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The effect of green supply chain on the export performance of the Jordanian pharmaceutical industry

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A B S T R A C T

This research came to examine the influence of green supply chain practices on export performance. The research population consists of the decision-makers in pharmaceutical companies in Jordan. The Jordanian pharmaceutical industry is considered one of the oldest industrial sectors in the Arab region. Accordingly, the research took a purposive sampling method to collect primary data. The questionnaire was designed electronically via Google Forms and distributed to the study sample via e-mail. Data were analyzed using covariance-based structural equation modeling (CB-SEM) by version 24 of AMOS software. The study results showed that green supply chain dimensions have influenced export performance of the pharmaceutical industry in Jordan. Based on the study results, the researchers recommend managers and decision makers of the pharmaceutical organizations to create a policy outlining the organization's commitment to sustainability and outlining its aims and objectives for decreasing its environmental effect.

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1. Introduction

Global warming and natural resource depletion have prompted calls for fundamental changes in the way businesses manufacture and provide goods and services (younis et al., 2016). Over the last few decades, global awareness of environmental challenges such as carbon emissions, harmful chemical use, and resource depletion has grown. Policymakers and activists are urging people to become green, and many organizations throughout the world are responding by implementing green principles. The sustainability movement urges businesses to embrace and implement green supply chain management (GSCM) techniques throughout their operations (Rahamneh et al., 2022).

Given that business organizations are the source of most environmental problems, concern for environmental issues has become increasingly prevalent among governments, societies, and business organizations, particularly with the emergence of environmental problems such as global warming (increased temperature of the earth) or the depletion of a layer of water. Although factories are an important part of the economy in many nations, particularly in developing countries, they are also a source of pollution and degradation (Attiany et al., 2023).

According to a McKinsey Corporation (2014) poll, 43 percent of respondents want their organizations to link green supply chain strategies with their overall business objectives. Competitiveness improves business performance for organizations who use it. According to (Srivastava, 2007), GSCM is “the integration of environmental thinking into supply chain management, encompassing product design, material sourcing and selection, manufacturing process, distribution of the finished product to

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customers, and product end-of-life management after its useful life". A company's dedication to greening its supply chain may be seen in how it manages lean manufacturing, reverse logistics, product development and design, and packaging (Al-Hawary et al., 2017; Alshawabkeh et al., 2022). According to Aityassine et al. (2022) and Al-Awamleh et al. (2022), green supply chain management is the goal of enhancing the environmental performance of the supply chain (Al-Nawafah et al., 2022). This research came to examine the influence of green supply chain practices on export performance of the Jordanian Pharmaceutical Industry.

2. Theoretical framework and Hypotheses Building

2.1 Green Supply Chain practices

Green supply chains emerged in the late 1990s. It includes acquiring, operating, and selling functions with green features advances in each stage that create value across the supply chain (Al-khawaldah et al., 2022). Organizations have utilized green supply chain management (GSCM) to improve performance and, as a result, the environment has been preserved (Alhalalmeh et al., 2020). It provides enterprises with a tried-and-true method for reducing their environmental footprint while preserving profit margins and discovering new prospects. It is an essential technique that must be used, particularly in underdeveloped nations where a healthy environment supplies essentials such as air, food, and water. To safeguard humans, scarce resources such as food, water, energy, and air must be preserved (Altaf et al., 2020; Perotti et al., 2012).

To improve the long-term performance of the company and its supply chain partners, green supply chain can be defined as the strategic, transparent inclusion and attainment of an organization's overall, environmental, and economic objectives in the system - wide coordination of key inter-organizational business processes. This implies that all supply chain partners must adhere to requirements. Simultaneously, appropriate environmental and social conduct must be promoted for the benefit of the entire chain (Wu et al., 2012). Practices for green supply chain management 10 might refer to a multitude of efforts and initiatives undertaken by a company to decrease its influence on the natural environment (Awaysheh & Klassen, 2010). GSCM is a relatively new method of managing supply chains that takes environmental considerations into account. In a study published in Business Strategy and the Environment, Khairani et al. (2012) found that "businesses who make significant changes to their environmental commitments have a competitive advantage in the worldwide market".

