



The Impact of Circular Economy on Sustainable Development (Applied on Egypt)

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Abstract

The main objective of this study is to investigate the impact of Circular Economy (CE) on Sustainable Development (SD) in Egypt and also analyze the indicators of sustainable development and circular economy in Egypt by conducting theoretical review, descriptive analysis of the variables then study the relation between them through econometric model in order to detect the impact of Circular Economy on Sustainable Development in Egypt. Depending on Co-integration using bounds test based on Autoregressive distributed lag (ARDL). The results show that the concept of Sustainable Development is an interaction between economy, society and environment. Also the Circular Economy promotes the notions of cycles where nothing is waste out by depending on processes like recycling, reusing and reducing and it's necessary to integrate the Circular Economy strategies from the beginning during designing process. The study also shows there is positive relation between circular economy and sustainable development in general. The value of R2 IS 93.2% this mean 93.2% of the changes in Sustainable Development are due to Circular Economy. There are negative tendencies, and the equation constant is negative, and this means that the value of genuine saving that express the Sustainable Development is negative which means this negative value erodes the development's outcomes that resulted from the application of Circular Economy strategy in Egypt.

Keywords: Sustainable development, Circular Economy, Linear Economy.

1. Overview

In the face of resource depletion, population growth and environmental disturbances, the call for a new economic model become louder. The linear model of resources consumption, based on the **“take-make-consume-dispose”** pattern, does not appear to be sustainable as it depletes the natural capital and pollutes the environment, along societal issues like high unemployment and poverty trap and the economic challenges like financial and economic instability and others. It is an unsustainable path of consumption and production in which resources turned into waste and ends up to landfill, so the need for more sustainable system become urgent.

In addition to the global crisis that the whole world faces the covid-19 pandemic, the pandemic spread over the world and also highlighted the weakness of the linear system. It restricted the movements and activities in countries and between them this in turn affected the economy. After recognizing the shortcomings of this system and its risks on the world and economic recession that the countries face in this crisis, the governments and the civil societies paying more attention for these global challenges and put solutions to solve it.

“To give an indication of the magnitude of this problem, recent studies suggest that the world’s cities generate about 1.3 billion tonnes of solid waste per year, which will increase to 2.2 billion tones by 2025, resulting in an annual cost of \$205.4 billion today and an estimated cost of \$375.5 billion in 2025” (Masi D. et al, 2017).

In Egypt, the total size of sewage was estimated to reach about 147.8 million tons in 2010. In the same year, the houses garbage was about 13.8 million tons which equivalent to 475 grams per capita Daily. Also, the total medical waste was about 3.4 million tons in the same year (information and decision support center, 2012).

The concept of sustainable development embraced by governments, big business and environmental activities it is an intersection between environment, society and economy. The classic definition of sustainable development is "**meeting the needs of present without compromising the ability of future generations to meet their needs**". This concept was produced in the Brundtland report (WCED, 1987). In line with the 2030 Agenda, the Egyptian Government has launched a working plan called Egypt's Vision 2030, also known as Sustainable Development Strategy (SDS), which encompasses the economic, social and environmental dimensions of development.

To address the problem of wastes and these sustainability issues there is new concept "**the Circular Economy**" that recently has attraction by scholars and policy makers despite it isn't entirely new. The starting idea of circular economy has been to change linear economic system depending on renewable energy using lower resource and low waste of natural capital. The circular economy promotes the notions of cycles where nothing is wasted but goes around in closed loops (Berndtsson, M., 2015).

The European economic forum and Ellen MacArthur Foundation reported the circular economy would save 1\$ trillion in 2025 and generate 100.000 new jobs in five years. According to European negotiators, the circular economy would reduce carbon emissions by about 45 tons per a year (Ellen MacArthur,

2015). It considers a potential solution that creates synergies between economic growth and environment (Masi, D. et al, 2017).

