A Research Paper Titled:

"Sustainability and Competitiveness: Case Study of the Application in the Developed Countries Versus That of the Developing Countries"

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Abstract

Purposes – Sustainability and competitiveness represents the part of the economic theory that deals with sustainable economic development. This research paper focuses on the competiteveness as related to economic development in the developed countries, and in the developing (less-developed countries). This in fact deals with several pillars that provide for studying the effect of the competitiveness on key macroeconomic variables. The purpose of this is to provide for an acceptable practical measure of the application of competitiveness on development and growth. This study do not only test these effects, but also provide for a comparative analysis between the success of this approach among developed countries versus that of the developing countries.

Design/methodology/approach – The extent of the economic application of sustainability and competitiveness is studied within this research paper. The common acceptable measures of the impact of sustainability and competitiveness on the process of development and that of the growth are researched and analyzed. The analysis covers the effect on key macroeconomic variables. The methodology used in this connection is extended to cover the case of both the developed countries and that of the developing countries. This study provide for a comparative analysis of the case of the developed countries versus that of the developing (less-developed) countries. .

Findings - The study was conducted with the purpose of providing an integrated framework of the impact of innovation on the economic development and growth by arriving at the most reliable justifiable relevant econometric measures. The econometric running of the world data explored that there is a very strong correlation with a Pearson correlation coefficient of degree one (r = 1) between the GDP and the "competitiveness index" in one hand, and between the GDP per capita and the "competitiveness index" in the other hand. The study made set of recommendations concerning the possible means to help the developing countries to overcome their chronic economic problems through their effective participation in the sustainability and competitiveness economic practices.

Originality/value - The research work is an original combination of integrated framework of the analysis of the role of the economics of sustainability and competitiveness in the process of economic development and growth. The study

explored and measured the impact of applying sustainability and competitiveness on the key macroeconomic variables. This was done within a comparative approach of the case of the developed countries versus the case of the less developed countries. At the end of the study a purely new set of recommendations were made to add to the economic literature a new set of recommendations concerning the possible means to help the developing countries to maximize their economic benefits from sustainability and competitiveness at both the international and the national levels.

Introduction
During the second half of the twentieth century, the world witnessed several substantial changes. Such crucial changes were evident in the special emphasis given to the issues of sustainability and competitiveness, and the economic application of the sustainability and competitiveness that changed the global economy. The strength and magnitude of the sustainability and competitiveness economic impacts are studied in this research paper.

These sustainability and competitiveness economic impacts had dramatically affected the global economy within the framework of globalization. Such impacts reshaped the global economy and led to provide for new types of employment that matched with a rapid growth in total investments, in the Gross Domestic Products (GDP) of the major industrial countries, and in the global GDP growth rate.

This ultimately resulted in a huge change in the world total production, and in the investment in both labor (human capital), and capital (physical capital) irrespective of the applied economic system. Also, this boosted the development process all across the world, and enforced new types of investment in all economic sectors. This definitely changed the whole economic system, and reshaped both economic and human development. The whole process is led by the industrial countries through the transfer of both the direct foreign investment (FDI) and the indirect

foreign investment. This ultimately led to build up and to stimulate the direct domestic investment, and the indirect domestic investment.

On the other hand, this situation also changed the international economic cooperation as related to the flow of international trade and of capital investments as the cornerstone of economic cooperation by directing the international flow of funds and investments at a global level.

This was clear not only with the flow of foreign direct investment (FDI) but with the flow of indirect investment as well. The economic development as the cornerstone of sustainability and competitiveness economics mainly dealt with productivity. This was done by producing more units by using the same level or even less of the resources. The processes is accelerated through continues development of the products and through providing new products. This raised the need to open new markets and to redirect investment activities among countries based on the comparative advantage in each and every country. Such situation brought the multinational corporations at the center of the economic reality of globalization in favor of the developed countries against the interest of the developing countries in many cases. This is ultimately a development vehicle which provides for a dynamic that helps more practically to evaluate the process as a socio-economic process, especially as related to the issue of unemployment. The economic aspect and the social aspect are integrated and of mutual effect, which could never be ignored.

