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Reinforcing Environmental Sustainability through Institutional Pressures, Green Supply Chain, and Customer Intention among Pakistani Manufacturing Firms A-Pilot Test

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ABSTRACT

Achieving equilibrium between environmental sustainability and economic growth remains a challenge for business concerns across the globe. Developed countries have achieved this balance through re-designing and re-engineering their business operations to eco-friendly processes to some extent but developing countries are still in the transit phase. As this study incorporated an adapted questionnaire hence, this needs to examine the reliability and validity of the constructs. This study was conducted to measure the reliability and validity of the instrument designed to evaluate the role of institutional pressures in implementing green supply chain management practices and their impact on environmental sustainability through the moderating role of green marketing and mediating role of customer green purchase intention among manufacturing firms in Pakistan. The self-administered questionnaire was distributed among employees of manufacturing companies and customers of green products. A total of 200 questionnaires were distributed and 162 valid responses were received which were used for this pilot test. The initial content and face validity of the survey questionnaire were obtained from subject and field experts. However, the results of this pilot showed that all the constructs met the reliability and validity threshold and the instrument is valid to measure the theoretical model proposed for the study. The study suggested that easy access to credit should be given to augment economic growth.

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1. Introduction

Balancing economic growth and environmental sustainability remains challenging world around. Economic growth maximization is a dream of every business concern but it leads to the deterioration of the natural environment. Recently, ineptitude in handling environmental issues and achieving the UN Sustainable Development Goals (SDG) objectives among Asia Pacific countries has been reported (Awan, 2021). The dramatic climate change is witnessed across the globe and especially among emerging economies

and Asian regions. Among Asian countries, Pakistan is the 6th most heavily populated country in the world. Depletion of water reservoirs and environmental deprivation are the major issues in this region (Abas, Khan, Saleem, & Raza, 2019). Manufacturing companies operating without environmentally friendly measures in this region are a major source of environmental pollution. Despite resources and facilities to maintain environmental sustainability, large-scale manufacturing companies contribute to 30% of environmental pollution across the world (Bakos, Siu, Orengo, & Kasiri, 2020). Carbon emission is a major pollutant produced by these manufacturing companies. The major sources of CO_2 emission include fossil fuel combustion 392 billion Mt, cement production 113 billion Mt, power generation through coal 279 billion Mt, and industrial manufacturing 178 billion Mt (Yoro & Daramola, 2020).

In Pakistan, the manufacturing sector significantly contributed to the gross domestic product (GDP) after the agriculture sector. Moreover, the manufacturing sector is the backbone of economic growth because of its strong nexus with other sectors. The manufacturing sector provides 16.1 % of employment opportunities and contributes 13-14 % to the GDP (Ministry of Finance [MOF], 2020). Large-scale manufacturing counts for 78% contribution to manufacturing and has a 9.5 % share of GDP whereas small-scale manufacturing contributed 9.5 % to manufacturing and only 2.04 % of GDP (MOF, 2020).

Despite its contribution to GDP, the manufacturing sector has a huge impact on environmental performance. Carbon emissions and other hazardous chemicals is a major pollutant produced by these manufacturing companies. Similarly, the manufacturing sector of Pakistan also contributed CO_2 emission which accounts for 21% (Tanveer, Song, Faheem, Daud, & Naseer, 2021). The major pollutants excreted through manufacturing industries are carbon monoxide, carbon dioxide, ammonia, nitrogen oxide, hydrocarbons, methane, and non-metallic volatile organic compounds (NMVOC) (Sarkis & Dou, 2017). Due to these pollutants, pollution exceeds dramatically and there were nine million deaths recorded worldwide (Sezgin, Levental, Mayor, & Eggeling, 2017) and Pakistan have no exemption.

