Green Supply Chain Systems and Technology and Their Impact on the Performance of Economic Units in the Oil Sector

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ABSTRACT

The research aims to find out the impact of the practices of green supply chain systems and technology - reverse logistics, green information systems and green manufacturing - on the environmental performance of the economic units operating in the oil sector. Realizing the impact of the practices of green supply chain systems and technology - reverse logistics, green information systems and green manufacturing - on the operational performance of economic units in the oil sector. Examining the effect of the practices of green supply chain systems and technology - reverse logistics, green information systems and green manufacturing - on the operational performance of economic units in the oil sector. Testing the proposed model for the effect of green supply chain systems and technology practices on the performance of the economic unit in the oil sector.(SPSS 23), where the researchers concluded, that green supply chain systems and technology are contemporary and important topics for economic units, because they seek to reduce negative environmental impacts and production costs, as well as an important way to make economic units sustainable and green. The researchers recommended it, the need for economic units to realize the importance of green supply chain systems and technology and their operations, because they have the full perception and vision and direct influence in aspects of economic units.

INTRODUCTION

The new directions of the economic units at the present time is to protect the environment from pollution and to advance technological development and progress based on modern methods used in production processes. Where it has become necessary to find ways and means to preserve the environment from pollution, and several ways have emerged to solve such problems, including systems and technology of green supply chains represented by reverse logistics, green manufacturing, green information systems, and green innovation, which aims to produce quality products using processes and methods that do not effect on the environment. Which requires the economic units to adopt such systems in order to preserve the environment and the sustainability of the economic unit, as this chain would meet the needs of the economic units such as preserving the environment from pollution and production free from toxic or gaseous emissions, and the sustainability of the economic unit can also be maintained. Increased interest in recent years in the concept of green supply chain management, coinciding with the growing interest in environmental issues and the role of organizations in achieving sustainable development and preserving the environment and responding to the pressures of stakeholders interested in environmental issues and considerations, as there are many factors that encourage economic units to apply seamless systems and technology practices Green supply, including stakeholder pressures, customer concerns, environmental concerns of the economic unit, response to environmental regulations and standards, green marketing, cost reduction, and ethical and commercial motives. It is clear from the foregoing that the research problem is represented in the existence of a gap between what should be, which is the effect of green supply chain management practices on the performance of economic units, and what is actually the existence of a discrepancy in the results of previous studies regarding the impact of green supply chain management practices on unit performance. Based on the above, the research problem can be formulated in the

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following question: (Is there an impact of green supply chain systems and technology practices on the performance of economic units in the oil sectors).

The research aims to

1 - To know the impact of the practices of green supply chain systems and technology - reverse logistics, green information systems and green manufacturing - on environmental performance in economic units operating in the oil sector.

2 - Realizing the impact of the practices of green supply chain systems and technology - reverse logistics, green information systems and green manufacturing - on the operational performance of economic units in the oil sector.

3 - Examining the effect of the practices of green supply chain systems and technology - reverse logistics, green information systems and green manufacturing - on the operational performance of economic units in the oil sector.

4- Testing the proposed model for the impact of green supply chain systems and technology practices on the performance of the economic unit in the oil sector.

The following points highlight the importance of research

1 - This research contributes to addressing the practices of green supply chain systems and technology, and it represents an addition to the theoretical side, and thus directs the attention of researchers and practitioners to the field of supply chain in general and green supply chain management in particular.

2 - Considering this research as an extension of the studies concerned with the practices of green supply chain systems and technology and performance in economic units.

3 - This research helps direct the consideration of managers in the economic units in the oil sector to green supply chain management practices and the extent of their impact on performance - whether environmental performance, operational performance, or economic performance - and the extent of their contribution to achieving excellence over competitors, and the extent to which the customer is aware of following those economic units For those practices, which helps him to differentiate between units that care about the environment and preserve it and provide him with environmentally sustainable products.