To be successfully implemented, the many subsystems that make up green supply chains must be well understood, some of the fundamentals that are crucial to the success of green supply chain activities include green design, green buying, green manufacturing, reverse logistics, environmental collaboration with suppliers, and green distribution (Rushton, Croucher, & Baker, 2022). As can be seen from the above definitions, the "waste hierarchy" of 3Rs is a common way in which GSCM has been constructed (reduce, reuse, and recycle). From this viewpoint, GSCM will include efforts such as eco-design, eco-packaging, eco-procurement, green distribution, and product end-of-life (Aityassine et al., 2021; Green et al., 2012). This highlights the importance of GSCM principles being implemented from the very beginning of the supply chain, from the procurement of raw materials, and extending through the product's lifecycle until its eventual disposal. Sarkis's (2003) functional model of a green supply chain revealed how GSCM activities, from sourcing raw materials to developing a product down to the energy and materials consumed and the pollution generated during distribution, disposal, or recycling, all play a part.

Internal environmental management, green buying (GP), customer collaboration, eco-design, and investment recovery are all examples of GSCM methods, as stated by Zhu et al. (2013). In like manner, Younis et al. (2016) classified GSCM practices as Eco-design, environmental collaboration, reverse logistics, and GP. Additionally, GSCM practices are categorized as cleaner manufacturing, general practice, patents, internal service quality, eco-design, and green innovation (Al- Quran et al., 2020; Wu et al., 2011). There are two major categories that these policies address: internal activities (such as eco-design and internal environmental management) and external activities (such as GP and CWC) (Rha, 2010). They are key efforts because of their potential to decrease the environmental impact of a company's supply chain operations in both their direct and indirect forms (Darnall et al., 2008). They also have a significant impact on the core aspects of a business, including branding, competitive advantage, and marketing outreach (Cosimato & Troisi, 2015).

2.2 Export performance

Export performance is described as "the degree to which an organization's strategic and economic goals for exporting a product into an international market are realized via the design and implementation of an export advertising strategy". According to researchers (Boehe & Jiménez, 2016; Alhalalmeh et al., 2022), exporting has been one of the key markers of a firm's capacity to effectively employ its resources and competencies abroad.

Export performance is rated significant and crucial and may play a crucial part in strengthening Jordan's economy. There are several export performance metrics (AL-Zyadat et al., 2022). Azar and Ciabuschi (2017) assert that export success may be judged along two dimensions: financial performance and strategic efficacy (AlTaweel & Al-Hawary, 2021; Mohammad et al., 2020; Alolayyan et al., 2022). EP may include the choice to export, the range of markets serviced, the number of goods

sold, and the value of exports (Spanos, 2016). Some studies have categorized the metrics into two major categories: financial (e.g., profitability, sales) and non-financial (e.g., employee satisfaction) (Katsikeas et al., 2000).

2.3 GSCP and EP

Previous research (Hervani et al., 2005; Mitra & Datta, 2014; Dubey et al., 2015; Geng et al., 2017) has examined the links between GSCM practices and performance, including environmental, economic, and operational performance. Green Jr. et al. (2012) showed that any improvement in economic and environmental performance ought to increase organizational and operational performance. No prior research has studied the direct relationship between GSCM and export performance. Nonetheless, much research (e.g., Zhu & Sarkis, 2004) indicated this impact indirectly and showed a strong positive correlation (e.g., Al-Zu'bi et al., 2015). According to Singh et al. (2010), the use of GSCM assures worldwide market competitiveness. Nishitani (2011) discovered, using a sample of Japanese export-oriented companies that implementing Environmental management systems (EMS) led to an increase in EP. Based on above literature, the study hypotheses may be built as:

H_1: *Green Supply Chain practices influence Export Performance of the Jordanian Pharmaceutical Industry.*

