

فرضية النمو الاقتصادي الذي تقوده السياحة والعلاقة بين إيرادات السياحة الدولية والنمو الاقتصادي في المملكة العربية السعودية

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الملخص

السياحة الدولية تعتبر من الخدمات الأساسية في الاقتصاد العالمي، وتسهم بشكل إيجابي في الاقتصاد من خلال توفير العملة الصعبة، وخلق فرص العمل، وزيادة تراكمات رأس المال المادي. تبحث هذه الدراسة في العلاقة بين إيرادات السياحة الدولية (ITR) والنتائج المحلي الإجمالي في المملكة العربية السعودية واختبارات فرضية النمو الاقتصادي التي تقودها السياحة (TLEG) وذلك من خلال استخدام سلسلة زمنية لتحليل سببية جرانجر. وقد وجدت هذه الدراسة أدلة كافية تثبت أن للسياحة الدولية تأثير إيجابي وهام إحصائياً على النمو الاقتصادي في المملكة العربية السعودية، مما يؤكد ما ذهب إليه الافتراضات النظرية لفرضية TLEG ونتائج الدراسات التجريبية السابقة. كما أن نتائج هذه الدراسة تتفق مع فرضية TLEG من خلال ما أثبتته من وجود علاقة إيجابية بين الإيرادات الدولية للسياحة ITR والنتائج المحلي الإجمالي الحقيقي. كما أكدت هذه العلاقة نتائج مرونة الإيرادات الدولية للسياحة ITR والتي تم تقديرها بـ 0.56، مما يشير إلى أن زيادة 1% في إيرادات السياحة الدولية ستؤدي إلى زيادة في النمو الاقتصادي بنسبة 0.56% تقريباً على المدى القصير.

الكلمات المفتاحية: النمو الاقتصادي، سببية جرانجر، السياحة التي تقود للنمو الاقتصادي

**The impact of reverse logistics practices on the organization's
environmental performance
(An applied study)**

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Abstract

This research aims to identify the reverse logistics practices that actually applied in the Egyptian business organizations in general, and business organizations within the industrial goods, services and automobiles sector in particular, and the extent of the application, besides measuring the degree of impact of the application of those practices on the environmental performance of the organizations under study.

The analytical and descriptive approach has been used, and a field study was conducted using questionnaires as a key tool for collecting the primary data of the research. Moreover, a complete census method for determining number of observations from managers of the three administrative levels (top, middle, and direct) of the eleven organizations under study was used, where the number of collected observations were 289 observations.

The results of the research showed that there are no statistically significant differences between the points of views of the sampling units regarding the application of reverse logistics practices in the organizations under study, as managers in the top, middle and direct management pointed out that the practices are in the final planning phase and about to be applied. The results of the research also showed that the reverse logistics practices have a significant impact on the environmental performance of the organizations under study.

Keywords: Reverse Logistics, Forward Logistics, Environmental Performance.

1. Introduction

The environment of business organizations during the last two decades has witnessed rapid successive changes, the most notably is the phenomenon of globalization, industrial and technological progress, and excessive consumption of natural resources. These changes have caused environmental degradation due to the consumption of huge amounts of natural resources, fossil fuels, air, in addition to wasteful water and consumption of energy and generation of solid waste (Nunes & Bennett, 2010; Demirci, 2014).

These changes and the resulting challenges for business organizations besides world's interest to preserve the environment and eliminate practices that have negative impact on it have led to the emergence of the reverse logistics as a development of the traditional forward logistics. Those reverse logistics are considered as one of important practices of the supply chain that based on turning used products/ materials from point of consumption to the point of manufacturing.

They are vital for manufacturing organizations to be competitive in today's market conditions (Sari, & Yanginlar, G. (2015) as the objectives of reverse logistics are to save natural resources and raw materials, protect the environment from pollution through eliminating unused wastes or maximizing the value of unused elements (either by recycling, remanufacturing, or reselling ...etc.) and reduce costs associated with environmental laws violation (Rao & Holt, 2005, Islam et al., 2017).

2. Research problem

The research problem can be indicated through the following negative phenomena:

1. According to Environmental Performance Index, Egypt's rank in the Environmental Sustainability Index for 2018 is 66 out of 180. This gives an indicator that Egypt suffers from high levels of pollution, misuse of resources and lack of environmental protection, especially in the Egyptian industrial environment.
2. According to National Solid Waste Management Programme in 2019, the volume of municipal solid waste in Egypt amounts to around 21.1 million tons per year, and the current expansion in services and infrastructures cannot keep pace with these rates in wastes.
3. With regard to the study sector in particular, it relies on a group of feed industries, and these industries are not available locally, which led to the import of more than 50% of spare parts, that are not subject to quality specifications (Gomaa, 2018; Askar, 2018).
4. According to Ministry of Trade and Industry 2016, the feeding industries of that sector suffers from typically weak capability in technical product design and development (incl. energy efficiency) in addition to the lack of adherence to required standards.