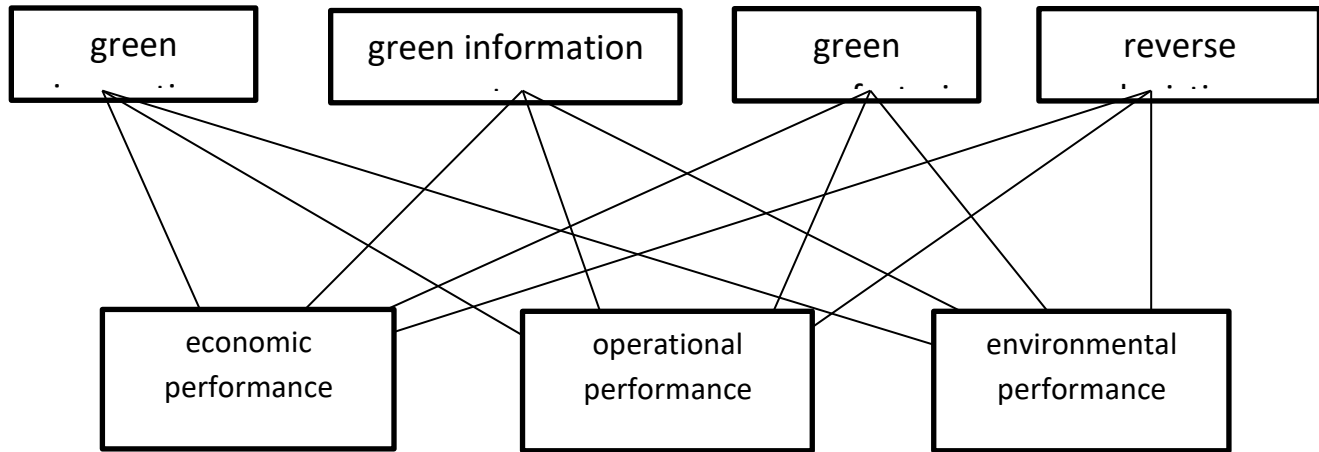**Fifth: the search form:** Green supply chain systems and technology

Figure No. (1) represents the research form

THE FIRST AXIS: GREEN SUPPLY CHAIN SYSTEMS AND TECHNOLOGY

First - Green Supply Chain Systems and Technology:

A - The concept of green supply chain systems and technology: The concept of supply chain systems and technology is one of the most important modern trends that seek to comply with the requirements of globalization and achieve the competitiveness of economic units. On the part of practitioners and researchers, in line with the intensity of competition between economic units, and even expanded to become between supply chains (green et al., 2012).

B - Definition of supply chain systems and technology: knew her (Zhu) as everything related to systems and technology flow of green logistics activities, starting from green procurement, i.e. from suppliers, green design processes and green manufacturing, to the final customer with environmentally friendly products, until the completion of reverse logistics activities or returns from customers and management of production waste disposal operations. (Zhu, Sarkis and Geng: 2005) as he knew it (Hervani) another definition of green supply chain systems and technology as the concept that combines green procurement and environmental management of green manufacturing materials and reverse logistics and green information systems (Hervani: 2005).

2- Practices of green supply chain systems and technology: Green supply chain technology and systems practices mean all activities and processes that are oriented with environmental dimensions, whether they are internally oriented practices such as green manufacturing and green information systems, or externally oriented reverse logistics practices. (Zhu, Sarkis and Geng: 2005).

3- Reverse logistics: be seen (Mohammed and Krishnan) that after collecting used products, materials, or parts from customers, they are transferred to the next process in the chain via reverse logistics (Mohammed and Krishnan, 2012), and (Kumar and Chatterjee) explained that in this process, the recovered products, materials, or parts It is transferred to screening and disposal facilities. (Kumar and Chatterjee, 2011, 2)

