRY, Villanova School of Business

DUMITRU CIUCUR, Bucharest Academy of Economic Studies

LUMINITA CONSTANTIN, Bucharest Academy of Economic Studies

ANCA DACHIN, Bucharest Academy of Economic Studies

ELENA DOVAL, Spiru Haret University

MANUELA EPURE, Spiru Haret University

LEVENT GOKDEMIR, Inonu University

EDUARD IONESCU, Spiru Haret University

KASH KHORASANY, Montreal University

RAJ KUMAR, Banaras Hindu University, Varanasi

MARTIN MACHACEK, VSB-Technical University of Ostrava

COSTEL NEGREI, Bucharest Academy of Economic Studies

ABDELNASER OMRAN, Universiti Sains Malaysia

T. RAMAYAH, Universiti Sains Malaysia

ANDRE SLABBERT, Cape Peninsula University of Technology, Cape Town

CENK A. YUKSEL, University of Istanbul

MOHAMMED ZAHEERUDDIN, Montreal University

LETITIA ZAHIU, Bucharest Academy of Economic Studies

GHEORGHE ZAMAN, Economics Research Institute, Bucharest

PROOFREADERS

MIHAELA BEBESELEA, Spiru Haret University
ONORINA BOTEZAT, Spiru Haret University
MIHAELA CIOBANICA, Spiru Haret University
DANIEL DANECI, Spiru Haret University
MIHNEA DRUMEA, Spiru Haret University
CLAUDIA GUNI, Spiru Haret University
PAULA MITRAN, Spiru Haret University
LAVINIA NADRAG, Ovidius University Constanta
IULIANA PARVU, Spiru Haret University
LAURA PATAACHE, Spiru Haret University
MEVLUDIYE SIMSEK, Bilecik University
ADINA TRANDAFIR, Spiru Haret University

CONTENTS

THE STATUS OF IRAN'S INNOVATION IN THE CONTEXT OF THE KNOWLEDGE-BASED ECONOMY: A COMPARATIVE STUDY WITH SELECTED COUNTRIES	7
NASSER ALI AZIMI	
FDI, REMITTANCE INFLOWS, AND ECONOMIC DEVELOPMENT IN A DEVELOPING ECONOMY: WHAT DO NIGERIAN DATA SHOW?	27
ANTHONY ORJI JONATHAN E. OGBUABOR EMMANUEL NWOSU ONYINYE I. ANTHONY-ORJI ADAABI J. OKPALA	
TRADE IN SERVICES AND GROWTH: CASE OF KOSOVO	46
DRITA KONXHELI RADONIQI	
CORPORATE BANKRUPTCY PREDICTION USING ALTMAN'S Z-SCORE MODEL: THE EFFECT OF TIME AND METHODOLOGY ON ACCURACY OF THE MODEL	58
GURMEET SINGH RAVI SINGLA	
INFLOWS OF FOREIGN CAPITAL AND ECONOMIC GROWTH – A CAUSALITY ANALYSIS WITH INDIAN DATA	72
SUPRIYA DUTTA	
CO-MOVEMENTS BETWEEN THE US AND EMERGING AND FRONTIER ASIAN STOCK MARKETS: A POST SUBPRIME CRISIS ANALYSIS	89
LEO PRASAD V SANGEETHA G NAGARAKATTE DZOMBZA COSMAS LOVEJOY NAMITHA K CHERIYAN	

- THE ROLE OF ORGANIZATION CLIMATE AND WORK
MOTIVATION ON JOB SATISFACTION IN ACEH GOVERNMENT
HEALTH OFFICE** **98**
T. ROLI ILHAMSYAH PUTRA
- A MODEL SUGGESTION FOR CUSTOMER SATISFACTION IN
THE PROCESS OF USING MOBILE SHOPPING APPLICATIONS:
THE ROLE OF PERSONAL INNOVATIVENESS AS A
MODERATOR** **107**
BILGE TURP GÖLBAŞI
PEYAMI SEFA ÇARIKÇIOĞLU
CENK ARSUN YÜKSEL
- THE EFFECT OF CONSUMER DECISION MAKING STYLES ON
COGNITIVE DISSONANCE ALONG WITH THE ROLE OF THE
PERCEIVED RISK AS A MODERATOR IN ONLINE SHOPPING** **118**
HANDE AYHAN GÖKCEK
PEYAMI SEFA ÇARIKÇIOĞLU
CENK ARSUN YÜKSEL

THE STATUS OF IRAN'S INNOVATION IN THE CONTEXT OF THE KNOWLEDGE-BASED ECONOMY: A COMPARATIVE STUDY WITH SELECTED COUNTRIES