Through the previous negative phenomena, it can be concluded that the problem of the research represented in answering the following questions:

Q1: To what extent is the application of the reverse logistics practices within the industrial organizations operating in the Egyptian business environment?

Q2: Are there significant impacts of reverse logistics practices on the environmental performance within industrial organizations operating in the Egyptian business environment?

3. Research Objectives

This research aims to achieve the following objectives:

1. To determine the reverse logistics practices already applied in the target sector.
2. To identify the degree of application of these practices in the target sector.
3. To measure the impact of these practices on the environmental performance of the organizations under study.

4. Research Hypotheses

This research attempts to test the following hypotheses:

H₁: There are no statistically significant differences between the points of views of the sampling units regarding the application of reverse logistics practices in the organizations under study.

H₂: The reverse logistics practices have a positive significant impact on the organizations' environmental performance.

5. Research Importance

The importance of this research is as follows:

5.1 Scientific Importance:

5.1.1 Studies on reverse logistics have been conducted in different countries and different conditions from the Arab environment in general, and the business environment in Egyptian organizations in particular, and it is shown that there is a scarcity of researches at the level of Egyptian universities dealing with the issue of reverse logistics practices, hence the importance of the research is due to the need to direct industrial organizations to positive environmental initiatives in various industrial activities, which requires further shedding light on reverse logistics practices.

5.1.2 Modernity that characterize the subject of reverse logistics practices, and then this research is an addition to the theoretical structure in this area, as an idea that did not receive sufficient attention in the Arab environment in general, and Egyptian environment in particular.

5.1.3 Also the importance of this research is expressed by providing a clear view of reverse logistics and their different practices, and their role in supporting the environmental performance of organizations.

5.2 Practical Importance:

5.2.1 This research contributes to identifying the actual practices of the reverse logistics within the industrial organizations operating in the Egyptian business environment. This is even more important if we take into account Egypt's orientation towards sustainable development; it is therefore in dire need to identify the basic practices affecting the environmental performance of organizations so that they can start to achieve goals under the new national strategies.

5.2.2 Studying the environmental performance will help organizations focus on intangible assets as well as help them to participate in preserving the environment while maintaining their business objectives.

5.2.3 This research supports the strategy of Egypt 2030, which aims to ensure that the environmental dimension is the core to all developmental and economic sectors in a manner that achieves the security of natural resources, supports the equitable use and optimal utilization of these resources through the reduction of pollution, and the complete management of waste through the safe disposal of waste resulting from industrial activities.

6: Theoretical framework

The theoretical framework addresses the concepts related to the independent variable of the research, namely the reverse logistics in addition to the concepts related to the dependent variable of environmental performance.

6.1 Definition of reverse logistics

(Mahaboub Sheriff et al., 2012) and (Sarkis & Dou, 2018) defined the reverse logistics as "The process of planning, implementing and monitoring the efficient and cost-effective flow of obsolete materials (raw materials, semi-finished or finished goods or information) from point of consumption to point of origin the purpose of restoring value or proper disposal".

Besides, (Rajagopal et al., 2015) defined it as "A systematic process that manages the flow of products, spare parts and information from the point of consumption to the point of origin, by extending the traditional life cycle of the product".

Also, (Hamdi, 2016) defined as a set of necessary processes that are used to receive products from the end user in order to recycle and remanufacture them in a manner that reduces the negative impacts on the environment and make maximum use of neglected or returned products from the customer.

It is clear from the previous definitions that they were agreed on that reverse logistics can be described as the process of moving goods from the place of usage to the place of manufacturing, and mainly focus on the retrieval of products or materials from the point of consumption to the forward supply chain for repair or proper disposal because a lot of products are not fully used at the end of the product life, despite having residual value for most of them (Sarkar, 2012; Baykasoglu et al., 2013; Büyüközkan & Çifçi, 2012; Govindan et al., 2015).