Before the covid-19 the call for promoting Circular Economy is to flourish the economy without damaging the environment and less depend on non-renewable energy and virgin raw material. Aftermath of the pandemic, it is becoming crucial to work for reactivating the economy and turned it from merely a reacting economy during the crisis to the one that is address and mitigate the future crises.

In This thesis, we will study the relation between the circular economy and sustainable development and examine the impact of the circular economy on sustainable development in Egypt.

2. Research question

What is the impact of implementing circular economy on SD in Egypt?

3. Literature review:

1-Information technology and systems in China's circular economy (Implications for sustainability)

Joseph Sarkis, Hanmin Zhu, (2008)

The purpose of this paper is to focus on the developing circular economy (CE) policy within China and its relationship to China's information technology (IT) and IT products industry. It provides a framework to understand the role CE plays in sustainability at many levels within China.

This paper provides a review of the literature and practice in China various information sources including Chinese publications are used to further

develop the framework and provide exemplary activities fitting within this framework.

If The CE program for IT is to work, this needs to be co-operation at multiple levels of analysis. A proposed governmental policy can greatly influence sustainability in the IT industry.

2-Circular economy practices among Chinese manufacturers varying in environmental-oriented supply chain cooperation and the performance implications

Qinghua Zhu, Yong Geng, Kee-hung Lai (2010)

The study investigate if the Chinese manufacturer types varying in enterprises on environmental-oriented supply chain cooperation (ESCC) differ in their implementation of the CE practices towards achieving the CE-targeted goals on improving both environmental and economic performance.

To test whether the circular economy (CE) practices are positively associated with the manufacturer types implementing ESCC practices at higher levels, multivariate analysis of variance (MANOVA) has been used. And to determine if the manufacturer types are distinct in terms of implementing CE practices, the Scheffe's method as poshoc tests of significance has been applied to examine the differences among the four manufacturer types.

The empirical results show that ESCC practices have been implemented at different levels among the sample Chinese manufacturers. Both CE practices and CE-targeted performance are positively associated with manufacturer types implementing ESCC practices at higher levels. This study lays a solid

foundation for several environmental management issues to be answered by future research. The empirical results confirm the benefit of a “win-win” solution to balance economic development with environmental protection. There can be additional merits for a broadened “win-win-win” solution by integrating social aspects such as improved livelihoods and more employment opportunities in carrying out the CE strategy in China.

3- Empirical Analysis of Regional Circular Economy Development--Study Based on Jiangsu, Heilongjiang, Qinghai Province

Jiang Guo-gang (2011)

This paper assesses evaluation system to develop regional circular economy in three provinces and indicate especially the characteristics of resources recycling process.

It used fuzzy comprehensive evaluation method in each single region, as well as the Comparison Evaluation Method to analyse the development of circular economy in various regions.

This paper proposed evaluation index system which include four categories “**resources consumption, environmental disturbance, recycling and social development and 16 indicators**” in order to enhance the evaluation of the development of circular economy.

4-Circular Economy and Sustainable Development

Malou Berndtsson(2015)

This thesis aims to contribute with new academics knowledge within the field of Circular Economy (CE). It is doing so by exploring the concept of CE

in relation to SD and seeks to understand the possible contribution of CE in the creation of a more sustainable system within the planetary boundaries.

The research`s methodological approach begin with discussion of the nature of the problem by identifying what is to be studied in order to define how to study in sustainable way. The next step describe the methods for collecting secondary data through literature reviews and primary data through two types of interviews have initial unstructured interviews and later 6 semi-structured interviews. Both of these methods are typically seen as qualitative methods.

The thesis concludes that CE is building on existing concepts but with new implementation and more of a business target group. It also concludes the importance of keeping sustainability as a goal and of business initiatives for CE to be supplemented with policy instruments.

5-Sustainable Supply Chain Management and the transition towards a Circular Economy:

Evidence and some Applications

Andrea Genovese, et al, (2015)

The study has investigated the environmental implications related to the implementation of circular production systems, providing a comparison with traditional linear production alternatives. It also examines a potential enhancement of sustainable supply chain management practices by aligning them to circular economy concepts.

