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INFLUENCE OF GREEN SUPPLY CHAIN MANAGEMENT, ENVIRONMENTAL PERFORMANCE, MARKET PERFORMANCE AND OPERATIONAL PERFORMANCE ON BUSINESS PERFORMANCE

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Abstract

The concept of supply chain management (SCM) with an environmentally friendly approach, known as Green Supply Chain Management (GSCM), it is becoming more widely aware in developing nations. This is driven by the recognition of its positive effects on both the environment and the economy, as well as an increased awareness of the importance of environmental safety. Businesses are making genuine efforts to demonstrate their dedication to sustainable practices. This paper aims to investigate how implementing green supply chain management in a developing country like Pakistan affects environmental performance (EP), operational performance (OP), market performance (MP), and overall business performance. This research relies on data obtained through a structured questionnaire administered to 101 supply chain professionals working in manufacturing companies in Pakistan. The conceptual framework for the study was constructed based on existing literature. To assess the hypotheses, Partial Least Squares-Structural Equation Modeling (PLS-SEM) was employed. The findings indicated that although green supply chain management has a positive influence on business performance, this influence was not statistically significant. However, the study revealed significant and positive effects of green supply chain management on market performance (MP), environmental performance (EP), and operational performance (OP). These results suggest that there are opportunities to enhance business performance through improvements in MP, EP, and OP facilitated by green supply chain management practices. In the context of a developing country such as Pakistan, this research adds to the current pool of knowledge by exploring how green supply chain management influences environmental performance (EP), operational performance (OP), market performance (MP), and the overall performance of businesses. The outcomes provide valuable insights for supply chain management professionals interested in implementing green supply chain practices. Additionally, the findings offer policy recommendations for organizations looking to advance their green supply chain management initiatives.

INTRODUCTION

In spite of the prevalence of industrialization and globalization, permit crucial earnings for organizations and nations, but these notions create negative effects on environment and grasp concentration from stakeholder groups, governments, and international authorities among others. Thereby, recently environment sustainability is no longer optional but a requirement for the organizations to achieve it (Charles Baah et al., 2020). Now, both public and private firms to improve their sustainability begin to concentrate more on green aspects (Gusmerotti et al., 2020). At the same time, researchers are also assisting the rising trend through expanding current literature (Luca Marrucci et al., 2021). Although there is a worldwide call for green practices, importantly for the manufacturing sector, because manufacturing industries are biggest contributor in releasing of greenhouse gases, vast energy utilization and larger waste production. Mostly manufacturing organizations performing their operations in developing countries are implacable regarding environmental sustainability (Awan, 2017; Baah et al., 2020). Despite the fact that in developed countries green practices have been broadly adopted and implemented, attempts should be made in developing countries to raise this notion to attain desired environmental sustainability level (Charles Baah et al., 2020). Although to develop business, to protect environment, to maintain customers, to create trust and loyalty, a key indicator of business performance is environmental performance. This research, thus, seeks to provide insights from the perspective of a developing nation, specifically "Pakistan," with a particular focus on the booming pharmaceutical industry within the country. According to Pakistan Business Council and CDPR, more than 700 pharmaceutical manufacturing entities prevailing in Pakistan. Currently due to the growth of public health care in 5th largest global market by size, in Pakistan the worth of pharmaceutical manufacturing sector could increase to USD 5 Billion by 2024-2025. Mostly manufacturers are the target of programs and regulations associated with energy preservation and lessening pollution (Zhu et al., 2017). To preserve the environment, practices of SCM in manufacturing companies are required to administer (Sharma & Gandhi, 2016; Zaid et al., 2018) in relation to more sustainable operations (Walker et al., 2014).