Literature Review

In fact, when we study the the main elements of this proposed research, we discover that these these main elements are directly related to the effect of sustainability and competitiveness on the economic development and growth in the developed countries versus the position of the developing (less-developed) countries. This research provides a link between them. Such link has not been subject to any previous literature.

The previous literature is concerned with each case separately as a topic. Very few writings provide a very weak link between them, but no previous writings formulated a meaningful economic link between them. This is the main gap in the previous economic literature. Accordingly, no previous case study attempted to provide the link between them, and ultimately to advise on how to practically promote the position of the developing (less-developed) countries as related to the economics of sustainability and competitiveness.

World Commission on Environment and Development. (1987) and OECD (2005) defined sustainability and competitiveness as related to innovation as "*the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations*". The Organization for Economic Co-operation and Development (OECD) focused exclusively on product innovation which, according to the Oslo Manual, is defined as "*the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Product innovations can utilize new knowledge or technologies, or can be based on new uses or combinations of existing knowledge or technologies*". Design modifications that do not entail any significant modification in the product's function, characteristics, and usage are not considered as product innovations. Product innovations in services can include remarkable developments in rendering the service as related to delivery, efficiency and/or speed of the service rendered.

Diamond (2015), Dresner (2102), and Farah (2015) showed that sustainable competitive advantage in the competitive corporations in the industrial countries are privileged if compared to their counterparts in the developing (less-developed) countries. Corporations in the industrial countries receive the support of standard-setting organizations (SSOs) and national laboratories within the alliance of government, labor, consumers, and firms to implement regulatory standards to provide for leverage economic growth and development. SSOs together with the other industry organizations in the industrial countries form strategic alliances among firms to ensure that each firm can compete successfully with its own products, and to ensure that each firm's products are compatible with the products supplied by other firms. The SSOs together with the other industry organizations utilize the government laboratories within this process to support the strategic alliance that takes the form of a public/private partnership.

Waite (2013), Nelson (2009), Zahra (2002), Hilbe (2007), and Hall (2005) showed that all competitive sustainable output related to the high technology levels such as laser technology is restricted to the industrial rich countries only. They emphasized the absorptive capacity of the industrialized countries for starting and conducting researches in any new technological field. They argued that the spatial pattern of knowledge diffusion is highly relevant in implementing the innovation processes as a prerequisite for setting suitable policy measures together with appropriate public intervention. This must be matched with the ability to attract regional industrial, academic, and government actors interested in the value of new technology, in order to assimilate it, and then to utilize it. This

combination will only be possible in case of rich industrial countries. Thus, knowledge is obtained from the huge stock pile of information which is transferred by job mobility between the firms and the research institutions because of the relatively large skilled labor markets in these developed countries. They cited an example of the dominance of developed countries' inventors whereas more than 7000 German and international engineers and natural scientists worked in the Siemens laboratories alone in Germany, which makes it one of the largest private-sector research and development (R&D) facilities in the world. In addition to this, the Siemens laboratories are still in full coordination with the most prestigious academic institutions worldwide.

Scerri (2010) and Toole (2014) emphasized that the role of universities in research and development (R&D) in the developed countries is vital for sustainability and competitiveness. His analysis covered also the effect of R&D in creating job opportunities in the economy of the developed countries. Such job opportunities are represented by the creation of direct and indirect job opportunities in all economic sectors. He emphasized this as the scientific absorptive capacity in knowledge-intensive industries that can build strong capabilities for growth through university interactive research alliances. This can provide the economy with a stable level of valuable intangible and tangible assets such as knowledge, skilled personnel, and specialized equipment needed for the growth and development in the developed countries. He showed that the methods used in the developed countries in this connection are mainly attributed to the collaborative research alliances among universities and the productive sectors in the developed countries through the engagement in contract research, contracting-out to the university, personnel exchange, and many other means of research collaboration.