The developed countries made adequate measures to counter these changes but developing and third world countries are still far behind. Globally, countries have incorporated certain environmentally friendly processes in the production and services industry that help reduce waste, energy usage and enhance resources and reduce the danger to human beings and the natural environment (Agyabeng-Mensah, Ahenkorah, & Osei, 2019). Achieving economic growth and environmental sustainability simultaneously is a challenging task for organizations worldwide and especially in developing countries like China, India, Malaysia, Bangladesh, Pakistan, etc. Environmental sustainability includes the process of using renewable resources, reduction in pollution production, and eliminating those activities that are harming the natural environment (Bakos et al., 2020). To address sustainable performance, the organization worldwide adopted green practices due to increased environmental awareness and tilted towards using green supply chain management practices green supply chain management practice (GSCMP) in their operations and services. Green supply chain management is a process of providing products and services through environmental-friendly practices for end users hence satisfying the stakeholder's interest (Ahmed & Najmi, 2018).

The role of authorities and concerned managers is vital in implementing and adopting these practices in their processes and services (Sarkis & Dou, 2017). Previous literature regarding GSCM indicates that senior authorities and organizational management need to accomplish continuous improvement through efficiency and effectiveness in their output (Chen & Lu, 2016). Contemporary research on GSCM and eco-friendly activities showed that these practices improve the organization's effectiveness and efficiency by increasing profit and eliminating waste (Rehman et al., 2019). GSCM is originating as a fresh organizational and managerial philosophy that indicates that firms can improve their economic goals by implementing eco-friendly activities hence reducing the perilous influence on the environment (Van Hoek, 1999; G. Zhu et al., 2012). Implementation of GSCM practices not only provides environmental sustainability but also enhances competitive and supportive advantage that ultimately leads to economic growth (Choi & Hwang, 2015; Rao & Holt, 2005). Besides this, many studies showed that the implementation of the green supply chain management (GSCM) practice has many advantages besides environmental performance which include increased efficiency and

effectiveness, perceived goodwill of firms, differentiation in-process and services, managerial motivation, and profit generation (Golicic & Smith, 2013; Rao & Holt, 2005; Wu, 2013). Maintenance of balance between economic growth and environmental sustainability remains a challenge for firms but the implementation of green supply chain management (GSCM) and managerial interest to adopt these practices can maintain this balance (Felice, Petrillo, & Cooper, 2013). More importantly, government legislation and adherence to rules and laws enhance the implementation of environmental performance measures and sustainability (Green, Zelbst, Meacham, & Bhadauria, 2012).

Moreover, the institutional pressure and increased customer demand forced companies to incorporate environmental management capabilities in their operations and hence successful in responding to intuitional pressure and protocols (Ahmad & Ilkay, 2019). Institutional pressure and managerial interest act as influential factors in bringing a motivational shift in organizations to act as society-friendly behavior to meet environmental goals (Ciliberti, De Haan, De Groot, & Pontrandolfo, 2011). To cope with the institutional pressure and environmental requirements organizations of developing nations have to shift their supply chain design consideration toward environmental responsiveness (Mudgal, Shankar, Talib, & Raj, 2009).

Hence, it is very essential for managers and administrators to deeply realize the motivating factors for the incorporation of GSCM practices and their substantial impact on outcomes, especially from the perspective of developing nations like Pakistan. Therefore, this study aims to evaluate the role of institutional pressures in implementing GSCM practices. Moreover, this study also aims to measure the role of GSCM practices in achieving customer green purchase intention. The moderating role of green marketing in achieving green purchase intention is also investigated. Finally, the mediating role of customer green purchase intention in achieving environmental sustainability is also evaluated. Hence, to measure the proposed theoretical model, it is essential to check the validity and reliability of the construct before proceeding further. Therefore, this study aims to measure the reliability and validity of the survey instrument. A questionnaire is considered valid when it is successful to measure the desired relationship among the variables. The reliability, validity, convergent, and discriminant validity were measured in this study. The rest of the paper is designed as: Section 2 discussed the critical literature regarding green supply chain management and other constructs incorporated. Section three discussed the methodology incorporated, section four discussed the results and lastly, the conclusion was provided.

