Factors Affecting Managers' intention to Adopt Green Supply Chain Management Practices: Evidence from Manufacturing Firms in Jordan

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Abstract

Global sustainability movement encourages companies to adopt and implement Green Supply Chain Management (GSCM) practices across the organization. Moreover, the integration of green practices into traditional supply chain still to be a difficult task in manufacturing sector. However, empirical studies regarding the identification of influential factors affecting GSCM adoption among supply chain managers in manufacturing sector are under researched. This study assesses the factors affecting GSCM adoption in Jordan manufacturing firms. A well-structured questionnaire was administered for data collection. A valid 376 responses were collected from different manufacturing firms in Jordan. The data were analyzed, and the proposed model was validated using the Structural Equation Modelling (SEM) approach. Results reveal that four factors namely supplier, environmental, customer and cost factors significantly influence the intention to adopt GSCM among managers. The firm size had significantly moderated the relationship between market/financial and GSCM adoption, internal factor and GSCM adoption. The study will help the policymakers to understand the drivers of GSCM adoption among managers and assist them in implementing GSCM practices according to the size of the firm. This study is first of its kind to analyze the role of firm size as a moderator on the relationship between market/financial, supplier, governmental, environmental, internal, customers, cost factors and GSCM in the context of Jordon.

Keywords: Green supply chain management; managers intentions; Sustainable development; Manufacturing firms; Jordan

1. Introduction

Global industrialization has expanded energy and material consumption resulting in a variety of environmental issues such as high carbon emissions, toxic pollution, hazardous waste disposals, waste water, and other land contaminants, which have the most detrimental health effects (Ikram et al., 2019; Lin et al., 2020). The developed nations, which provided an environment for the

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movement of their high polluting industries to developing countries, is to be blamed for these environmental effects of the developing nations. In the meantime, recent increases in production and consumption have boosted supply chain operations, and as a result, environmental degradation has also been accelerated (Muduli et al., 2013). Government laws are being implemented, and nations all over the world are implementing and promoting environmental policies to reduce emissions by enhancing environmental performance and effectiveness (Jum'a et al., 2021; Wang et al., 2016). These rules apply to all sectors, including both manufacturing and service sectors. Following increased public concern for the environment around the world, businesses have been under increasing pressure to employ eco-friendly processes to produce eco-friendly goods (Govindan et al., 2016). In response to these pressures, a management approach called green supply chain management got attention (GSCM) has arisen (Zhu et al., 2008). Companies in a variety of sectors around the world are becoming more concerned about environmental degradation, since companies recognized that adoption of green technology has a positive effect on operations e.g. reducing energy-related costs and also has a great impact on suppliers and customers' relationships within company (Ikram et al., 2021; Lin et al., 2020).

Most businesses have adopted the GSCM practices and integrated in their business processes as long-term environmental responsibility (Masudin, 2019). GSCM strikes a balance between negative environmental effects, social advantages, and profit-generating operations that foster value along the so-called triple bottom line, which gives adopting businesses a competitive advantage (Tyagi et al., 2015). GSCM is an environmentally friendly principle that aims to increase environmental performance (Diabat and Govindan, 2011). According to Zhu et al. (2008), GSCM emerged as a way to connect aspects of supply chain management (SCM) and environmental management. Companies with a sustainable supply chain and activities are better

positioned in the market (Jum'a et al., 2021; Saade et al., 2019). Thus, green technology adoption in business operations has been recognized as having higher advantages, as well as affecting supplier and customer relationships within companies (Lin et al., 2020). Researchers and practitioners have focused heavily on GSCM adoption issues since GSCM adoption has a profound effect on an organization's environmental, social, and financial performance (Masudin, 2019). The increasing value of GSCM as a result of depleting raw material supplies, overflowing waste sites, and emission levels (Ikram et al., 2019; Mathiyazhagan et al., 2013), has gained attention to several researchers to investigate the factors that influence GSCM implementation.

Many factors such as include legal pressure, consumer awareness, human resource, support from senior executive and inter-operational companies which influence the transition from conventional SCM to GSCM (Choudhary and Sangwan, 2019; Mitra and Datta, 2014). According to the study of de Sousa Jabbour et al. (2013), analyzed the positive relationship of firm's size, the effective implementation of Environmental Management Systems (EMS) such as ISO 14001, and the of harmful substances have a with the adoption of GSCM procedures.. Prior studies investigate the pressures, techniques, and performance measurement of GSCM (Bai et al., 2012; Choudhary and Sangwan, 2019; Ferreira et al., 2016; Mathivathanan et al., 2018; Sarkis et al., 2010; Shibin et al., 2016). Although GSCM has been studied for developed and developing countries, there is gap in literature about the adoption of GSCM practices in developing countries such as Jordan (Balasubramanian et al., 2020; Mitra and Datta, 2014). The emissions of air pollutants from manufacturing activities in hot spot areas such as free industrial sites are the main source of air pollution in Jordan (European Environment Agency, 2014). In addition, Jordan has large industries that generate pollution and may cause heavy air pollution if their emissions are not controlled properly. This leads to in an increase in pollutants levels in ambient air and consequently causes

degradation of the air quality in many areas and harmfully impacts the public health (European Environment Agency, 2014). As per author best knowledge this study is first of its kind to investigate factors affecting firm' intentions to adopt GSCM practices in context of Jordan manufacturing firms. Moreover, recent studies has shown increasing interest in investigating the role of firm size in adopting GSCM practices. It has been revealed that GSCM practices is lagging for organizations of all sizes and that there are differences in the level of GSCM adoption based on the firm size (Balasubramanian et al., 2020; Mitra and Datta, 2014; Vijayvargy et al., 2017). Therefore, this study seeks to investigate whether there is a link between firm size and intentions to adopt GSCM practices. Consequently, the study intends to compare the results with the conclusions draw by prior studies, and to provide implications for manufacturers on the steps needed to be taken to facilitate the adoption of GSCM practices among Jordan firms to a greater extent. So, this study will fill the gap and will help to define the factors which influence the intention of the managers to adopt GSCM in their companies.

This study contributes in various ways. First, this study fills the literature gap by developing the comprehensive framework to investigate the influencing factors that affect the adoption intention of GSCM practices among supply chain managers. As per the author best of knowledge this study is first of kind to analyze the role of firm size as a moderator on the relationship between market/financial, supplier, governmental, environmental, internal, customers, cost factors and GSCM in the context of Jordon. Further, this study uses the application of Structural Equation Modelling to check the relationship between construct and latent variables. Finally, this study proses policy guidelines for decision makers and managers to focus on the most important issues that assist them in implementing GSCM practices according to the size of the firm.