NASSER ALI AZIMI

Academic member of NRISP
Email: naazimi5@yahoo.co.uk

Abstract

Moving towards a Knowledge-based economy is an important factor for improving national economics condition. Innovation is regarded as one of major pillars for moving towards a knowledge-based economy. This study considers the condition of efficiency of different channels impacting upon the direction towards developing a knowledge-based economy. In this respect, the various efficiency channels, namely human capital, technology, market specialization, innovative outputs, economic growth and competitiveness all of which speed economic growth and shape the knowledge-based economy. This paper studies each of these individual channels and will analyses them considering both their strengths and weaknesses. In the final part, outcomes and managerial recommendations will be presented.

Keywords: Innovation, Efficiency channels, Human capital, Economic and technological growth

JEL Classification: D83, E24, O38.

1. INTRODUCTION

Today, knowledge-based economy (KBE) is one of the most successful economic development models in countries' experiences. This development pattern, unlike traditional patterns, does not face constraints such as declining efficiency versus scale. In the knowledge-based development model, according to the nature of knowledge, there is no diminishing returns on the development of natural resources. This has led developing countries to follow the developed countries and adopt knowledge-based development models.

Knowledge-based development models are based on the four key pillars of the World Bank's theoretical framework. These pillars include Economic Incentive & Institutional Regime, Education & Training, Information Infrastructure, Innovation Systems. In other words, the achievement of knowledge-based development models depends on the formation of four pillars and their

reinforcement. One of the most important characteristics of the patterns of knowledge-based development is the use of knowledge in both its explicit and implicit forms for the purposes of national economic development. This characteristic has a significant impact on the two key pillars of knowledge-based economics, the innovation and the education. Iran's economy has always, in line with developed and developing economics, laid the foundations for development towards a knowledge-based economy as a basis for development. This issue in the Iranian economy was seriously dealt with in the fourth development plan and is also targeted in the fifth plan. Moreover, in general economic resilience policies, second article of the foundations also point out moving towards this type of economy, to make economy, emphasizes on strengthening the economy and increasing the competitiveness of the national economy in the international area.

In recent decades, we have witnessed a dramatic increase in the role of knowledge and innovation in international economic activity, since innovation is the most important aspect of creating knowledge (Collinson, 2000). Innovation is the process of knowledge transfer to economic growth and social improvement, and includes a range of scientific, technological, organizational, financial and business activities. Innovation appears in the form of introducing and marketing new products or services, or improving the basic use of existing products and services, introducing a new production process or substantially improving existing processes, opening up new markets, developing new sources of supply, such as: raw materials, equipment and other inputs and major changes in industrial and institutional structures in societies and plays a decisive role in economic growth and development (Puga and Trefler, 2010).

Moving towards KBE is recognized as one of the requirements of countries on the path to economic development. Iran is considered as one of the developing countries, and also a transition country from resource economy to KBE. Iran has high potential in terms of human resources and natural resources for transferring to the KBE, but the pillars of the knowledge-based economy in Iran are not shaped according to existing potentials. Extensive efforts at the national and regional levels have been carried out to strengthen the knowledge role in the Iranian economy, but Iran's position in terms of the indicators of the KBE, as opposed to existing potential, is not evaluated desirably.

In this study, we try to examine the weak innovation pillar of Iranian economy with studying the components of national innovation system of the country. To this end, the status of the national innovation system in Iran is examined, with focus on its role in the transition to a knowledge-based economy compared to the selected countries. In fact, the main purpose of this paper is to identify the factors affecting the weakness of the pillar of innovation in Iran and to answer this question is why the national innovation system in Iran is weak? In order to achieve this goal and to answer the mentioned question, the second part reviews the theoretical and empirical literature of innovation and knowledge economy. In the following, the

status of the basis of innovation in Iran is discussed in relation to the selected countries based on the global indicator of innovation.

2. AN OVERVIEW OF THEORETICAL AND EXPERIMENTAL LITERATURE

The emergence of the theoretical concept of knowledge-based economy is due to the limits of the framework of the national innovation system and the role of knowledge-based economy as the lines of guidance in the field of science and technology for achieving economic development. Economists have been criticized for many years because of the lack of attention to institutions in economic theories and econometric models. The emergence of the concept of the national innovation system is part of the response of economists to these criticisms. The first category focuses on the definitions of the innovation system around institutional analysis. The second category emphasizes the knowledge and learning process. The concept of the knowledge-based economy has emerged based on the definition of the second category.