There is a growing global emphasis on environmentalism, spurred by specific treaties aimed at addressing climate change (Fernando et al., 2019). In contemporary times, stakeholders such as customers and employees within corporations are increasingly advocating for greater environmental responsibility and financial contribution (Boiral et al., 2018). Consequently, conventional business models are transitioning into environmentally friendly or "green" models across various business entities. This shift involves implementing environmentally conscious practices as a means to gain a competitive edge (Wagner, 2011). Additionally, the evolving business landscape demands top-notch decisions across strategic, operational, and tactical aspects to maintain competitiveness across the market (Dubey et al., 2020). To acquire a steadiness between financial profitability and environmental reputation, it has become essential for organizations to comply with multiple obstacles and pressure (Younis et al., 2016). In recycling process and in restructuring architecture, firms need to comply with green oriented production practices, this has become demand of new business model. There is a cautious need to control material reusability, energy quality and recyclability. It will help the decision makers to ensure that they are fulfilling operational specifications and also assist them in tracing purposes (Giampieri et al., 2020).

This study's goal is to fill a gap in the pool of literature through providing a detailed perspective about the correlation between GSCM, Environmental Sustainability, Operational Efficiency, and business performance of firm and we expanded the analysis to market performance of firm. To the extent of the author's understanding previously some articles presented this unique combination of independent and dependent variables on which our research has focused. This research aims to establish novel theoretical connections among a company's business performance and the execution of strategies related to GSCM and all these variables together put positive influence on business performance of firm. Furthermore, this study's outcomes are of vital importance for the development of pharmaceutical sector in manufacturing industry of Pakistan. This

examination will also assist the Supply Chain professionals for their decision-making in environmental sustainability towards common organization goal in their domain.

Theoretical Background

Environmental management and supply chain management are the foundations of green supply chain management. Generally, when we add the word "Green" with Supply Chain Management, it means we are discussing the correlation between the natural environment and supply chain management. (Srivastava, 2007). Srivastava (2007, p. 54) explained GSCM as consolidating environmental thinking into supply chain management encompasses aspects such as product design, manufacturing processes, material sourcing, product delivery, and end-of-life product management later its useful phase". The theoretical framework employed in this research is rooted in the 'Natural Resource-Based View' theory, a modification of the resource-based view theory. The authors emphasize that addressing environmental issues through NRBV results in the creation of essential resources, including cleaner production practices, ongoing product enhancements, stakeholder-driven innovation, and integrated innovation. These, in turn, result in a competitive edge for the firm, manifested as long-term growth, enhanced legitimacy, reduced costs, and an improved reputation (Hart & Dowell, 2011).

Nowadays the universal focus is on resource waste, ecological imbalance, and environmental pollution. Green supply chain management is a strategic option for the firms to adopt to decrease environmental influence and enhance operational performance so that organization can improve its business performance through sustainable development (Zhang et al., 2020). As stated by Green et al, (2012) The waste hierarchy involving the three principles of reducing, reusing, and recycling
have often been analyzed with GSCM. In this study, GSCM will encompass internal environmental management, Corporation with customer, green buying and eco-friendly design. This highlights that the requirement of GSCM activities begin at the start of supply chain from procurement then continue at every stage up to discard of the product.

Current research is on exploring the influence of green supply chain management on environmental performance, market performance, operational performance, and business performance in the setting of establishing nation Pakistan and the chosen sector for the research purpose is pharmaceutical sector in manufacturing industry due to the main contribution of this sector in environmental pollution. After reviewing so many articles related to GSCM it is found that one of the theories is the Natural Resource Base View (NRBV) which we can apply to the conceptual model, and it is supported by literature. Firms owned or control some resources that may be human, immaterial, or substantial (CepedaVera, 2007; Wu et al., 2010). When a company possesses valuable, rare, and inimitable resources and utilizes them in distinctive ways. So, it can achieve and sustain a competitive edge over its competitors (Barney, 1991). Eltayeb et al., (2011) explained that environmental performance possesses positively influence of GSCM on natural environment inside and outside firms. Moreover, competitive edge and Sustainable Development Goals mainly based on good environmental performance (Zailani et al., 2012; Ulubeyli, 2013).

Hypotheses Development:

The relationship between Green Supply Chain Management and Business Performance.

