
| RESEARCH ARTICLE

The Impact of Innovation on the Global Manufacturing: Selected Sample for 2012-2019

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| ABSTRACT

The study dealt with some of the main axes of innovation and its impact on the level of manufacturing and the added value of the manufacturing industry in the sample countries by analyzing the role of innovation on this variable, and this was done using descriptive analysis methods. The thesis started from the premise that innovation has a positive direct impact on the level of industrialization for countries of the world and in a hierarchical manner according to the level of industrialization. The research was divided into three sections. The first dealt with a theoretical introduction to innovation, the second dealt with the nature of industry and manufacturing, and the third was measuring and analyzing the impact of innovation on the added value of the manufacturing industry. Represented by the global innovation index and manufacturing outputs, as well as the fulfillment of this chapter for all the standard indicators that support the hypothesis of the study, the study had recommendations, the most important of which was that developing and least developed countries should upgrade the global innovation index, which would increase production, productivity and patches of competitiveness for these countries. The study also recommended the need to increase spending on research and development and benefit from the experiences of developed countries in the field of innovation.

| KEYWORDS

Innovation, GII Manufacturing, Value Added

| ARTICLE INFORMATION

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1. Introduction

Innovation has become of great importance to industrialized countries, economic bodies, and developing countries. It is the main component on which countries depend to achieve economic and social prosperity. Innovation is the main engine for the growth and development of most economic sectors (industry, agriculture, services, education, health, investment), and it has become difficult to build modern and developed economies in the absence of innovation and the importance of innovation comes through its ability to achieve economic growth and economic development and enables innovative countries to compete in the global market and have an impact on those markets and thus increase production and productivity.

The problem of the study is that the economic progress achieved by countries is not only related to human and natural resources or material capabilities, as much as it is related to the knowledge and technological content, and the interest in innovation makes the country's economy among the advanced economies. The problem of the study is summarized by answering the following questions:

1. Does innovation have an impact on the level of industrialization in the world?

2. Does innovation have an impact on the output value represented by the added value of the manufacturing industry and its exports of advanced technology to countries around the world?
3. Does innovation have the potential to transfer the economies of countries to industrial economies?

1.1 The importance of the study:

The importance of the study comes from the fact that innovation is one of the important and recent indicators because of its role in the field of manufacturing and how to use its indicators in an optimal manner in order to achieve a better and highly efficient manufacturing level, and thus has the ability to become an industrial country if it tracks the impact of innovation.

The objective of the study: The study aims to define the importance of innovation represented by the Global Innovation Index, how to build it, and the extent of its impact on the level of manufacturing through its impact on value added and exports of advanced technology for the manufacturing industry.

The hypothesis of the study: The study starts from the hypothesis that innovation has a positive direct impact on the level of industrialization for countries in the world, and thus the country's economy moves from a less developed economy to a developing economy, then an emerging economy, and finally an industrial economy whenever the level of innovation increases.

1.2 Study Methodology:

The study relied on descriptive and numerical analysis, relying on data related to the subject of the study, and in an inferential manner supported by quantitative measurement to reach the goal and hypothesis of the study.

The limits of the study:

1. Study time limits for the period 2012-2019.
2. The spatial boundaries of the study. A selected sample of the world's countries amounted to 77 countries out of the number of countries participating in the Global Innovation Index report, an average of 135 countries.

2. What is Innovation?

2.1 The Concept of Innovation

Innovation expresses the mental activities of man to adapt himself according to the circumstances he is going through with the aim of satisfying his diverse and increasing needs in line with the civilized stage. In the beginning, innovation was spontaneous until it gradually became more organized. Global or international level innovation is based on scientific research and research and development programs.

There are several concepts of innovation according to the literature and relevant authorities, and each party has a concept that differs from the other according to its intellectual, economic, and social orientations. With this, the researcher faces difficulty in finding a comprehensive definition of innovation. Innovation has been defined as doing something new and its embodiment in the development or manufacture of new goods that are Accepted by the consumer or the opening of new shopping centers, or is it a new way of working or is it all industrial and commercial processes that lead to the marketing of new goods (Zhou, 2020, 177.)