More specifically

H_{11}: *Green design influences Export Performance of the Jordanian Pharmaceutical Industry.*
H_{12}: *Green purchasing influences Export Performance of the Jordanian Pharmaceutical Industry.*
H_{13}: *Green manufacturing influences Export Performance of the Jordanian Pharmaceutical Industry.*
H_{14}: *Green distribution influences Export Performance of the Jordanian Pharmaceutical Industry.*
H_{15}: *Green reverse logistics influences Export Performance of the Jordanian Pharmaceutical Industry.*

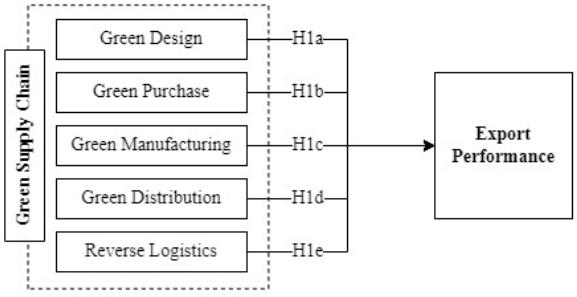

Fig. 1. Research Model

3. Methodology

3.1 Data Collection and Sampling

The current research targeted a population of decision-makers in pharmaceutical companies in Jordan. The Jordanian pharmaceutical industry is considered one of the oldest industrial sectors in the Arab region. This sector proved its important role during the COVID-19 pandemic, as it contributed to the provision of domestic-made treatment and medicines for patients in Jordanian hospitals. Moreover, many supplies and medicines were exported to neighboring countries during this pandemic. Indeed, the pharmaceutical industry contributed about 9% of Jordanian exports during 2022, thus providing an increase of about 2% in the GDP. Recently, it is noted that the demand for Jordanian pharmaceutical products has increased in the Jordanian and regional markets due to the high quality and the ability to meet the increasing demand. Accordingly, the research took a purposive sampling method to collect primary data, according to (Campbell et al., 2020). The purposive samples were used by distributing the search instrument to 250 production employees at senior and middle managerial levels in pharmaceutical companies in Jordan, as they were the most appropriate to answer the survey items. The response received was 214, where 26 included incomplete responses which were excluded from post hoc analyses. Hence, the research sample contained 188 complete responses, which represents a response rate of 75.2% of the total surveys sent.

The demographic characteristics of the research sample showed that it includes 102 males with a ratio of 54.3% compared to 86 females with a ratio of 45.7%. The majority of respondents 43.6% “from 40-less than 50”, followed by 28.2% belonged to the age group “from 30-less than 40”, then 17.5% belonged to the age group “50 years or more”, and finally 10.7% “less than 30 years”. Moreover, 42% of the respondents had a master's degree, followed by 37.8% who held a bachelor's degree, and 20.2% who held a PhD. In terms of work experience, 36.2% were those who had experience within the category "from 5-less than 10", followed by 32.9% those who had experience within the category “from 10-less than 15 years”, then 21.3% those who had experience within the category “15 and more”, and finally 9.6% those who had experience within the category “less than 5 years”.

3.2 Research Instrument

This research relied on a multi-item survey through a questionnaire developed according to the relevant literature. The questionnaire was designed electronically via Google Forms and distributed to the study sample via e-mail within the period from December 2, 2022, until January 5, 2023. Respondents were asked to respond to the questionnaire within a maximum period of one week from the date of receiving the e-mail. The research questionnaire consisted of a cover letter and three sections. The cover letter explained the purpose of the research and the researchers' commitment to the confidentiality of the information provided by the respondents and to use it for research purposes only. Moreover, the first section of the questionnaire included demographic information including gender, age, education, and experience. The rest sections were for the main variables of the study, where the respondents were asked to evaluate their items based on a five-point Likert scale with a minimum value (1) for the response “strongly disagree” and a maximum value (5) for the response “strongly agree”. Here are the details of these sections:

Green supply chain: it was the research's independent variable for which items were developed according to (Sarwar et al., 2021). The GSC was considered a second-order construct, where its total items were divided into five first-order constructs. The green design was evaluated by four items, e.g., pharmaceutical companies in Jordan take into account environmental standards when designing their products by not including environmentally harmful substances such as lead. Green purchase was evaluated by four items, e.g., pharmaceutical companies in Jordan choose suppliers who have ISO 14001 certification. Green manufacturing was evaluated by four items, e.g., pharmaceutical companies constantly monitor pollution and noise levels from the manufacturing process. Reverse logistics was evaluated by four items, e.g., pharmaceutical companies in Jordan tried to use materials that could be recycled and recovered from consumers. The green distribution was assessed by four items, e.g., pharmaceutical companies in Jordan package their products with easily biodegradable materials.