Since the early 1990s, the attention to the innovation system and its related indicators have been priorities of the Organization for Economic Co-operation and Development (OECD). These indicators were firstly evaluated and analyzed in five main categories: (a) industrial cooperation; (b) interaction between the university and the industry; (c) the interactions of academic institutions with industry; (d) the diffusion of technology and staffing. Based on the critique of the National Innovation system, with its low operational value and the difficulty of deploying it, the field was developed to develop alternative concepts around the development and dissemination of knowledge for economic development (OECD, 2003).

According to the definition of the Organization for Development and Economic Cooperation, knowledge-based economy is the basis of economies that are directly based on the production, distribution and use of knowledge and information. This definition is the basis for further studies in the field of knowledge economics. In this regard, two new concepts were presented by the OECD, which are as follows:

(A) Investing in knowledge, which includes the costs associated with existing knowledge improvement activities and the acquisition of new knowledge or dissemination.

(B) Knowledge-based industries with three characteristics, including a high level of investment in innovation, are the significant users of technology gained and the use of educated labor.

Innovation and the knowledge economy are not two separate issues, and there are two-way relationships between them. This means that innovation leads to the formation of a knowledge-based economy, and the knowledge-based economy provides the ground for the formation of innovation. Therefore, the study of

knowledge economics is considered to be practically incomplete, regardless of the issue of innovation.

Based on the framework defined by the World Bank on Knowledge-based Economy, innovation is considered as one of the four pillars for a knowledge-based economy. The pillar of innovation, along with the pillars of education, the institutional regime and economic stimulus, and ICT, play a key role in the knowledge of transferring to KE. The pillar of innovation should be considered in the framework of the national innovation system performance of the countries. Given the close relationship between the national innovation system and the knowledge economy, some of the most important channels of innovation impact on knowledge-based economics can be summarized as follows:

Productivity Channel - The National Innovation system plays an important role in promoting the productivity of labor and capital in the economy. Given the key role of knowledge in the national innovation system, the desirable performance of this system can help improve the productivity of the economy. Improving the productivity of knowledge-based production factors highlights the role of knowledge in the economy and promotes the status of the economy. Therefore, it can be argued that a national innovation system from the channel of production directly affects the knowledge-based economy.

Human Capital Channel - One of the most important roles of the National Innovation System is the development of human capital with a high reserve of knowledge. The national innovation system in the country can raise human capital with a high knowledge base, and its economy will move toward knowledge-based. Because in a knowledge-based economy, the knowledge base human resources all areas of decision-making, management, technology, and others, perform must operate on based the reserved knowledge. Therefore, it can be argued that the human capital channel also affects the formation of the knowledge economy and its success.

Market specialization - One of the most important conditions in which a knowledge-based economy can play a key role in the economy of a country is its market environment. If the market is in a non-traditional and traditional economy, knowledge will have little role in creating value and earning more money for its owners. Therefore, the existence of a specialized market environment is essential for the functioning of knowledge-based economics. The knowledge-based marketplace is in fact a peripheral environment for innovative activities. Accordingly, if the national innovation system can perform better in a specialized market, the move to a knowledge-based economy will also be accelerated. Therefore, from the market specialization channel, the national innovation system helps to develop a knowledge-based economy.

Output of knowledge - One of the most important outputs of the national innovation system is knowledge-based output. In fact, in an idealized environment, there is the possibility of generating knowledge outputs. Given the central role of knowledge outputs in the knowledge economy, it can be claimed that the national

innovation system from the output channel of knowledge can also affect the growth and development of knowledge-based economics.

Creative Output - The essence of the national innovation system is to support innovative and creative activities. Therefore, the favorable environment of the national innovation system can contribute to the development and development of creative outputs along with the inputs of knowledge. On the one hand, creative inputs contribute to the growth and development of knowledge-based economics, on the other hand, they affect the knowledge-based economy. Therefore, it can be argued that the national innovation system from the creative output channel also affects the growth and development of knowledge-based economics.

Competitiveness - The National Innovation system contributes greatly to the competitiveness of economies. In other words, economies based on innovative activities that are driven by the dynamic of the national innovation system, compared to other economies, have a highly competitive power in the global arena. Accordingly, the stronger the national innovation system in countries, the higher the competitiveness of the economy can be expected. In the meantime, the competitiveness of motivation and the tendency to move toward a knowledge-based economy is increasingly being developed. Therefore, it can be argued that the national innovation system of the competitive channel is effective in the formation and growth of the knowledge-based economy. In summary, the channels for the effectiveness of the national innovation system on the growth and development of knowledge-based economics are presented in Fig. 1.