The rest of paper is organized as follows. First, a review of related literature is undertaken, followed by the development of theories and a conceptual model. Following that, research methods are described, including sampling, data collection, study measurement, data analysis plans. The study's findings and interpretations are then summarized. The study's next section is discussion, which gives a clear explanation of current findings and how they relate to previous studies. At the end of the segment, a conclusion is drawn after discussing the study's limitations.

2. Literature review

2.1 Green Supply Chain Management (GSCM)

In this section the prior studies in the fields of adoption of GSCM and so on are reviewed. Zhu et al. (2008) observed whether organizations in China vary in adopting GSCM practices based on the firm's size. They undertook the comparative analysis of five practices of GSCM among small, medium and large-sized organizations. The results showed that organizations vary in adopting GSCM practices where medium and large-sized firms were more progressive in the adoption of some GSCM practices compared to small-sized firms. de Sousa Jabbour et al. (2013) investigated the impact of the factors including firm size, EMS, hazardous materials as inputs and supply chain structure: bargaining power on GSCM adoption. Moreover, all the elements except the bargaining power of a supply chain member were positively associated with the adoption of GSCM practices. The commitment of top management, the linkage of performance with reward, effective organizational communication, in house training on green adoption, employee empowerment, team building, mutual trust and respect, minimizing the barriers to adopt change, green motivation and strategic planning toward green innovation are some of the behavioral factors that were assessed to detect their effects on GSCM practices (Muduli et al., 2013). After examining several drivers of GSCM practices, Govindan et al. (2016) found that top management

commitment for green practices and competitiveness were the two most influential drivers and on the other hand, the least significant driver was employee pressure.

According to the study of Saade et al. (2019), the adoption of GSCM practices help organizations to capture new market opportunities at national and international level, which turn in to motivate the market to go green and attraction for employees. Moreover, GSCM adoption was impeded by external stakeholder pressure and a lack of government support. Lin et al. (2020) assessed the impact of technological innovation, organizational, and environmental factors on GSCM adoption where the results showed that perceived relative advantage, perceived cost, top management support, complexity, compatibility, firm size, customer pressure, regulatory pressure, and human resource were significantly related to GSCM adoption. Mathiyazhagan et al. (2018) identified and prioritized several factors that drive the implementation of GSCM. The most significant category was found as government, followed by market, supplier, customer, internal drivers, and finally environment. Asif et al. (2020) diged out three high priority drivers of GSCM adoption including government regulations, customer demands, and supplier performance.

Researchers have long considered SCM, but it was not until the early 2000s that the emphasis shifted to GSCM. GSCM is defined as a set of business practices that continuously monitor and improve a supply chain's environmental impact (KAFA et al., 2013; Vanalle et al., 2017). It is also characterized as incorporating environmental considerations into SCM, which includes product design, material sourcing and selection, manufacturing procedures, final product delivery to customers, and product end-of-life management (Asif et al., 2020; Srivastava, 2007). The green operations are incorporated into the supply chain's overall management phase. According to Andiç et al. (2012), the incorporation of green supply chain necessitates in business processes minimizing or attempting to eliminate the supply chain's negative environmental effects.

GSCM is a complex process, involving a large number of stakeholders such as vendors, manufacturers, dealers, retailers and clients (Saade et al., 2019). Strategic and operational business policies such as internal environmental management, green acquisition, customer relationship management, and eco-design should all be part of GSCM practices (Sinaga et al., 2019). GSCM has been described as a valuable measure for improving the enterprise's ecological performance and reducing environmental risk (Abid et al., 2021; Mangla et al., 2014a). The adoption of green practices in SCM also aids in the improvement of business enterprises' and their partners' ecological competence (Wang et al., 2016). Managers of different firms adopt GSCM by getting influenced by ecological competencies. Also, by incorporating GSCM, the managers of the manufacturing firm would be able to fulfil society's standards for environmental conservation during the product lifecycle (Jum'a et al., 2021; Wu et al., 2011). According to the framework developed in this study several factors would enable companies to adopt GSCM practices as GSCM has become a popular topic of interest for researchers and industrial practitioners. The factors include government factor, supplier factor, market factors, environmental factor, customer factor, cost factor, internal factor (Asif et al., 2020; Diabat and Govindan, 2011; Hassan et al., 2016; Kim and Adilov, 2012; Mathivathanan et al., 2018; Muduli and Barve, 2013; Van den Berg et al., 2013).

2.2 Factors affecting intention to adopt GSCM

2.2.1 Market/financial factor

GSCM has played an influential role in the development of sound economic-environmental performance on different levels of the industry over the last few years (Centobelli et al., 2020; Rao and Holt, 2005). In terms of the financial implications, it demonstrates that there is a direct link between the adoption of green production and green logistics, all of which are GSCM components,

and the financial success of the organization (Tippayawong et al., 2015).GSCM assists the companies in portraying itself and its goods as environmentally conscious in the minds of consumers (Diabat and Govindan, 2011). Government tax credits are available for green construction, both industrial and residential (Arif et al., 2009). Moreover, with rising energy costs, a green building's reduced construction and operating costs raise the property value. Further, buildings that are energy-efficient use less electricity from the municipal grid and water supply, allowing local facilities to expand (Mathiyazhagan et al., 2018). Further, it's related to Phuah and Fernando. (2015) report's, which showed that the main goal of implementing GSCM is to achieve a combination of financial and environmental supply chain success. To do so, it based on the above statements, the following hypothesis is concluded:

H1: Market/financial factor significantly affect intention to adopt GSCM

2.2.2 Supplier factor

Integrating suppliers into EMS is known as GSCM (KAFA et al., 2013; Vanalle et al., 2017). Suppliers and distributors' guiding force represents the whole supply chain's common demands for GSCM improvement (Zhu and Xu, 2019). Suppliers play a critical role in improving green supply chain efficiency (Mangla et al., 2014a). Suppliers may assist in the provision of useful ideas that can be used both before and after the building process (Mathiyazhagan et al., 2014). According to the study of Mitra and Datta (2014), supplier collaboration for environmental protection has a significant effect on environmentally friendly product design and logistics, which in turn is positively linked to the firm's productivity and economic efficiency(Ikram et al., 2021). Integration and cooperation with the designer of products with supply chains aids in the successful handling of environmental problems (Govindan et al., 2014). Vendors in the design process and technology suppliers are often hesitant to make the transition to GSCM, this behaviour has an

impact on the supply chain's overall efficiency (Govindan et al., 2014). Zhu and Xu, (2019) observed that GSCM adoption by suppliers and distributors will reduce the risk and complexity of target enterprises' green orientation, thus growing their passion for GSCM. A company's collaboration with its suppliers to achieve environmental objectives of reducing the environmental footprint of the supply chain will motivate all parties to follow GSCM practices (Somsuk and Laosirihongthong, 2017). Based on the above statements, the following hypothesis is concluded:

H2: Supplier factor significantly affect intention to adopt GSCM

2.2.3 Governmental factor

According to the research conduction by Mathiyazhagan et al. (2013), the two most important drivers for the implementation of GSCM are "central governmental environmental regulations" and "regional environmental regulations," which are at the bottom of the hierarchical structure. Government entities are among the most visible stakeholders influencing companies' adoption of environmental practices (Delmas and Toffel, 2004; Vanalle et al., 2017). Government regulations and legislations serve as drivers that enable organizations to restrict the use of non-renewable energy and to limit greenhouse gas emissions (Rehman et al., 2021; Balaji et al., 2014). The government not only offers capital for businesses to buy renewable production equipment but also provides sustainable energy advisory services (Ikram et al., 2020b; Wu et al., 2012). As a result, government intervention will assist businesses in removing barriers to environmental protection (Darnall and Edwards Jr, 2006; Vanalle et al., 2017). According to the statement of Lee, (2008), governments will attract businesses by providing tax breaks and capital improvements for environmentally friendly complexes. Delmas, (2002) and Ikram et al. (2020) also discovered that governments play a significant role in a company's decision to follow ISO 14001 standards.

Adoption of ISO 14001 standards ensures the compliance of the government rules and regulation regarding the environment by the companies.

The legal profession should concentrate on ensuring regulatory compliance with government regulations while also emphasizing the importance of environmental concerns across the product's life cycle (Saade et al., 2019). GSCM will be an incentive to maintain constant control and monitoring of the company's environmental impact, as well as to ensure compliance with rules (Gandhi et al., 2015). Government policies and schemes, both at the national and state level, are one of the most important factors in encouraging businesses to start green initiatives (Mangla et al., 2014b). So, based on the above statements, the following hypothesis is concluded:

H3: Governmental factors significantly affect intention to adopt GSCM

2.2.4 Environmental factor

Environmental certifications such as ISO 14001, EMAS, ECO-Label are critical because they serve as the first step toward a green initiative (Diabat and Govindan, 2011; Jum'a et al., 2021). GSCM procedures are activities or actions that would minimize the environmental effects of industrial operations while maintaining quality, competitiveness, and operating costs (Golicic and Smith, 2013). Green supply chains ensure that all of an organization's usable productive resources are used sustainably (Bhool and Narwal, 2013). Construction and demolition generate a significant amount of toxic waste. In GSCM, as building deconstruction is used instead of complete demolition, waste generation is drastically reduced (Ghazilla et al., 2015). Eco-packaging, sustainable distribution, and waste disposal are deemed drivers for businesses to improve their environmental efficiency in the field of GSCM (Andalib Ardakani and Soltanmohammadi, 2019; Rao, 2002). González et al. (2008), conducted a study of Spanish car

manufacturers, proposed that an environmental management system, particularly ISO 14001 and adequate environmental management practices, are positively correlated.

Environmental management refers to long-term management techniques that seek to engage in green processes and procedures to reduce the environmental effects of a company's operations (Gotschol et al., 2014). GSCM helps to minimize the environmental impact of production operations through paradigm shifts and create profits in companies by balancing economic and environmental sustainability (Zhu et al., 2007). Darnall et al. (2008) conducted a study and found that the adoption of EMSs assists the organization to incorporate sustainable supply chain practices and procedures, implying that the EMS is a catalyst for GSCM. Moreover, the prior registration of EMS is it is more likely to follow GSCM procedures (Abid et al., 2021; de Sousa Jabbour et al., 2013). So, based on the above statements, the following hypothesis is concluded:

H4: Environmental factor significantly affect intention to adopt GSCM

2.2.5 Internal factor

Internal green management practices at the organizational level assess the degree to which businesses are evident in environmental protection activities that are the responsibility of various stakeholders (Lai and Wong, 2012). The internal dimensions of green management also include procedures such as departments' environmental auditing, environmental monitoring, overall management of environmental quality, communication and training and certification of ISO 14001 (Ikram et al., 2019; Shaw et al., 2010). Companies that implement internal sustainability policies can minimize future environmental emissions by using safe products, recycling discarded components, and properly disposing of exhausted equipment (Wang et al., 2018). According to

263 Luthra et al. (2016), personal intention at the top and middle management levels are needed to
264 accelerate the successful application of GSCM. It is widely assumed that senior management
265 support is required and, in many cases, a key driver for the effective adoption and implementation
266 of most inventions, technology, programs, and activities (Yu and Ramanathan, 2015). Alananzeh
267 et al. (2017) found that personal intentions and behaviour at the workplace play a vital role in
268 effectively implementation of GSCM practices. Thesuccessful application of GSCM necessitates
269 collaboration across disciplines (Masudin et al., 2018). Internal green management is becoming
270 more widely regarded as a systemic and comprehensive approach to producing superior
271 environmental results (Zhu et al., 2008). So, based on the above statements, the following
272 hypothesis is concluded:

273 *H5: Internal factors significantly affect intention to adopt GSCM*

274 **2.2.6 Customer factor**

275 Customers are externally focused drivers of the adoption of green supply chain policies
276 (Wang et al., 2018). Customers are the most significant variable influencing environmental
277 management policies (Walker et al., 2008). The demand for green goods has surged as a result of
278 increased consumer awareness (Jum'a et al., 2021; Rao and Holt, 2005). When customers desire
279 and expect an environmentally sustainable product, an organization will go to great lengths to meet
280 those demands and implement GSCM practices (Luthra et al., 2015). A study of Brazilian
281 electrical/electronic businesses conducted by Govindan et al. (2013), discovered that cooperation
282 with customers for eco-design practice is the root practice driving other green practices. Moreover,
283 customer pressure is the second most quoted source of pressure to implement an environmental
284 management plan, trailing only government pressure (Delmas and Toffel, 2004; Vanalle et al.,
285 2017). Customers should also promote environmentally friendly practices by educating their

supply chain partners. The proximity of the supply chain's final consumer is an essential factor that influences an organization's environmental proactivity (de Sousa Jabbour et al., 2013). As customers have the market power to make green practices more widely adopted, they may encourage businesses to embrace green policies by putting pressure on the corporation (Jayaram and Avittathur, 2015). So, based on the above statements, the following hypothesis is concluded:

H6: Customer related factor significantly affect intention to adopt GSCM

2.2.7 Cost factor

Combining SCM and green practices offers an excellent opportunity to minimize costs while also addresses environmental problems (Zhu et al., 2012). Green supply chain practices result in cost cuts and increased profitability for companies rendering them competitive in creating long-term strategic advantages (Vanalle et al., 2017). Baumann- et al. (2013) stated that larger businesses have lower overall overhead costs than small businesses, and the cost savings from green practices are more relevant for big businesses. Companies will be more likely to accept GSCM because it would make it easier to take advantage of all available economic savings opportunities, increase the possibility of attracting investors, obtain bank loan eligibility, and take advantage of grant opportunities.It has been proposed that buying eco-friendly products will significantly raise costs and reduce the buying company's productivity from the viewpoint of purchasing management (Wang et al., 2018). Moreover, overall cost savings across the supply chain may require a considerable investment needed to launch an environmental program. The high initial cost required to implement various green methodologies such as green design, green manufacturing and green labelling of packaging. Previous studies suggested that long-term and life-cycle cost analysis would aid in the effective operation of an environmental program. So, based on the above statements, the following hypothesis is concluded:

H7: Cost factor significantly affect intention to adopt GSCM

2.2.8 Firm size as a moderator

Organizational size has traditionally been used as a control variable in studies of organizational size and environmental relationships (Zhu et al., 2008). According to Zhu et al. (2007), firm size can influence the majority of the relationships between GSCM practice and results. The factors that influence green manufacturing adoption vary depending on the size of the company (Masudin, 2019). Small and large businesses, as anticipated, vary in their perceptions of the impact of cost factors on internal and external green practices (Wang et al., 2018). According to the study of Schrettle et al. (2014), firm size can also influence the drivers-practices relation. The GSCM acceptance rate in firms of various sizes was contrasted by (Zhu et al., 2008), who found that big companies follow GSCM activities more vigorously than small companies. For controlling their supply chains, larger corporations are gradually adopting sustainable policies such as corporate social responsibility (Welford and Frost, 2006). According to Vijayvargy et al. (2017), medium-sized companies have implemented GSCM procedures that are similar to those of large enterprises, with three exceptions such as current environmental management programs, funding from mid-level and top management, and supplier assessment for environmental practice. González et al. (2008) conducted a study on automotive companies in Spain and found that as client/buyer companies grow in size, so do environmental pressures on suppliers. Samll size businesses may continue to follow new environmental strategies as information, processes, systems, and rituals in the business-natural environment interface become more commonly disseminated (Centobelli et al., 2020; Sharma, 2000). The conceptual model which is utilized in this study presented in figure 1. According to the discussion, the following hypotheses is formulated:

H8a: *Firm size significantly moderate the relationship between market/financial factor and managers' intention to adopt GSCM*

H8b: *Firm size significantly moderate the relationship between supplier factor and managers' intention to adopt GSCM*

H8c: *Firm size significantly moderate the relationship between governmental factor and managers' intention to adopt GSCM*

H8d: *Firm size significantly moderate the relationship between environmental factor and managers' intention to adopt GSCM*

H8e: *Firm size will significantly moderate the relationship between internal factor and managers' intention to adopt GSCM*

H8f: *Firm size will significantly moderate the relationship between customer factor and managers' intention to adopt GSCM*

H8g: *Firm size will significantly moderate the relationship between cost factor and managers' intention to adopt GSCM*

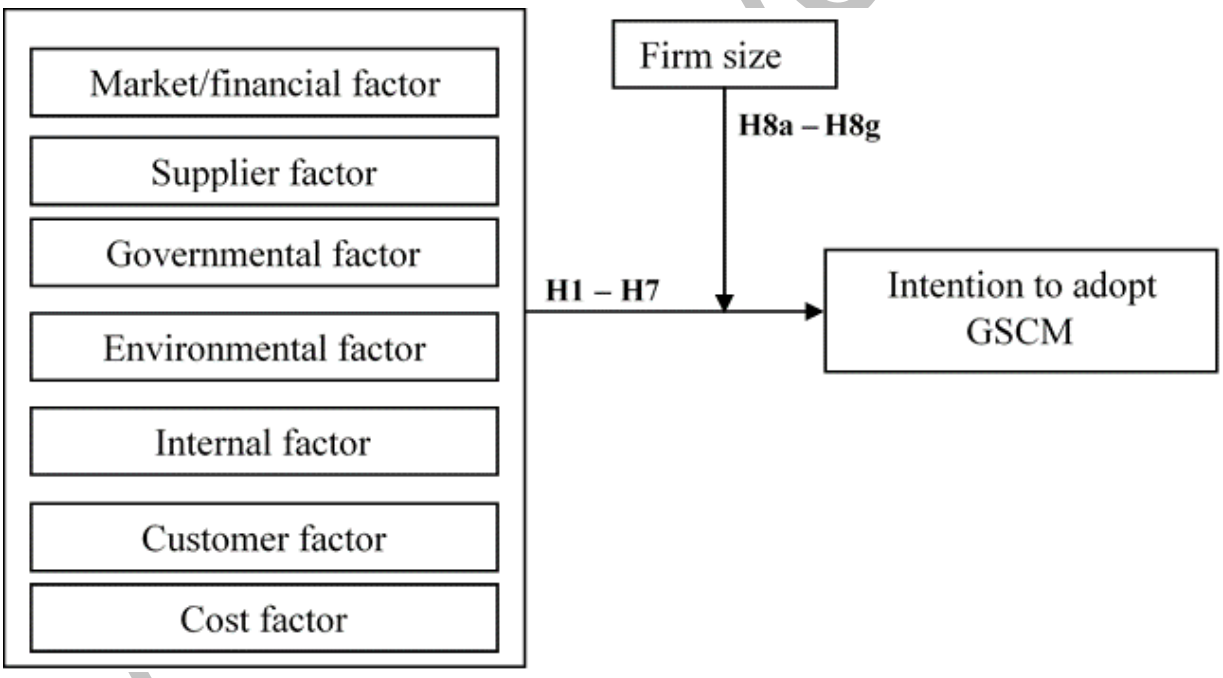

Figure 1. Conceptual framework

3. Research Methodology

3.1 Sampling and data collection

The target population for this study was Jordanian manufacturing firms. The data of managers from manufacturing companies located in Amman are included in the sampling frame. A detailed breakdown of the respondents' profiles is presented in section 3.2. The specific manufacturing firm served as the unit of analysis. Malhotra, (2010) noted that the population parameter can also be estimated to some extent by non-probability sampling. A well administered questionnaires approach was used through web based online survey for data collection in this study. The sample size was determined in this study based on the guidelines of Hair et al. (2019), which was 200 and above. The respondents were reminded softly via telephone and emails. A total of 387 valid responses were received from the participants in the survey.

3.2 Profiles of the respondents

The participants were from numerous sectors including chemicals, construction, food and supply, furniture, garments, mining and minerals, plastic products, printing and paper, therapeutics. Figure 2 shows that the highest participation was received from the "Food and supply" sector (n = 73 or 18.9%). On the other hand, the lowest participation was received from the "Furniture" sector (n = 23 or 5.9%).

