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Research Article

ARAB COUNTRIES DEVELOPMENT TRENDS BASED ON GLOBAL INNOVATION INDEX AS AN INDICATOR

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ABSTRACT

Objective: Development and wide use of technology by all groups of society are the global trend of world development and can be measured by global innovation index (GII). The GII is "an annual ranking of countries by their capacity for, and success in, innovation". This study contains estimated results of the current development trends in the world, some of Arab countries based on GII as an indicator.

Methods: The study relied on descriptive analytical method. The GII is computed by taking a simple average of the scores in two subindices, the innovation input index and innovation output index, which are composed of five and two pillars, respectively. Each of these pillars describes an attribute of innovation and comprises up to five indicators, and their score is calculated by the weighted average method.

Results: The GII was increased from 0.5 in 2008 up to 36.3 in 2016. The GII of Arabic countries is lower than that of worldwide GII. The worldwide GII was increased during the years 2013–2016 while decreased for Arabic countries for the same period of time.

Conclusion: Innovation is a major pillar of the country's economic development and its consider one of the major issue of government policies. The GII was decreased in some Arab countries that suffer from war in the past years that affect the economy and industry.

Keywords: Arab countries, Development and global innovation index, Global Innovation Index

INTRODUCTION

World trends for the development of technologies and science-intensive systems are the most highly-efficient, flexible, and multicoordinated [1]. Innovations should be directed specifically to these basic technologies, in new materials and in components based on microelectronics technologies, radio, electronics, laser technologies, computer equipment, information technologies, and finally, nanotechnologies or molecular engineering technologies [2].

High technologies are the special object that requires continuous study and also specific approach during economic estimation, original methods for development, and implementation control [3]. Usually, such technologies need a significant economic support in earlier stages because in this period they cannot specifically stand economic competence with traditional methods of production activity. Only in further stages, the efficiency of earlier made decisions is shown. The main feature of high technologies is essential cost value for initial scientific researches that demand special financial mechanisms of financial resource attraction [4].

Today, microelectronics development is very essential for the development of the countries. It suggests direct use of intelligent system paradigm [5]. However, the use should be built not only on world global level of mechatronics system but also on the level of development of intellectual machines, devices, robotics, instruments, and separate components [6].

Understanding in more details the human aspects behind innovation is essential for the design of policies that help to promote economic development and richer innovation-prone environments locally [7]. The global innovation index (GII) includes indicators that go beyond the traditional measures of innovation such as the level of research and development. The GII is an annual ranking of countries by their capacity for, and success in, innovation [8]. It is published by Cornell University, INSEAD, and the world intellectual property organizations, in partnership with other organizations and institutions, and is based on both subjective and objective data derived from several sources, including the international telecommunication union, the World Bank, and the world economic forum [9].

The GII aims to capture the multidimensional facets of innovation and provide the tools that can assist in tailoring policies to promote long-term output growth, improved productivity, and job growth [10]. The GII helps to create an environment in which innovation factors are continually evaluated. It provides a key tool and a rich database of detailed metrics for economies, which in 2016 encompassed 128 economies, representing 92.8% of the world's population and 97.9% of global GDP. It is, therefore, necessary to study such field of science as mechatronics and its development trends in modern society [11].

METHODOLOGY

The GII 2016, in its 9th edition, is copublished by Cornell University, INSEAD, and the World Intellectual Property Organization, an agency of the United Nations. "The core of the GII report consists of a ranking of world economies" innovation capabilities and results. Over the past 9 years, the GII has established itself as a leading reference on innovation (Matthews and Brueggemann, 2015). The GII is computed by taking a simple average of the scores in two subindices, the Innovation Input Index and Innovation Output Index, which are composed of five and two pillars, respectively. Each of these pillars describes an attribute of innovation and comprises up to five indicators, and their score is calculated by the weighted average method."

RESULTS AND DISCUSSION

Development and wide use of microelectronics by all groups of society are the global trend of world development and can be measured by GII [10] so that GII of worldwide and selected Arabic countries for the past years was compared.

Worldwide mean GII

High technology construction level in the world and their role on World Markets of high technologies are characterized with GII, and the dynamic of which is shown in Table 1 [8].

The GII was increased from 0.5 in 2008 up to 36.3 in 2016 as shown in Fig. 1. The occurred abrupt jump can be explained by modifying its estimation method at the expense of index amount growth. In addition, the amount of states, which are used to estimate index, increases every year. In 2008, the index was estimated only for 108 states, and in 2013, the amount of studied states reached 142 [12,13].

In general, the growing of index dynamic proves the development of high technology World Market [14]. At the present moment, the structure of high technology World Market is not finally determined as evidenced by the results of estimation for 213 states within the period from 2000 to 2016. In this case, cluster analysis was carried out. Before the cluster analysis was carried out, a theory was made which indicates that inner markets of high technologies in different countries are on different development levels [15]. Nevertheless, the increase rates for states were not aligned in the previous years, that is why the structure of high technologies market creation in world's states was changed in the period from 2000 to 2016 [16].

GII for selected arabic countries

All Arabic countries have dropped in their places in GII during the period 2013–2016. Saudi Arabia has dropped to 49th place in 2016 compared to 42nd in 2013. Jordan has dropped to 82nd place in the GII and down by seven places from 2015. The score and place of other countries are shown in Table 2.