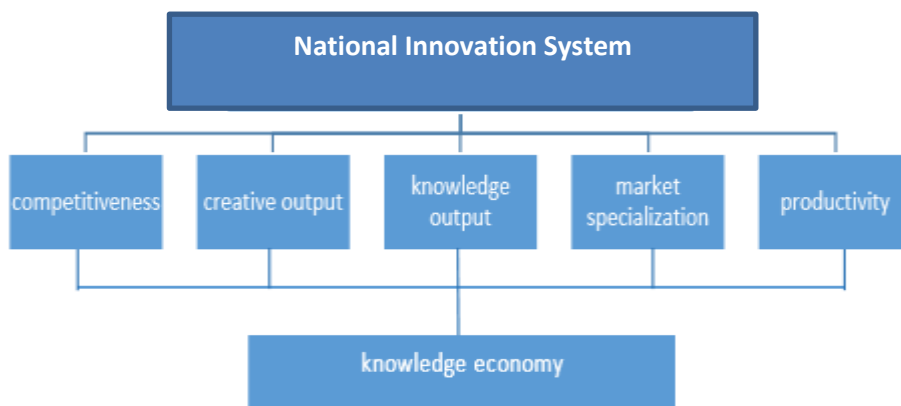


Figure 1. *Influencing Channels of the National Innovation System on the Knowledge-Based Economy*

Several studies have been conducted on innovation and its role in the economy, but in none of the studies the relationship between the channels of the national innovation system on the knowledge economy has not been investigated. Here are some recent studies in this area:

Manteghi et al. (2013) in a study titled *Identifying Policy Challenges in Iran's National Innovation System*, reviewed the challenges using the Delphi method. Based on the findings of this research, a total of 48 components have been identified as the effective factors in the inefficiency of innovation policy making. Shojaei et al. (2012), in a research on the systematic explanation of the ability of innovation at the national level, have tried to review the various models of the native model for assessing the innovation potential in Iran. Based on this model, the strengths and weaknesses of the National Iranian Innovation System have been presented.

Mombini et al. (2012) in a research entitled "Determining the status quo of the functions of the National Innovation system of Iran", has examined the status of each of the functions of the National Iranian Innovation System in the current situation. The results of the study show that the national innovation system of Iran has the most weaknesses in the field of policy and guidance, as well as the lack of formation of the market for services and goods based on innovation. Haji Hosseini et al. (2012) in a research on the governance of the Iranian National Innovation System, based on the innovation policy cycle, examined the current status and challenges of the governance of the National Innovation System in Iran. The results show that the dominant approach in innovation policy in Iran is linear and the style of governance of the national innovation system is also synonymous.

Shah abadi and Sari Gul (2013) in a study on the comparison of the impact of innovation on income inequality in OPEC and developed countries have concluded that the situation of OPEC countries compared to developed countries in Gini indexes and innovation are weak and undesirable, because of the lack of coordination of macroeconomic policies with scientific and research policies.

Entezari and Mahjob (2013) in a research on the development of knowledge economy based on the perspective of 1404, analyzed the evolution of knowledge economy in Iran over the past 15 years in comparison with the regional countries. The results of the study show that the knowledge economy in Iran has undergone a significant improvement over the period under study. Therefore, if weaknesses are resolved during the fifth and sixth development plans, one can expect to achieve the goals of document 1404. Amini et al. (1393), in an article entitled *Impact of innovation in promoting the full utilization of production factors in developing countries*, concluded that the number of inventions, human capital and the degree of economic openness had a positive and significant relationship with total productivity factors of production.

Hadavand et al. (2016), in a research entitled *analyzing process of policy making in Iran's national innovation system using the institutional framework*, identified the complications of the Iranian National Innovation System. The findings of this study indicate that the most important complication in the policy making process of Iran's national innovation system is the monitoring and evaluation system.

Fagerberg (2006) explored the role of knowledge, technology and innovation in economic growth based on knowledge-based economics. The results

of the study indicate that there is a significant difference in the performance of related indicators in this area among different countries of the world. James and colleagues (2001, James) investigated the role of clusters, innovation, and quality in learning to achieve a knowledge-based economy in the UK. The results of the study show that there is a different conceptualization of learning for a knowledge-based economy from clustering literature, in which the process of deepening innovation and learning in regional economic activity accumulation is analyzed.

Galabova (2012,) investigated the basic economic development of knowledge base in Bulgaria, Finland and Scotland based on innovation policies. This study attempts to examine innovation policies and strategies in three European countries with three different stages in the development of knowledge-based economics. The results show that achieving a knowledge-based economy from an innovation channel needs a continuum between education, research and innovation policies.