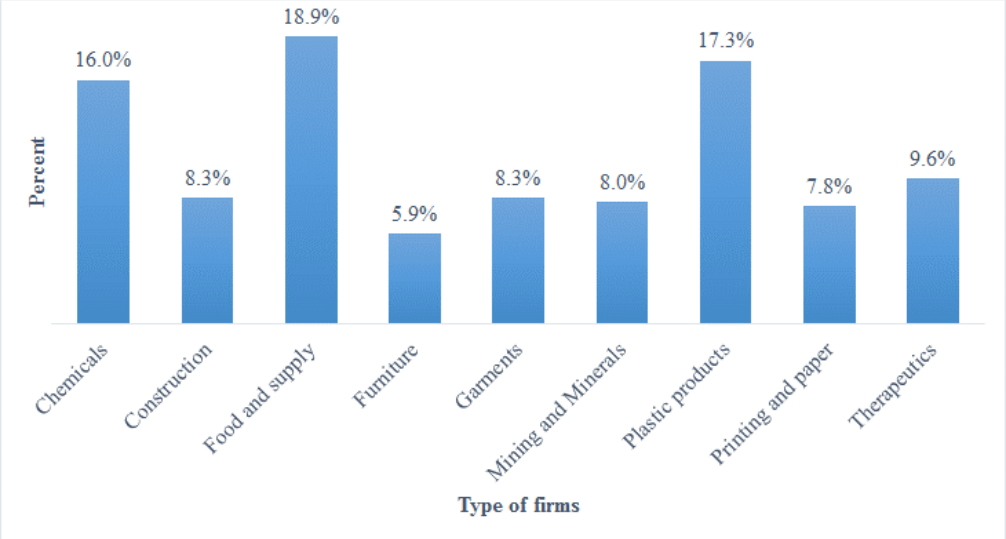

Figure 2. Type of firms

Moreover, other characteristics of the respondents including gender, age, years of experience, education level, position and number of employees or firm size were shown in table 1.

Table 1. Respondents' characteristics details

attribute	Sub-attribute	Frequency (n)	Per cent (%)
Gender	Male	327	84.5
	Female	60	15.5
Age	21 – 30 years	110	28.4
	31 – 40 years	163	42.1
	41 – 50 years	67	17.3
	Above 50 year	47	12.1
Years of experience	Less than 5 Years	119	30.7
	5-10 Years	174	45.0
	More than 10 Years	94	24.3
Education level	Diploma degree	30	7.8
	Bachelor's degree	284	73.4
	Master's degree and above	73	18.9
Position	First-line managers	247	63.8
	Middle managers	87	22.5
	Top managers	53	13.7
Number of employees/ firm size	Small (Less than 20)	122	31.5
	Medium (20 - 99 employees)	172	44.4
	Large (100 employees) and more	93	24.0

3.3 Measurement scale

The study adopted measurement items related to the latent variables from relevant past studies where these items were found to have reliability and validity. The details of construct and measurement items are presented in table 2. The first segment of the questionnaire includes general demographic data from respondents. The second section included measurement items related to the study variables. Items related to market/financial factor, supplier factor, governmental factor, environmental factor, internal factor and customer factor were adopted from (Mathiyazhagan et al., 2018). Besides, items related to cost factor and intention to adopt GSCM were adopted from (Lin et al., 2020). All the items were measured using a 5-point Likert scale ranging from not at all important (1) to extremely important (5) for independent variables and strongly disagree (1) to strongly agree (5) for the dependent variable.

Table 2. Constructs and measurement items

Constructs	Measurement items	Scale	Sources
Market/finance	● Establishing firm's green image locally and globally ● Tax Incentives ● Increased property values ● Decreased infrastructure strain	5-point Likert scale from 'Not at all important' (1) to 'extremely important' (5)	(Mathiyazhagan et al., 2018)
Supplier	● Firm's awareness and advances in providing environment-friendly packages ● Firm's environmental collaboration with suppliers ● Collaboration between product designer and supplier		
Government	● Environmental management certification ● Adapting to regulation and reducing risk ● Anticipation of government regulations ● Government rules and legislation		
Environment	● Sustainable use of natural resources, construction material and equipment ● Reusing and recycling construction materials. ● Waste reduction ● Emissions reduction		
Internal factor	● Firm's environmental mission ● Investors and shareholders' pressure ● Increased employee/labour productivity ● Support from top managers		
Customer	● Society or public pressure ● Customer/Client awareness and pressure		

	• Improve the image of the construction industry		
Cost	• Initial set up cost • Additional staff for adopting GSCM • Justification of benefits and costs	5-point Likert scale from 'Not at all important' (1) to 'extremely important' (5)	(Lin et al., 2020)
Intention to adopt GSCM	• Our company intends to adopt GSCM • Our company intends to use GSCM regularly in the future • Our company would highly recommend GSCM for other companies to adopt	5-point Likert scale from strongly disagree (1) to strongly agree (5)	(Lin et al., 2020)

3.4 Plan of data analysis

The data were preliminary analyzed using descriptive statistics and assessment of multicollinearity in SPSS version 25. After that, SEM was performed using a partial least square (PLS) approach in SmartPLS version 3. Structural equation modelling included the assessment of the measurement model and the structural model. Finally, the proposed hypotheses were tested with the results of structural model analysis.

4. Results

4.1 Descriptive statistics

Descriptive statistics include determining mean, standard deviation, skewness and kurtosis values of the latent variables. Before performing the analysis, single composite scores were calculated for each of the latent variables by averaging their associated items. As shown in table 3, the results showed that the market/financial factor generated the highest mean value (M = 4.1596, SD = 1.05387). On the other hand, the cost factor generated the lowest mean value (M=2.8605, SD = 1.12441). Skewness and kurtosis analysis used to test normality of the data, where skewness represents distribution symmetry. The negative value means skewed to the left and positive value means skewed to the right. Kurtosis refers to if the data are peaked or flat. A negative value of kurtosis means that the distribution is flatter than a normal curve with the same

mean and standard deviation while a positive value of kurtosis indicate that a distribution is peaked and possess a thick tail (Ahad et al., 2011). Acceptable values of skewness fall between -3 and +3, and kurtosis is appropriate from a range of -10 to +10 when utilizing SEM (Wood, 2008).

