The role of the knowledge economy in stimulating economic growth in Egypt form 1995 until 2021

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ABSTRACT

The effects on the developing countries from the developed countries have continued to restrain the developing countries from producing knowledge economy products, which widened the gap between developed and developing countries. Knowledge has been developed all over the world, and Egypt has the right land for development, and the Egyptian state is distinguished by its population wealth that allows manpower and specialization in work to produce highly specialized, highly knowledgeable products. The research has been divided into four axes, The first axis: The theoretical framework of the knowledge economy, second axis: characteristics of the knowledge economy, the third axis: the theories that explain the knowledge economy and its relationship to economic growth, fourth axis: the theoretical frame work for the relationship between the knowledge economy and economic development in Egypt.

We argued that there is a positive relation ship between development and knowledge economy, but the Egyptian state alone cannot move forward with steady steps towards the knowledge economy and industrialization based on the knowledge economy, the secret is in cooperation.

Keywords: Knowledge economy, international economics, Macroeconomics, high technology exports, economic policies.

Introduction

In the wake of the great development that took place in the information revolution the majority of countries intervened to take advantage of this revolution in the economic field, and thus the emergence of what is known as knowledge economics or the production technology revolution, which led to a change in the concepts of traditional economics, which changed the concepts of commodity value. Which contained multiple concepts and

different opinions, so sometimes they defined the value as a result of the effort expended, and at other times as the effect of using of capital, while Say defined it as the benefit. Classical economists, where it changed from the material value to be replaced by the creativity of minds and other values that are more easily to use more attractive , fun, and more developed in performance,These are the products of knowledge .

The concept of wealth differed since the beginning of economic writings, so the theory of merchants arose that wealth is in gold and silver, and the state must accumulate gold and silver in order to increase its wealth. He considered that wealth lies in specialization in work, then Hecksher and Olin developed the idea to specialize in capital-intensive commodities and labor-intensive commodities, and with the great development in the field of information technology, a major source of wealth and richness of peoples appeared, which is the knowledge economy based on knowledge in manufacturing, and the concept developed globally Global cooperation has yielded fruits in the great countries that adopted the concept of cooperation, but Egypt and the Arab countries did not catch up as required, as the knowledge economy did not take in Egypt the field that exists in Western countries such as the United States of America and the European Union. It is not a weakness in its resources, but the Egyptian state possesses the most important components needed for the knowledge economy in its human and natural resources, but the country faced difficulties due to the forces which prevent the cooperation of developing countries, so that developing countries would continue as a broad market for rich countries.

The real challenge facing the Egyptian state in order to catch up is the challenge of cooperation between Arab countries in the field of information technology, similar to the cooperation that took place in the United States of America with its bloc of 50 states, the European Union with 27 countries, the Federal Republic of China, and the Russian Federation, all of this. This led to the ability of these superpowers to make their decisions and direct them towards the knowledge economy, which has borne fruit and increased the income of individuals on a large scale.

Literature review

Solow (1956)[i] contributes that as much as we increase growth by more and more from labor and capital, we will reach to a ceal or an equilibrium point that we can't increase growth above this point, without technological progress in the long term we can't increase growth, so technological progress is critical on the long run, so Solow dealt with technology as an exogenious variable.

Romer (1989)[ii] develop the model by taking knowledge as an endogenious variable, so that human capital is whom create tecknology, saying that E years in school now produces a worker of higher productivity than E year in school did 100 years ago because of the growth of knowledge and science (as the education input in his function has the sign E).

Romer (1990)[iii] invented a model driven by tecnological changes, and investment intentionally in technology can maximize profits, he concluded that the human capital growth can motivate the technological growth which in turn maximize profit, all this is intentionally.

The firstaxis The theoretical framework of knowledge economy :

" The knowledge economy, which is sometimes also called the new economy ,or the "information economy" means the knowledge-based economy " whether directly or indirectly, Knowledge is the main engine of economic growth.

Knowledge economies depend on the availability of communication and information technology, and use innovation and digitization to produce ,goods and services with high added value. surrounding this transformation with the need for an interdependence or an overlapping organic relationship .between data, information, and knowledge of traditional production factors In contrast to the traditional economy, where growth is driven by traditional factors of production(labor, land, capital, and organization), qualified human resources with advanced skills, or knowledge capital, are the most valuable assets in the knowledge -based economy, the relative contribution of industries based on knowledge or enabling it also rises, and it is mostly represented in the activities that fall within the framework of the services sector with its various activities that have benefited greatly from the ,combination of various scientific revolutions such as the digital revolution the communication revolution, and the genetic engineering revolution.