Payne (Wei) This process consists of a set of activities such as transportation, storage, distribution and inventory management (Wei, 2011). (Mohammed and Krishnan) indicated that the aim of this process is to deliver the recovered products, materials or parts to the examination and disposal facilities in an appropriate cost manner (Mohammed and Krishnan, 2012). explained ((Guide and Van Wassenhove states that in most cases, the economic units themselves carry out this process in order to control the mobile operations and reduce their costs, as well as speed up the value recovery process, but in other cases, the economic unit may resort to external parties specialized in logistical operations to carry out this process. Guide and Van Wassenhove, 2002).indicated (Daugnoraite and Slaitas) indicated that reverse logistics is an important process for many economic units, being (4-10%) of the total logistical costs, and

this is what motivated these units to develop reverse logistics systems and the effective management of reverse logistics activities (Daugnoraite and Slaitas, 2010). and sees ((Wei, 2011 that the effective management of these activities is necessary for economic units in order to ensure that the total costs of renewable products that arise from the reverse supply chain do not exceed the costs of new products. ((Wei, 2011, 13

4- Green manufacturing: Green manufacturing is an expression used to describe manufacturing practices that do not harm the surrounding environment during production operations, as this concept emphasizes the use of processes that do not lead to environmental pollution and harm to working personnel, customers and others (Aurora, 2008).

see (Tomovic) that green manufacturing has a positive effect towards reducing the cost curve as well as reducing production waiting time and improving product quality, as the essence of its process is directed towards reducing damage to the environment and realizing awareness of increasing economic growth in a rapid and steady manner (Tomovic, 2009).

Al-Nemah sees a philosophy of operations management that focuses on achieving efficiency in the use of resources (raw materials and energy) at all stages of production processes in order to reduce the generation of waste and emissions and to contain the associated or resulting pollutants at the source of their generation in order to preserve human health and the contents of the natural environment from what these carry. Waste, emissions and pollutants are risks (Al-Nama, 2007).

while pointing (Backus & Chrome) that green manufacturing is part of a continuous improvement strategy that helps producers improve the rate of profitability and competition. & Chrome, 2009).

see (Handy) that green manufacturing refers to a multidisciplinary approach that aims to reduce energy and material consumption, and the intensity of manufacturing operations. Such as actualization of operations and scheduling, advanced/improved manufacturing techniques, reduced waste volume, and improved energy efficiency (Handy, 2008).

5- Green information systems: It is an umbrella term that refers to environmentally sound information technology, systems, applications and practices. This is done by following three approaches as follows: ((Dedrick, 2010

A - Efficiently design, manufacture, use and dispose of computer hardware, software and communication systems and effective without any significant impact on the environment.

B - Recycling and reuse of manufactured information technology products.

C - Reducing waste and pollution by changing production and consumption patterns.

D - the use of information technology and information systems to enable - that is, to provide support and assistance and provide lifting

Financial - other environmental initiatives across the organization.

E - Harnessing information technology to help create awareness among stakeholders and promote business

Green, green initiatives.

male(Chen et al. 2011) that the concept of green information systems or green information technology refers to the products and practices of information systems (information technology) that aim to achieve pollution prevention, or to supervise products, or achieve sustainable development." It conveys (Chowdury, 2012) the point of view of a higher education institution in describing this term as "a system of sustainability designed to manage data and information as outputs in order to support special research activities, and/or support decision-making activities."

Green information systems are an economic necessity as well as an environmental necessity and a social responsibility (Murugesan, 2007). The role of green information systems is not limited to creating energy-efficient information technology systems (such as hardware, software, and applications), but also contributes to energy efficiency, environmentally sustainable business processes and practices, transportation, and buildings. Information systems can

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also support and assist environmental initiatives. And benefit from it in several areas and also help create green awareness.

6- Green innovation: pointed out (Huang, 2011) indicates that green innovation means creating products or production processes aimed at addressing environmental problems resulting in the product life cycle. (Weag, et.al, 2015) stated that it is the new or modified products and processes that include technical, administrative and organizational innovation that help preserve the surrounding environment. (Sterbrink & Westerberg, 2016) defined it as innovation related to green products and processes, including innovation in technologies that contribute to energy savings, pollution prevention, waste recycling, green product designs, or corporate environmental management. He explained (ma, et.al, 2017) that it is the innovation of new or modified processes, technologies, systems and products to avoid or reduce environmental damage. He added (li, et. Al, 2018) that it is innovation in technologies, products, services, organizational structures, or administrative methods adopted by economic units to achieve sustainable development.