2. Literature Review

The manufacturing sector played a pivotal role in the economic development of countries, especially in the era of globalization where exports and shipment of goods are essential. China is the leading manufacturer in the world with $ 2.01 trillion in output with 20 percent of the world's total output, the United States with $ 1.867 trillion with 18 percent of the world capacity, and Japan with $ 1.063 trillion with 10 percent of the total world's output. Only China, the USA, and Japan contributed 48 percent of the world's manufacturing output (O'Neal, 2019).

Similarly, the contribution of developing and emerging countries reported an increase of 4.3 percent in the fourth quarter of 2021 despite the severe blow from the COVID-19 pandemic while industrial economies reported an increase of 3.20 percent in manufacturing (*UNIDO Statistics Data Portal*, 2022)**.** Similar to other nations, Pakistan's manufacturing sector is also considered the backbone of its economic growth (Bakar, 2019; Shahzad, Qu, Zafar, Rehman, & Islam, 2020).

The manufacturing sector of Pakistan comprises three broad sub-sectors. The large-scale manufacturing (LSM), Small scale manufacturing (SSM), and slaughtering. Large-scale manufacturing contributed a 78 % share of manufacturing and 9.5 % of GDP whereas small-scale manufacturing only contributes 15.2 % to manufacturing and 2.04 % of GDP (MOF, 2020). Large-scale manufacturing is further subdivided into different manufacturing sectors. These sectors consist of textile, engineering, chemical, petroleum, agricultural manufacturing, and small and medium enterprises. The manufacturing sector

contributes 12.80 % to the GDP of Pakistan. Besides this, manufacturing goods exports to other nations constitutes 78.23 % of total exports (MOF, 2020).

Despite respectable contributions to the economic growth of the country, the manufacturing sector is also putting an immense influence on environmental degradation. The consumption and utilization of natural resources like water, air, and fuel have been widely recognized due to the emergence of industrialization(Abbas, 2020). Due to the immense utilization of these resources, they exert more pressure on the environmental degradation further deteriorating the situation. This deteriorated situation leads to global warming and climate change (Zhang, Wang, & Zhao, 2019). Recent UN reports reported that the Asian region is failed to incorporate the desired environmental improvement measures. Moreover, these countries are more vulnerable to natural disasters due to climate change, melting of glaciers, and depletion of the ozone layer.

To address the environmental issues, the adoption of green initiatives and practices are widely incorporated in the previous literature across the world and Asian regions as well. One of the most imperative and widely used practices is eco-friendly practices or green supply chains in business operations. Hence, the concept of eco-friendly supply chains is based on the triple-bottom-line (3 PL) theory. The triple-bottom-line concept consists of ecological performance, economic performance, and social performance of organizations (Green et al., 2012). This theory highlighted the role of managers who officially runs the firms and tend to increase profit for the firm's economic performance, and social and environmental performance. Taking into consideration the broader term sustainability, this study operationalizes the environmental sustainability dimension which ultimately leads to financial performance and other organizational outcomes. Jääskeläinen and Heikkilä (2019) indicated that organizations across the globe in the last decade are competing and promoted customer services based on their efficient and environmentally friendly supply chains.