6.2 Differences between forward logistics and reverse logistics

Reverse logistics is a reversal of forward logistics. According to (De Brito & Dekker, 2004; Srivastava, 2007; Ninlawan et al., 2010; Lakshminieera & Palanisamy, 2013; Mahaboub Sheriff et al., 2012; Islam et al., 2017), the Differences between forward logistics and reverse logistics are:

- 1) Reverse Logistics focuses on products where there is some value to be recovered and the outcome usually enters a new supply chain.
- 2) The flow of raw materials/ parts is from manufacturer or distributor to end users in the forward logistics, while in the reverse logistics, it is from end users to the manufacturer.
- 3) The speed of order delivery is a high priority in the forward logistics, while in the reverse logistics speed is often not.
- 4) The decisions affecting the forward logistics are on production capacity and expected demand, while the decisions affecting the reverse logistics are the end user's decisions about disposal of the product or not.

6.3 Reverse logistics practices

According to (Ilgin & Gupta, 2010; Eltayeb et al., 2011; Selvaraj, 2011; Sarkar, 2012; Cardoso et al., 2013; Govindan et al., 2015b; Rostamzadeh et al., 2015; Abdul-Rashid et al., 2017), reverse logistics typically consists of all the practices that a firm carries out to:

- 1) Collect back used products from customers for recycling, or reuse.
- 2) Collect back used packaging from customers for reuse or recycling.
- 3) Require suppliers to collect back their packaging materials.

Reverse logistics operations have a positive and significant impact on operational, environmental and financial performance except competitive advantage, while competitive advantages and reverse logistics operations have insignificant relationship. In addition, due to adoption of reverse logistics, firms may increase their overall performance and increase the efficiency of manufacturing processes due to elimination of waste.

7.2 (Geng et al., 2017) Study, titled: The relationship between green supply chain management and performance-A meta-analysis of empirical evidences in Asian emerging economies.

This study investigated the impact of intra-organizational environment management, product eco-design, green supplier integration, green customer cooperation, and reverse logistics on firm's economic, environmental, operational, and social performance in the manufacturing sector in Asian emerging economies (China, Taiwan, India, Malaysia, Indonesia, Thailand, Vietnam, Philippines and South Korea).

The study concluded that:

Reverse logistics had the least impact on economic performance among all five practices. This may be due to the fact that reverse logistics have received less attention than other practices so far, due to the high investment need, lack of recycling infrastructure and related technologies. While reverse logistics had a strong and positive impact on environmental performance and a moderate and significant impact of reverse logistics on operational performance.

7.3 (Awawda, 2016) Study, titled: The Effect of Green Supply Chain Practices on Environmental Performance: An Applied Study in the Jordanian Chemical and Cosmetics Industries Sector.

This study aimed to test the impact of green suppliers, green procurement, green manufacturing, green design, green distribution and reverse logistics on environmental performance, with the presence of information technology as an intermediary variable, by applying to Jordanian chemical and cosmetic companies listed in the Amman Chamber of Industry.

The study concluded that:

Green suppliers, green procurement, green manufacturing, green design, green distribution and reverse logistics practices had a positive impact on environmental performance separately, and this reflects the organization's success in gaining competitive advantage and increasing its effectiveness.

7.4 (Sari & Yanginlar, 2015) Study, titled: The impact of green logistics practices on firm performance: Evidence from Turkish healthcare industry.

This study aims to investigate the impact of green logistics practices (reverse logistics, green distribution and marketing, green purchasing and manufacturing practices) on firm performance (operational performance- economic performance- environmental performance) in Turkish healthcare organizations.

The study concluded that:

Reverse logistics and green purchasing and manufacturing practices have a positive impact on the firm's operational, economic, and environmental performance for hospitals in Turkey.

7.5 (Su et al., 2015) Study, titled: Salient task environment, reverse logistics and performance.

This study analyzes the impact of the salient task environment on reverse logistics practices and the impact of reverse logistics (collection and transportation, repair and maintenance

- 4) Return the products back to suppliers for recycling, or remanufacturing.
- 5) Return back the packaging to suppliers for reuse or recycling.
- 6) Return the products from customers for safe refill.
- 7) Provide hazardous waste treatment for products after recovery from the market.

6.4 Environmental performance

The researchers did not agree on a common concept of environmental performance. Some consider it as a set of activities, or processes of the firm, some considered it to be a set of results achieved by the firm, while others consider it as the ability of the firms themselves to protect the environment. The following are some of these definitions:

(Alshehadeh, 2010) defined environmental performance as "All the activities and operations undertaken by the organization, whether compulsory or voluntary, that prevent and mitigate the environmental and social damage resulting from the organization's productive or service activities".