Second: the performance of economic units: It can be divided into three sections according to the search form, namely

1- Environmental performance: It can be defined in terms of (a.kherakem, 2010) Performance indicates the performance of an action, the completion of an activity, or the implementation of a task, in the sense of doing an action that helps to reach the set goals. defines (Alain Fernandez, 2005)performance as "the search for maximizing the relationship between results and resources in order to achieve the set goals, while seeing (angele dahou, 2007) that the concept of performance It has been confined for a long time to its financial dimension. This performance seeks to achieve the desired returns from the shareholders with sales figures and a share of purchases according to the strategy Enterprise .

From the above, it can be said that performance is an important indicator Many important decisions are based on it, as it determines the directions of the activity of the economic unit Positive and negative, determines the extent approaching or unless away It reflects the achievement of the goals and the implementation of the plans set, and thus reflects the extent of the success or failure of the economic unit(Al-Ayeb, 2001)

The environmental performance of the organization is represented In protecting the environment from pollution and removing the damages caused to it as a result of carrying out its activities(architecture,2011)It can be defined as the activity and operations carried out by the economic unit compulsorily or voluntarily to prevent environmental and social damage resulting from the activities of the production or service unit.(shahada,2010), as defined by the standard(ISO 14013)that he: results that The organization obtains it through its interaction with the environment (Rasheed, 2011). while Known in the field of environmental management that: various measurable outcomes The environmental management system, which is linked to the economic unit's control of its various environmental aspects, in accordance with its environmental policy jubilant environmental goals and directions. dohou, 2004).

2 –operational performance: Operational performance refers to the ability of the economic unit to produce products and present them to customers more efficiently, with improved quality and a shorter lead time, which ultimately leads to improving its position in the market and increasing its chances of selling its products to international markets.(zhu.et, al, 2008).Operational performance is related to the ability of the economic unit to achieve a competitive advantage over competitors through quality.-Reduced scrap rates, reduced customer complaints, increased warranty periods, cost,-Reducing inventory levels, reducing the proportion of waste or losses during manufacturing operations, optimizing the use of available production capacity,-speed in delivering the product to customers,-Reducing product design time, and reducing preparation time for machines, increase the quantity of products delivered on time,-Flexibility and diversity in the products offered by the economic unit(green, et al, 2012).

3 –economic performance: Economic performance is related to the ability of the economic unit to reduce costs associated with purchased materials, energy consumption, waste treatment, waste disposal, and fines resulting from environmental accidents.(zhu.et,al, 2008).

Economic performance can be defined as improvements in financial and marketing performance resulting from the implementation of green supply chain management practices that lead to an enhanced position compared to the

industry average. The financial improvement includes lower material purchase costs, lower energy consumption costs, lower waste treatment and disposal costs, and lower costs of environmental accidents. Include marketing improvements the following :Increase the average return on sales, and increase the average market share growth (namagembe, et al, 2018).

When reviewing the research literature related to production and operations management, it became clear that one of the important issues in supply chain management is management related to the environment, as green supply chain management emerged as an organizational philosophy that helps the economic unit and its partners in the supply chain achieve profits and increase market share by reducing risks. and environmental impacts while improving environmental efficiency(Rao and Holt, 2005).

Fourth: Research Hypothesis: Based on the research problem and its objectives, a set of hypotheses can be formulated that can be tested to answer the research question and achieve its objectives, which are:

1 - The impact of green supply chain systems and technology practices on environmental performance.

2 - The impact of green supply chain systems and technology practices on operational performance.

3 - The impact of green supply chain systems and technology practices on economic performance.

RESULTS AND DISCUSSION

Firstly: The research sample: A group of economic units operating in the oil sectors were selected due to their capabilities and capabilities in work and employment. These units are among the most important units in absorbing practical energies, as the number of workers in them is more than5000employee and worker. A group of them who have experience and important information in the work of these economic units were selected for the purpose of answering the questionnaire prepared by the researchers. As it was distributed(100)invisibility A questionnaire for the purpose of being answered by them, the table below shows the description of the selected sample. The research hypotheses were analyzed and tested on a program(spss 23)Where the data of the questionnaire was analyzed and the results of correlations were extracted and effect .