Scerri (2010) and Johansson (2015) explored that sustainability and competitiveness are attained through the high innovation systems' efficiency which are supported by the stable structures of the research and development, the industry composition, the country's innovation capacity, the innovation structure, the industrial clusters, the venture capital market, the university capacity, and the formal and informal institutional setting in the industrialized developed countries. This made innovation and growth became two synonyms in the industrialized developed countries. According to Johansson all OECD members can be considered as knowledge innovation economies, because for them their comparative advantages and productivity development depend on their absorptive capacity to have, accumulate, and change innovation knowledge to innovation performance and to technical and economic growth.

Madhavan (2013) and Buchmann (2015) analyzed the evolution of innovation networks that supports sustainability and competitiveness in the developed

countries as part of the infrastructure of the innovation economies which is only available in the western industrialized countries. It provides an additional comparative advantage to the western industrialized courtiers. Such innovation networks exist within the same industry, such as in the automotive industry. Such innovation networks constitute another constraint given by a clear case of oligopoly. Such oligopoly cannot be penetrated not only because of the huge investments required in the highly innovated industries but because of the patents and royalty requirements as well that is supported by the joint researches within the innovation networks among the same industry.

Objectives of the Study

It is clear from the previous illustration of the literature review that this study fills a gap in the sustainability and competitiveness economic literature by exploring the position of the developing (less-developed) countries in contrast to that of the developed countries. Then, this study moves to another addition to the sustainability and competitiveness economic literature by setting recommendations to boost the position of the developing countries in this connection.

The relevant study was carried to provide a framework of its applicable results and recommendations. Thus, this study could be considered as the first case study in this connection. This was achieved by identifying –in a precise manner- the main dimensions of sustainability and competitiveness economic practices as related to economic development and growth. Thus, the ultimate objective was to design the proposed framework concerned with achieving a better observation of the effects on the macroeconomic status. This ultimately set a method to tackle the main dimensions of the problems of the developing countries in this connection. This required providing recommended solutions to the problems related to the tasks that need to be undertaken to avoid any future similar defaults in case of the developing countries.

Methodology of the Study

The research work was concentrating on the study of all relevant aspects of the economics of sustainability and competitiveness. The main macroeconomic impacts of sustainability and competitiveness on the position of any country are researched and analyzed.

The analysis is extended to apply on the sustainability and competitiveness economic position of the developed countries in one hand, and on the position of the developing (less-developed countries) in the other hand. Then, a comparison is set between the positions of the developed countries in contrast to the position of the developing (less-developed countries) with respect to the application of

economic of sustainability and competitiveness. The methodology used in this connection is extended to cover the possible means to avoid the repetition of the defaults of the developing countries in this connection.

At the end of the study, the results were interpreted accordingly and in conjunction with the elements of the literature review to reach recommended solutions to the problems related to the tasks that need to be undertaken to avoid any future similar defaults in case of the developing countries.

Macroeconomic Impacts of Sustainability and Competitiveness

The Theory of Sustainability and Competitiveness Growth Rate

Research and development (R&D) is set to be one of the main drivers of the Gross Domestic Product (GDP). Knowing that GDP is the sum of consumption expenditure (C), investment expenditure (I), government purchases (G), and the net exports [exports (X) –imports (M)], such that:

$$GDP = C + I + G + (X - M)$$

In fact, sustainability and competitiveness is of direct impact on the growth in investments by adding more products and/or by increasing the productivity. Thus, sustainability and competitiveness as related to productivity interprets the economic doctrine of the best utilization of the scarce resources. The growth in I leads to a direct growth in X and to a direct decline in M. The accumulation of revenues in the economy matched with growth in investment will ultimately lead to creating new job opportunities and increasing the demand on the new and the existing types of jobs. This will in turn increase the wage levels, which will increase C and savings (S). Therefore, GDP will increase. This situation in the economy will attract domestic investment, especially with the increase in S, and will attract foreign direct investment (FDI) as well. The cycle will be repeated and repeated. It will continue as such as long as the component of the sustainability and competitiveness still exists. No doubt that the acceleration in the sustainability and competitiveness as an engine of growth will lead to an accelerated rate of growth in GDP to the extent to exceed the rate of growth in the general price level. This means that actual rate of inflation will decline. This is matched by lower rate of unemployment, and a higher GDP growth rate. This situation of the economy, I would like to call it as "*The Theory of Sustainability and Competitiveness Growth Rate*", whereas innovation is a mean vehicle of a comprehensive economic growth as mentioned in the analysis shown here.