The extent to which any organization improves its performance relies upon promotion of GSCM activities (Jabbour et al., 2015). Some researchers concluded positive influence of GSCM activities on BP (Chien, 2014). Enhancement in Business Performance resulted if firm adopt GSCM practices at the design stage through presetting the environmental influence of Product and through environmental auditing programs which accelerate effective and efficient handled operations and assuring water, energy, and material utilization that is efficient (Shi et al., 2012). Eco-cooperation with suppliers and customers offers a collaborative framework to gain competitive advantages, which will be reflected in company success (Vachon & Klassen, 2008; Lai & Wong, 2012). There will be a call for extra investment if firm adopt GSCM practices according to some research and also raise operational cost that negatively influence on business performance. (Lee et al., 2012)

Nevertheless, this negative influence exists in the short run because profits earned through reduced waste and boosted operational efficiency and saved energy, resulted in compensation on investments in the long run. Improvement in BP reflected in the long run due to profit earned and improved firm's image (Abdullah & Yaakub,2014). Based on this literature the hypothesis of this research is derived as:

H1: Green Supply Chain Management positively influences Business Performance.

The Relationship between Green Supply Chain Management and Environmental Performance.

Studies have shown that GSCM techniques have a positive impact on EP. (Jabbour et al., 2015). For Eco-Products the strategy of GSCM is based on customer necessity. Through understanding these practices, firms fulfil the eco-necessities of their customers. GSCM practices require encouragement from top management and also cross-functional co-operation, because all the GSCM practices are associated with each other. Thus, to enhance the firm's performance, IEM (internal environmental management) is a key. Jabbour et al. (2015) verified and noted that mostly IEM (internal environmental management) is an important practice that affects environmental performance. Eco design suggests product designing with their life cycle based on eco-criteria (Shi et al., 2012). Reduction in waste later on results in enhancement of environmental performance. Cleaner production operations facilitated by co-operation with suppliers for green purchasing (Zhu & Sarkis, 2004). Based on this literature, the hypothesis of this research is derived as:

H2: Green Supply Chain Management positively influences Environmental Performance.

The relationship between Green Supply Chain Management and Operational Performance.

For environmental sustainability, GSCM practices focus on reduction in waste (Green et al., 2012). Existing research indicates that these environment-based GSCM methods improve product value, reduce manufacturing costs, and boost a company's reputation (Raut et al., 2019). According to Zhu et al. (2008), OP is to efficiently and rapidly create and deliver products to customers depending on the firm's capabilities. Close link between suppliers and customers demanded by organizations for GSCM practices increased operational performance require continuous improvement strategies, such as TQM, JIT (Fang & Zhang, 2018). Numerous empirical studies (Raut et al., 2019) specifically stated that if a business implements some or all of the GSCM principles, it may lead to superior operational performance in terms of inventory level, lead time, quality, and customer satisfaction both internally to the firm and across the supply chain. The same unsteadiness seems to be rational for OP just like EP (Luthra et al., 2014; Younis et al., 2016). Based on this literature, the hypothesis of this research is derived as:

H3: Green Supply Chain Management positively influences Operational Performance.

The relationship between Environmental Performance and Business Performance.

Moneva & Ortas (2010) explored the association between environmental performance and organizational performance in terms of economic outcomes. The outcomes of the study unveiled that financial performance and internal efficiency enhanced through environmental performance. Furthermore, Chen et al. (2006) signalizes that within all phases of manufacturing process an enhanced BP (i.e., Cut throat edge) will be outcome of enhanced Environmental performance. An enhanced EP although cost affiliated (Kumar et al., 2017). Company's EP effectively avoids valuable cleanups and accountabilities (Clemens & Bakstran, 2010). Nevertheless, Barnett (2007) showed that the association among EP and BP with regards to Customer satisfaction, Sales and profit depends on the level to which the Organization cope will stakeholder interests. Through addressing environmental performance, a lot of potential economic and financial gains are achievable. Managers and practitioners will have more clarification about these associations. Based on this literature, the hypothesis of this research can be derived as:

H4: Environmental Performance positively influences Business Performance.