Schumpeter believes that there are two types of innovation (J.A. Schumpeter), the first is radical innovation (penetration), which is represented by reaching a new product or a new process in production that differs from what preceded it and achieves a great strategic leap in the market, as it represents great progress that differs from a kiss, achieving a new innovative cycle A higher level than the previous cycle, and the second type of innovation is the (gradual) innovation that is represented by reaching new products in part through improvements that are made to the existing products, and that this type of innovation does not lead to the creation of new innovative cycles because it represents partial innovations. According to this concept, innovations are limited to radical technological innovations that improve productivity, stimulate economic growth, create jobs in the industrial and service sectors, and achieve social welfare (Najm, 2003, 18). And then innovation spreads when it is reproduced by others, which is called diffusion. It is clear from this that innovation, diffusion, and invention are successive stages in the process of technological change in the industry because imitation is not possible without innovation, and innovation is not possible without being preceded by the invention (5Barthwal, 2010, 17).

2.2 Types of Innovation

There are many types of innovations, including:

- I. Product innovation: It is in the form of a new product or a new or significantly improved service. New products are those goods and services that are fundamentally different from those that exist before any process of creating new ideas that contribute to providing new products that differ from old products. Innovation may be in the form of Improving the

current or old product by making improvements to it and increasing its performance significantly. It is improved by making changes in its constituent elements. No product can continue in the market without making changes or improvements because the needs and desires of consumers are constantly changing, and every firm does not develop its products. It will face the risk of failure compared to other facilities (Lashab et al., 2017, 262.)

- II. Process innovation: The process is defined as a series of activities that are carried out by a group of individuals, tools, and equipment; that is, it works to transform inputs into outputs through a series of procedures and activities carried out in the facility. Follows:

Improving an existing production process: It works to improve the methods, methods, activities, procedures, and performance of production processes (machines, materials, methods), and the goal may be to reduce costs, increase production capacity, or improve the quality of outputs.

Designing a new production process: The views of researchers varied in defining the concept of process design, as Krajewski & Ritzman linked that process design is how to choose inputs, processes, work flow, and methods and methods for producing goods and services. (Al-Rahim and Hassan, 2010, 69)

- III. Marketing innovation: This type of innovation focuses on the marketing activity and the ways, methods, and procedures that the establishment does to create a new marketing situation in the field of promotion or distribution. Or in the way of product packaging or opening new centers for the company's product is marketing innovation, and thus any distinct act in the field of marketing that makes the facility different from other establishments in the market falls within the field of marketing innovation (Ahmed, 2010, 57.)
- IV. Organizational innovation: It is the implementation of a new organizational method in the practice of the company's business or external facility, with the aim of developing the company's performance and increasing its performance by reducing work costs or as processes that work to establish or adopt new systems in production and management (Atalay, Anafarta, eds). ,2013,230)

2.3 The Importance of Innovation

Innovation at the present time is one of the most important indicators that help the progress of institutions because the view of innovation has changed at the present time at the level of countries. And an important factor for achieving the process of economic and social development, in addition to creating new job opportunities and creating new markets, meaning increasing the level of productivity and contributing to raising the level of national wealth and its development. Many books link the institution's survival in the circle of competition and its success with its ability to create new innovative ideas and transform them into products and services and put them on the market. Innovation has increasingly become, for a large number of institutions, one of the most important sources of competitive advantage (Abdul Wahab, 2012, 36). Innovation is one of the important indicators that measure the development of nations, as it is the variable on the basis of which establishments or institutions are created, which gives them or gains a sustainable competitive advantage, improves the productivity of the enterprise through high efficiency, and improves the use of resources and energy in an economical manner (Asmaa, 2019, 61.)

3. What is the Concept of Industry and Manufacturing?

3.1 The concept of the industry:

The concept of the industry has been given more than one meaning, similar to most other economic terms and concepts, due to the multiplicity of views on the concept of industry. However, this definition has been subjected to criticism from different economic schools due to the absence of an industry that produces one homogeneous commodity. The industry is a more important and comprehensive concept than the previous definition, as it expresses every substance that is transferred from one state to another and becomes ready for use and consumption, which has undergone changes in its composition to become Manufactured or semi-manufactured goods, the industry is the important pillar for every economic development and growth of any country, and on this basis, the industry can be defined as a major and large unit in the national economy, which consists of a number of branches and industrial projects that extract raw materials from nature and convert them into commodities Material and energy for productive and personal consumption, and services of an industrial nature aimed at preserving or re-manufacturing use value. (Al-Moamari, 2006, 3-4.)