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Application On the Developed and the Developing (Less-Developed Countries)

In order to understand the effect of sustainability and competitiveness on the economy as whole through the GDP effect as mentioned earlier, let us consider the following comprehensive table with actual figures measured in US dollars as follows:

Global GDP, GDP per capita, & Global Competiveness Index- 2015

Country	GDP-USD billions	GDP per capita-USD	Index
Switzerland	712.8	57,960	5.7
Albania	12.9	10,180	3.8
Algeria	213.8	13,880	4.1
Angola	-	-	3
Argentina	579.2	..	3.8
Armenia	12.1	8,450	4
Australia	1516.2	42,760	5.1
Austria	423.9	45,930	5.2
Azerbaijan	72.4	16,910	4.5
Bahrain	28.4	37,680	4.5
Bangladesh	171.3	3,330	3.7
Barbados	4.3	15,190	4.4
Belgium	530.6	43,220	5.2
Bhutan	1.8	7,280	3.8
Bolivia	30.3	6,290	3.8
Botswana	16.1	16,030	4.2
Brazil	2375.3	15,590	4.3
Bulgaria	55	16,260	4.4
Burkina Faso	12.3	1,600	3.2
Burundi	2.9	770	3.1
Cambodia	15.6	3,080	3.9
Cameroon	30.8	2,950	3.7
Canada	1835.1	43,360	5.2
Cabo Verde	1.8	6,200	3.7
Chad	13.3	2,070	2.8
Channel Islands	..	..	4.6
China	10097	13,170	4.9
			5.3
Colombia	381	12,910	4.2

Costa Rica	**48.1**	**14,420**	**4.4**
Cote d'Ivoire	**32.2**	**3,130**	**3.7**
Croatia	**55**	**20,500**	**4.1**
Cyprus	**22.5**	**29,800**	**4.3**
Czech Republic	**193.1**	**28,020**	**4.5**
Denmark	**345.8**	**46,210**	**5.3**
Dominican Republic	**62.9**	**12,600**	**3.8**
Egypt, Arab Rep.	**273.1**	**10,260**	**3.6**
El Salvador	**23.9**	**8,000**	**4**
Estonia	**25**	**26,330**	**4.7**
Ethiopia	**53.6**	**1,500**	**3.6**
Finland	**264.6**	**39,940**	**5.5**
France	**2844.3**	**39,610**	**5.1**
Gabon	**16.4**	**17,200**	**3.7**
Gambia, The	**0.9**	**1,600**	**3.5**
Georgia	**16.7**	**7,510**	**4.2**
Germany	**3853.6**	**46,850**	**5.5**
Ghana	**42.7**	**3,900**	**3.7**
Greece	**250.1**	**25,660**	**4**
Guatemala	**55**	**7,250**	**4.1**
Guinea	**5.8**	**1,130**	**2.8**
Guyana	**3**	**6,940**	**3.6**
Haiti	**8.7**	**1,730**	**3.1**
Honduras	**18.1**	**4,570**	**3.8**
Hong Kong SAR, China	**292**	**56,570**	**5.5**
Hungary	**131.6**	**23,630**	**4.3**
Iceland	**15**	**41,090**	**4.7**
India	**2028**	**5,630**	**4.2**
Indonesia	**923.7**	**10,190**	**4.6**
Iran, Islamic Rep.	**549**	**16,590**	**4**
Ireland	**214.7**	**42,270**	**5**
Israel	**290.2**	**32,830**	**4.9**
Italy	**2102.2**	**34,700**	**4.4**
Jamaica	**14**	**8,640**	**4**
Japan	**5339.1**	**37,920**	**5.5**