Export performance: it was the research's dependent variable for which items were developed based on (Navaia et al., 2023). The export performance was considered a first-order construct, where its items include, for instance, export contributes to the growth of the market share of Jordanian pharmaceutical companies in the regional markets.

3.3 Analytical Process

Data were analyzed using covariance-based structural equation modeling (CB-SEM) by version 24 of AMOS software. This approach enables the examination of the research model and the proposed assumptions, as it helps in the formulation of multi-layered equations for the relationship between the observed and latent variables to evaluate the relationships, considering the measurement errors (Dash& Paul, 2021; Mia et al., 2019). The CB-SEM approach is appropriate for research that is based on well-established theory (Collier, 2020). Accordingly, this approach could be implemented in testing the impact of the GSC on EP, since it is based on a resource-based view (RBV) and the foundations of sustainability. The analysis related to this research was performed in two stages. In the first stage, confirmatory factor analysis (CFA) was conducted to assess the validity and reliability of the measurement model and to determine its psychometric properties. The second stage was applied to evaluate the structural model and extract the effect coefficients between the green supply chain and export performance. Moreover, descriptive tests were implemented to assess the overall attitude of the respondents about the variables of the research. The following sections detail each stage.

4. Research Findings

4.1 Validity and Reliability

The psychometric properties of the measurement model were assessed in order to determine composite reliability and both convergent and discriminant validity through CFA. Before performing CFA, the normality was tested using the skewness and kurtosis of the items (Liang et al., 2019). The results confirmed that the skewness values of the items were less than 3 and their kurtosis values of them were less than 10, which indicates their distribution according to the bell curve and the data distribution does not represent a problem in the research (Khatun, 2021; Boudlaie et al., 2022; Mukhlis et al., 2022; Seijas-Macias et al., 2023). Moreover, CFA was conducted to assess the validity and reliability of a model measuring the impact of GSCM on the export performance, and the results are presented in Table 1. The results of Table 1 reported that the loading of items on the latent first-order constructs ranged between 0.662 and 0.847, thus exceeding the minimum item retention threshold of 0.50 (Kreitchmann et al., 2019). The average variance extracted (AVE) for all first-order constructs used in the research exceeded the accepted minimum of 0.50 (Sürücü & Maslakci, 2020; Mohammad, 2020). Hence, it is possible to judge the convergent validity of the measurement model. The discriminant validity was tested by comparing the maximum shared variance (MSV) and AVE, along with comparing the square root of AVE with the correlation coefficients between the first-order constructs. The results showed that AVE was superior to MSV for all constructs. Moreover, the square root of AVE was higher than the correlation coefficients between the research constructs. According to Roemer et al. (2021), the results mentioned are evidence of the discriminant validity of the measurement model. As for composite reliability, it was tested using McDonald's Omega coefficients with a minimum of 0.70. The results presented in the table showed that the composite reliability values were within the range of (0.802-0.896), which means that they exceeded the lower threshold and that the measurement model was characterized by composite reliability (Harahap et al., 2022; Canatay et al., 2022). In another context, the constructional validity of the measurement model was verified using the goodness of fit indices listed in Fig. 2.