Green supply chain management has been widely discussed in terms of conceptual frameworks in literature and the primitive work was done by Chin, Tat, and Sulaiman (2015). They discussed the link between GSCM practices and ecological cooperation and sustainable outcome. The GSCM practices include: green procurement, green production, green distribution, and reverse logistics and sustainable performance includes economic, social, and ecological. Their findings showed a positive association between elements of GSCM and organizational outcomes. Besides conceptual discussions comparison of GSCM and traditional SCM remained under debate in the literature. In this regard, Tippayawong, Tiwaratreewit, and Sopadang (2015) found a positive association between the incorporation of green manufacturing and green logistical activities on the firm financial outcome. These findings were also supported by Phuah and Fernando (2015) who declared that the achievement of balance between financial performance and ecological performance is possible through the implementation of GSCM. From a cost-saving perspective, the application of GSCM practices brings significant cost reduction in materials, water, and energy conservation and built company image among stakeholders. On the other hand, neglecting these practices in firms' operations brings losses in inventory pricing (Flammer et al., 2012; Wisner, Tan, & Leong, 2014). Inter-organizational operations of GSCM like reverse logistics; eco-friendly packaging and ecological distribution might also bring cost reduction and improve international competitiveness(Rao & Holt, 2005). In terms of transportation and distribution costs, the findings of (Saridogan, 2012) are evidence that the implementation of GSCM successfully reduces the said costs in the shape of fuel usage, maintenance, and repair expenditure. Implementation of GSCM in the food industry reported improvement in cost reduction and logistical activities and transportation (Ala-Harja & Helo, 2015).

This study focused on the well-known GSCM practices in the previous literature which were proposed by G. Zhu et al. (2012). Most of the other studies across the world also adopted these practices in their studies (de Sousa Jabbour, Vazquez-Brust, Jabbour, & Latan, 2017; Shukla, Deshmukh, & Kanda, 2009; Vanalle, Ganga, Godinho Filho, & Lucato, 2017). The GSCM practices incorporated, planned, and designed within the firm's boundary wall are called internal GSCM practices while the practices which depend on mutual sharing and cooperation like customer cooperation and relationships with suppliers (Q. Zhu, Sarkis, & Lai, 2013) are categorized as external GSCM practices. In this study, internal

environmental management, and eco-design is considered internal GSCM practices, and green purchasing, cooperation with the customer, and investment recovery are categorized as external GSCM practices.

3. Research Methodology

The instrument for this study was adapted and required reliability and validity testing before conducting a complete analysis. Hence, in this study, the content validity, face validity, and construct validity were measured. Similarly, the reliability of the instrument was also measured through Cronbach's alpha. The pilot of the questionnaire was performed on a sample of 162 respondents from the manufacturing industry of Pakistan.

Table 2
Demographic Profile of Respondents (Employees)

Variables		Frequency	Percentage
Gender			
	Male	157	97
	Female	5	3
Age			
	20-30 years	82	50.6
	31-40 years	67	41.4
	Above 40 years	13	8
Education			
	Bachelors	55	34
	Masters	104	64
	PhD	3	2
Position			
	SCM Manager	60	37
	Manager Procurement	21	13
	Manager Logistics	24	14.9
	Manager Operations	25	15.5
	Manager warehouse	31	19
	CEO, GM, MD	1	.6
Industry			
	Textile	27	16.7
	Beverages	31	19.1
	Pharmaceutical	39	24.1
	Automobile	20	12.3
	Chemical	21	13
	Petroleum	24	14.8
Experience			
	5 Years	111	68.6
	10 years	30	18.6
	15 years	21	13
City			
	Karachi	103	63.6
	Faisalabad	4	2.5
	Lahore	25	15.4
	Islamabad	6	3.7
	Rawalpindi	2	1.2
	Gujranwala	8	5.0
	Peshawar	14	8.6

To conduct a study, it is very much crucial to address the pretest of the instrument, and the reliability, validity, and accuracy of the instrument are essential. The questionnaire used in this study was adapted from the critical review of previous literature. The questionnaire of this study was divided into three sections having 54 total items. The first section consists of an introduction and consent form, the second section consists of demographic data of respondents and the third section contains items of variables (institutional pressures, GSCM practices, Green Marketing, customer green purchase intention, and environmental sustainability) incorporated in the study.