Graf (2016), in a research on innovation resources in the knowledge economy in the Los Angeles area, concluded that there is strong cooperation between the branches of technology and the traditional economics of Los Angeles. Also, the results of this study indicate that although this region has all the necessary characteristics for the innovative structure, the geographic extent and the island's nature of the neighbors are a major obstacle to linking each other with these resources.

Empirical studies show that the studies have focused on theoretical literature on the relationship between innovation and the knowledge base economy, and the discussion of the channels of the effectiveness of the national innovation system on the development of knowledge-based economy has not been considered in internal studies. In fact, this study is one of the first studies in this field which, in addition to studying theoretical and empirical literature in the field of innovation, it attempts to investigate the discussion of knowledge-based economy and its channels of influencing the national innovation system based on global indicators in Iran, with comparing Iran with the selected countries. The results of this study are helpful for policy-makers and planners in the area of innovation and knowledge-based economy in achieving the goals of the resilience economy.

3. STATUS OF THE NATIONAL INNOVATION SYSTEM

In this part of the article, the status of the national innovation system of Iran in the framework of the knowledge-based economy is discussed based on the global indicator of innovation compared with the selected countries.

3.1. GLOBAL INNOVATION INDEX

Iran has been evaluated in the GII report since 2011. The presence of Iran began at 95 in 2011, and in its following years it was 104, 113, 120, 106 and 78,

respectively. From 2011 to 2014, Iran ranked nine, nine, and seven feet behind, without any upswing. Between 2014 and 2016, it has fallen by 42 steps.

Table 1. Iran's rank in Global Innovation Index compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Global Innovation Index (2016)
Germany	12	15	15	13	12	10	57.9
Italy	35	36	29	31	31	29	47.2
Japan	20	25	22	21	19	16	54.5
Iran	95	104	113	120	106	78	30.5
South Korea	16	21	18	16	14	11	57.1
Malaysia	31	32	32	33	32	35	43.4
Turkey	65	74	68	54	58	42	39

Source: *WIPO, 2011-2016*

The overall ranking of each country in the Global Innovation Index is based on performance in the seven pillars of innovation, which is described below. Iran's performance in the field of innovation is undesirable and has a large deviation from the 1404 perspective. The performance of Iran from countries such as Turkey, Malaysia and South Korea has been weaker.

According to the Global Innovation Index, Iran ranked 78th among 128 countries. Switzerland, Sweden, the United Kingdom, the United States and Finland are the top five countries in terms of the global indicator of innovation in 2016. Other countries are in a favorable position to Iran. Also, comparing Iran's position with countries such as Turkey and Malaysia and South Korea also shows that the status of Iran's innovation compared to developing countries is also not desirable. In the following, the state of Iran's innovation is examined based on GII sub-indicators compared to the selected countries.

3.2. INNOVATION INPUT AND OUTPUT SUB-INDEX

Iran's ranking in the index of inputs in 2012 has been nine steps better than in 2011, remaining at its previous year's level in 2014. In 2015 and 2016, reaching 90 in 2016. In general, it can be said that the state of the country has not changed much in enabling innovative activities.

Iran's index of Iran's index has been weak compared to developing countries. The rate of poor or wealthy countries in the rate of entry of innovation can be a

determining factor, because the change in the input of innovation is largely dependent on investment. During the 2015-2016 period, Iran has made significant investments in creating innovative inputs. This has led to a recovery from 116 to 91 in the countries of the world.

Table 2. Iran's rank in Innovation input sub-index compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Innovation Input Index (2016)
Germany	21	23	20	19	18	18	61.9
Italy	37	34	28	32	29	28	54.1
Japan	18	18	14	15	12	9	66
Iran	106	97	107	107	106	90	35.7
South Korea	17	16	16	16	15	13	63.5
Malaysia	27	29	32	30	31	32	52.1
Turkey	80	81	81	78	71	59	42.5

Source: *WIPO, 2011-2016*

The good or bad performance of the indicator in the innovation input has a direct effect on the future status of the global innovation indicator, as the impact of the index performance on the main index will be reflected in the long run. The situation of Iran and selected countries in the innovation indicator is shown in Table (3). Over the past five years, the performance of the country's innovation in the group has a worrying situation and has fallen by 2014, but in 2015, with 20 stairs climbing to its previous year, it reached 105th level and dropped in 2016. The poor performance of output (outputs) means that, on the other hand, Iran has not been able to exploit the input capacity created by innovation, while, during a six-year period, Iran's innovation in the inputs sector is not strengthened and it is at a weak level; it is clear that innovative projects are also in an inappropriate situation.