The analysis was formulated using a Hybrid LCA methodology, combining both process LCA and the environmentally extended multi-regional input-output (MRIO) hybrid model.

The paper asserts that an integration of circular economy principles within sustainable supply chain management can provide clear advantages from an environmental point view. More relevant environmental indicators could be considered in order to perform the comparison between linear and circular systems. Bottom-up initiatives at a supply chain level might need to be incentivized through some form of top-down governmental support.

6- The Circular Economy a New Sustainability Paradigm?

Martin Geissdoerfer , Paulos Savaget ,et al ,(2016)

The research addresses the gap between circular economy and sustainability and aims to provide conceptual clarity by distinguishing the terms and synthesizing the different types of relationships between them.

To answer the research questions different methodologies were employed. Firstly, a bibliometric research is conducted; a well-established form of meta-analytical research of literature a bibliometric review was thus conducted to identify the articles that describe both sustainability and the Circular Economy, while also revealing the most cited authors, keywords mentioned, and the journals in which they were published. Snowballing techniques are conducted also to investigate the state of the art in the field and synthesize the similarities, differences and relationships between both terms.

This paper provides an overview of the most relevant similarities between sustainability and the Circular Economy and found that the Circular Economy is viewed as a condition for sustainability, a beneficial relation, or a trade-off in literature.

7- Circular economy and sustainable rural development. Theory and best practice: a challenge for Romania

Adriano Ciani, et al (2016)

The paper tries to demonstrate that the success of the Strategy of SD depends in the next years on the application of the best practices of the Circular Economy.

The paper use inductive model, figures and analysis implementation of circular economy can lead not only on a reduction of waste and hence environmental impacts but also on net savings for businesses of up to 604 billion Euros throughout the European Union, in line with the global framework (SD Goals 2015- 2030).

The agricultural sector special in Romania could be transformed by the nowadays weakness in the strong point for the future innovative development of the Country. This to achieve the target of the harmonization of the model of development in a very innovative identity way represented by the Smart Communities and Smart Lands.

8-Environmental sciences, Sustainable Development and circular economy: Alternative concepts for trans-disciplinary research

Sébastien Sauvé, Sophie Bernard, et al (2016)

This paper explores three alternative concepts that relate to the protection of the environment – environmental sciences, SD and circular economy. It clarifies and contrasts the underlying premises of each concept, and to identify how they can be applied as a means of addressing contemporary environmental challenges.

It is not useful to try to compartmentalize the three concepts, or to argue that one is inherently better than another. SD is the end goal, and environmental protection is a subsidiary goal. The potential for confusion is certainly present and further exacerbated because in many disciplines, SD is a sub-area of environmental sciences rather than the other way around.

The circular economy concept is gaining momentum because it is giving a clear angle of attack to help solving environmental problems. Environmental sciences, SD, circular economy and, indeed, other terms are all important to finding solutions for a better environment.

9-Towards a more Circular Economy: Proposing a framework linking sustainable public procurement and sustainable business models

Sjors Witjesa, Rodrigo Lozanoa(2016)

This paper addresses the link between procurement and supply practices, and proposes changing from a traditional public procurement process, based on product-selling business models, to a more service oriented system. It proposes a framework to include technical and non-technical specifications of product/service combinations that improve resource usage efficiency through recovery

The study uses analytic induction, which is concerned with generating and providing an integrated, delimited, universally applicable theory of the causes accounting for a specific behavior (here, the contribution of the collaboration between procurement and business models to CE). Two types of theory can be generated: (1) Substantive, developed for a substantive or empirical area of inquiry, and (2) Formal, developed for a formal or conceptual area of inquiry.

The latter is more appropriate for the objectives, and addressing the research questions, of this paper.

This research proposes that collaboration between procurers and suppliers can lead to reductions in raw material utilization and waste generation, whilst promoting the development of more sustainable business models, thus better contributing to making societies more sustainable.