There are a number of knowledge economy concepts; It is a term used to describe the economic and social transformations as a result of the applications of communication and information technology, which leads to faster economic growth. The knowledge revolution is a global trend that affects all countries and is not subject to borders. It does not care about economic, social and political borders. It is a change and a challenge that confronts countries with their ideas, opportunities ,the business environment the work of organizations, production methods and the .development process This economy may be called by several terms such as: post-industrial ,economy, innovation economy, information economy, knowledge economy digital economy, electronic economy, new economy.

The first study of the new economy appeared in the sixties of the last century by the economist "Furtz Macloop", in which he indicated that the new economy is represented in the service economy. At that time, the studies were directed towards studying and analyzing the material outputs of production, which prompted Macloub to study knowledge products and develop his analysis of the concept of "knowledge economy" through distinguished scientific work that had a great contribution to bringing the concept of knowledge economy to light, through its author "The Production and Distribution of Knowledge in the United States"

On the other hand, Peter Drucker used the term "knowledge economy and the knowledge society"

Knowledge Society and Knowledge Economy In the twelfth chapter of his book "The Age of Discontinuity".

In1977 Mark Uri Porat" and "Michael Rubin" presented an integrated", theoretical contribution to the new economy in a book consisting of 9 parts " under the titleThe Information Economy." Through it, he tried to measure and estimate the size of the new economy, which they described through their research as the "information economy Through this author, they concluded precisely the nature of the economic sectors included in the framework of the new economy and the difference between them and other traditional sectors.

Theoretical contributions came after that in this context, as the American economist" Joseph Stiglitz", who won the Nobel Prize, made another contribution in the framework of the knowledge economy, through which he was interested in studying the nature of the transformation that government policies must witness in the framework of the new economy, in his book entitled Public Policy for A Knowledge Economy.

The following is a presentation of the most important different definitions of the concept of the new economy, which were mentioned in a number of previous theoretical contributions.

Definition of Fritz Macclub The "new economy" is the knowledge-based economy in which the number of workers in the knowledge-producing sectors exceeds the number of workers in the rest of the other economic sectors ."Macclub " indicated that there are five basic economic sectors within the framework of the new economy manely : 1. Education, and 2. Research and development, 3. communications, 4. information machinery, and 5. information services Maclopp estimated the size of all sectors of the knowledge economy in the United States to be approximately 30 percent of the gross national product in 1958 [iv]

Borat definition: An economy in which the sectors that use and produce information play the main role in the economy as opposed to the traditional sectors in which the processes of using raw materials and energy form the main role in generating output, such as agriculture and industry. Other economic sectors This happened in 1967 in the United States when the percentage of employment in the information sectors reached 53 percent of the total employment [v].

Organization for Economic Co-operation and Development " An economy based on distinguished knowledge and based on the production, use and distribution of knowledge, information, high-tech investments, and modern-".technology industries and the achievement of associated productivity gains Whereas, the countries of the Economic Cooperation Organization tended to support the role of knowledge sectors greatly, especially during the last decade of the last century . By supporting technology-intensive investments and high-tech industries, as well as by developing labor skills for the [vi] associated productivity gains

The definition of the Ministries of Trade and Industry in the United Kingdom and New Zealand: " The knowledge-based economy is the economy in which the processes of generating and investing knowledge play a fundamental and sustainable role in creating the wealth of nations and increasing the efficiency of all sectors of the economy" [vii]

Definition of the Kaufman Institution The report of the New Economy Index for the United States, issued by the "Kaufman Foundation" in2007 indicated that the new economy is "a set of quantitative and qualitative shifts that have emerged during the past fifteen years, which have changed the structures, functions, and economic rules." It is the global organized economy based on knowledge Global Entrepreneur Knowledge Based Economy (In which success factors are represented in the ability of enterprises to employ knowledge, technology and innovation to produce goods and services with From the foregoing, we come to the fact that the local[viii] high added value knowledge economy is necessary to achieve economic growth and advance economic development, because the future will be determined in one way or another based on it, because the strengthening of the knowledge economy and its consequent contribution to achieving economic growth and stimulating the competitiveness of the economy as a whole. The knowledge economy is characterized by its ability to generate and use knowledge and the ability to innovate, so that knowledge is not only the main source of wealth, but an acquired advantage in the knowledge economy

Second axis: characteristics of the knowledge economy

There is no single style of the information society, but each country has its own political, economic, social and cultural directives. This means that there are a set of characteristics of the knowledge economy that we review as follows:

Initial property: It is the use of information as an economic resource, i.e. its use as an investment resource, and information has become involved in all activities where institutions and companies work to use and benefit from information to increase their efficiency, to develop innovation and innovation, and to increase their effectiveness and competitive position by improving the quality of goods and services they provide. An increasing trend towards the creation of information companies that add large amounts of value and thus improve the overall economy of the country.