The relationship between Operational performance and Business performance. Increased revenues and cost savings are expected due to enhancement in

operational performance that resulted in improved business performance (Laosirihongthong et al., 2013). Competitive edge and improved BP recognized the operational efficiency superiorly that manifested operational performance (Terjesen et al., 2011). The firm production-related goals are attainable due to efficient operations. Business performance will be enhanced by achieving production-related objectives such as product quality complying with requirements, accuracy of delivery, product flexibility, volume, and cost control (Yu & Ramanathan, 2016). In addition, Lin et al. (2011) asserted that the foundation of effective production and distribution is expressed by OP, which in turn denotes monetary gains. Akgul et al. (2015) highlighted that organization that wish to attain higher performance and competitive positions in the market should enhance their OP concerning delivery, cost, and quality. Boosted market performance, on time product delivery, increased productivity, decreased cost, better quality, and less defective products are the outcomes of enhanced operational performance (Kafetzopoulos et al., 2015). Using the literature, the hypothesis of this research can be derived as:

H_5: Operational Performance positively influences Business Performance.

The Relationship between Green Supply Chain Management and Market Performance.

GSM practices assure operational efficiency, lower the effect of economic decline, market position of a firm get better, and it also build green capabilities and competitive edge for the firm (Sut duean et al., 2019). Laari et al. (2016) declared that in the eyes of customers GSCM activities build the green image of firms and leads to increase in market share due to attraction of more eco-friendly customers and rise sales revenue and the profitability of the firm. Klassen & McLaughlin (1996) found that the position of a company improves than its rivals in the business due to GSCMPs. Vein et al., Sarkis (2007) concluded that the market share and sales revenue of firms increases than its rivals due to green products and firms that emphasize green practices. Choi et al (2018) revealed that there is a positive association among GSCMPs and marketing performance. Agya beng - Mensah et al. (2020 a, b, c, d, e) found positive influence of green logistics on market performance of the firms. Based on this literature the hypothesis of this research is derived as:

H_6: Green Supply Chain management positively influences Market Performance.

The Relationship between Market Performance and Business Performance.

Lonnqvist (2004) described performance as the capability to analyze object to acquire firm's outcome in relation to goals. firm's results ultimately measure through performance and several market contingencies and firms condition affect firms' performance hence through the variety of methods firms performance has been analyzed. Many researchers have explained methods in literature and software to analyze business performance using sub aspects including quality, innovation, non-financial and financial performances (Samson & Terziovski, 1999). Thus, through various major firms' performance has been operationalized entailing production vs financial, past vs future and accounting vs market (Gunday et al., 2011; Bowen et al., 2010). Gunday et al. (2011) put down production, market and financial performance are three distinct perspectives of firm's performance. Tsai and Yang (2013) analyzed company's financial, market and global performance is business performance related to its rivals. In an organization market performance associated with the level of attraction and customer retention for their products and services (Hogan & Coote, 2014). Based on this literature the hypothesis of this research is derived as:

H_7: Marker Performance positively influences Business Performance.

Conceptual Framework

The theoretical model that we proposed in our research study comprises of five variables and seven hypotheses. GSCM, OP, MP and EP are independent variables whereas BP is dependent variable (see Figure 1).