Jordan	34.1	11,910	4.3
Kazakhstan	204.8	21,710	4.4
Kenya	58.1	2,940	3.9
Korea, Rep.	1365.8	34,620	5
Kuwait	185	79,850	4.5
Kyrgyz Republic	7.3	3,220	3.7
Lao PDR	11.1	5,060	3.9
Latvia	30.4	22,690	4.5
Lebanon	45.6	17,590	3.7
Lesotho	2.8	3,150	3.7
Libya	49	16,000	3.5
Lithuania	45.2	25,490	4.5
Luxembourg	42.3	65,040	5.2
Macedonia, FYR	10.7	12,800	4.3
Madagascar	10.4	1,400	3.4
Malawi	4.2	790	3.2
Malaysia	332.5	24,770	5.2
Mali	11	1,510	3.4
Malta	8.9	27,020	4.4
Mauritania	5	3,710	3
Mauritius	12.1	18,150	4.5
Mexico	1237.5	16,640	4.3
Moldova	9.1	5,500	4
Mongolia	12.5	11,120	3.8
Montenegro	4.5	14,530	4.2
Morocco	105.8	7,290	4.2
Mozambique	16.4	1,120	3.2
Myanmar	68.1	..	3.2
Namibia	13.5	9,810	4
Nepal	20.6	2,410	3.8
Netherlands	874.6	48,260	5.5
New Zealand	..	34,970	5.2
Nicaragua	11.3	4,790	3.8
Nigeria	526.5	5,710	3.4
Norway	532.3	66,330	5.4
Oman	65.9	33,690	4.5
Pakistan	258.3	5,090	3.4
Panama	43.1	19,930	4.4
Paraguay	28.8	8,470	3.6

Peru	**196.9**	**11,440**	**4.2**
Philippines	**347.5**	**8,450**	**4.4**
Poland	**520.1**	**23,930**	**4.5**
Portugal	**222.1**	**28,010**	**4.5**
Puerto Rico	**69.4**	**23,960**	**4.6**
Qatar	**200.3**	**134,420**	**5.2**
Romania	**189.5**	**19,020**	**4.3**
Russian Federation	**1930.6**	**24,710**	**4.4**
Rwanda	**7.9**	**1,630**	**4.3**
Saudi Arabia	**759.3**	**51,320**	**5.1**
Senegal	**15.4**	**2,300**	**3.7**
Serbia	**41.5**	**12,150**	**3.9**
Seychelles	**1.3**	**24,780**	**3.9**
Sierra Leone	**4.4**	**1,770**	**3.1**
Singapore	**301.6**	**80,270**	**5.6**
Slovak Republic	**96.2**	**26,820**	**4.1**
Slovenia	**48.6**	**29,920**	**4.2**
South Africa	**367.2**	**12,700**	**4.4**
Spain	**1366**	**33,080**	**4.5**
Sri Lanka	**71.4**	**10,370**	**4.2**
Suriname	**5.4**	**17,040**	**3.7**
Swaziland	**4.5**	**7,880**	**3.6**
Sweden	**596.9**	**46,750**	**5.4**
Tajikistan	**8.9**	**2,660**	**3.9**
Tanzania	**46.4**	**2,510**	**3.6**
Thailand	**391.7**	**14,870**	**4.7**
Timor-Leste	**3.2**	**5,080**	**3.2**
Trinidad and Tobago	**27.2**	**31,970**	**4**
Tunisia	**46.5**	**11,020**	**4**
Turkey	**822.4**	**18,980**	**4.5**
Uganda	**25.3**	**1,720**	**3.6**
Ukraine	**152.1**	**8,560**	**4.1**
United Arab Emirates	**405.2**	**67,720**	**5.3**
United Kingdom	**2801.5**	**39,040**	**5.4**
United States	**17601.1**	**55,860**	**5.5**
Uruguay	**55.9**	**20,220**	**4**

Venezuela, RB	373.3	17,700	3.3
Vietnam	171.9	5,350	4.2
Yemen, Rep.	33.3	3,650	3
Zambia	26.4	3,690	3.9
Zimbabwe	12.8	1,650	3.5

<u>Source</u>: Global Competitiveness Index (GCI), Global Competitiveness Index (GCI) Dataset, World Economic Forum, 2016. The International Monetary Fund (IMF): World Economic Outlook (WEO), 2016, and the IMF: WEO Update, January 2016. Some data comes from the WEO database: October 2016.