The second feature: Information is an indispensable element in our daily lives for any individual, by using information intensively in their activities as consumers and also establishing information systems that expand the availability of education and culture for all members of society.

The third feature: It is the emergence of the information sector as an important sector, in addition to other traditional economic sectors, and the information society comes after stages that human history passed through, and each stage was characterized by a type of technology consistent with it. Humanity witnessed before hunting technology, then agricultural technology, then industrial technology, then We have finally reached information technology, and therefore the information society is characterized by the following characteristics:

- The information is not subject to consumption because it is cumulative and the most effective means of collecting and distributing it is based on the participation of the collection process and the general and joint use of it by individuals.
- The value of information is in eliminating uncertainty and developing the human capacity to make the most effective decisions.
- Information technology is based on focusing on mental work.
- The characteristics of the information society can be summarized in the following
- Informational benefit through the establishment of an information infrastructure based on public computers that are available to all people in the form of various information networks and information banks, which will themselves become the symbol of society.
- The information industry is the leading industry that will dominate in industrial construction.
- The highest advanced degree in the information society is a stage characterized by the creation of knowledge through effective public participation and the ultimate goal of which is the complete formation of the global information society.

This is because today's economy is based on the operation of knowledge, and that some new economic facts have appeared, most of which revolve around increasing the trend towards technology, and the use of knowledge more than material things. A set of characteristics that characterized the economy with characteristics and characteristics that made us call it the knowledge economy, which is characterized by the following characteristics.

- It is an economy that does not suffer from the problem of scarcity in the sense of analysis, but rather an economy of resources that can be continuously increased through the increasing use of information and knowledge, and that it is an economy in which the importance and influence of the site diminishes through the appropriate use of technology and methods of the main markets, that is, through electronic means and electronic networks, which changes the traditional concept of markets.
- It is an economy in which it is difficult to apply tax laws, and customs and non-tariff restrictions by a single national state. Knowledge and information increased the demand for its products, and in return, it reduced customs and non-tariff restrictions.
- The prices of products that include a higher knowledge density are lower than those that do not use knowledge intensity or do not use it at all.
- The knowledge economy, in its essence, means that the value of knowledge itself is greater when it enters the field of operation and production systems, and on the other hand, its value becomes zero when it remains imprisoned in the minds of its owners.
- The key to value in the knowledge economy is the competitiveness of human capital.
- It is an economy that gives a central place to the systems of continuous education and training in order for the benefits of the process to be compatible with the knowledge economy, and this [ix] requires new methods of thinking and in making economic policy.

Table (1-1) Characteristics of the knowledge economy compared to the traditional economy [x]

	old economy	The new economy
	production economy	Knowledge economy
	P-economy	K-economy
field of competition	patriotism	International
markets	stable	volatile
Business movement	Low / Medium	high
The role of the public sector	prep ; Infrastructure, restrictive trade and industrial policies.	prescriptive _ Privatization Accession to the World Trade Organization, regional blocs partnership with the private sector
required skills	Job-specific skill	Comprehensive learning and multiple skills, continuous learning and practice
labor market relations	competitive	Solidarity / joint
Resource conditioning	Material resources	Informatics and knowledge resources
Policy objectives	Creating employment opportunities	Wages - high incomes
Relationship with the other establishment	Independent adventures / risks	Union and cooperation
The main source of productivity	The use of manpower for machines	More use of technology
Sources of competitive advantage	economic blocs	Renewal ,quality and cost
Growth vectors	Factor inputs (labor, capital)	Innovation ,renewal, invention and knowledge

There are many characteristics that characterize the new economy, the most important of which are the following:

- Rapid generation, dissemination and investment of knowledge.
- Increase in the global competitive environment.
- Increasing the importance and role of knowledge and innovation in economic performance and wealth accumulation.
- Trade liberalization and the increasing proportion of technology in exports.
- globalization of production.
- Increase the role of education and training as governments need to provide skilled and creative manpower or human capital capable of integrating technologies into work.
- There is a growing need to integrate information and communication technology as well as creative skills into educational curricula and lifelong learning programmes.
- ,The decline in the volume of tangible physical products (industry ,agriculture, ...) in return for services in all its forms (insurance education, research, information)
- The development of this sector is based on information, knowledge and innovation, by creating an effective system of commercial links with academic institutions and other organizations that can keep pace with the growing knowledge revolution and absorb and adapt it to local needs.
- With globalization, this sector opens up many opportunities and fields for everyone because there is no need for natural resources, as in the traditional economy
- The speed imposed by competition in this sector constitute a major obstacle to the continuity ofdevelopment.

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Third axis: the theories that explain the knowledge econom and its relationship to economic growth.