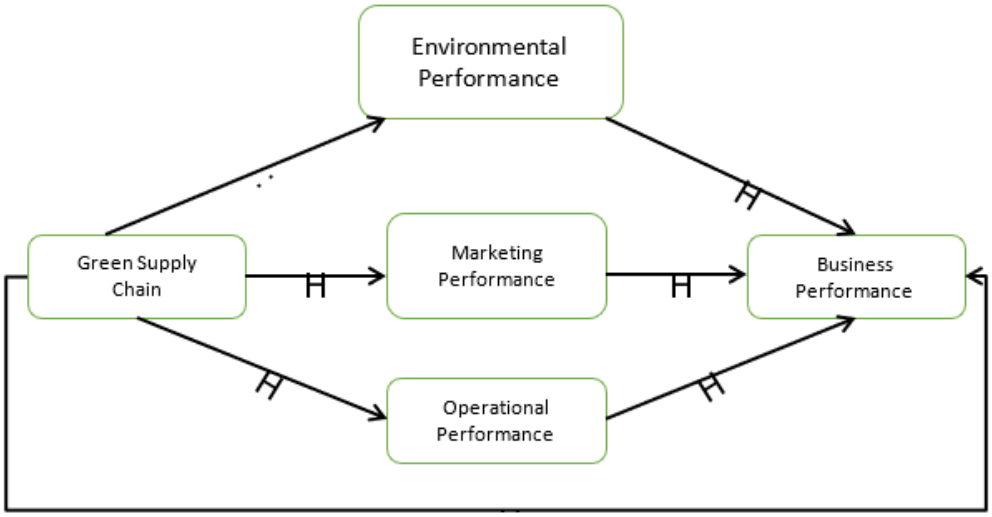


Figure.1: Conceptual Framework

Research Methodology

To measure the influence of GSCM activities on organization performance, a study of Pakistani pharmaceutical manufacturing enterprises served as the foundation for the research technique through adopting GSCM practices to test the proposed hypothesis. Following are the illustrations of how we developed the survey instrument, data collection, and data analysis. How we decided the sample size and selected the target population for this research.

In our research, it is correlational. We examined the correlation among GSCM and the performance drivers of firms (i.e., business, operational market, and environment performance) and we explored how these variables are related and different from each other.

The reason to conduct this study was to understand the impact of GSCM activities on operational, market, environmental, and business performance. To identify the relationship among the variables we choose "Natural Resource base view theory".

We use primary data collection and secondary data collection as two main sorts of data gathering techniques in study. Our primary data was gathered systematically, mostly from Pakistani pharmaceutical manufacturing companies. In the current study, we used a questionnaire-based survey to test the hypothesis.

The target population of our research is all the professionals, frontline managers and supply chain representatives working in the supply chain domain of the pharmaceutical manufacturing sector of Pakistan and to guarantee that the data from our study would be richer, we also made sure that participants had to have the required skills and job experience

We utilized the software for calculating our sample size that is used in Structural Equation Modeling technique (SEM). The software recommended sample size of 269 performing the Daniel Sooper test we use 101 honest responses to draw sample size in our study. A survey questionnaire was created to gather the data in order to achieve the goals of the current investigation. From the existing literature the items adapted. A 5-point Likert scale was used to evaluate every response. The structured questionnaire uses options to measure responses. 1: strongly disagree 2: disagree 3: neutral 4: agree 5: strongly agree.

Two sections make up the questionnaire: the first section determines the demographics of participants, and the second section determines the items of this study. Data from the participants were gathered using a research tool questionnaire. We performed quantitative based survey analysis in our study. We asked close-ended questions which were based on five constructs that we adapted from existing literature for our study.