While (Gad-Almawla, 2012) defined it as "A set of activities and actions taken by business organizations to reduce or prevent environmental degradation resulting from the production of goods or the provision of services by such organizations".

Besides, (Fernando & Wah, 2017) defined it as "Organizational processes undertaken by the organization to achieve its objectives related to environmental improvement and reduction of emissions of gases".

In addition, (Fernando et al., 2019) points out that environmental performance is the ability of organizations to reduce air emissions, effluents, hazardous substances and environmental accidents.

It is clear from the previous definitions that the financial performance is not the sole guide to the performance of organizations, but organizations today strive to achieve a balanced performance that satisfies environmental satisfaction in a way that results in stability, growth, progress and sustainable development (Elnaggar, 2014). As there has been a belief in the past that organizations exist primarily for the interests of capital owners and that the environmental and social aspects are the responsibility of the government, but now the community is waiting for much of the management of the organization, which is expected to be responsible not only for the objectives of investors, owners, managers and employees of the organization but contribute to the progress and prosperity and maintain the cleanliness of the community to which it belongs, so we find many organizations that have a social character and have many contributions in the surrounding areas (Elshawadfi & Badr, 2012; Elshawadfi & Zeina, 2017).

7. Literature Review

The literature review is the main foundation on which the subject of the research is based, especially that the reverse logistics is one of the modern management concepts that have emerged on the cognitive arena in recent years. These literatures were analyzed in terms of their objectives, and the most important findings as follows:

7.1 (Yu et al., 2018) Study, titled: The impact of reverse logistics on operational performance.

This study investigates the impact of reverse logistics operation on environmental performance, competitive advantage, financial and operational performance of pharmaceutical firms located in India.

The study concluded that:

service, reuse/resell, recycling, and proper disposal for recapturing value) on both environmental and economic performance of the Taiwanese computer, communication, and consumer electronics retail industry.

The study concluded that:

As the salience of the constituents of the task environment increases, their level of influence on the firm's reverse logistics also increases. In addition, reverse logistics implementation has a positively significant impact on both the environmental and economic performance.

7.6 (Muma et al., 2014) Study, titled: Green supply chain management and environmental performance among tea processing firms in Kericho County- Kenya.

This study aimed to study the impact of green procurement, green processing, green distribution, green marketing and reverse logistics on the environmental performance among the tea manufacturers in Kericho province.

The study concluded that:

There is a positive impact of green procurement, green manufacturing, green distribution, green marketing, and reverse logistics separately on the environmental performance. As organizations that adopt those practices reduce environmental pollution and reduce the cost of environmental management, thereby enhancing their environmental performance.

7.7 (Khor & Udin, 2012) Study, titled: Impact of reverse logistics product disposition towards business performance in Malaysian E&E companies.

This study analyzes the impact of reverse logistics (Repair-Recondition-Remanufacture-Recycle-Disposal) on business (environmental- profitability - sales growth) performance among electrical and electronic companies in Malaysia that have established ISO 14000 certified environmental management system.

The study concluded that:

Repair is positively associated with profitability but it does not bring significant benefit to firms' environmental outcome and sales growth. However, manufacture is positively associated to sales growth but not associated to environmental and monetary benefits. Besides, recycling contributes to profitability and this is attributed to the presence of valuable content that can be disassembled and recycled in-house or sent to contract recyclers. Finally, disposal is not associated with positive environmental impact even though management of disposal throughout firm's operations are fundamental activities of ISO14000 certified companies.

7.8 (Huang et al., 2010) Study, titled: Reverse logistics activities, the task environment, and performance.

This study analyzes the impact of reverse logistics activities on both environmental and economic performance of the Taiwanese computer, communication, and consumer electronics (3C) retail industry.

The study concluded that:

Reverse logistics activities positively and significantly influence both environmental and economic performance separately.

8. Research Gap:

From the review and analysis of previous literatures, the research gap is clear, which can be identified by the following points:

- The uniqueness of the current research in the subject within its applied environment, where it is noted the absence of studies on the impact of reverse logistics practices on the

environmental performance of organizations in the services, industrial goods, and automobiles sector in firms under study.

- There is no research – to the researcher's knowledge- that applied in the Egyptian business environment and paying attention to the degree of actual application of reverse logistics practices in the business organizations.

- Due to the lack of studies that dealt with the of reverse logistics practices in the Egyptian environment and their impact on the environmental performance of the organizations, this research is a serious contribution to the achievement of scientific addition in this field.