Knowledge refers to understanding, skill or competence, and it is characterized by three characteristics that have important effects on the knowledge economy. It can be used on a large scale without being exhausted with use. It is infinitely renewable, and its first owner can increase its own economic value for him by By selling or licensing it, it can also be used by a large number of individuals and in different places at the same time, and therefore we find that knowledge economies differ from other goods and services, as they are of economic value not only to their creators, but through ,their spread they can also produce economic value. For many of its users which means that the value of the total knowledge of the economy increases with the increase in its participation and use, its private value and the private return on investment in the production of knowledge is much less than the social return on that investment.[xi]

Knowledge is divided into explicit and implicit knowledge. Explicit knowledge is that which can be transferred and shared easily with others, and tacit knowledge that can only be transferred through training and gained through personal experiences. The information and communication revolution has led to a global knowledge economy through which knowledge can easily be transferred from One country to another, but that is within the framework of explicit knowledge. As for tacit knowledge, it cannot be transferred except through personal interaction. Tacit knowledge is embodied in human capital.[xii]

It can be said that knowledge flows between units or between industries take two basic forms: "embodied" and "non-embodied or abstract". Embodied flows include knowledge embodied in machinery and equipment, while non-embodied or abstract flows include the use and transfer of knowledge through scientific and technical literature . Consulting, education systems, and so on [xiii]

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Thus, the concept of knowledge differs from the concept of technology, as technology is a term that refers to knowledge associated with the development design, production, and application of products, processes, and services. Or improved processes and services through which knowledge is spread and employed within the framework of the knowledge economy.[xiv]

,Despite the use of the concept of the knowledge economy on a large scale but there is no single definition agreed upon, we find that one of the prevailing concepts of the knowledge economy and the oldest is that it is "the part of the economy involved in the production and distribution of knowledge: It was developed by Machlup Fritz(1962), and defines the knowledge economy It is also defined as "the part of the economy that includes knowledge-intensive industries" and accordingly it divides the economy into two sectors, a knowledge-intensive sector, which is the sector that relies in production on advanced technology and workers with a high level of education and skills, and a non-knowledge-intensive sector that relies on traditional production methods. And employment with a low level of education and skills.

However, the most comprehensive and widespread definition is that it is "a description of the state of the economy in which the production, use and dissemination of knowledge plays a pivotal role in the various sectors of the economy." [xv]

There are many schools of economics in the introductions to the definition of the knowledge economy to include[xvi]

The approach based on the classification of the industrial sector: where the knowledge economy is defined as that which includes knowledge-intensive industries and services that are based on the production and use of information and communication technology (ICT) or that have a high , percentage of workers with a high level of education, or both.

This definition focuses on manufacturing industries and usually uses the ,intensity of research and development as an indicator to distinguish the low medium and high technology sectors.

It is worth noting that the Organization for Economic Cooperation and Development(OECD) includes under this definition both high- and medium-technology manufacturing industries, and service industries that are ,knowledge-intensive and have high added value, such as insurance, finance communications and business   services   Of the sectors that use ICT intensively, such as the retail trade sector, as well as the energy sector.[xvii]

The occupational classification-based approach: This approach avoids the problem of the approach based on the industrial classification through its inclusion of several sectors, as it includes sectors that include a high percentage of knowledgeable workers. However, there are multiple directions to define what is meant by knowledgeable workers, as it may mean all workers. In the first three occupations according to the professional ,standard classification (managers professionals and assistant professionals) or it means all the worlds with a high skill level, which is measured by(NVQ level 4) [xviii] or equivalent qualification, and may refer to all employees who perform tasks that require experience and complex communication skills with the help of computers.

The entrance based on activities related to innovation: it identifies the sectors that fall within the knowledge economy based on the contribution of innovation-based enterprises (innovative enterprises) in output or employment, and according to the definition of the OECD, theinnovative enterprise is that which produces products or implements new or technologically improved processes.

Whatever the approach used in defining the knowledge economy, the most important and clear features of it are that it includes all sectors of the economy not just the knowledge-intensive industrial sector - in addition to the intensive and increasing use of information and communication technology by workers with high levels of education, and the percentage of the contribution of knowledge capital to the output GDP is an increasing percentage compared to physical capital.

The successful transition to the knowledge economy requires a number of elements which the World Bank described as the pillars of the knowledge economy, and together constitute the framework of the knowledge economy and are represented in the following four elements.[xix]

Economic incentive and institutional regime.

Long-term investments in education, which provide educated and skilled workers who can continually update and adapt their skills to create and use knowledge efficiently.

Developing the ability to innovate through an effective innovation system for companies, research centers, universities, consultants and other organizations that can keep pace with the knowledge revolution and take advantage of the growing stock of global knowledge and absorb and adapt it to local needs.

The existence of a modern and adequate information infrastructure that can facilitate effective communication, dissemination and processing of information and institutions that allow for the effective mobilization and allocation of resources, and stimulate creativity for the effective creation dissemination and use of knowledge.