10- Analysis of the relations between circular economy and sustainable development goals

J. M. Rodriguez-Anton a, L. Rubio-Andrada b, M. S. Celemín-Pedroche a and M. D. M. Alonso-Almeida a, (2019)

This paper aims to indicate if there is significant relationship between the EU's initiatives regard circular economy and SDGs, whether there are groups of countries are of compliance with the SDGs and achieve similar results.

It used exploratory factor analysis, correlation analysis and a cluster analysis. The paper found that all countries that are of compliance with SDGs.

This study asserted that there is relationship between CE and SDGs and also asserted the ability of EU to achieve SDGs and make the economy more circular. It also concludes there are countries that are homogenous in achieving SDGs because of many aspects like geographic and political aspects.

The summary of the literature reviews:

The previous studies involved the relation between CE and SD and provide that there are relevant similarities between SD and CE; it found CE is important condition to SD. It also concludes that the concepts of CE are

building on existing concepts and processes. It also asserts the importance of CE and integrates its principles in the sustainable supply chain and also its benefits in balancing economic development with environmental protection. The studies also provide the relation between CE and SDGs and the role of geographic and political aspects in some countries that enable them to follow the CE principles besides indicating that some variables that exist in one country not exist in other so, not all variables are suitable for all countries.

4. Research importance

Within a circular economy, products and resources are meant to cycle through the economy many times through recycling, reusing and reducing, which means less waste and more opportunities to sell and resell a product. If a company recycles its own parts and generates its own supply of renewable energy, it becomes more self-sufficient, resilient, competitive, and usually more profitable. The importance of the study comes from the importance of the circular economy and its impacts on Egypt economy and on SD in Egypt.

5. Research objective

This research aims to study:

1. The circular economy and its variables.
2. The circular economy in Egypt.
3. The relation between circular economy and SD.
4. The impact of applying circular economy on SD in Egypt.

6. Research hypothesis:

The main hypothesis:

The circular economy has a Positive effect on SD in Egypt.

The sub-hypothesis:

1. Annual Freshwater Withdrawals for Industrial purposes has a positive effect on SD in Egypt.
2. Annual Freshwater Withdrawals has a positive effect on SD in Egypt.
3. Energy consumption has a positive effect on SD in Egypt.
4. Industrial waste water discharge rate has a positive effect on SD in Egypt.
5. Household waste treatment rate has a positive effect on SD in Egypt.
6. Total treated waste water has a positive effect on SD in Egypt.
7. The volume of recycled solid waste has a positive effect on SD in Egypt.
8. Coverage rate of recycling networks for the total Waste has a positive effect on SD in Egypt.

7. Research methodology:

In order to measure the impact of circular economy on sustainable development, the applied study depended up on the Egypt's time series data from 1990 to 2019 issued by:

- Central Agency for Public Mobilization and Statistics.
- World Bank
- Ministry of Environment
- Information and Decision Support Center

1. Describing the variables

The study uses the circular economy as independent variable expressed by 8 variables which are: Annual Freshwater Withdrawals for Industrial purposes

(AFWI), Annual Freshwater Withdrawals (AFW), Energy consumption (EC), Industrial waste water discharge rate (IWD), Household waste treatment rate (HWT), Total treated waste water (TTW), The volume of recycled solid waste (VRSW) and Coverage rate of recycling networks for the total Waste (CRRNW).

And on the other side it uses the genuine saving (Net Adjusted Saving) as a percentage of GDP as an indicator for sustainable development(Aidt,2010).

1.1. Circular Economy (independent variable)

$$CE = F (AFWI, AFW, EC, IWD, HWT, TTW, VRSW, CRRNW)$$

1.1.1. Annual Freshwater Withdrawals for Industrial purposes (AFWI)

It expressed by (X_1), it represents the volume of freshwater that used in industrial purpose; it is a percentage of total cubic meters of used freshwater annually.

1.1.2. Annual Freshwater Withdrawals (AFW):

It expressed by (X_2), it represents the total volume of freshwater used for all purposes; it is estimated by billion cubic meters.