Due to the availability of the data until 2015, the corresponding GDP relevant data of 2015 were also used for consistency in making justifiable comparisons.

The econometric measures used in the analysis of the above mentioned tables are based on the Pearson product-moment correlation coefficient, also known as Pearson's r, which is used as a measure of the strength and the direction of the linear relationship between two variables.

By running these data with the GDP and the GDP per capita of these countries, it is obvious that there is a very strong correlation with a correlation coefficient of degree one (r = 1) between the GDP and the "competitiveness index" in one hand, and between the GDP per capita and the "competitiveness index" in the other hand.

The Innovation Economic Position of the Developed Countries In Contrast To That of the Developing (Less-Developed) Countries

It is clear from the previous analysis and the measured findings that there is a direct positive relation between sustainability and development in one hand, and between competitiveness and development, performance, and stability in the other hand in case of the developed countries.

Alternatively, the position of the developing (less-developed) countries in this connection is very complicated. The main reason is the very low percentage of GDP that is directed to sustainability and competitiveness. This exerted a inverse impact on the accumulation of investment that led to the decline in total exports. Developing countries suffer from chronic trade balance deficit matched with chronic deficit in the balance of payments together with very low percentages of

participation in the world trade. This made their economies vulnerable to economic shocks. This was always matched with high inflation rate and with high unemployment rate.

Under these circumstances, developing (less-developed) countries must embark on development, performance, and stability. This must shift the focus of the developing countries to be on encouraging sustainability and competitiveness. This will require the developing countries to be exporters of the technology rather than just being simply end users of the technology. Under these conditions, politicians in the developing countries may undertake socially optimal actions. Thus, this will be depending on the incentives facing the developing countries in contrast to the constraints that could hinder the sustainability and competitiveness operations. These constraints might be given by problems related to the available relevant resources in the developing countries such as the technological infrastructure, and the skilled manpower.

Conclusion and Recommendations

The findings presented above illustrate the interaction between the major aspects of development as related to the innovation conditions, within the context of comprehensive and sustainable development. The comparative case study of the developed countries in contrast to that of the developing (less-developed) countries served as a prototype model for the extent of the problem in a non equitable world. It adds to the literature a missing link between the effect of sustainability and competitiveness on the economic development and growth in the developed countries in contrast to the position of the developing (less-developed) countries.

The econometric measures used in the analysis of the data collected and analyzed all through this research paper are based on the Pearson product-moment correlation coefficient, also known as Pearson's r, which is used as a measure of the strength and the direction of the linear relationship between two variables.

By running these data with the GDP and the GDP growth rate of these countries, it is obvious that there is a very strong correlation with a correlation coefficient of degree one ($r = 1$) between the GDP and the "competitiveness index" in one hand, and between the GDP per capita and the "competitiveness index" in the other hand.

The findings explored the clearly poor position of the developing (less-developed) as related to the sustainability and competitiveness as a vehicle for a comprehensive suistainable economic growth within the current world economic system.

It is, therefore; recommended that developing countries are required to apply the following:

1- Provide men and women with basic sustainability and competitiveness education and technical training to be enrolled in the labor force.

2- Allocating government funds for sustainability and competitiveness projects.

3- Allocating education funds directed to sustainability and competitiveness.

4- Increase the level of public awareness by launching organized campaigns and guiding the population there to basic sustainability and competitiveness knowledge and readings.

5- Guide the working population to the measures required to establish sustainability and competitiveness systems.

6- Improve the working conditions to provide services and standards as related to sustainability and competitiveness systems in their industries.

7- Launching programs to compensate the companies and institutions engaged in sustainability and competitiveness practices, sustainability and competitiveness education, and sustainability and competitiveness training.

8- Irradicating the high technology illiteracy level among labors and specially young labors.

10-Provide technical technological training to the working labor, and provide continous technology education programs to them.

11-Promulgate legislation to support sustainability and competitiveness.

12-Providing tax cuts to the industries producing technology.

13-Providing tax cuts to the exporters who export goods produced by using domestic technology.

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