Saudi Arabia ranked first on GII among Arab countries followed by Qatar, Lebanon, Oman, Tunisia, and Jordan, then Algeria and Egypt, while the last rank on GII was for Yemen as shown in Fig. 2.

The GII of Arabic countries is lower than that of worldwide GII. The worldwide GII was increased during the years 2013–2016 because, in the past years, mechatronics development reaches the higher level in comparison with previous years [17]. While The GII decreased for Arabic

Table 1: Value transformation of worldwide mean GII

Years	GII
2008	0.5
2009	0.6
2010	0.7
2011	35.2
2012	35.0
2013	35.5
2014	35.7
2015	36.0
2016	36.3

Source: Official website of GII, 2017. GII: Global innovation index

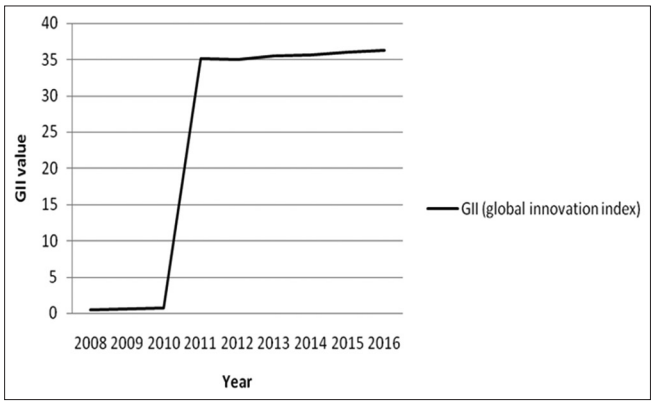

Fig. 1: Value transformation of worldwide mean global innovation index

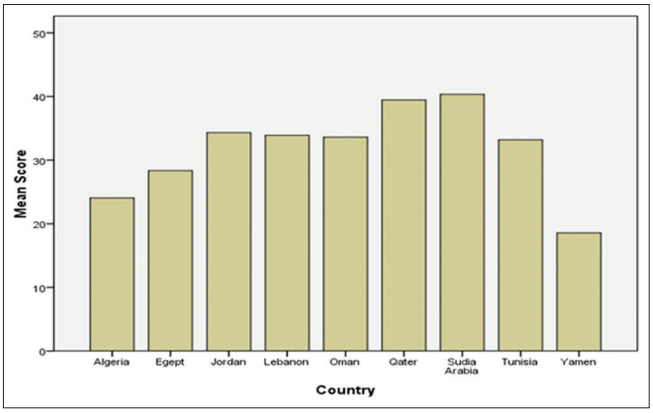

Fig. 2: Comparison between global innovation index mean score for selected Arabic countries

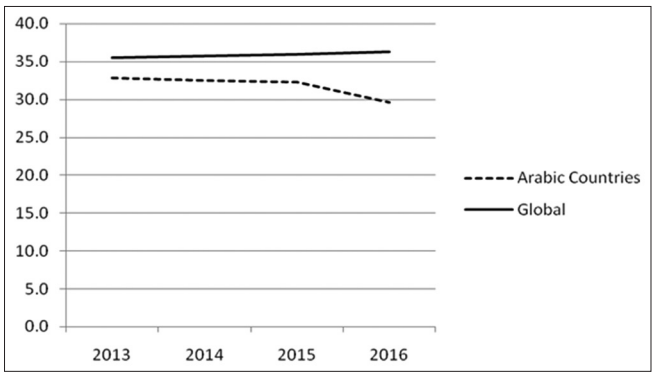

Fig. 3: Global and Arabic innovation index

Table 2: GII for selected Arabic countries

Arabic Countries	2016		2015		2014		2013	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Saudi Arabia	49	37.9	43	40.7	38	41.6	42	41.2
Qatar	50	37.5	50	39	47	40.3	43	41
Lebanon	70	32.7	74	33.8	77	33.6	75	35.5
Oman	73	32.2	69	35	75	33.9	80	33.3
Tunisia	77	30.6	76	33.5	78	32.9	70	35.8
Jordan	82	30	75	33.8	64	36.2	61	37.3
Egypt	107	26	100	28.9	99	30	108	28.5
Algeria	113	24.5	126	24.4	133	24.2	138	23.1
Yemen	128	14.6	137	20.8	141	19.5	142	19.3

Source: Official website of GII, 2017. GII: Global innovation index

countries for the same period (2013-2016), This decrease can be explained by the wars in some of the Arabic countries that affect the economic and industry, as seen in Fig. 3. This decrease can be explained by the wars in some of the Arabic countries that affect the economy and industry.

CONCLUSION

Innovation is a major pillar of the country's economic development and its consider one of the major issue of government policies. The improvement of some Arabic countries such as Saudi Arabia was attributed to achievements such as strengthening institutions and market sophistication, as well as development in information technology, communications, infrastructure, and applying of mechatronics that has main meaning for the growth of population living standard and national economics competitiveness, widening the possibility of its integration into world economic system, while GII was decreased in some countries that suffer from war in the last years.

CONTRIBUTION OF AUTHORS

- KHOLOUD AL QALAB is the chief author, supervised the work, and contributed in writing all parts.
- RAMADAN HEJAZIN and SARI MALAHIM are responsible for writing and results, discussion, language reviewing, and editing.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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