1.1.3. Energy consumption (EC):

It expressed by (X_3), it represents the average per capita energy consumption during a year. It is estimated by kilowatt/hours (i.e. the average per capita energy consumption within one hour).

1.1.4. Industrial waste water discharge rate (IWD):

It expressed by (X_4) it represents the percentage of treated water to the total water used in industry (percentage of the total industrial waste water).

1.1.5. Household waste treatment rate (HWT):

It expressed by (X_5). It represents the volume of treated household waste whether by disposal or recycling (percentage of total waste).

1.1.6. Total treated waste water(TTW):

It expressed by (X_6), it represents the total treated waste water and rains (by billion square meters).

1.1.7. The volume of recycled solid waste (VRSW):

It expressed by (X_7). It represents the volume of recycled residuals from manufacturing and consumption (million tons).

1.1.8. Coverage rate of recycling networks for the total Waste (CRRNW)

It expressed by (X_8).It is a percentage of recycled materials to total waste whether it industrial, consumption or treated waste water and rains.

1.2. Sustainable development (Dependent Variable)

1.2.1. Genuine Saving (Adjusted Net Saving)(%GDP)

It expressed by one variable which is the genuine saving Adjusted Net Saving as a percentage of Gross Domestic Product (GDP). It expressed by (Y), it represent sustainability indicator through evaluate the changes in natural resources, type of the environment and human capital. The negative genuine saving rates means the total wealth is decreasing and the applied policies leads to negative genuine saving and not sustainable and vice versa. So the genuine saving has advantage in presenting the environmental and resources issues (Ibrahim, 2010 p 69, 72).

So the regression model can be rewritten as following:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + e$$

	X1	X2	X3	X4	X5	X6	X7	X8	Y
Mean	7.069637	71.49490	1270.519	31.75759	25.73795	73.05549	15.02406	12.18256	7.945470
Median	6.677583	71.44550	1226.118	33.57364	26.41919	75.82371	16.41176	12.84168	7.859506
Maximum	10.87293	94.44031	2291.681	45.63590	33.53180	103.0360	20.45434	14.39914	19.65216
Minimum	4.442256	57.03000	677.8188	19.73027	15.98654	53.26548	7.067609	8.694804	1.044221
Std. Dev.	1.527224	10.89566	465.8944	8.796062	4.965447	12.47644	4.258455	1.810107	4.628138
Skewness	0.852007	0.234065	0.421548	-0.122039	-0.396480	0.471701	0.454082	-0.521378	0.469438
Kurtosis	3.205059	1.942593	2.176867	1.517298	2.222819	3.216934	1.855005	1.898886	2.911516
Jarque-Bera	3.682138	1.671569	1.735448	2.822475	1.540994	1.171333	2.669718	2.874739	1.111648
Probability	0.158648	0.433534	0.419906	0.243841	0.462783	0.556735	0.263195	0.237552	0.573600
Sum	212.0891	2144.847	38115.58	952.7276	772.1384	2191.665	450.7218	365.4769	238.3641
Sum Sq. Dev.	67.63995	3442.745	6294669.	2243.750	715.0144	4514.185	525.8988	95.01819	621.1703
Observations	30	30	30	30	30	30	30	30	30

Data Descriptive analysis

3. Correlation

Correlation is an important way to measure and define the relation between two variables and it is denoted by the symbol (R).

Its value is between (1) and (-1), the positive value expresses the positive relationship, while the negative value expresses the negative (inverse) relationship and zero means there is no relationship. The correlation value increases as the value of its parameter increases without taking the sign into account, whereas the correlation strength with the value of (1) is the same as

the correlation strength with the value of (-1) but with different direction of the relation.