Table 1
Result of confirmatory factor analysis

Variables	Items	Loadings	AVE	MSA	√AVE	C.R
Green Design	GDE1	0.725	0.575	0.371	0.758	0.844
	GDE2	0.773				
	GDE3	0.802				
	GDE4	0.730				
Green Purchase	GPU1	0.662	0.504	0.304	0.710	0.802
	GPU2	0.715				
	GPU3	0.706				
	GPU4	0.753				
Green Manufacturing	GMA1	0.813	0.565	0.426	0.751	0.838
	GMA2	0.734				
	GMA3	0.711				
	GMA4	0.744				
Green Distribution	GDI1	0.682	0.538	0.382	0.734	0.823
	GDI2	0.790				
	GDI3	0.736				
	GDI4	0.722				
Reverse Logistics	RLO1	0.782	0.577	0.377	0.760	0.845
	RLO2	0.709				
	RLO3	0.791				
	RLO4	0.755				
Export Performance	EPE1	0.847	0.632	0.468	0.795	0.896
	EPE2	0.733				
	EPE3	0.803				
	EPE4	0.801				
	EPE5	0.787				

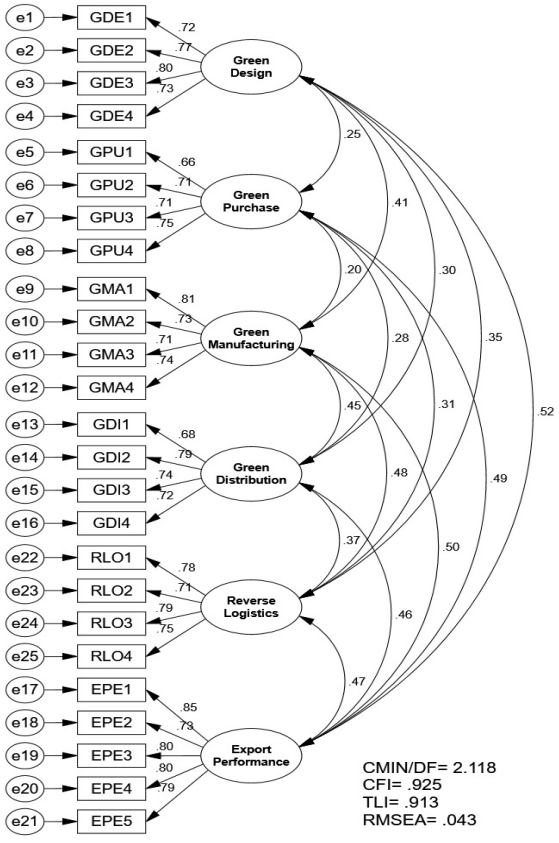

Fig. 2. Measurement Model Evaluation

The results in Fig. 2 demonstrated that the chi-square ratio to degrees of freedom (CMIN/DF) was lower than the accepted upper threshold of 3 (Zahran et al., 2023; Shi et al., 2022). The values of the comparative fit index (CFI) and the Tucker-Lewis index (TLI) were, respectively, 0.925 and 0.913. These values are considered appropriate as they are above the lower limit of 0.90 for both indicators (Montoya & Edwards, 2021). Moreover, the root mean square error of approximation (RMSEA) was below 0.08 the upper limit allowed for this indicator (Karunasingha, 2022). Therefore, these values were considered evidence that the measurement model for testing the impact of GSCM on the export performance was valid.

4.3 Descriptive Statistics

The descriptive statistics for the variables used in the research were extracted and presented in Table 2 by applying the indicators associated with theorems of central tendency and dispersion.

Table 2
Means, standard deviations, and correlations

Variables	M	SD	1	2	3	4	5	6
1- Green Design	3.72	.748	1					
2- Green Purchase	3.57	.935	.315*	1				
3- Green Manufacturing	3.69	.854	.524*	.294*	1			
4- Green Distribution	3.62	.912	.420*	.355*	.403*	1		
5- Reverse Logistics	3.64	.892	.377*	.318*	.397*	.443*	1	
6- Export Performance	3.65	.903	.624*	.593*	.651*	.606*	.615*	1

Note: *the correlation coefficients are significant at levels less than 0.05.