The cross-sectional study design along with quota sampling was used to gather the data. This study used two different questionnaires for data collection. The first survey form includes the dimensions of institutional pressures, GSCM practices, and environmental

sustainability and the other questionnaire includes the items of green marketing and customer green purchase intention. The target respondents of the first questionnaire were supply chain officials of manufacturing companies of textile, pharmaceutical, beverages, automobile, petroleum, and chemical industries situated in metropolitan cities of Pakistan. The target respondents of the second questionnaire were the customers of green products. Five-point Likert scale was used in both the questionnaires. The Likert scale for institutional pressures ranges from (1= Unimportant to 5= Important), for GSCM practices (1= Not Considering It to 5= Implementing Successfully), and for environmental sustainability (1= Not at all to 5= Significant). However, the Likert scale for green marketing and customer green purchase intention ranges from (1= Strongly Disagree to 5= Strongly Agree). The content and face validity of the questionnaire were held before data collection through the field and subject experts. The demographic analysis was done through SPSS 23 version. However, the reliability and factor loading and measurement model analysis was done with the help of Smart PLS.

4. Results and Discussion

Descriptive statistics showed in table 1 below. According to statistics majority of respondents are male 157 (97%). As per age, the majority were young managers representing 50.6 % (82), and the majority of them had masters 104 (64%). The supply chain managers dominated among positions representing 37 % (60). Most of the respondents are from the pharmaceutical industry showing 24.1 % (39). Karachi is the largest industrial hub representing 103 (63.3%) and as per experience majority of managers are more than 5 years of experience 111 (68.6%).

Descriptive statistics of customer data showed that the majority of respondents are male showing 78.7 %. As per age criteria, 33 (27.7) are young users of products and most of them are graduates.

Table 3
Demographic Profile of Respondents (Customers)

Variables		Frequency	Percentage
Gender			
	Male	37	78.7
	Female	10	21.3
Age			
	20-30 years	33	70.2
	31-40 years	13	27.7
	Above 40 years	1	2.1
Education			
	Bachelors	30	63.8
	Masters	14	29.8
	PhD	3	6.4
Experience			
	5 Years	26	55.3
	10 years	10	21.3
	15 years	11	23.4

4.1. Measurement Model

Figure 1 showed the findings of the validity and reliability using the measurement model. The reliability of the constructs was assessed through Cronbach's Alpha, CA, and AVE. According to (Hair, Hult, Ringle, Sarstedt, & Thiele, 2017), values for Cronbach's Alpha should be greater than 0.70, and CA and AVE should be greater than 0.70 &.50 respectively. Cronbach's alpha of all the variables used is well above the thresh hold as recommended. Moreover, values of CR and AVE are also well above 0.7 and .50 except for normative pressure respectively which means that there is no issue of reliability. Moreover, reliability can be improved by increasing the sample size (Saunders, Lewis, & Thornhill, 2009). Factor loadings of all the items are shown in Table 2 below. Furthermore, values of discriminant validity are also shown in table 4.

Table 4
Factor Loadings

Variable and Factor	Factor Loadings	Reference/ Source
Coercive Pressure		Zhu et al., (2004, 2013)
CP 1	0.844	
CP 2	0.863	
CP 3	0.805	
CP 4	0.858	
CP 5	0.784	
Normative Pressure		Zhu et al., (2004, 2013)
NP 2	0.741	
NP 3	0.755	
NP 4	0.67	
NP 6	0.709	
Internal GSCM	0.824	Zhu et al., (2004, 2013)
IEM 1	0.814	
IEM 2	0.818	
IEM 3	0.787	
IEM 4	0.862	
IEM 5	0.722	
IEM 6	0.844	
IEM 7		
ECD 1	0.836	Zhu et al., (2004, 2013)
ECD 2	0.790	
ECD 3	0.814	
ECD 4	0.782	
External GSCM		
CC 1	0.872	
CC 2	0.811	
CC 3	0.850	
CC 4	0.832	
GP 1	0.758	
GP 2	0.755	
GP 4	0.792	
GP 5	0.766	
IR 1	0.770	
IR 2	0.623	
IR 3	0.671	
IR 4	0.757	
Environmental Sustainability		Zhu et al., (2004, 2013)
ES 1	0.886	
ES 2	0.861	
ES 3	0.860	
ES 4	0.837	
ES 5	0.881	
Green Marketing		Haytko and Matulich (2008
GM 1	0.803	
GM 2	0.826	
GM 3	0.851	
GM 4	0.818	
GM 5	0.765	
Customer Green Purchase		Zhang et al. (2017)
Intention	0.855	
CGPI 1	0.731	
CGPI 2	0.865	
CGPI 3	0.826	
CGPI 4	0.832	
CGPI 5	0.701	
CGPI 6	0.749	
CGPI 7	0.755	
CGPI 8		