ITEM #	Item descriptions (reference)
Green Supply Chain Management: (Cousins et al., 2019; Inman & Green, 2018; de Sousa Jabbour et al., 2015)	
GSCMPS1	Our firm emphasizes on green purchasing.
GSCMPS2	Our firm has green co-operation with customers.
GSCMPS3	Out firm emphasizes cross-functional co-operation for environmental improvements.
GSCMPS4	Our firm has total quality environmental management.
GSCMPS5	Our firm emphasizes on environmental compliance and auditing programs.
GSCMPS6	Our firm co-operates with suppliers who are ISO 14001 certified.
GSCMPS7	Our firm has environmental management systems.
GSCMPS8	Our firm emphasizes on green supply chain information system.
GSCMPS9	Our firm emphasizes on reverse logistics.
GSCMPS10	Our firm has green distribution and packaging.
Market Performance: (Choi et al., 2018; Agyabeng-Mensah et al., 2020a, b, c, d, e)	
MP1	Our firm has explored new market opportunity during the last three years.
MP2	Our firm emphasized on customer loyalty during the last three years.
MP3	Our firm has improved brand image during the last three years.
MP4	Our market share has increased during the last three years compared to competitors.
MP5	Our sales have increased during the last three years compared to competitors.
MP6	Our customer satisfaction level has increased during the last three years compared to competitors.
Business Performance: (Beyene, 2015)	
BP1	Our market share has increased during the last three years compared to competitors.
BP2	Our overall competition position in Pakistan has improved during the last three years compared to competitors.
BP3	Our sales have increased during the last three years compared to competitors.
BP4	Our customer satisfaction level has increased during the last three years compared to competitors.
BP5	Our profitability has increased during the last three years compared to competitors.
Operational Performance: (Zhu et al., 2005)	
OP1	Our firm has achieved operational cost savings during the last three years compared to competitors.
OP2	Our firm has improved products' quality during the last three years compared to competitors.
OP3	Our firm has improved on-time delivery rate during the last three years compared to competitors.
OP4	Our firm has developed a flexible system for rapid response to change in orders/demand during the last three years compared to competitors.
OP5	Our firm has decreased inventory levels during the last three years compared to competitors.
Environmental Performance: (Chien, 2014)	
EP1	Our firm has reduced consumption of hazardous/toxic material during the last three years compared to competitors.
EP2	Our firm has reduced air emissions during the last three years compared to competitors.
EP3	Our firm has reduced effluent wastes during the last three years compared to competitors.
EP4	Our firm has sought to improve its environmental image/position during the last three years compared to competitors.

EP5	Our firm has reduced energy consumption during the last three years compared to competitors.
EP6	Our firm has reduced solid wastes during the last three years compared to competitors.

Assessing content validity entails the thorough examination of every question within a research tool, alongside consultations with supply chain experts or corporate professionals to confirm that the instrument comprehensively addresses all aspects related to the variables in question. Our objective was to guarantee the integrity and excellence of our survey instrument. To accomplish this, we enlisted the feedback of two supply chain professionals, who subsequently assessed and provided feedback, affirming that the questions adeptly encompassed the subject matter of our research.

In this research study, we used non-probability sampling because we did not know the exact population of the pharmaceutical industries in Pakistan. We used the purposive sampling method to collect data from participating companies A model of structural equation was performed to analyze the relationship between the constructs, and we use PLS-SEM approach to test the proposed hypothesis in our research study.

Variable Description:

Green Supply Chain Management (GSCM): In response to environmental concerns, green supply chain management (GSCM) was developed as a perfect option. According to (Siferd 2001, p. 69), GSCM is "The Layout of SCM guidelines filled, with measures taken, and connections configured taking into account the design, distribution, acquisition, production, use, reuse, and disposal of Organization's goods and services." This demonstrated the necessity for GSCM activities to begin at the beginning of the supply chain from the purchase of raw materials and continue around each step until the product is disposed of.

Environnemental Performance (EP):

Younis et al. (2016) described Environmental performance as a firm's capacity to reduce air emissions, effluent, and solid wastes, to decrease utilization of poisonous and unsafe substances, and to lessen environmental incidents. Currently, EP provides a competitive edge and long-term organizational success. (Zailani et al., 2012 b; Ulubeyli, 2013).

Market Performance (MP):

Market performance is a measure of green practices related to marketing activities with regards to accomplishing marketing goals of a firm (Ebenezer Afam, 2020). In an organization, MP associate to the level of attraction and customer retention for their products and services.

***Operational Performance (OP*):**

Firms now a days are looking forward for efficient and effective processes in this unstable environment to enhance their operational performance (Slack et al., 2004). OP is described as the performance linked to an organization's internal operations, including productivity, product quality, and customer satisfaction. Additionally, it is generally agreed in the body of literature that the four OP metrics of cost, quality, flexibility, and delivery are those that operations and supply chain researchers absolutely must have (Yu et al., 2014).