The results in Table 2 demonstrate that the dimensions of the GSC, according to the responses received from the research sample, were within the high and moderate relative importance levels. Green design (*M*= 3.72, *SD*= 0.748) ranked first, followed by green manufacturing (*M*= 3.69, *SD*= 0.854), both of which had a high relative importance level. As for the rest of the green supply chain dimensions, they were of moderate relative importance levels, as reverse logistics (*M*= 3.64, *SD*= 0.892) were classified in the third rank, followed by a green distribution (*M*= 3.62, *SD*= 0.912) in the fourth rank, and green purchase (*M*= 3.57, *SD*= 0.935) in the fifth and last rank. Regarding the export performance of the pharmaceutical industry in Jordan, the results confirmed that it was at a moderate relative importance level (*M*= 3.65, *SD*= 0.903). Moreover, the results of Table 2 show the correlation coefficients between the search variables that were all within a moderate correlation level. The correlation coefficients between the GSCP were within the range of (0.294-0.524), which is less than 0.80 the upper value of the correlation that includes the multicollinearity problem (Shrestha, 2020). Accordingly, the dimensions of the green supply chain did not include this problem and each dimension could express an independent factor of influence.

4.4 Hypotheses Testing

A structural model was developed via AMOS software to test the impact of GSCM on the export performance. Fig. 3 shows the results achieved for testing the constructional validity of the impact model by extracting the goodness of fit indices.