Table 3. Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
Latent variables	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Market/financial factor	387	4.15	1.053	-1.841	.124	2.268	.247
Supplier factor	387	3.53	1.309	-.883	.124	-.531	.247
Governmental factor	387	3.98	.941	-1.902	.124	3.197	.247
Environmental factor	387	4.03	.932	-2.004	.124	3.158	.247
Internal factor	387	3.78	.886	-1.589	.124	2.558	.247
Customer factor	387	3.88	1.045	-1.287	.124	1.122	.247
Cost factor	387	2.86	1.124	-.402	.124	-1.252	.247
Intention to adopt GSCM	387	3.65	1.245	-.913	.124	-.258	.247

4.2 Testing of Multicollinearity

The path coefficients that are estimated in the statistical analysis may be affected by high correlations among the independent variables. To detect multicollinearity, the variance inflation factor (VIF) and tolerance values were used. As shown in table 4, there was no such multicollinearity since all of the VIF values are less than 5 (ranging from 1.878 to 1.217) and the tolerance is greater than 0.10 (ranging from .822 to .532) (Hair et al., 2019)

Table 4. Collinearity Statistics

Latent variables	**Intention to adopt GSCM**	
	Tolerance	VIF
Market/financial factor	.581	1.721
Supplier factor	.748	1.338
Governmental factor	.582	1.719
Environmental factor	.532	1.878
Internal factor	.575	1.739
Customer factor	.756	1.322
Cost factor	.822	1.217

4.3 Assessment of the measurement model

The measurement model analysis defines the relationship between observed variables (measurement items) and latent variables (Hair et al., 2019). Several numerical values of measurement instruments were collected from the study participants to quantify the latent variables. As a result, the measurement items' reliability and validity must be determined. The proposed model was evaluated with SmartPLS version 3.0 using a partial least square structural equation modelling (PLS-SEM) technique (Ringle et al., 2015).

4.3.1 Convergent validity and reliability

Cronbach's alpha and composite reliability (CR) were used to evaluate the reliability of the latent variables. If the value of CR greater than 0.7, which shows the reliability of latent variables (Hair et al., 2019). Table 5 showed the results of Cronbach's alpha and CR values for all latent variables were greater than 0.70, indicating that reliability had been ensured. Following that, convergent validity is assessed by the factor loading values greater than 0.70 and average variance extracted (AVE) which value greater than 0.50. (Hair et al. 2019). All factor loading values were greater than 0.70 and AVE values were above 0.50 thus, appropriate.

Table 5. Results of measurement model analysis

Latent variables	Items	Factor loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Market/financial factor	M1	0.958	0.958	0.970	0.888
	M2	0.929			
	M3	0.938			
	M4	0.945			
Supplier factor	S1	0.973	0.971	0.981	0.946
	S2	0.981			
	S3	0.964			
Governmental factor	G1	0.929	0.942	0.958	0.851
	G2	0.917			
	G3	0.894			
	G4	0.949			
Environmental factor	E1	0.935	0.946	0.961	0.861

	E2	0.934			
	E3	0.924			
	E4	0.918			
Internal factor	Intern1	0.920	0.924	0.946	0.816
	Intern2	0.946			
	Intern3	0.937			
	Intern4	0.802			
Customer factor	Cus1	0.974	0.976	0.984	0.955
	Cus2	0.982			
	Cus3	0.975			
Cost factor	Cost1	0.963	0.966	0.978	0.937
	Cost2	0.973			
	Cost3	0.967			
Intention to adopt GSCM	Inten.1	0.966	0.942	0.963	0.896
	Inten.2	0.947			
	Inten.3	0.927			

4.3.2 Discriminant validity

Discriminant validity is reached when the square roots of the AVE are greater than the coefficients of correlation between all constructs (Fornell and Larcker, 1981). The diagonal values reflected the AVE's square root, whereas, the off-diagonal values represented inter-construct correlations. As shown in table 6, all of the square roots of AVE values were greater than the correlation coefficients between all of the constructs. As a result, the discriminating validity of the latent factors was established.

Table 6. Discriminant validity (Fornell-Larcker Criterion)

Latent variables	1	2	3	4	5	6	7	8
1. Cost factor	0.968							
2. Customer factor	0.200	0.977						
3. Environmental factor	0.333	0.109	0.928					
4. Governmental factor	0.301	0.217	0.563	0.923				
5. Intention to adopt GSCM	0.454	0.489	0.266	0.273	0.947			
6. Internal factor	0.289	0.130	0.554	0.541	0.204	0.903		
7. Market/financial factor	0.333	0.216	0.547	0.478	0.241	0.530	0.943	
8. Supplier factor	0.210	0.465	0.086	0.178	0.338	0.048	0.219	0.973

4.4 Assessment of the structural model

In order to build robustness for the estimated results, the study performed skewness and kurtosis analysis to test the normality of data. Robust corrections to standard errors and test statistics have wide applications in SEM. However, the SEM development was to account for the effect of nonnormality (Tong et al., 2014).Therefore, acceptable values of skewness and kurtosis were achieved to indicate the normality of the data. Moreover, multicollinearity test was performed to detect if path coefficients may be affected by high correlations among the independent variables. Furthermore, the convergent and discriminate validity analysis are conducted to make sure that every variable explains the most percentage of variation in the constructs and degree that every variable is different than other variable (Hair et al., 2019). After the validity of the complete measurement, the model has been checked, the structural model is run (Hair et al., 2019). The structural model analysis is used to test the hypotheses that were proposed. The structural model results either endorse or reject the formulated hypotheses that explain the relationship among variables (Byrne, 2013; Weston and Gore, 2006). In this study, a bootstrapping method with a subsample of 500 was used to estimate the structural model (Ringle et al., 2015). Figure 3 depicts an approximation of the proposed model.