4.2. Face and content validity

Validity refers to the degree to which a measurement determines what it is aimed to measure (Rosenthal & Rosnow, 1984). One of the types of validity is face validity. It is a subjective and superficial assessment of whether the measurement used in a study appears

to be a valid measure of a given variable or construct. It is also called surface validity or appearance validity. Whereas, content validity refers to how an adequate measurement tool taps into the various aspects of the construct in question. For assessing content and face validity two subject experts and two field experts were asked to provide comments on the content and understandability of the questionnaire. The experts were requested to edit and improve the items of the questionnaire if necessary to enhance clarity, understandability, readability, and content adequacy.

Table 4
Construct Reliability and Validity

Variable Name	Cronbach's Alpha	Rho A	Composite Reliability	Average Variance Extracted (AVE)
Coercive Pressure	0.889	0.893	0.916	0.648
Environmental Sustainability	0.916	0.922	00.937	0.748
External GSCM	0.938	0.943	0.947	0.580
Internal GSCM	0.948	0.951	0.955	0.659
Normative Pressure	0.763	0.774	0.835	0.461
Green Marketing	0.872	0.874	0.907	0.661
Customer Green Purchase Intention	0.917	0.929	0.932	0.631

Additionally, they were also asked to revise the items that were incomprehensive and needed to be improved. After a detailed review, the questionnaire was validated by the experts, and a few changes were suggested, which were incorporated accordingly.

Table 5
Discriminant Validity

Variable Name	CGPI	CP	EGSCM	ES	GM	IGSCM	NP
CGPI	0.792						
CP	0.033	0.776					
EGSCM	0.088	0.452	0.758				
ES	0.084	0.488	0.665	0.850			
GM	0.729	0.029	0.069	0.046	0.802		
IGSCM	0.108	0.490	0.840	0.608	0.108	0.786	
NP	0.079	0.551	0.504	0.430	0.117	0.555	0.709