Table no(1)The selected research sample

The ratio%	the number	data sections	data	T
25%	25	top positions	Workplace	1
63%	63	Central positions		
12%	12	lower positions		
100%	100	Total		
0%	0	junior high	Scientific level	2
6%	6	diploma		
20%	20	Bachelor's		
57%	57	Master or What equals it		
17%	17	PhD or What equals it		
0%	0	other		
100%	100	Total		
88%	88	male	sex	
12%	12	feminine		
100%	100	Total		

From the table above, it is possible to indicate and clarify the subject under study, as it became clear that the percentage of the higher centers is (25%) of the sample, the middle centers are (63%), and the lower center is (12%) from the administrations of the economic units. It also shows the percentages of educational attainment from these centers

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Diploma (6%), Bachelor's degree (20%), Master's degree or equivalent (57%), PhD or equivalent (17%). It was found that the gender of these groups in the centers is (88%) males and (12%) female .

Table No. (2) The correlation between reverse logistics and the performance of the economic unit

Relationship	dependent variable	the independent variable	
	economic unit performance		
positive relationship	0.787	environmental performance	green supply chain Logistics Reverse t
positive relationship	0.609	operational performance	
positive relationship	0.776	economic performance	
positive relationship	0.724	aggregate index	

It is clear from the above table that there are positive correlations, that is, with significant indications between the practices of green supply chain systems and technology on the performance of the unit in terms of environmental, operational and economic performance, as the total correlation coefficient reached (0.724), as this result indicates that the economic units of the research sample have interest Significant reverse logistics, which in turn will significantly contribute and develop the sustainability of the unit. And if we take the relationship between the performance of each unit separately, as shown in the above table, as it is as follows, the correlation between environmental performance and reverse logistics, where the results of the statistical analysis showed a positive significant relationship with a percentage of (0.787), which is higher than ($p \leq 0.05$). Also, the correlation between operational performance and reverse logistics, where the results of the statistical analysis showed a positive significant relationship with a percentage of (0.609), which is higher than ($p \leq 0.05$). As for the correlation between economic performance and reverse logistics, the results of the statistical analysis showed a positive significant relationship with a percentage of (0.776), which is higher than ($p \leq 0.05$). After reviewing the results from Table No. (2), and as discussed, it is possible to accept the research hypotheses that there is an impact of green supply chain systems and technology on the environmental, operational and economic performance.

Table No. (3) The correlation between green manufacturing and the performance of the economic unit

Relationship	dependent variable	the independent variable	
	economic unit performance		
positive relationship	0.780	environmental performance	green supply chain green manufacturing
positive relationship	0.654	operational performance	
positive relationship	0.740	economic performance	
positive relationship	0.724	aggregate index	

It is clear from the above table that there is a positive correlation between green manufacturing and the performance of the economic unit represented by environmental performance, which came by (0.780), operational performance by (0.654), and economic performance by (0.740), as the overall performance index as a whole was by (0.724), and these percentages are significant. which is higher than ($p \leq 0.05$). This means that there is a significant effect between green manufacturing and the performance of the economic unit represented by the environmental, operational and economic performance, and on this basis the hypotheses are accepted.

Table No. (4) The correlation between green information systems and the performance of the economic unit

Relationship	dependent variable	the independent variable	
	economic unit performance		
positive relationship	0.682	environmental performance	green supply chain green information systems
positive relationship	0.836	operational performance	
positive relationship	0.666	economic performance	
positive relationship	0.728	aggregate index	

It is clear from the above table that there are positive correlations, that is, with significant indications between the practices of green supply chain systems and technology on the performance of the unit in terms of environmental, operational and economic performance, as the total correlation coefficient reached (0.724), as this result indicates that the economic units of the research sample have interest Great green information systems, which in turn will greatly contribute to and develop the sustainability of the unit. And if we take the relationship between the performance of each unit separately, as shown in the above table, as it is as follows, the correlation between environmental performance and green information systems, where the results of the statistical analysis showed a positive significant relationship with a percentage of (0.787), which is higher than ($p \leq 0.05$). Also, the correlation between operational performance and green information systems, where the results of the statistical analysis showed a positive significant relationship with a percentage of (0.609), which is higher than ($p \leq 0.05$). As for the correlation between economic performance and green information systems, the results of the statistical analysis showed a positive significant relationship with a percentage of (0.776), which is higher than ($p \leq 0.05$). After reviewing the results from Table No. (2), and as discussed, it is possible to accept the research hypotheses that there is an impact of green supply chain systems and technology on the environmental, operational and economic performance.