The framework of the knowledge economy thus emphasizes that investments in the four pillars of the knowledge economy are necessary for the continuous retention adoption, adaptation and use of knowledge in local economic production, which will consequently lead to higher value-added goods and services, and this will lead to an increase in the probability of economic success, and thus economic development in The current global economy is highly competitive and globalized.

There are some concepts close to the concept of the knowledge economy, but they differ from it, including the concept of the "new economy", a concept that appeared in the nineties to describe the transformation from an economy that relies on traditional industries to an economy that relies on technology, but it also expands to focus on globalization and entrepreneurship.[xx]

Fourth axis: the theoritical framework for the relaionship between the knowledge economy and economic development in egypt.

1- Data and methodology

Model data:

Data was taken on an annually basis from 1995 until 2021 according to the availability of data for the following variables.

Dependent variable

NY.GDP.PC = GDP per capita, PPP (current international $)[xxi]

Independent variables

TX.VAL.MANF = Manufactures exports (% of merchandise exports)

TX.VAL.FOOD = Food exports (% of merchandise exports)

TX.MNF.TECH = Medium and high-tech exports (% manufactured exports)[xxii].

Discussion and results

ARDL model and discussion

The initiation of the autoregressive distributed lag (ARDL) method or Bounds test is due to Pesaran and Shin (1999)[xxiii], while its further development is due to Pesaran et al. (2001)[xxiv]. It is acknowledged as one of the most flexible methods in the econometric analysis.

The ability to host sufficient lags enables best capturing of the data generating process mechanism. This translates into that the method can be applied irrespective of whether the time series is I(0), namely stationary at levels, I(1) namely stationary at first differences or fractionally integrated. Nevertheless, within the ARDL framework, the series must not be I(2), because this integration order invalidates the F-statistics and all critical values established by Pesaran.

Furthermore, the ARDL method provides unbiased estimates and valid t-statistics, irrespective of the endogeneity of some regressors[xxv] [xxvi]. Actually, because of the appropriate lag selection, residual correlation is eliminated and thus the endogeneity problem is mitigated[xxvii]. As far as the short-run adjustments are concerned, they can be integrated with the long-run equilibrium through the error correction mechanism (ECM). This occurs through a linear transformation without sacrificing information about the long-run horizon. One other aspect is that the method allows the correction of outliers with impulse dummies and the approach distinguishes between dependent and independent variables.

Last but not the least, the interpretation of the ARDL approach and its implementation is quite straightforward[xxviii] and the ARDL framework requires a single form equation[xxix], while other procedures require a system of equations. The ARDL approach is more reliable for small samples as compared to Johansen and Juselius's cointegration methodology. Halicioglu (2007) [xxx] also mentions two more advantages of the method, which are the simultaneous estimation of short- and long-run effects and the ability to test hypotheses on the estimated coefficients in the long run. This is not done in the Engle–Granger method.

Unit root test

The first step in the ARDL analysis, is the unit root analysis. It informs about the degree of integration of each variable. To satisfy the bounds test assumption of the ARDL models, each variable must be I(0) or I(1). Under no circumstances, should it be I(2). Unit root analysis is performed with a long array of tests such as for example the augmented Dickey Fuller (ADF) and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS), the Phillips–Perron (PP), the Ng–Perron test, the cross-sectional augmented IPS-CIPS (Pesaran 2007)[xxxi], the LS (Lee and Strazicich 2003)[xxxii], and many others. Each one is more compatible with different data characteristics, but this paper will not discuss them for brevity reasons. However, it should be stressed that researchers should apply both augmented Dickey Fuller (ADF) and Phillips–Perron (PP) unit root tests to make sure that the variables are not I(2).

Unit root test for the model from 1995 to 2021

UNIT ROOT TEST TABLE (PP)				
	At First Difference			
		d(NY_GDP_PC)	d(TX_MNF_TECH)	d(TX_VAL_FOOD)	d(TX_VAL_MANF)
With Constant	t-Statistic	-5.373384602383845	-5.864466147787508	-5.321520184698853	-5.145428504058853
	Prob.	0.0002165114897655973	6.790130344803195e-05	0.0002448820934433789	0.0003700359857744933
		***	***	***	***
With Constant & Trend	t-Statistic	-5.425908398454906	-5.709380942411958	-5.296822019061933	-5.016400363489648
	Prob.	0.001045941520618726	0.0005575509257584044	0.001392988337976445	0.00258591180541475
		***	***	***	***
Without Constant & Trend	t-Statistic	-2.841694473140816	-5.477260132572475	-5.058334400875431	-5.196797792522808
	Prob.	0.006488942998000602	6.553717033410342e-06	1.921381871529679e-05	1.341046820586479e-05
		***	***	***	***