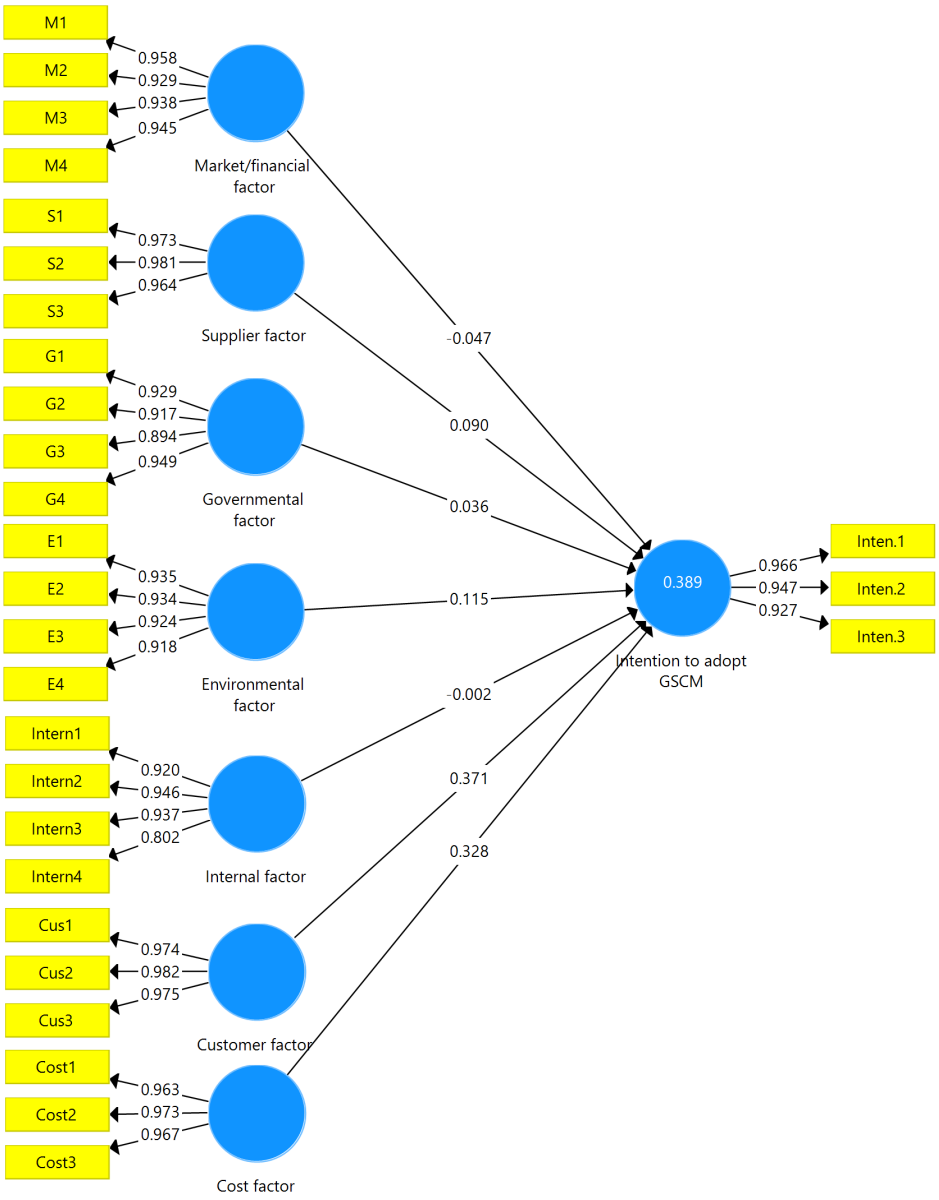

Figure 3. Structural model diagram

Table 7 presented the structural model analysis results, including path coefficients, t statistics, and p values. The results showed that four out of seven factors had a significant and positive impact on the intention to adopt GSCM. Customer and cost factors were significantly related to GSCM adoption intention at $p<0.05$. Besides, supplier and environmental factors were significantly related to GSCM adoption intention at $p<0.10$. As a result, hypotheses H2, H4, H6

and H7 were supported. Among all the factors, the customer factor had the largest effect on intention of GSCM adoption (beta=0.371) indicating that when GSCM adoption intention will be increased by 0.371 standard deviation unit if customer factor is increased by 1 standard deviation unit.

R^2, f^2 and Q^2 values can also be used to evaluate the predictive powers of the factors (Hair et al., 2019). The overall R^2 (0.389) value indicated a small to medium effect. The f square values of cost factor (0.144) and customer factor (0.170) indicated medium effects and on the other hand, other factors showed small effects. The Q^2 value of 0.336 showed the predictive relevance of the exogenous constructs (e.g., all the seven factors) since it is greater than zero (Hair et al., 2019).

Table 7. Results of structural model analysis

Paths	Path coefficients (β)	T Statistics	P Values	Results
Market/financial factor -> Intention to adopt GSCM	-0.047	0.732	0.464	Insignificant
Supplier factor -> Intention to adopt GSCM	0.090	1.828	0.068*	Significant
Governmental factor -> Intention to adopt GSCM	0.036	0.677	0.499	Insignificant
Environmental factor -> Intention to adopt GSCM	0.115	1.966	0.050*	Significant
Internal factor -> Intention to adopt GSCM	-0.002	0.034	0.973	Insignificant
Customer factor -> Intention to adopt GSCM	0.371	7.540	0.000**	Significant
Cost factor -> Intention to adopt GSCM	0.328	6.936	0.000**	Significant

Note: **p<0.05, *p<0.10, based on two-tailed test; t=1.96

The results of the moderation analysis were shown in Table 8. Firm size significantly moderated the effects of two factors on the intention to adopt GSCM. The effect of market/financial factor on intention to adopt GSCM was significantly moderated by firm size at p<0.05. Besides, the effect of an internal factor on intention to adopt GSCM was significantly

moderated by firm size at p<0.10. As a result, there was sufficient evidence to support hypotheses H8a and H8e.

Table 8. Results of moderation analysis

Paths	Path coefficients (β)	T Statistics	P Values	Results
Market/financial factor*firm size	.115	2.194	.029**	Significant
Supplier factor*firm size	-.072	-1.531	.127	Insignificant
Governmental factor*firm size	-.024	-.448	.654	Insignificant
Environmental factor*firm size	.085	1.497	.135	Insignificant
Internal factor*firm size	-.100	-1.788	.075*	Significant
Customer factor*firm size	.037	.775	.439	Insignificant
Cost factor*firm size	-.036	-.805	.422	Insignificant

Note: **p<0.05, *p<0.10, based on two-tailed test; t=1.96

As shown in figure 4, firm size positively moderated the relationship between market/financial factor and GSCM intention. In other words, large firms with a higher score in market/financial factor tend to adopt GSCM more compared to small firms.

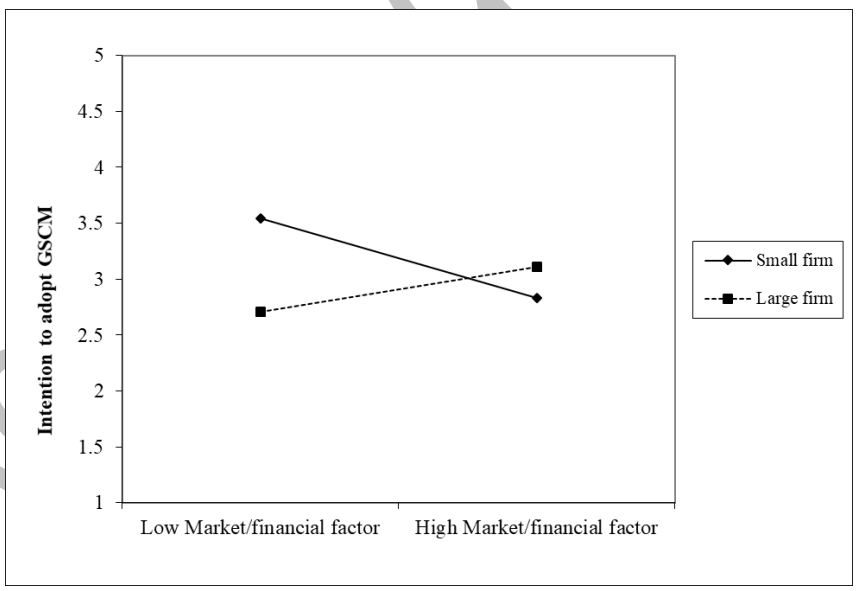

Figure 4. Interaction plot for market/financial factor

As shown in figure 5, firm size negatively moderated the relationship between the internal factor and GSCM intention. In other words, small firms with a higher score in internal factor tend to adopt GSCM more compared to large firms.