Table No. (5) The correlation between green innovation and the performance of the economic unit

Relationship	dependent variable	the independent variable	
	economic unit performance		
positive relationship	0.861	environmental performance	green supply chain green information systems
positive relationship	0.742	operational performance	
positive relationship	0.703	economic performance	
positive relationship	0.768	aggregate index	

From the above table, we note that there is a correlation between green innovation and the performance of the economic unit represented by the environmental, operational and economic performance at the level of the research sample. As the existence of a positive significant correlation between green innovation and the performance of economic units (environmental, operational and economic performance) as dependent variables, as the total correlation coefficient reached (0.768) at a significant level ($p \leq 0.05$) This indicates that the interest of the administrations of economic units in the elements of green innovation has, as it will contribute to enhancing the sustainability of those economic units. Based on this review of the statistical results and their discussion, the research hypotheses can be accepted.

For the purpose of testing the research hypotheses in terms of stability, Table No. (6) shows the effect of green supply chain systems and technology practices on the performance of economic units.

Controversy No. (6) The impact of green supply chain practices on the performance of economic units

Test morale	a testF	R2	supply chain		the independent variable	
			β1	oβ	dependent variable	
0.00	52.11	0.70	0.88	1.82	pedigree (β)	performance of economic units
			9.11	4.34	to choose (T)	environmental performance
			0.00	0.00	indication	operational performance economic performance

It is clear from the above table for the analysis of the regression test, where it was found that the value of the test level (F) by (0.00), which is less than the significant level (0.05). This indicates that there is a significant impact of green supply chain systems and technology practices on the performance of economic units. The coefficient of determination (R2) was at a rate of (0.70), and this confirms that (70%) explains sustainable development, which is due to the impact of green supply chain systems and technology practices on the performance of economic units (environmental, operational and economic performance), while the rest, which represents (30%) to Variables to be addressed in the future, as evidenced by the significance of the research sample with the regression coefficient (β1) through the (T) test, as it reached a percentage of (0.00), which is less than the level of significance (0.05). This result shows that the practices of green supply chain systems and technology take an important role in performance of economic units. From this table and the above clarification, it says to accept the research hypotheses and to say that there is an impact of green supply chain systems and technology practices on the performance of economic units.

CONCLUSIONS AND RECOMMENDATIONS

First: Conclusions

1- Green supply chain systems and technology are contemporary and important issues for economic units, because they seek to reduce negative environmental impacts and production costs, in addition to being an important means to make economic units sustainable and green.

2 - Through applied practical measures, the impact of green manufacturing on the performance of economic units is evident in the environmental, operational and economic performance, which reflects that sustainable development derives the elements of its promotion from green manufacturing.

3 - Green information systems help economic units to reduce environmental impacts such as waste, gaseous emissions and toxic pollutants, which will develop the sustainability of economic units.

4 - Green innovation is important for economic units, because green innovation enhances environmental, operational and economic sustainability, and this indicates that increased interest in green innovation will contribute to increasing sustainable development.

Second: Recommendations

1 - The need for economic units to realize the importance of systems and technology of the green supply chain and its operations, in order to have the full perception and vision and direct influence in the aspects of economic units.

2- Economic units should raise awareness of the importance of green manufacturing, due to its importance in sustainable development, by moving away from industrial waste harmful to the environment.

3 - The costs of green information systems can be significantly reduced by making some changes, such as the uses of mobile devices and computers, as there are office devices that work without needing them.

4 - The increased interest in green innovation by economic units enhances the benefits of environmental, operational and economic performance, which in turn enhances environmental, operational and economic sustainability.

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