- This study is the first to address the degree of application (whether not applied, at the planning stage, or actual implementation stage) of green supply chain practices in the Egyptian business environment.

9. Research Methodology

The following methodology was used in the study:

- Depending on the theoretical study of the scientific thesis, periodicals and Arabic and foreign books related to reverse logistics, for formulating the theoretical aspects.
- Analyzing the results of the applied study through which the statistical results derived from the acceptance or rejection of any of the hypotheses, and then the results generalized to the relevant organizations.

9.1 Research variables and measurement:

9.1.1 Independent variable: Reverse Logistics:

Refers to a process of moving goods from their place of use, back to their place of manufacturing (to the forward supply chain) with the goal of recovering or for proper disposal (Mahaboob Sheriff et al., 2012). It has been measured by Likert 7-dimensions scale using seven dimensions that are shown in table (1).

9.1.2 Dependent variable: Environment performance:

Refers to the results achieved by the management of the organization on environmental aspects for the protection and preservation of the environment and the rational use of natural resources (Murad and Fawzi, 2015). It has been measured by Likert 5-dimensions scale using six dimensions that are shown in table (2).

9.2 Research population:

The population consists of all industrial firms in the industrial goods, services and automobiles sector that registered in the Egyptian Stock Exchange in December 2017. They are 11 organizations :Delta for Printing and Packaging -El Ahras Co. for Printing and Packing- El Arabia Engineering Industries- El Nasr Transformers -Electro Cable Egypt- ELSWEDY ELECTRIC-Engineering Industries -GB AUTO -Modern Shorouk Printing and Packaging - Suez Bags- Universal for Paper and Packaging Materials. Besides, the research depended on complete census method that gives a real picture of the whole population.

9.3 Sampling units:

The sampling units consist of managers in the three administrative levels (top, middle and direct management).

9.4 The secondary data sources:

Are published data related to firms under study, and the most important sources that was used are organizations' sustainability records, organizations' periodical publications, organizations' quality certificates, organizations' websites, and organizations' mission.

9.5 Data collection tools

This research is based on personal interviews and a survey list as appropriate means of collecting the data needed to achieve the objectives of the research.

9.6 Statistical methods used for data analysis

The (SPSS) and (STATA) programs were used to perform the statistical analysis, and the validation of hypotheses. Besides, the following statistical methods were used:

A) **Descriptive statistics:** That were used to describe the variables of the research, so that the general views of the respondents can be identified, and the relations between them can be interpreted.

B) **Analytical statistics:** to determine the validity of the hypotheses of the study. Among these methods are: Pearson correlation coefficient and its significance test, Alpha Cronbach Coefficient, Kruskal Wallis test, Local-Linear Least-Squares method.

10. Testing Study Tool

10.1 Face validity

Before the adoption of the survey list, the survey list presented to 17 faculty members in 6 universities in order to verify that the tool is suitable for the purpose for which it was designed.

10.2 Reliability and validity test

10.2.1 Reliability test

The research used Alpha Cronbach to ensure the reliability of the scale. According to test results, the Alpha Cronbach value for reverse logistics is 0.706 while for environmental performance is 0.771, since Alphas greater than 0.70, therefore the scale were considered reliable (Huang et al., 2010)

10.2.2 Validity test

First: Internal consistency of reverse logistics:-

Table (1)
Internal consistency of reverse logistics items

Item	Person correlation	Sig.	Validity
Providing means to collect consumables from customers.	0.507**	0.000	Valid
Recycling consumables.	0.681**	0.000	Valid
Remanufacturing components or products that have been dismantled from recovered products.	0.732**	0.000	Valid
Reusing some pieces or materials from damaged products recovered.	0.731**	0.000	Valid
Repairing defective or damaged products.	0.580**	0.000	Valid
Having a site for the collection of manufacturing waste.	0.471**	0.000	Valid
disposing the manufacturing waste in environmentally safe manner.	0.483**	0.000	Valid

Second: Internal consistency of environmental performance:-

Table (2)
Internal consistency of environmental performance items

Item	Person correlation	Sig.	Validity
Commitment to the legal requirements for protecting the environment.	0.670**	0.000	Valid
Reducing the use of non-renewable energy sources.	0.610**	0.000	Valid
Supporting the local community by contributing to social activities.	0.7099**	0.000	Valid
Cooperation with environmental research organizations to reduce environmental damage	0.660**	0.000	Valid
Maintaining the health and safety of employees.	0.757780**	0.000	Valid
Reducing the incidence of environmental accidents within it.	0.704386**	0.000	Valid

- The table (1) and table (2) showed that all items with sig correlation is less than 0.05 at $p=1\%$, which means that all the used items are valid and appropriate for the measurement

11. Testing hypotheses

11.1 Testing the first hypothesis

This hypothesis was tested using the method of arithmetical averages and standard deviations for the recognition of the sampling units' points of views towards the application of reverse logistics practices.