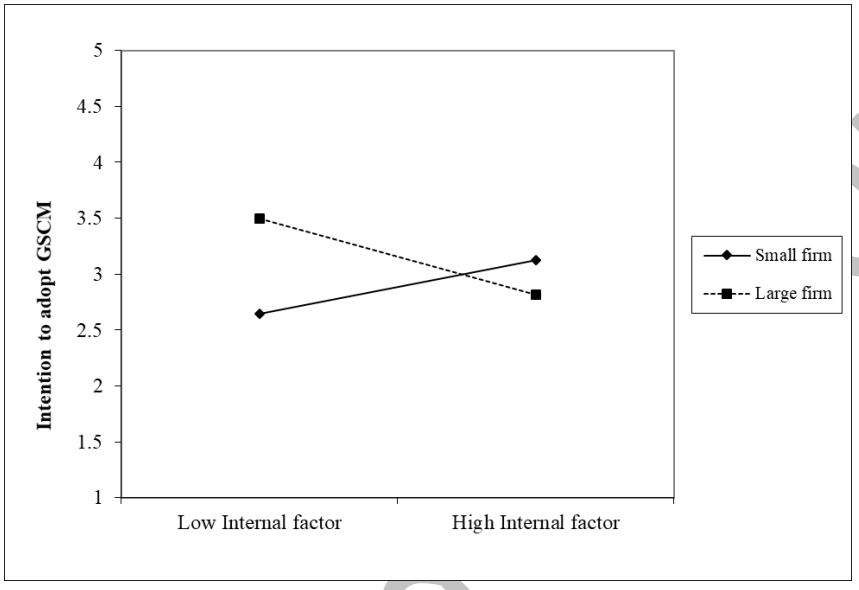

Figure 5. Interaction plot for internal factor

5. Discussion

The study aims at identifying the factors that significantly affect managerial intention to adopt GSCM in different manufacturing firms in Jordan. The study also targets to investigate the effect of firm size as a moderator in the relationship between the factors and GSCM adoption intention. Studies in the field of adoption of GSCM have been reviewed (Asif et al., 2020; Choudhary and Sangwan, 2019; de Sousa Jabbour et al., 2013; Govindan et al., 2016; Lin et al., 2020; Masudin, 2019; Masudin et al., 2018; Mauricio and Jabbour, 2017; Saade et al., 2019; Wang et al., 2016; Zhu et al., 2008).The results of the study demonstrate that customer, cost, supplier and environmental factors significantly influenced managers' intention to adopt GSCM in their organizations. Intention is highly influenced by customer factor (beta = 0.371) followed by cost

504 factor (beta = 0.328), environmental factor (beta = 0.115), supplier factor (beta = 0.090). The
505 customer factor involves three important items such as society or public pressure, customer/client
506 awareness and pressure and improves the image of the construction industry among which
507 customer/client awareness and pressure has the highest factor loading (0.982). The cost factor has
508 three items including initial set up cost, additional staff for adopting GSCM and justification of
509 benefits and costs where additional staff for adopting GSCM has the highest factor loading (0.973).
510 Besides, the environmental factor has four items including the sustainable use of natural resources,
511 construction material and equipment, reusing and recycling construction materials, waste
512 reduction and emissions reduction where sustainable use of natural resources, construction
513 material and equipment has the highest effect (factor loading = 0.935). Finally, the supplier factor
514 has three items such as firm's awareness and advances in providing environment-friendly
515 packages, the firm's environmental collaboration with suppliers and collaboration between
516 product designer and supplier where the firm's environmental collaboration with suppliers has the
517 larger effect (factor loading = 0.981).

518 The results are comparable across previous literature that are relevant to this study. de
519 Sousa Jabbour et al. (2013) found three significant factors that affect GSCM adoption including
520 firm size, environmental management system, hazardous materials as inputs. Govindan et al.
521 (2016) discovered that top management engagement Mauricio and Jabbour, (2017) observed the
522 competition were the two most influential drivers, while employee pressure was the least
523 significant driver influencing GSCM adoption. Lin et al. (2020) found that customer pressure
524 significantly associated to adopt GSCM. Moreover, in this study, the moderating effect of firm
525 size was significant on the relationship between market/financial factor and GSCM intention,
526 internal factor and GSCM intention. The finding is consistent with Zhu et al. (2008) who found

527 that firms differed in adopting GSCM practices based on the size of organizations. The results
528 showed that large and medium-sized firms are higher in the adoption of several GSCM practices
529 compared to small firms. Lin et al. (2020) also found a significant association between
530 organizational size and intention to adopt GSCM.

531 **6. Conclusion and Policy Implications**

532 This study aims to assesses the factors affecting GSCM adoption in Jordan manufacturing
533 firms and to investigate the moderating impact of company's size of this phenomenon.
534 Consequently, the study made several contributions. For instance, the study presents a
535 comprehensive framework to academic and decision makers that highlights the factors affecting
536 the adoption intention of GSCM practices among supply chain managers. The study concludes that
537 four out of seven factors such as supplier's commitment, environmental sustainability, customer
538 satisfaction and cost factors are the most significant drivers of GSCM adoption among managers.
539 In specific, the most significant factors that are related to the intention of GSCM adoption among
540 supply chain managers. Second, this study identifies the most influential factors in which,
541 customer factor has the highest effect followed by the cost factor, environmental factor and
542 supplier factor. This finding will shed the light to decision making on the most influential factors
543 and their priorities when they plane for GSCM.

544 Moreover, this study demonstrates the moderating impact of the company's size when
545 adapting GSCM. The finding will help decision maker to give more attention to impact of
546 company's size in this regard. The result concludes that company's size positively moderates the
547 relationship between market/financial factor and intention to adopt GSCM. In other words, large
548 companies with a higher score in market/financial factor tend to adopt GSCM practices more than
549 small companies. On the other hand, company's size negatively moderates the relationship

between internal factor and intention to adopt GSCM. In other words, small companies with a higher score in internal factor tend to adopt GSCM practices more than large companies.

However, this study has some limitations. First of all, this study has utilized a convenient sampling approach which limits the generalizing capability of the study findings, but the larger sample size (n = 387) may reduce the limitation to some extent. Second, this study only considers seven factors that may influence GSCM adoption, however, incorporating other factors should also be considered in future studies. Finally, this study considered only firm size as a moderator, thus, future studies can adopt other social demographic variables as moderator to come up with additional findings.

Compliance with ethical standard

Ethics approval: Not applicable

Consent to Participate: Not applicable

Consent to Publish: Not applicable

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