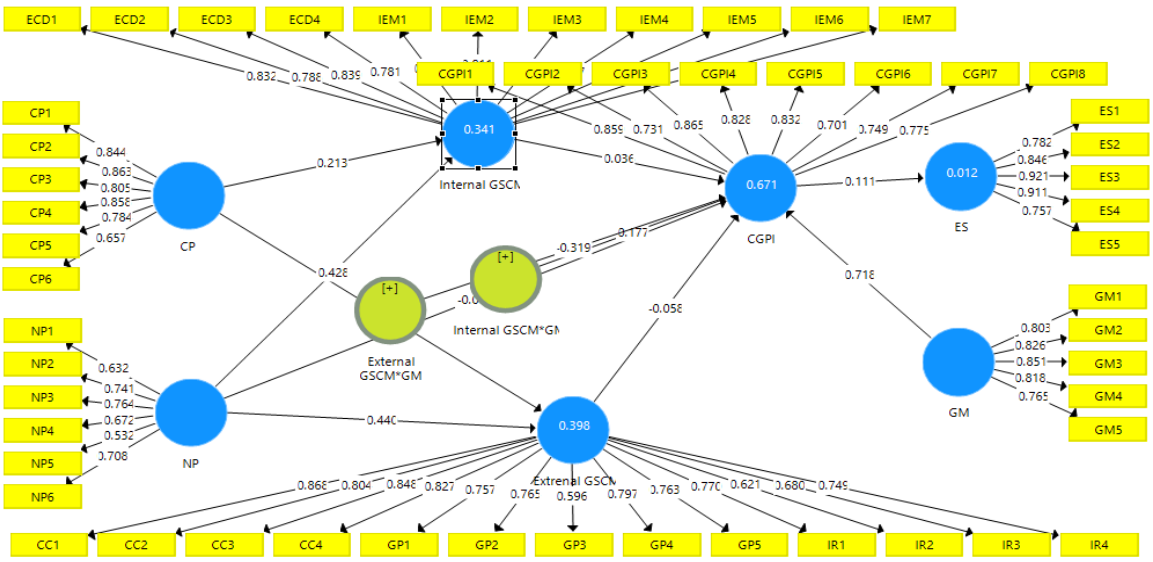

Figure 1: ***Measurement Mode***

5. Conclusion Implications and Recommendations

The manufacturing sector played an important role in the economic growth of a country. Similarly, in Pakistan, the manufacturing sector is very important after agriculture and contributed to the GDP of the country. However, the manufacturing sector also

deteriorating the environment and the international slogan is making the countries bound to abide by the sustainable goals. In this regard, national and international pressures are significant to address environmental issues. Similar, to other developing and emerging economies, Pakistan is also trying hard to cope with the pressures exerted by legislative bodies. The developed countries had already re-engineered their business process towards an eco-friendly perspective by incorporating green initiatives and green practices.

Institutional pressures are very important to compel firms to adopt eco-friendly practices across the world. Hence, in this study, the role of institutional pressures is addressed and how do these pressures compel the firms in Pakistan to implement the green supply chain practices? The role of these green practices is an important aspect to gain the customer green purchase intention that promotes ecological sustainability. The penetration of GSCM practices into customer green intention is supported through green marketing in this study. The research instrument for this study was designed through a critical review of previous literature. The survey form designed for this study was pretested in this study as the validity, reliability, and accuracy of interment are essential to conducting a comprehensive model. The pretest was done to further improve the conceptualization of the variables according to the social lab and to achieve the initial idea about the future - the perspective of the study. The analysis showed that the instrument is meeting all the prerequisites of reliability and validity. All the values of reliability, validity, factor loading, and measurement model were found within the criterion.

5.1. Implications

This study has many contributions: primarily, this study contributed to the GSCM literature by investigating the role of institutional pressures in implementing GSCM practices and the effect of GSCM practices in enhancing customer green purchase intention. Moreover, the role of green marketing in promoting customer green purchase intention provides implications for policymakers and managers. Secondly, it provided the role of GSCM practices and customer intention combined in environmental sustainability. Finally, this study provided implications to the managers and policymakers, and governments to enhance the GSCM practices among organizations and increase collaboration among GSCM practices and customers to achieve environmental sustainability. Moreover, the pretest has provided evidence that this instrument can contribute to conducting a full-length study on the said topic.

5.2. Limitations and Future Research Directions

Like other studies, this study also has some limitations. Firstly, this study was cross-sectional future studies can be conducted through a longitudinal approach to accomplish deep insight into the model. Secondly, this study was quantitative, qualitative, and mixed research can be conducted in the future to gauge further generalizations of the results. Besides this, this study was conducted among the manufacturing companies of Pakistan only. As the environmental issues are serious concerns of the Asian region, future studies can be conducted among Asian nations to provide generalized patterns of institutional pressures and their role in implementing GSCM practices and how these practices along with green marketing and customer intention can influence environmental sustainability? In the future, some other GSCM practices can be incorporated to measure their impact on environmental sustainability.

Authors Contribution

Muhammad Rahies Khan: Idea, Methodology, Data Collection and Writeup
Mutasim Billah Tufail: Revision, Supervision and Approval:
Mubashir Ali Khan: Interpretation and Discussion:
Muhammad Shakeel: Data Analysis:

Conflict of Interests/Disclosures

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