A) Analysis of response averages for sampling units using the mean and standard deviations method:

Table (3)

Analysis of the response means of the sampling units towards the application of reverse logistics practices

Management level		Reverse Logistics Practices							Total	
		Providing a means to collect consumables from customers	Recycling consumables	Reproducing components or products that have been dismantled from recovered products	Reusing some pieces or materials from damaged products recovered	Repairing defective or damaged products	Having a site for the collection of manufacturing waste	Disposing the manufacturing waste in an environmentally safe manner	Mean	Std. Deviation
Top	Mean	2.00	1.38	2.08	3.00	5.46	6.62	6.23	3.824	0.948
	Std. Deviation	2.08	1.387	2.06	2.517	2.106	0.870	1.691		
Middle	Mean	3.40	2.27	2.66	2.77	4.82	6.01	5.83	3.967	1.297
	Std. Deviation	2.53	1.992	2.29	2.308	2.36	1.75	1.944		
Direct	Mean	3.47	3.20	3.31	3.28	5.25	5.64	5.65	4.258	1.32
	Std. Deviation	2.34	2.212	2.29	2.332	2.07	1.86	1.846		

The table (3) indicated that:

- With respect to the sixth practice regarding "Having a site for the collection of manufacturing waste", the views of the top management managers obtained the highest value of the mean equals 6.62 and the lowest standard deviation compared with the other values that equals 0.870. This mean reflects the orientation of top managers towards selecting a site for manufacturing waste collection.

- While for the second practice regarding "Recycling consumables", the mean had the lowest value of 1.38, with a deviation of 1.387. This indicates that top managers did not tend to choose that their organizations recycle their consumed products. In addition, the standard deviation indicates that there is dispersion in managers' views regarding the second practice.

- As for the sixth practice regarding "Having a site for the collection of manufacturing waste", the middle managers had the largest value of the mean that equals 6.01 and a lowest standard deviation compared to the other values equals 1.753. This reflects the tendency of middle managers towards having a site for the collection of manufacturing waste.

- While the second practice regarding "Recycling consumables", the mean of middle managers had the lowest value of 2.27, with a deviation of 1.992. This indicates that middle managers did not tend to choose that their organizations do recycling of consumed products. Besides, the standard deviation indicates that there is dispersion in managers' views regarding the second practice.

- For the seventh practice regarding "Disposal of the manufacturing waste in an environmentally safe manner", the views of direct managers achieved the highest value of the mean equals 5.65 and the lowest standard deviation compared to the other values equals 1.846. This reflects the tendency of direct managers towards choosing that their organizations dispose of manufacturing waste in an environmentally safe manner.

- For the second practice regarding "Recycling consumables", the mean of direct managers had the lowest value that equals 3.20, with a deviation of 2.212. This indicates that direct managers did not tend to choose that their organizations do recycling of consumed products.

- For "The company provides a means to collect consumables from customers", the response mean of the top management managers was 2.00, and the standard deviation was 2.082, indicating the direction of top management managers towards choosing that the idea is under study, while the response mean of the middle management managers was 3.40, and the value of standard deviation was 2.528. Besides the response mean of the direct managers was 3.47, and the standard deviation was 2.335, indicating the direction of middle and direct managers towards that the idea is in the first stage of planning.

- Regarding "The company recycles consumables", the response mean of the top managers was 1.38 and the standard deviation value was 1.39, indicating the direction of top managers towards choosing that the practice is not applicable. While the average response of the middle managers was 2.27, and the value of standard deviation was 1.99, indicating the direction of middle management managers towards that the idea is under study. In addition, the response mean of the direct managers was 3.20 and the value of standard deviation was 2.21, indicating the direction of direct managers towards that the practice is in the first stage of planning.

- Regarding "The company reproduces components or products that have been dismantled from recovered products", the response mean of the top managers was 2.08 and the standard deviation value was 2.060. While the mean of the middle managers was 2.66 and the standard deviation was 2.286, indicating the direction of top and middle management managers towards that the idea is under study. While the response mean of the direct management managers was 3.31 and the value of standard deviation was 2.29, indicating the direction of direct management managers towards that the idea is in the first stage of planning.