***Business Performance (BP*):**

In order to meet the requirements of customers and provide added value for the target markets, a company must recognize its target markets, understand their expectations, and organize its business processes in accordance with its business philosophy (Tang et al., 2007). There are several ways to measure corporate performance. Panigyrakis and Theodoridis (2009) were examined measures of company success, including financial indicators (such as growth rate of sales and total sales), non-financial indicators (such as stock age and market share), and worker productivity. Morrison and Teixeira (2004) highlighted those three

key notions concerning BP, namely Complexity, Lifestyle and Competitive edge.

Model Hypotheses: Following are the hypotheses of this research:

H1: GSCM positively influences BP.
H2: GSCM positively influences EP.
H3: GSCM positively influences MP.
H4: GSCM positively influences OP.
H5: EP positively influences BP.
H6: MP positively influences BP.
H7: OP positively influences BP.

Findings and Analysis

The respondent's gender distribution reveals that 33 female respondents constituting 32.7 percent of the total, 68 male respondents constituting 67.3 percent of the total.

Similarly, The respondent's age distribution reveals that individuals under the age of 25 accounted for 20 responses, constituting 19.8 percent of the total, respondents with 26 to 30 years accounted for 35 responses, constituting 34.7 percent of the total, respondents with 31 to 35 years accounted for 19 responses constituting18.8 percent of the total, respondents with 36 to 40 years accounted for 17 responses constituting 16.8 percent of the total and respondents with Above 40 years accounted for 10 responses constituting 9.9 percent response share of the total.

Similarly, the respondent's education distribution reveals that respondents intermediate or less found with 04 responses that reflected 4.0 percent response share, respondents with diploma found with 01 responses that reflected 1.0 percent response share, respondents with Graduate found with 40 responses that reflected 39.6 percent response share and respondents with masters/MPhil found with 56 responses that reflected 55.04 percent response share of the total.

Furthermore, the respondent's designation distribution reveals that respondents with supervisor found with 21 responses that reflected 20.8 percent response share, respondents with assistant manager found with 38 responses that reflected 37.6 percent response share, respondents with manager found with 28 responses that reflected 27.9 percent response share, respondents with senior manager with 11 responses that reflected 10.9 percent response share and respondents with CEO with 03 responses that reflected 3.0 percent response share.

Furthermore, the respondent's experience distribution reveals that respondents with less than 03 years found with 25 responses that reflected 24.08 percent response share, respondents with 03 to 06 years found with 35 responses that reflected 34.7 percent response share, respondents with 07 to 10 years found with 16 responses that reflected 15.8 percent response share and respondents with above 10 years found with 25 responses that reflected 24.8 percent response share and lastly, the respondent's income distribution reveals that respondents with less than 35,000 found with 07 responses that reflected 6.9 percent response share, respondents with 35,000 to 50,000 found with 24 responses that reflected 23.8 percent response share, respondents with 50,000 to 80,000 found with 28 responses that reflected 27.7 percent response share and respondents with above 80,000 found with 42 responses that reflected 41.6 percent response share.

Data Analysis: PLS-SEM, the statistical software was presented by Swedish econometrician Herman O.A. World (1975, 1982,1985). PLS path modeling is another name for the method (Hair et al., 2011). Through merging main components analysis with ordinary least squares regressions, it evaluates partial model structures. (Mateos-Aparicio, 2011). PLS SEM is referred variance-based method to analyze the parameters. The study conducted in the context of Pakistan and survey-based data collection done through online questionnaires from Pakistani manufacturing firms performing green supply chain activities. In order to assess the hypothetical association among the studied variables, we employed the partial least square structural equation modeling method in our research. The developed questionnaire filled by the participants of study i.e., Supervisor, assistant manager, manager, senior manager, and director of manufacturing firms having knowledge of green supply chain activities in their domains from the total of 269 questionnaire suggested by Daniel sooper calculator, there were 101 honest responses that we used to check the statistical relationship between variables. The data collection took time approximately 2 months. We used non-probability sampling because

we did not know the exact population of the manufacturing industries in Pakistan. We used the purposive sampling method to collect data from participating companies.