It is considered a branch of the national economy, and it includes all industrial establishments that produce materials and extract raw materials. The industry is defined as (the craft or economic activity that aims to transform raw materials from their original state to a new state in order to satisfy human needs and multiple desires. (Al-Dulaimi, 2018, 220.)

The industry is also known (it is one of the branches of the national economy in which goods and services are produced. The industry is distinguished from the rest of the economic sectors as it extracts natural and material wealth and transfers it for the purpose of satisfying production and consumer needs) (Zhou and Jassim, 2014, 168.)

The industry is also defined as a process by which a material is transformed from its original state to a new state or image, whose new state becomes more beneficial and satisfies human needs and desires, or it is the activities by which a person changes the shape or nature of raw materials of various kinds. (Mohammed, 2018, 11, 11.) It is also known as a group of factories that produce a specific type of commodity, i.e., the main activity of which is the production of a commodity (Aday, 2021, 84.)

It also defines all the measures taken by the economic units in society in order to transform the form of raw materials in nature to increase their value through the use of appropriate tools with the aim of making them capable of satisfying a specific need, whether intermediate or final (Horia, 2015, 3.)

Industry can be divided into two main types:

- 1) Manufacturing industries: It is a group of industrial branches that work to reprocess the raw materials that come from the extractive industry and the agricultural sector. Therefore, products that are suitable for use as consumer goods or as other means of production are made. The most important branches of the manufacturing industry can be stated:
 - I. Metal mining industry (production of iron, steel, and steel.)
 - II. The mining of colored metals (copper, lead, and aluminum production.)
 - III. Chemical industries.
 - IV. Wood industry.
 - V. Paper and textile industry of all kinds.
 - VI. Manufacture of leather shoes (Al-Ammari, 2010, 14-15.)
- 2) The extractive industry: It is one of the branches of industry that works on extracting various raw materials and fuels from the ground, coal industry, extracting oil and sulfur. Therefore, the industry is the vital sector that satisfies human needs for goods and services, whether they are production or consumer goods (Mawared, 2016, 53.) Second, the concept of manufacturing:

Industrialization is one of the economic concepts that are circulated in economic, social, and natural research and studies. It may mean expanding the base of industrial production in a society that was dependent on the agricultural sector or any other sector, and the consequences of this expansion of material and intellectual transformations on the structure of society, industrialization leaves its positive effects. On the development of the economy of the state and society together, industrialization takes the time period in which it grows and the extent to which it benefits from the competencies and technological expertise that exist in the country, and the ratio of workers who work in the industrial sector to workers in other productive sectors. Zhou, 2014, 168).

Industrialization is defined as the process of economic development of a country in which a large share of local resources are invested for the purpose of developing the internal economic structure in its various branches and equipping these branches with modern technology, in which the manufacturing industry has a major role, to produce consumer and production goods while achieving high growth rates for the national economy that lead to Achieving economic and social progress (Wasila and Kamal, 2016, 3).

It is also defined as "a process that results in a change in the economic structure of countries and an indicator of the percentage of increase in national income arising from the industrial sector. That is, manufacturing is a process of economic, social, and cultural transformation, and industrialization requires the use of modern science and technology data in industrial production, as well as the use of Modern methods and methods in production processes, which leads to increased production and higher quality of products, and the spread of the industrial method to the rest of the sectors and other economic activities.

Industrialization was defined as a development process aimed at eliminating underdevelopment by using modern technical means to transform materials from their original state to another state in which they become more useful and able to satisfy human needs and increase national income (Amin, 2018, 625).

Manufacturing also defines every effort made by human beings in productive activities related to raw materials in order to use them and transform them into productive consumer goods that satisfy human needs. Manufacturing is a human activity carried out by the manufacturer to add new things. , 146).

The United Nations also defined it as one of the aspects of social and economic development, where percentages of the available resources are allocated to the development and development of the technical level and diversifying the structure of the national economy in a way that contributes to the growth of the manufacturing industry, in both its forms, the industry of means of production and consumer goods, and then this sector is able to contribute to reaching a rate of High for national income growth, welfare, and social and economic progress (Elham, 2016, 39).

(Kiely, 1998, p.3) sees manufacturing as "all goods and services that are not produced directly from the land" or it is "a certain way to organize production with a process of technical and social change, which increases the ability of society to produce a wide amount of goods."

It can be defined as "the increase in the share of GDP due to its shareholders in the manufacturing sector, or it is a process that involves changing the structure of the economy (Amina, 2017, 9).