- Regarding "The company re-uses some pieces or materials from damaged products recovered", the response mean of the top managers was 3.00 and the standard deviation was 2.517. The response mean for the middle managers was 2.77 and the standard deviation was 2.308. In addition, the response mean of direct management managers was 3.28 and the value of the standard deviation was 2.33 indicating the direction of managers in the top, middle and direct management towards choosing that the idea is in the first stage of planning.

- Regarding "The company will repair defective or damaged products", the response mean of the top managers was 5.46 and the standard deviation value was 2.11, indicating the direction of top managers towards choosing that the practice is in the intermediate phase of application. Besides, the response mean of the middle management managers was 4.82, and the standard deviation was 2.356. In addition, the response mean of the direct management managers was 5.25 and the value of standard deviation was 2.066, indicating the direction of

middle and direct management managers towards choosing that the practice is in the initial phase of application.

-Regarding "The company has a site for the collection of manufacturing waste ", the response mean of the top managers was 6.62 and the standard deviation was 0.870, indicating the direction of top management managers towards choosing that the practice is in an advanced phase of application. While the response mean of the middle management managers was 6.01 and the standard deviation was 1.753, and the response mean of the direct management managers was 5.64 and the value of standard deviation was 1.861, indicating the direction of middle and direct management managers towards choosing that the practice is in the intermediate phase of application.

- Regarding "The company dispose the manufacturing waste in an environmentally safe manner", the response mean of the top managers was 6.23 and the standard deviation value was 1.69, indicating the direction of top managers towards choosing that the practice is in an advanced phase of application. In addition, the response mean of the middle managers was 5.83 and the standard deviation was 1.94, and the response mean of the direct managers was 5.65 and the value of standard deviation was 1.85, indicating the direction of middle and direct managers towards choosing that the practice is in the intermediate phase of application.

- Finally, regarding the reverse logistics practices as a whole, the response mean of the top management was 3.82 and the standard deviation was 0.948, the response mean of the middle managers was 3.967 and the standard deviation was 1.297, and the response mean of the direct management managers was 4.258, and the standard deviation was 1.315. That refers to the direction of managers in top, middle, and direct management towards that the idea is in the final stage of planning and about to be applied.

B) The significance of the differences between the views of the sampling units regarding the application of reverse logistics practices in the organizations under study:

The research checked first the normality of residuals, both the Shapiro-Wilk W test and Kolmogrov-Smirnov test were run besides the homogeneity test. They show that the residuals are non-normally distributed. So, due to the violation of the assumption of normality, the Kruskal- Wallis test was used as a good alternative to ANOVA test as in Table (4).

Table (4)

Kruskal Wallis Test regarding the application of reverse logistics practices.

Kruskal Wallis Test	Providing a means to collect consumables from customers	Recycling consumables	Reproducing components or products that have been dismantled from recovered products	Reusing some pieces or materials from damaged products recovered	Repairing defective or damaged products	Having a site for the collection of manufacturing waste	Disposing the manufacturing waste in an environmentally safe manner
Chi-Square	5.229	19.545	10.311	4.180	2.427	7.639	3.386
df	2	2	2	2	2	2	2
Asymp. Sig.	0.073	0.000	0.006	0.124	0.297	0.022	0.166

The table (4) indicated that:

- For "Providing means to collect consumables from customers", there are no statistically significant differences at a significant level of 5%, where the value of sig. equals 0.073, compared to a significant level of 5%, it is larger.

- For "Recycling consumables", there are statistically significant differences at a significant level of 5%, where the value of sig. equals 0.000, compared to a significant level of 5%, it is lower.

- For "Reproducing components or products that have been dismantled from recovered products", there are statistically significant differences at a significant level of 5%, where the value of sig. equals 0.006, compared to a significant level of 5%, it is lower.

- For "Reusing some pieces or materials from damaged products recovered", there are no statistically significant differences at a significant level of 5%, where the value of sig. equals 0.124, compared to a significant level of 5%, it is larger.

- For "Repairing defective or damaged products", there are no statistically significant differences at a significant level of 5%, where the value of sig. equals 0.297, compared to a significant level of 5%, it is larger.

- For "Having a site for the collection of manufacturing waste", there are statistically significant differences at a significant level of 5%, where the value of sig. equals 0.002, compared to a significant level of 5%, it is lower.

- For "Disposing the manufacturing waste in an environmentally safe manner", there are no statistically significant differences at a significant level of 5%, where the value of sig. equals 0.166, compared to a significant level of 5%, it is much larger.