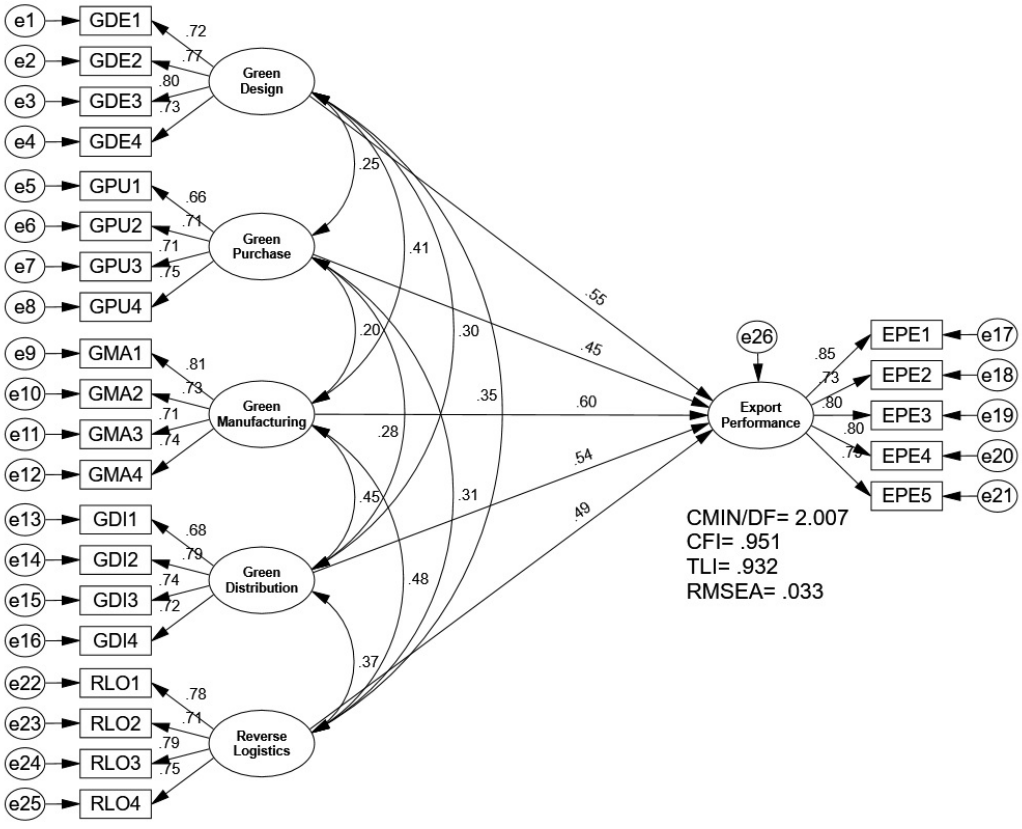

Fig. 3. Structural model for testing the research hypotheses

The results illustrated in Fig. 3 confirm that the structural model for testing the impact of GSCM on the export performance was characterized by appropriate levels of constructional validity. This result was established based on the values of the goodness of fit indices, where the chi-square ratio to degrees of freedom (CMIN/DF) was at the level of 2.007 which is less than the upper threshold 3 (Shi et al., 2022). The comparative fit index (CFI) and Tucker-Lewis's index (TLI) were respectively 0.951 and 0.932, which means they are greater than the lower limit of 0.90 (Montoya & Edwards, 2021). Moreover, the root mean square error of approximation (RMSEA) was smaller than the upper accepted limit of 0.08 (Karunasingha, 2022). On the other hand, Table 3 reports the results of the standardized and unstandardized impact coefficients to determine the impact of each dimension of the GSC on the export performance.

Table 3
Results of the effect coefficients

Effect Paths			B	S.E.	β	t	P*
Green Design	→	Export Performance	0.571	0.038	0.554	15.03	0.000
Green Purchase	→	Export Performance	0.488	0.045	0.446	10.84	0.025
Green Manufacturing	→	Export Performance	0.622	0.035	0.601	17.77	0.000
Green Distribution	→	Export Performance	0.538	0.037	0.536	14.54	0.003
Reverse Logistics	→	Export Performance	0.504	0.041	0.493	12.29	0.008

Note: *the effect is significant at levels less than 0.05.

It is evident from the results listed in Table 3 that the probability values (*P*) for all dimensions of the green supply chain were less than the level of 0.05, thus all of them had a statistically significant impact on the export performance. The highest impact was green manufacturing (β= 0.601, t= 17.77, p= 0.000), followed by green design (β= 0.554, t= 15.03, p= 0.000), then green distribution (β= 0.536, t= 14.54, p= 0.003), reverse logistics (β= 0.493, t= 12.29, p= 0.008), and finally green purchase (β= 0.446, t= 10.84, p= 0.025).

5. Conclusion and discussion

The study aimed to examine the influence of green supply chain practices on export performance. The current research targeted a population of decision-makers in pharmaceutical companies in Jordan. The Jordanian pharmaceutical industry is considered one of the oldest industrial sectors in the Arab region. The study results showed that green supply chain dimensions have influenced export performance of the pharmaceutical industry in Jordan.

Green design has a beneficial influence on export performance since it relates to ecologically friendly design principles. Companies may enhance their competitiveness and market attractiveness by introducing green elements into their products, particularly in regions where environmental concerns are prominent. Adopting green design may also assist businesses in meeting the norms and standards set by importing nations, increasing their chances of having their products approved in those markets. Furthermore, by implementing green design techniques, businesses may lower their environmental footprint and operational expenses, both of which can benefit their bottom line and overall export performance. According to one study conducted by Kim and Lee (2011), firms that embrace environmentally friendly practices have a competitive edge in foreign markets and are more likely to export their products. The study discovered a substantial positive association between environmentally friendly practices and export performance. (Lee & Kim, 2011). Another study, by Geng et al. (2017), found that enterprises that use green design are more likely to succeed in global marketplaces. The study discovered that firms with a strong commitment to green design were more likely to export their products and had greater export sales than firms with a weak commitment to green design. (Geng et al., 2017)

Green purchasing, or the selection and purchase of ecologically friendly items and services, can also have an influence on export success. Green buying practices may help companies enhance their reputation and brand image, which can assist raise demand for their products and services in the global market. Furthermore, green purchasing can result in cost savings because eco-friendly items often have a lower total cost of ownership due to their longer life spans and fewer maintenance requirements. Furthermore, certain governments may provide incentives to enterprises who engage in green buying, so increasing their export performance. It is crucial to note, however, that the specific influence on export success will vary depending on aspects such as industry, firm, and target market. According to Kim and Lee (2012), "Green supply chain management and organizational performance," green buying enterprises had higher export sales and a higher level of international competitiveness than non-green purchasing firms. The study looked at data from over 1,000 developing-country SMEs and discovered that green purchasing had a positive impact on SMEs' export performance, especially in countries where environmental concerns were high.(Lee et al., 2012). According to Geng et al. (2017)'s organizations who engaged in green purchasing were more likely to export their products and had greater export sales than companies that did not engage in green purchasing. The study discovered that green buying had a favorable influence on these firms' export success. The study also discovered that the influence of green buying on export performance was greater in markets with significant environmental concerns.(Geng et al., 2017)