Table 3. Iran's rank in Innovation output sub-index compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Innovation Output Index (2016)
Germany	4	7	10	8	8	8	54
Italy	39	39	29	33	32	31	40.3
Japan	26	28	33	27	26	24	43
Iran	71	117	120	125	105	72	25.3
South Korea	11	24	24	15	11	11	50.8
Malaysia	35	38	30	35	34	39	34.7
Turkey	53	61	53	39	46	37	35.5

Source: *WIPO, 2011-2016*

3.3. INNOVATION EFFICIENCY RATIO

As shown in Table (4), Iran's rank in innovation performance in 2011 was 119, and in the following years it was equal to 118, 107, 122, 103, and 51 respectively. As mentioned in the previous sections, the trend of the index of innovation input in Iran is relatively balanced, but the trend of the index of output has fluctuated each year, hence, it has had a significant impact on the efficiency index and it has fluctuated. It is the inappropriate situation of the output index relative to the input indicates that Iran is not in a good position in the innovation performance, that is, the innovation performance in Iran is low.

Table 4. Iran's rank in Innovation efficiency ratio compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Innovation efficiency Index (2016)
Germany	15	11	40	19	13	9	0.9
Italy	63	75	62	52	57	33	0.7
Japan	64	88	112	88	78	65	0.7
Iran	119	118	107	122	103	51	0.7
South Korea	25	69	95	54	27	24	0.8
Malaysia	77	84	52	72	56	59	0.7
Turkey	28	40	29	11	23	13	0.8

Source: WIPO, 2011-2016

4. THE STATUS OF INNOVATION PILLARS

In order to know the exact statue of innovation and the reasons for the weakness of the performance of the innovation sector of the country, it is necessary to study Iran's situation in innovation pillars comparing with selected countries (5 issues regarding innovation input and 2 issues regarding innovation output). In the following the status of each of the seven pillars is reviewed.

4.1. INSTITUTIONS

One of the most important factors that reduce the rank of Iran is institutional. The rank of Iran in the framework of the institutional framework in 2011 is 114 and in the following years there are 128, 132, 131, 126 and 112, respectively. Turkey, as one of the countries of the region, although better placed than Iran in the institutional framework, is not favorable in comparison to the selected countries.

Table 5. Iran's rank in Institutional Framework pillar compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Institutional Index (2016)
Germany	21	26	21	21	18	18	84.1
Italy	49	36	37	39	38	38	72.8
Japan	20	23	20	18	17	15	87.1
Iran	114	128	132	131	126	112	45.9
South Korea	35	27	32	32	33	31	75.4
Malaysia	51	55	49	50	42	43	70.9
Turkey	69	86	89	92	84	82	54.6

Source: WIPO, 2011-2016

4.2. HUMAN CAPITAL AND RESEARCH

Iran's position on human capital and research has improved. In the field of education, higher education and research and development, measures have been taken that have led to the promotion of the level of human capital of the country. For example, good investment has been made to create science and technology parks, centers of growth (especially in universities), research and development centers, etc. One of the threats of growth and promotion of human capital in Iran is a decline in population. Which will bring serious damage to the country in the long run.

Table 6. Iran's rank in Human Capital and Research pillar compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Human Capital and Research Index (2016)
Germany	11	16	19	14	10	10	58.9
Italy	39	41	34	33	33	31	46.5
Japan	20	19	12	17	13	13	57.5
Iran	58	54	56	46	46	48	36.9
South Korea	7	8	2	3	2	3	66.9
Malaysia	42	42	40	35	37	34	43.3
Turkey	80	82	76	54	50	43	39.2

Source: WIPO, 2011-2016

4.3. INFRASTRUCTURE

The ranking of Iran and the selected countries at the infrastructure pillar over the past five years is shown in Table (7). The best ranking in Iran in the years under review is 2015, which is 68. Iran ranked 92th in 2011 to 68 in 2015, climbing a total of 24 steps. In 2016, it has rebounded to 91.