UNIT ROOT TEST TABLE (ADF)					
	At First Difference				
		d(NY_GDP_PC)	d(TX_MNF_TECH)	d(TX_VAL_FOOD)	d(TX_VAL_MANF)
With Constant	t-Statistic	-5.335870318385405	-5.775794484541955	-4.177684047285915	-5.161723311645217
	Prob.	0.0002366803282454371	8.350718022413289e-05	0.003830708620716018	0.0003559705977559944
		***	***	***	***
With Constant & Trend	t-Statistic	-5.36511780511588	-5.633353508921452	-4.063586063691954	-5.026851780372945
	Prob.	0.001197091189366181	0.0006598394706959021	0.02079527202052181	0.002526946150476791
		***	***	**	***
Without Constant & Trend	t-Statistic	-2.841694473140816	-5.477260132572475	-4.064395736178758	-5.214149890471248
	Prob.	0.006488942998000602	6.553717033410342e-06	0.0002856250920731143	1.282290359487551e-05
		***	***	***	***

Calculated by researchers using statistical data packages E-VIEWS

It is clear from the previous table that all-time series are stable at the first difference at 5% significance, which is compatible with the conditions of the ARDL model Auto regressive distributive lag model equation.

ARDL long run form and bound test.

The ARDL analysis occurs as follows: If the existence of cointegration is confirmed in Equations (1) and (2), then the long-run and the short-run models are estimated and both long and short-run elasticities are derived, namely the ARDL equivalent of the UECM (Unrestricted error correction model). Cointegration, in the ARDL bounds test approach, is examined under the following hypothesis set up:

$$H0 : a1=a2=an=0$$

$$H1 : a1 \neq a2 \neq an \neq 0$$

The setup of the hypotheses reads as follows: there is cointegration if the null hypothesis is rejected. The F-statistics for testing are compared with the critical values developed by Pesaran et al. (2001)[xxxiii]. Narayan critical values are more appropriate for small samples. Pesaran et al. (2001) provide a table enumerated as CI and entitled: "Asymptotic critical value bounds for the F-statistic. Testing for the existence of a levels relationship" in five versions. These are (i) no intercept and no trend, (ii) restricted intercept and no trend, (iii) unrestricted intercept and no trend, (iv) unrestricted intercept and restricted trend, (v) unrestricted intercept and unrestricted trend. They also provide a table CII entitled "Asymptotic critical value bounds for the t-statistic. Testing for the existence of a levels relationship" in three versions: (i) No intercept and no trend, (ii) unrestricted intercept and no trend, (iii) unrestricted intercept and unrestricted trend. Next we reproduce a part of these tables (CI-iii and CI-v) in order to explain how the decision for cointegration was made in Bölük and Mert (2015)[xxxiv] based on Pesaran tables. Note that Pesaran tables are not valid for I(2) variables (Ali et al. 2016)[xxxv]. The interested reader can find these tables in Pesaran et al. (2001).

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ARDL long run form and bound test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TX_MNF_TECH	13.08298	5.782485	2.262519	0.1087
TX_VAL_FOOD	354.6100	29.86051	11.87555	0.0013
TX_VAL_MANF	-37.69577	5.631528	-6.693702	0.0068

EC = NY_GDP_PC - (13.0830*TX_MNF_TECH + 354.6100
    *TX_VAL_FOOD -37.6958*TX_VAL_MANF)

F-Bounds Test		Null Hypothesis: No levels relationship		

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	19.13767	10%	3.47	4.45
k	3	5%	4.01	5.07
		2.5%	4.52	5.62
		1%	5.17	6.36
			Finite Sample: n=35	
Actual Sample Size	22			
		10%	3.8	4.888
		5%	4.568	5.795
		1%	6.38	7.73
			Finite Sample: n=30	
		10%	3.868	4.965
		5%	4.683	5.98
		1%	6.643	8.313

t-Bounds Test		Null Hypothesis: No levels relationship		

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-6.729722	10%	-3.13	-3.84
		5%	-3.41	-4.16
		2.5%	-3.65	-4.42
		1%	-3.96	-4.73

Calculated by researchers using statistical data packages E-VIEWS

Here the long-run equation indicates that the relationship is positive between egyptian GDP per capita and high technology exports, the F bound test indicates that the calculated F is more than the upper value of tabulated F at 1 % significance.