Based on the previous, the first hypothesis was accepted that there are no statistically significant differences between the points of views of the sampling units regarding the application of the reverse logistics practices in the organizations under study for practices (1), (4), (5), and (7). However, the first hypothesis for practice (2), (3), and (6), have been rejected.

Accordingly, the first hypothesis, which states that "There are no statistically significant differences between the points of views of the sampling units regarding the application of reverse logistics practices in the organizations under study", is accepted

11.2 Testing the second hypothesis

To test this hypothesis, the research first checked the main linear regression assumptions in order to determine the appropriate type of regression model. These assumptions are (Garson, 2012):

1. **Normality:** Means that the residuals of the regression should follow a normal distribution (Das et al., 2016).
2. **Homoscedasticity:** The problem of the violations of make it difficult to gauge the true standard deviation of the forecast errors (Zamboni & Kim, 2017).
3. **Linearity:** Means that the predictor variables in the regression have a straight-line relationship with the outcome variable (Lewis-Beck & Lewis-Beck, 2015).
4. **Absence of Autocorrelation:** The autocorrelation occurs when the residuals are not independent from each other (Huo et al., 2017).
5. **Absence of Multicollinearity:** Multicollinearity refers to when the predictor variables are highly correlated with each other (Kalmans, 2018).

First: checking for normality of residuals:

- The Shapiro-Wilk W test for normality was ran. The test showed that the p-value is 0.000 that is less than 5% indicating that the residuals are not normally distributed.

Second: checking for homogeneity of variance:

- The Cook-Weisberg test for heteroskedasticity was ran. The test showed that the p-value is 0.0142 that is less than 5% indicating that the variance is not homogeneous

Therefore, there is a violation of two of the main assumptions, which are the normality, and homogeneity, so ordinary least square regression (OLS) could not be used for testing this hypothesis. Consequently, the study chose the Local linear regression.

Table (5)
Testing the impact of reverse logistics practices on the environmental performance

Bandwidth: cross validation		R-squared		=		0.7314	
	Observed	Bootstrap					
Performance2	Estimate	Std. Err.	F	P> F	Percentile	(95% Conf. Interval)	
Keat.							
Performance2	3.503731	.0616186	63.15	0.000	3.00063	4.041236	

Table (5) showed the following:

- The value of the significance level is less than the significance level ($\alpha=0.05$), which means that the reverse logistics practices have a significant impact on the environmental performance of the organizations under study.

- The value of the level of significance is lower than the value of the level of significance ($\alpha=0.05$), which means the possibility of relying on the overall model, as well as the possibility of generalizing the results of the study.

- ($R^2 = 0.731$). This means that the reverse logistics practices are responsible for interpreting 73% of the changes in the environmental performance of the organizations under study. The complementary ratio of these changes is explained by other variables not included in regression relationship.

Consequently, the second hypothesis is accepted.

12. Study results

- There are no statistically significant differences between the points of views of the sampling units regarding the application of reverse logistics practices in the organizations under study.
- With regard to the application of reverse logistics practices, managers in the top, middle and direct management also pointed out that the reverse logistics practices are in the final planning phase and about to be applied.
- The reverse logistics practices, they have a significant impact on the environmental performance, this agrees with (Huang et al., 2010), (Sari & Yanginlar, 2015), (Awawda, 2016), (Geng et al., 2017), (Yu et al., 2018) study.

13. Study Recommendations

In view of results reached by the research, recommendations are made to the field of application for managing reverse logistics along with other suggestions for the academic community.

13.1 Recommendations to field of application:

1. Firms should give reverse logistics the importance they deserve by highlighting the benefits of their application, and develop them periodically.
2. There is need for an independent department responsible for reverse logistics management, and that the location of this department is to be clear in the organizational structure, and be determined responsibility and its relationship with other departments.
3. The need to achieve the integration and coordination between the three administrative levels and to achieve efficiency in communication between them.
4. Giving more attention to remanufacturing process and developing it in such a way that makes it possible to re-take advantage of products that maintenance operations failed to repair and make them raw materials for new products.
5. Commitment of the senior management of the firm to support the implementation of the waste management system and dealing with it securely.

13.2 Academic Recommendations

1. Examine the degree of application of reverse logistics practices in other sectors.
2. Figure out why the degree of application of reverse logistics practices varies among organizations.
3. Examine the obstacles that hinder application of reverse logistics practices among organizations.
4. Conduct a comparative study between the application of reverse logistics practices in the Egyptian business environment and the Arab business environment.

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