Table (2) correlation

	X1	X2	X3	X4	X5	X6	X7	X8	Y
X1	1.000000	0.285689	0.747930	0.613857	0.697864	0.719426	0.620375	0.603687	-0.677528
X2		1.000000	0.526727	0.463592	0.276492	0.387874	0.299952	0.276294	-0.334189
X3			1.000000	0.971537	0.950271	0.968105	0.941543	0.931994	-0.868339
X4				1.000000	0.964584	0.945640	0.982174	0.977903	-0.874220
X5					1.000000	0.956206	0.987566	0.985423	-0.897430
X6						1.000000	0.934766	0.928939	-0.861605
X7							1.000000	0.999462	-0.891236
X8								1.000000	-0.883329
Y									1.000000

The researcher introduces the correlation relation between circular economy and sustainable development and its indicators:

- A.** R value between X5 that express Household waste treatment rate (HWT) and the genuine saving is -0.897430 this means there is strong negative correlation between the two variables and this inconsistent with the economic theory.
- B.** R value between X7 that express the volume of recycled solid waste (VRSW) and the genuine saving is -0.891236 this means there is strong negative correlation between the two variables and this inconsistent with the economic theory.
- C.** R value between X8 that express the Coverage rate of recycling networks for the total Waste (CRRNW) and the genuine saving is -0.883329 this means there is strong negative correlation between the two variables and this inconsistent with the economic theory.

- D.** R value between X4 that express the Industrial waste water discharge rate(IWD) and the genuine saving is -0.874220 this means there is strong negative correlation between the two variables and this inconsistent with the economic theory.
- E.** R value between X3 that express the energy consumption and the genuine saving is -0.868339 this means there is strong negative correlation between the two variables and this inconsistent with the economic theory.
- F.** R value between X6 that express Total treated waste water(TTW) and the genuine saving is -0.861605 this means there is strong negative correlation between the two variables and this inconsistent with the economic theory.
- G.** R value between X1 that express Annual Freshwater Withdrawals for Industrial purposes (AFWI) and the genuine saving is -0.677528 this means middle negative relationship between the two variables, while R value between X2 that express Annual Freshwater Withdrawals (AFW) is the weakest it is -0.334189 and there is negative correlation and this also inconsistent with the economic theory.

So we found that the relation between the dependent variable and all the variables that express the independent variable is inverse relation, and this is opposite to what formulated in the economic theory. This may return to the low level of sustainable development during the period of the study. so the researcher found it is unique state of the economy and he recommend modifying sustainable development strategy to be consistent with hopes of the future and investing the available opportunities of the Egyptian economy.

Results and Recommendations

Results:

Most important results and recommendations of studying the impact of CE on SD in Egypt during the period from 1990 to 2019 can be summarized as follows:

- 1- The concept of SD has great momentum more than the past and all countries seek to achieve SDGs.
- 2- The concept of CE is built upon existing notions like recycling, reusing and reducing but still need developing and expanding its strategies in all production and consumption patterns.
- 3- It's necessary to integrate the circular economy strategies from the designing process by intention in order to manufacturing products that have the ability to recycled and reused many times during its life cycle.

From analysing the data:

From analysing the data it is found that the indicator of SD (Genuine Saving) is downward in general during the period of study and also the aforementioned CE's variables are generally upward.

From the econometric analysis of the impact of CE on SD in Egypt It's found that:

By making the necessary steps to extract the equation, the estimated equation to study the effect of CE on SD is as follows:

$$Y = -163.759172591 + 0.136139499447 * Y_{(-1)} - 0.400517938199 * X_1 + 0.105792558098 * X_2 + 0.0147979357838 * X_3 + 0.354761840925 * X_4 + 0.49488264233 * X_5 - 0.306079394862 * X_6 - 13.8022733753 * X_7 + 28.9747289209 * X_8$$

First, we notice that the value of R is positive, which means that the correlation relationship between the two variables is positive relationship and it is also a measure of the amount by which SD changes when the CE variables change by one unit and this result is consistent with the economic theory and this is what was reached in the previous part of this chapter.

And we find that the value of $R^2 \approx 0.93$ and this expresses the percentage that the independent variable plays in explaining the changes that occurs in the value of dependent variable.