It was also defined as "the process of a broad and continuous transformation of society from the agricultural pattern to the industrial one, and the accompanying technical and economic values" (Moses, 2019, 785).

4. Analyzing the Impact of the Global Innovation Index on the Level of Manufacturing and the Added Value of the Manufacturing Industry in the Sample Countries.

4.1 Data Preparation:

Before analyzing this chapter, it is necessary to clarify the study sample and how to prepare the data. The study sample consists of 77 countries participating in the Global Innovation Index for the years 2012, 2013, 2014, 2015, 2016, 2017, and 2018 out of 141, 142, 143, 141, 128, 127, and 126, respectively, for the mentioned years, and from all regions of the world at the level of the continents, the sample countries were divided into four groups and according to the level of industrialization, which are the group of industrialized countries, the group of emerging developed countries, the group of developing countries, the group of least developed countries (Industrial Development). The report, 2016, 221-222, and from Appendix (1), the first group starts from the 1-24 sequence, the second is 25-44, the third is 45-68, and the fourth is 69-77, and the four groups are represented by their average GII score for the indicated years, and that The innovation index is one of the indicators whose impact does not appear in the same year because its impact is cumulative for innovations in previous years and it takes time for the consumer or customer to become familiar with the new product, whether it is an individual or an institution because the consumer makes his purchase decisions based on previous reports that confirm the innovation of the produced product, so he took an average Innovation Index B A time lag for the mentioned years and its impact on the level of manufacturing and the added value of the manufacturing industry for the year 2019.

4.2 The Impact of the Global Innovation Index on the Level of Manufacturing and Value Added

Through Table (1) and Figure (1), we note that the group of countries that obtained the highest totals of the Global Innovation Index are classified within the industrialized countries, followed by the emerging countries, and their total innovation index was less than the innovation index of the industrialized countries, then the developing countries and the least developed countries. Respectively, the first group, which obtained the highest total of the Global Innovation Index, was the group of industrialized countries. This reflected positively on the quality of their products in the production of goods and services and the creation of goods and services with advanced technological content that enabled them to expand their markets and increase their sales. Increasing their profits and production in the manufacturing sector and increasing the proportion of employment led to them becoming industrialized, innovative countries because they met the conditions and standards of industrialized countries. We note what the industrial countries obtained from the total averages of innovation averages for each country (1347.05) points. It is the highest among the economies of the world, with an average of 56.12 per country. It is the highest among the four groups. As for the group of emerging (developed) countries, the total average averages for innovation was (6310) points, with an average of (38.52) for each country. As for the group of developing countries, the total average averages for innovation was (730.88) points, with an average of It reached (30.45) for each country. As for the group of least developed countries, the total average of the averages for innovation was (204.09) points, with an average of (22.76) for each country. As for the added value of the manufacturing industry for total countries, we note from the table (1) that the ranking of the group of countries whose average value added is higher than others corresponds to the highest average of the innovation index. 262.91 billion dollars for each country. The group of emerging (developed) countries ranked second in the average averages of the innovation index, which amounted to 38.52, corresponding to the average added value of 260.4 billion dollars. As for the group of developing countries, the average for the innovation index reached 30.45, corresponding to the average added value of 13.70; as for the group of least developed countries, the average for the innovation index for each country reached 22.67, corresponding to the average value added of 1.66.

The table below shows the total and average GII for the year: 2012, 2013, 2014, 2015, 2016, 2017, and 2018, and the average value added for 2019 for the group of countries by level of industrialization

Table (1)

manufacturing level (Million dollars)	number of countries	The overall average for each country	the total	
industrial countries	24	56.12	1347.05	Innovation Index
		262.91	6310000	Value Added
Emerging (developed) countries	20	38.52	770.56	Innovation Index
		284.400	5688000	Value Added
Developing countries	24	30.45	730.88	Innovation Index
		13.70	329000	Value Added
least developed countries	9	22.67	204.09	Innovation Index
		1,66	15000	Value Added

المصدر: من اعداد الباحث بالاعتماد على الملحق رقم (1)