Table 7. Iran's rank in Infrastructure pillar compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Infrastructure Index (2016)
Germany	21	16	14	17	18	22	58.5
Italy	30	22	20	26	17	18	59.7
Japan	13	7	9	11	5	7	64.4
Iran	92	88	79	81	68	91	36.7
South Korea	6	3	4	5	8	9	63.3
Malaysia	53	41	33	35	44	43	49.2
Turkey	64	67	73	75	63	62	43.6

Source: WIPO, 2011-2016

4.4. MARKET SOPHISTICATION

The rank of Iran and selected countries in market experience is shown in Table (8). One of the weakest practices in Iran is on this pillar. Iran's situation in this pillar is very inappropriate. Meanwhile, in the path to innovation, supportive factors such as credit and capital, as well as a dynamic competitive environment play a key role in achieving the goal of commercializing the process.

Table 8. Iran's rank in Market Sophistication pillar compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Market Sophistication Index (2016)
Germany	14	24	21	25	22	16	59.7
Italy	53	59	33	52	39	25	53.6
Japan	19	18	14	13	12	8	68.3
Iran	117	133	133	139	139	102	36.2
South Korea	12	16	17	14	16	14	62
Malaysia	10	14	23	17	27	24	55
Turkey	72	64	60	63	58	46	47.7

Source: WIPO, 2011-2016

The ease of obtaining loans and financial facilities, investment in business, the total value of traded shares and the volume of venture capital investments are among the issues that Iran has not achieved much success. Many factories, companies, etc. are directly and indirectly under public administration, and the power of maneuvering market competition from the private sector has been taken. In the area of commerce, imports have, on the one hand, caused the bankruptcy of a part of domestic producers, and on the other hand, Iranian artisans do not have a strong presence in foreign markets. Of course, in addition to technical reasons, political reasons that restrict the business activities of the country have also affected the performance of the market.

4.5. BUSINESS SOPHISTICATION

In spite of gaining 49th place in 2012, in recent years Iran ranked above 110, indicating the weakness of the country in the field of business empowerment for innovation. A small percentage of human resources in Iran have practical knowledge related to their field of work. One of the main reasons for this is the need for universities and academic disciplines to be non-core. The lack of knowledge sharing platforms in industrial environments and between businesses that stem from poor

culture of knowledge sharing and weak intellectual property laws also play a significant role in Iran's poor rating on this pillar. Other selected countries have a better performance than Iran. Turkey has little discrepancy with Iran in terms of the business skills needed for innovative activities.

Table 9. Iran's rank in Business sophistication pillar compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Business sophistication Index (2016)
Germany	20	24	26	21	20	15	43.8
Italy	36	35	31	35	39	36	37.8
Japan	14	21	21	17	16	10	52.8
Iran	114	49	120	136	130	111	22.8
South Korea	26	25	32	30	30	13	50.1
Malaysia	9	11	27	29	22	29	41.8
Turkey	90	107	108	110	117	86	27.6

Source: *WIPO, 2011-2016*

4.6. KNOWLEDGE AND TECHNOLOGY OUTPUTS

One of the strengths of Iran is the production of knowledge, which is one of the main sources of knowledge and technology output. The high scientific evidence confirms this strength, but along with patent statistics and numerous articles, Iran is still not in a good position. In the function of innovation, knowledge dissemination is one of the weak functions of the Iranian innovation system. The pillar of knowledge and technology output reflects the benefits of the country through innovation. As a result, if a country carries out measures in the field of innovation empowerment, but does not lead to output, the initial goals have not been achieved and the investment benefits for innovation have not been achieved. Iran's 65th rank in 2016 shows how much Iran has been able to exploit the existing capacity in the field of innovation.

Table 10. Iran's rank in Knowledge and Technology Outputs pillar compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Knowledge and Technology Outputs Index (2016)
Germany	14	12	10	11	10	8	51.6
Italy	46	35	21	23	22	25	38.7
Japan	13	15	16	12	14	13	46.9
Iran	45	73	96	113	90	65	24
South Korea	7	9	12	6	5	5	54.1
Malaysia	38	36	24	39	35	35	33.4
Turkey	90	63	49	48	60	45	29.1

Source: WIPO, 2011-2016

4.7. CREATIVE OUTPUTS

The ranking of Iran and selected countries in the innovative output pillar for the past five years has been reported in Table (11). Iran's performance on this pillar is poor. In 2011, Iran ranked 100, and in the following year, due to poor performance, Iran saw a 31-foot drop, ranking 131 in the world. In 2013, although Iran climbed 4 stairs, it still remained at a weak 127 position. In 2014, the country's rating was a step up and reached 128. In 2009, the 12th climb has hit 116th. Ranking 75 in 2016 is Iran's best rank in this pillar. Germany has a very good position among the elected countries.