Green manufacturing, which stresses environmental sustainability and environmentally friendly industrial techniques, improves export performance. Companies may cut manufacturing costs and increase their worldwide competitiveness by minimizing waste and emissions. Furthermore, as customer demand for environmentally responsible products grows, firms that use green manufacturing processes will be better positioned to satisfy shifting market demands. In certain circumstances,

nations provide incentives for green manufacturing, enhancing the export performance of enterprises that use these techniques. It is crucial to note, however, that the specific influence on export performance will differ based on a variety of factors such as the nation, industry, and firm. Green technology promotion and India's accession to the WTO will benefit expanded market access for product exports, increasing job possibilities, and forcing local enterprises to enhance efficiency, productivity, and capacity via increased competition.(Toke & Kalpande, 2019; Toke et al., 2012). The study reveals that green supply chain management has had a good and significant influence on export performance levels.(Al-Ghwayeen & Abdallah, 2018)

Green distribution strategies, such as the use of eco-friendly packaging materials, the reduction of waste in the supply chain, and the use of energy-efficient transportation techniques, may help a company's reputation and image in the global marketplace. This, in turn, can lead to increased customer loyalty and more demand for the company's products, increasing its export performance. Previous research has not explicitly explored the effect of GSCM on export performance. However, several investigations indirectly pointed to this impact and found a substantially favorable correlation. It claimed that using GSCM assures worldwide market competitiveness.(Al-Ghwayeen & Abdallah, 2018). Reverse logistics has the potential to improve export performance by lowering the costs of returns and enhancing customer satisfaction. Effective reverse logistics management may help a company's reputation by ensuring that returned items are handled properly, decreasing the time and expenses involved with returns, and lowering the chance of goods being damaged during transportation. This can result in enhanced client loyalty and more revenue, which can help a company's export performance. Furthermore, reverse logistics may assist businesses in recovering value from returned items, minimizing waste and increasing their bottom line. Overall, competent reverse logistics management may aid a company's worldwide competitiveness, leading to enhanced export performance. "An empirical study of dynamic capacities in managing strategic flexibility in manufacturing organizations" (Singh et al., 2013) The influence of reverse logistics on export performance in Indian manufacturing enterprises was investigated in this study. According to the findings, enterprises with efficient reverse logistics management systems reported lower costs connected with returns, more customer satisfaction, and increased revenues, resulting in improved export performance. The authors argue that good reverse logistics management may play a critical role in increasing a company's worldwide competitiveness and export success.(Singh et al., 2013). According to current research, when active resources are committed to reverse logistics projects, operations and supply chain managers should expect greater performance by destroying, recycling, refurbishing, and/or remanufacturing merchandise.(Skinner et al., 2008). GLM may be accepted as a beneficial resource to help organizations meet their increasing productivity goals while decreasing pollution and resource consumption.(Lai & Wong, 2012)

6. Recommendations

Based on the study results, the researchers recommend managers and decision makers of the pharmaceutical organizations to Create a policy outlining the organization's commitment to sustainability and outlining its aims and objectives for decreasing its environmental effect. Conduct a supply chain evaluation to identify opportunities for improvement and select actions that will have the greatest impact. Engage suppliers in promoting sustainability practices throughout the supply chain and encouraging them to use green supply chain management strategies. In addition to Implement logistics and transportation optimization measures such as combining shipments, minimizing the number of empty trips, and using more fuel-efficient vehicles, and Implement waste reduction strategies, such as recycling and packaging reduction, to reduce the quantity of trash created by the organization. Finally, encourage energy efficiency through implementing methods such as lowering energy usage in buildings, using renewable energy sources, and enhancing energy-efficient operations. By taking these measures, pharmaceutical companies may successfully apply green supply chain management techniques and enhance their sustainability performance while lowering costs and increasing market competitiveness.

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