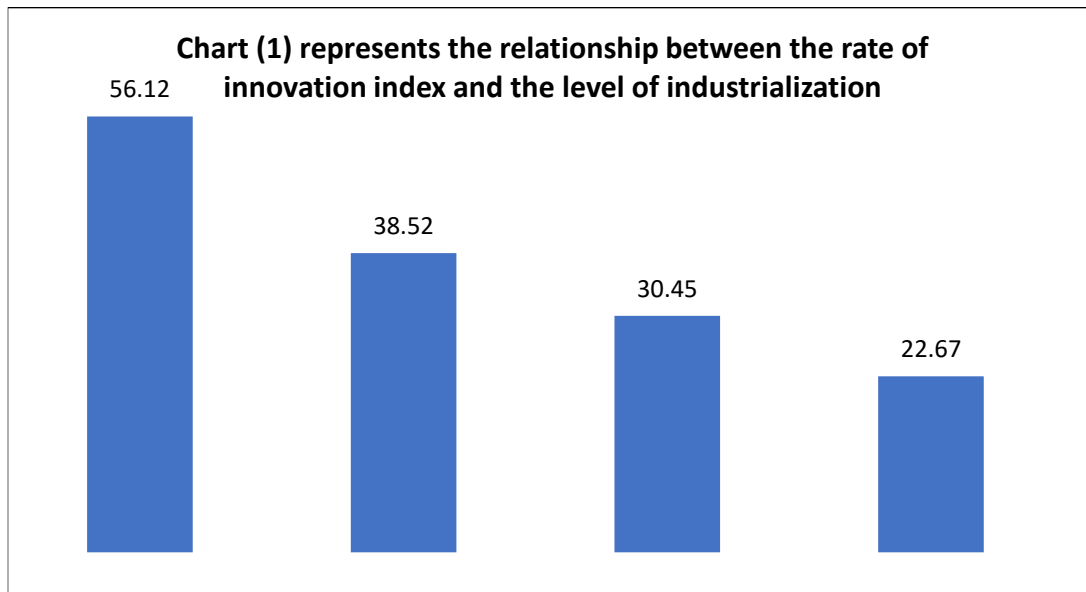


Figure (1) The relationship between the innovation index rate and the level of industrialization
Source: Prepared by the researcher based on the data in the table (1.)

5. Conclusions and Recommendations

Through descriptive and quantitative analysis of the relationship between the global innovation index and the level of industrialization, the study reached a number of conclusions and recommendations, the most important of which were:

5.1 The Conclusions

1. The Global Innovation Index is one of the modern and important indicators for all developed and developing countries of the world because of this indicator's effective role in the national economy. It is built on indicators that concern all aspects of economic life. The importance of this indicator is supported by the interest of many global organizations and industrialized countries in innovation as a tool effective and important in economic development.

2. Innovation is the reliable key to the production of modern goods, services, and technology that did not exist in the past, which makes innovative countries increase their sales to occupy a higher market position than others.
3. Innovative countries can expand their industrial facilities, which requires an increase in the employment of manpower, and this, in turn, leads to an increase in the percentage of the industrial sector's contribution to the GDP because the industrial sector is sector concerned with innovation more than the rest of the other sectors because of its potential and ability to translate ideas and new inventions into modern goods, services and technology.
4. The global innovation index has an impact on the level of industrialization, and this is evident from the four aggregates of developed, emerging (developed), developing, and least developed countries, as shown in Tables 14 and 15, and this proves the hypothesis of the study that the global innovation index has an impact on the level of industrialization, the higher the innovation index of the country is possible To move to a higher level of industrialization and become an industrial country according to its achievement of the criteria of the Global Innovation Index.

5.2 Recommendations

- 1- After the traditional elements of production have become ineffective in the process of economic transformation as they were in the past, countries and international organizations must pay attention to indicators that have the ability to bring about effective changes in the process of economic transformation and the most important of these indicators is innovation, which has the ability to create and develop products New that did not exist before, which achieves competitiveness and ensures a larger market share.
- 2- Developing and least developed countries should raise the global innovation index by paying attention to the achievement of its sub-indicators, especially research and development, which is the mainstay of innovation, as well as interest in discovering modern ways to manage economic institutions, as these methods are considered innovation priorities because of their advantage that helps reduce production costs and the discovery of new markets.
- 3- Establishing innovation departments within the institutions that bear the responsibility of paying attention to innovation and motivating their employees to innovate by providing incentives and rewards that will improve the innovation process.
- 4- It requires global economic organizations interested in the global innovation index to assist developing and least developed countries in order to improve the innovation index through the achievement of its sub-indicators, and this, in turn, contributes to developing the wheel of the global economy and alleviating poverty and unemployment for developing and least developed countries.

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