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ARDL Error Correction Regression (the short run)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8954.450108245555	721.8455628856661	12.4049389074985	0.001128805150372023
@TREND	887.4990315826619	71.0150410921059	12.4973388444792	0.001104325851216961
D(NY_GDP_PC(-1))	5.250960398685602	0.4427431644779501	11.860059781786	0.001288858550174613
D(NY_GDP_PC(-2))	5.546655638558703	0.4398726582974143	12.60968494842978	0.001075502979227686
D(NY_GDP_PC(-3))	3.263897741693387	0.2471535068254639	13.20595359384604	0.0009381416328678072
D(TX_MNF_TECH)	204.1591044837725	15.08095911875712	13.53754113886876	0.0008717368020018319
D(TX_MNF_TECH(-1))	-115.0010249636094	12.92207830836997	-8.899576540185505	0.002992035547824965
D(TX_VAL_FOOD)	882.571790964122	73.19199834645854	12.05830980029289	0.001227331929136702
D(TX_VAL_FOOD(-1))	-888.112091687564	64.46089167259825	-13.77753345700448	0.0008275239033193625
D(TX_VAL_FOOD(-2))	-232.3935218997048	23.88472554956725	-9.729796619074626	0.002306142848231868
D(TX_VAL_FOOD(-3))	49.14567046761188	11.81686473287724	4.158943305061056	0.02528048927871218
D(TX_VAL_MANF)	-233.1525997095715	18.70740746814892	-12.4631165545806	0.001113309296431494
D(TX_VAL_MANF(-1))	-24.33040564671245	6.148317969605626	-3.957245829996181	0.02880631120141153
D(TX_VAL_MANF(-2))	-75.41610691523649	8.439690201372685	-8.935885691985511	0.002956763327570506
D(TX_VAL_MANF(-3))	-132.2291812982439	9.634099855497436	-13.72512048676669	0.0008369208264099362
CointEq(-1)*	-5.173935608454648	0.4181494606529943	-12.37341212966024	0.0011137322243234489
R-squared	0.986547491763553	Mean dependent var		349.3771938140985
Adjusted R-squared	0.9529162211724358	S.D. dependent var		337.8718450303901
S.E. of regression	73.3141255419477	Akaike info criterion		11.58264613472068
Sum squared resid	32249.76602388281	Schwarz criterion		12.37613155534491
Log likelihood	-111.4091074819275	Hannan-Quinn criter.		11.76956744026504
F-statistic	29.33423193425584	Durbin-Watson stat		1.943618613053929
Prob(F-statistic)	0.0002300859905159728			

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F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	19.13766596667688	10%	3.47	4.45
k	3	5%	4.01	5.07
		2.5%	4.52	5.62
		1%	5.17	6.36
t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-12.37341212966024	10%	-3.13	-3.84
		5%	-3.41	-4.16
		2.5%	-3.65	-4.42
		1%	-3.96	-4.73

Calculated by researchers using statistical data packages E-VIEWS

In the error correction model the cointegration coefficient has a significance of 1% with negative sign which is compatible with the ARDL method, the coefficients of the independent variable for medium and high technology export have a significance of 1%, positive effect on level, and with a -ve sign on the first difference, which does not indicate the direction of relation on the short run but over all coeffictint of determination indicate very strong relation 0.98 that the variations occured in the independent variables expalin 98% of the variations ocuured in the dependent variable, but our convern in this research concentrates on the long run.

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Breusch–Godfrey Serial Correlation LM Test:

F-statistic	0.008066327962765788	Prob. F(1,2)	0.9366204850818922
Obs*R-squared	0.08837318404760275	Prob. Chi-Square(1)	0.766255592681546

Calculated by researchers using statistical data packages E-VIEWS

In the Heteroskedasticity Test: Breusch-Pagan-Godfrey the significance of F- statistics stands at 0.93 so we can deny the null hypothesis, so there is no homoscedasticity problem.

Cusum test
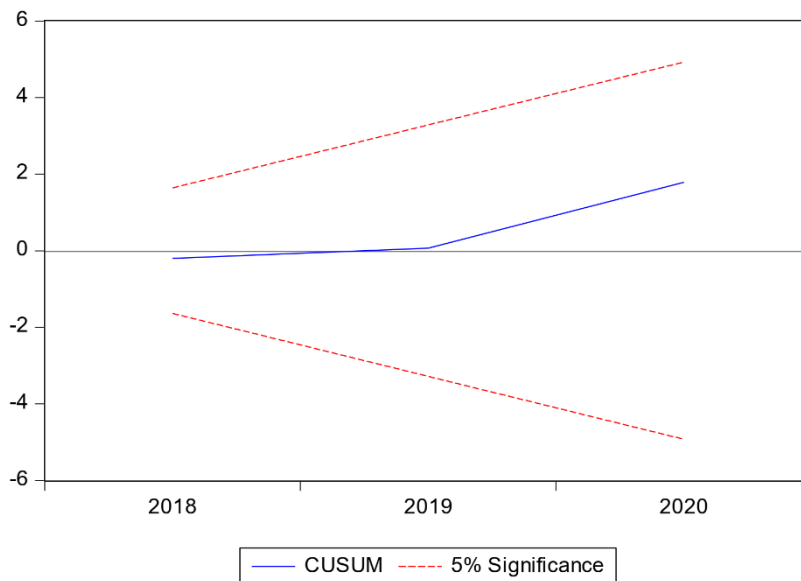
Calculated by researchers using statistical data packages E-VIEWS

The previous figure indicate that the blue line appears between the two red lines of the 5% significance which are compatible with ARDL method.