Table 11. Iran's rank in Creative Outputs pillar compared with selected countries

Year Country	2011	2012	2013	2014	2015	2016	Creative Outputs Index (2016)
Germany	6	10	14	14	14	7	56.3
Italy	43	45	43	48	47	32	41.8
Japan	65	69	63	46	43	36	39.2
Iran	100	131	127	128	116	75	26.7
South Korea	27	59	54	37	28	21	47.4
Malaysia	40	42	38	39	32	43	35.9
Turkey	29	64	69	40	37	31	42

Source: *WIPO, 2011-2016*

5. CONCLUSION AND RECOMMENDATIONS

Moving towards the KBE is one of the main requirements for strengthening the national economy. Innovation is considered as one of the main pillars of the movement towards the economics of knowledge. What was discussed in this study was to identify the status of different channels of innovation in moving towards the economics of knowledge. Innovation, through the channels of productivity, human capital, technology, creative output, market specialization, economic growth and competitiveness, accelerates economic growth and shapes the KBE. In this study, each of these channels was discussed and Iran weaknesses in each were studied.

Low educational costs and, as a result, the neglect of the impact of education, the quality of the education system and skilled manpower training, are one of the most important factors in the low level of economic growth in developing countries. Therefore, due to the growing number of young people in developing countries, including Iran, on the one hand, and the urgent need of these countries to increase the production and moving toward KE, on the other hand, it is worth paying attention to the promotion of the level and quality of education.

Considering the importance of increasing competitiveness in order to improve the economic situation and realizing the KBEs, attention is paid to such issues as making amendments to business-related laws, removing legal and structural barriers to competition such as tariffs and price deviations, maintaining stability in policy-making and decision-making, reducing macroeconomic fluctuations,

strengthening financial markets with appropriate policies and efforts to remove barriers to the presence of foreign investors and producers in Iran seems necessary.

Due to the weakness of the country regarding the market specialization, in order to improve the status of this channel, improving the credit status in support of innovative activities, increasing investment in the field of innovative activities, producing knowledge-based products, developing the competitiveness of products manufacturing, improving the conditions of domestic and foreign trade of the country and improving the economic complexity in the production of products are suggested.

REFERENCE

- Collinson, S. (2000). Knowledge networks for innovation in small Scottish software firms. *Entrepreneurship & Regional Development*, 12(3), 217-244.
- Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2011). The global innovation index 2012. Stronger innovation linkages for global.
- Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2012). The global innovation index 2012. Stronger innovation linkages for global.
- Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2013). The global innovation index 2012. Stronger innovation linkages for global.
- Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2014). The global innovation index 2012. Stronger innovation linkages for global.
- Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2015). The global innovation index 2012. Stronger innovation linkages for global.
- Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2016). The Global Innovation Index 2016 Winning with Global Innovation (WIPO).
- Entezari, Y., & Mahjob, H. (2013). An analysis of KBE development on base of document of future perspective 1404, *Culture Strategy*, 6, 65-97, (in Persian).
- Fagerberg, J. (2006, March). Innovation, technology and the global knowledge economy: Challenges for future growth. In Green Roads to Growth” Project and Conference, Copenhagen.
- Galabova, L. P. (2012). Developing a knowledge-based economy through innovation policy: The cases of Bulgaria, Finland and Scotland. *Science and Public Policy*, 39(6), 802-814.
- Graf, M. (2016). Exploring sources of innovation in the Knowledge-Based Economy: The case of Los Angeles, PhD Dissertation, Pardee RNAD Graduate School.
- Hadavand, M. et al. (2016). An analysis of policy making process in Iran’s NIS using institutional framework, *Macroeconomic and Strategic Polices*, Vol. 4, PP. 1-18, (in Persian).
- Manteghi, M. (2013). The automotive industry: New trends, approaches, and challenges. In *Science and Innovations in Iran* (pp. 217-243). New York: Palgrave Macmillan.
- Mombeni, D. et al. (2012). Determining the status quo of the functions of the National Innovation system of Iran. *Policy of Science and Technology*, 2, (in Persian).
- OECD, Development, Economic Analysis, & Statistics Division. (2003). OECD Science, Technology and Industry Scoreboard 2003. Canongate US.

- Puga, D., & Trefler, D. (2010). Wake up and smell the ginseng: International trade and the rise of incremental innovation in low-wage countries. *Journal of development economics*, 91(1), 64-76 (in Persian).
- Shah Abadi, A. and Sari Gol, S. (2013) Comparing the effect of innovation on income inequality in OPEC countries and selective developed countries, *Technology Growth*, 9, (in Persian).
- Shojaei S.M. et al. (2012) Investigation of systemic innovation in national level, *Development of Industrial Technology*, 3, 25-39 (in Persian).