We find that, the value of R^2 is a high value, so it can be said that the interpreted variable is almost responsible for most of the changes that occur to the dependent variable, and this means that approximately 93.2% of the changes in SD are due to CE.

It also possible to judge the significance of the model parameters through the value of the probability of error of the first type and since the value of probability is less than 5%, the null hypothesis is rejected at the level of significance of 5%, meaning that the equation of the estimated model differs significantly from zero, as for indicators of the model are all significant at level of 10%, expect $Y_{(-1)}$, which expresses the dependent variable(SD), but with one lag , but this relationship has no effect or meaning.

- Relationship analysis:

- (Y) is affected by the positive tendencies of the following variables:
- ($Y_{(-1)}$, X_2 , X_3 , X_4 , X_5 , and X_8)
- (X_1)(X_6), (X_7) are negative tendencies, and the equation constant are negative, and this means that:

The basic value of the variable Y, which expresses sustainable development -163.759172591 and this means this negative value erodes

the development's outcomes that resulted from the application of the circular economy strategy in Egypt.

Recommendations

- 1- Accelerating CE requires cooperation on both national and international levels. On the international level it's important to all countries to hold world forums about how synergies all efforts and exchange technologies and information in order to apply CE strategy in all levels.
- 2- it's necessary to impose regulations policy on producers and consumers in order to make circular economy more feasible.
- 3- This also requires more investments for searches in this field. On the national level in Egypt it is necessary to co-operate the government with all the society and also private and public sector.
- 4- it's important to take into account the geographical aspects and encourage companies to interconnected with each other and concentrates on consumers' needs
- 5- Awareness and incentives are necessary for people in order to change their consumption pattern and encourage circular products from beginning to save energy and resources.
- 6- for achieving sustainable development this requiring more investments and supporting from governments and developed countries for the less developed in many fields like infrastructure and creating tight relationships between private industries and also creating new opportunities for supply and demand that help in encouraging investments without exceeds the rights of the future generation and this in turn leads to development.

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ملخص الدراسة

تهدف الدراسة الي معرفة أثر الاقتصاد الدائري على التنمية المستدامة في مصر خلال الفترة (1990:2019) وكذلك تحليل مؤشرات التنمية المستدامة والاقتصاد الدائري في مصر من خلال العرض النظري والتحليل الوصفي للمتغيرات ثم دراسة العلاقة بينهما من خلال الأسلوب القياسي لمعرفة أثر الاقتصاد الدائري على التنمية المستدامة في مصر. اعتمدت الدراسة علي اختبارات التكامل المشترك (co-integration) باستخدام منهج اختبار الحدود المبني على الانحدار الذاتي لفترات الابطاء الموزعة (ARDL). وقد توصلت النتائج إلي أن مفهوم التنمية المستدامة هو تفاعل بين الاقتصاد والمجتمع والبيئة و أن الاقتصاد الدائري يعزز مفاهيم الدورات التي لا يتم فيها التخلص من أي شيء من خلال الاعتماد على عمليات مثل إعادة التدوير وإعادة الاستخدام والتقليل من الفاقد ومن الضروري دمج استراتيجيات الاقتصاد الدائري من البداية أثناء عملية التصميم. كما اظهرت الدراسة أن هناك تأثيراً ايجابياً للاقتصاد الدائري علي التنمية المستدامة بشكل عام. وأن قيمة R^2 93.2 %، مما يعني أن 93.2% من التغيرات في التنمية المستدامة ترجع إلى الاقتصاد الدائري . هناك ميول سالبة ، وثابت المعادلة سالب ، وهذا يعني أن قيمة الادخار الحقيقي الذي يعبر عن التنمية المستدامة سالب ، وهذه القيمة السلبية تأكل من ثمار التنمية التي نتجت عن تطبيق استراتيجية الاقتصاد الدائري في مصر .

الكلمات المفتاحية: التنمية المستدامة، الاقتصاد الدائري، الاقتصاد الخطي.