Discussions

Despite the positive results of the impact of the knowledge economy on the gross domestic product per capita, the Egyptian state alone cannot move forward with steady steps towards the knowledge economy and industrialization based on the knowledge economy, due to the large number of interventions and conditions dictated by the International Monetary Fund that prevent access to industrialization. It is characterized as knowledge industrialization, as developing countries toil in poor industries from the component of the knowledge economy, unlike developed countries that delve into heavy, capital-intensive and technology-intensive industries, and they transfer technology without being prevented, such as China, while developing countries cannot transfer technology because It is forbidden to do so due to its weakness, so it is necessary to benefit from the fruits of international cooperation and enrich the idea of the knowledge economy on the basis that cooperation is no longer an option in light of the prevailing global conditions, so cooperation has become the last resort and the only resort to succeed in excelling in the knowledge economy, but without that the state will remain idly by. Due to external pressures and the influences of countries that benefit from the people of developing countries, and their industries are based on importing raw materials from developing countries and returning them in the form of manufactured goods within the framework of the knowledge economy.

Conclusion

The results indicated that the GDP per capita is in a positive relationship with medium and high-technology exports on the long run. The higher the medium and high-technology production, the greater the matter will lead to a large increase in the gross domestic product per capita, due to the ability to division of labor in these industries, unlike the industries that were sprayed by the old colonialism. The new colonalization that Kwame Nkrumah spoke about, since modern countries specialized in the production and export of high-tech goods, so these countries won the largest gains, and the developing countries could not keep pace with this production at home because of the foreign pressures resulting from the involvement of developing countries in loans and their need to borrow from the Monetary Fund, the international community,

in turn, did not hesitate to impose requirements on small countries to influence them and prevent them from producing medium and high-technology exports, and to establish the principle of developing countries working in raw materials and exporting raw materials without converting the raw material into a finished product for the final consumer, and therefore the time has come to transfer technology From the outside to the inside of the Egyptian country, benefiting from the knowledge economy, and benefiting from the international bipolarity at the present time The economy is characterized by high-tech industries.

We argued that the Egyptian state could reach a better position by changing the industrial structure by entering modern industries to improve its competitive position. The market will gradually become open to speed. There must be modern industries that are in demand internationally. It is necessary to delve into the modern automobile and electrical industries, and other technological industries as electronics and computers to enter the global competition, for which the flotation was a door, it is necessary to improve the quality of local industries, encourage the private sector, stimulate shareholding companies, and direct the industry by the state to go to modern competitive industries.

It is the state's tendency to encourage exports, not any exports, but exports with higher value and higher technology, because the market has become open to its speeds, and the stronger is the one who exports the most value-added and technological commodities.

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دور اقتصاد المعرفة في تحفيز النمو الاقتصادي في مصر من عام ١٩٩٥ حتى عام ٢٠٢١

مستخلص

عانت الدول النامية من تأثير الدول المتقدمة عليها كلما أرادت ان تخطو خطوات في اتجاه اقتصاد المعرفة، مما أدى إلى اتساع الفجوة بين الدول المتقدمة والدول النامية، لقد تطورت المعرفة في كل أنحاء العالم، ومصر لديها الأرض المناسبة للتطور، وتتميز الدولة المصرية بثرواتها السكانية التي تسمح للقوى العاملة والتخصص في العمل بإنتاج منتجات عالية التخصص ومعرفة عالية، وقد تم تقسيم البحث إلى أربعة محاور، المحور الأول: الإطار النظري لاقتصاد المعرفة، المحور الثاني: خصائص اقتصاد المعرفة، المحور الثالث: النظريات التي تفسر اقتصاد المعرفة وعلاقته بالنمو الاقتصادي، المحور الرابع: الإطار النظري للعلاقة بين اقتصاد المعرفة والتنمية الاقتصادية في مصر.

وتبين لنا أن هناك علاقة إيجابية بين التنمية واقتصاد المعرفة، ولكن الدولة المصرية وحدها لا تستطيع المضي قدما بخطوات ثابتة نحو اقتصاد المعرفة والتصنيع على أساس اقتصاد المعرفة، فيكمن السر في التعاون.

الكلمات المفتاحية: اقتصاد المعرفة، الاقتصاد الدولي، الاقتصاد الكلي، صادرات التكنولوجيا العالية، السياسات الاقتصادية.

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