Construct Reliability and Validity

Variables	Cronbach's Alpha	Composite Reliability (ρc)	Average Variance Extracted (AVE)
BP	0.858	0.898	0.638
EP	0.863	0.898	0.594
GSCM	0.878	0.905	0.578
MP	0.859	0.914	0.780
OP	0.790	0.863	0.613

Cronbach's alpha, which bears the name of American psychologist Lee Cronbach, serves as a frequently employed indicator of internal consistency reliability in research carried out in the realm of social sciences. This statistical measure gauges the reliability of a scale by assessing how closely the items within that scale are associated with one another (Gefen et al., 2011). In this particular study, all the relevant statistics for the latent variables were found to exceed the benchmark value of 0.7, aligning with the established standard for Cronbach's Alpha. The Cronbach's Alpha for business performance, environmental performance, green supply chain management, market performance and operational performance observed 0.858, 0.863, 0.878, 0.859 and 0.790 respectively.

Composite reliability (rho C) serves as an evaluation metric for gauging the internal consistency and reliability of a scale or a collection of items within the context of structural equation modeling (SEM) or confirmatory factor analysis (CFA). It serves as a reliability indicator that gauges how effectively the observed variables (indicators) accurately capture the latent variable (construct) they are meant to depict (Henseler et al., 2015). To be considered satisfactory, the composite reliability score should exceed 0.7 The composite reliability for business performance, environmental performance, green supply chain management, market performance and operational performance observed 0.898, 0.898, 0.905, 0.914 and 0.863 respectively.

The Average Variance Extracted (AVE) is a metric applied in structural equation modeling (SEM) and confirmatory factor analysis (CFA) for evaluating the convergent validity of a latent construct. It quantifies the proportion of variance explained by the latent construct relative to the measurement error linked to the observed indicators (Hair et al., 2017). Typically, achieving a value of 0.5 or higher is seen as favorable evidence of convergent validity, though the precise threshold could vary depending on the particular research context and disciplinary area. The AVE for business performance, environmental performance, green supply chain management, market performance and operational performance observed 0.638, 0.594, 0.578, 0.780 and 0.613 respectively.

4.6.1. Outer loadings:

	BP	EP	GSCM	MP	OP
BP1	0.799				
BP2	0.801				
BP3	0.871				
BP4	0.753				
BP5	0.765				
EP1		0.752			
EP2		0.782			
EP3		0.807			
EP4		0.799			

EP5	0.757			
EP6	0.725			
GSCM1		0.777		
GSCM10		0.726		
GSCM2		0.796		
GSCM4		0.738		
GSCM5		0.784		
GSCM7		0.776		
GSCM8		0.720		
MP4			0.890	
MP5			0.852	
MP6			0.877	
OP1				0.772
OP2				0.805
OP3				0.807
OP4				0.745

In the setting of Partial Least Squares (PLS), the Outer-loading indicates the connection between observed indicators and latent variables (Hair et al., 2017). This term is also referred to as factor or indicator loading and aids in comprehending the link between observed indicators and their corresponding latent variables. It facilitates an understanding of how well observed variables contribute to explaining the underlying construct (Gefen et al., 2011). A higher outer-loading value signifies a strong association between an indicator and a latent variable, indicating that the chosen indicator effectively represents the latent variable (Henseler et al., 2015). The accepted benchmark for outer-loading is set at 0.7. As evident from the results below, the values of the observed factors for the respective latent variables surpass this threshold. The outer-loading values of business performance BP1, BP2, BP3, BP4 and BP5 observed with 0.799, 0.801, 0.871, 0.753 and 0.765 respectively. The outer-loading values of environmental performance EP1, EP2, EP3, EP4, EP5 and EP6 observed with 0.752, 0.782, 0.807, 0.799, 0.757 and 0.725 respectively. The outer-loading values of green supply chain management GSCM1, GSCM2, GSCM4, GSCM5, GSCM7, GSCM8 and GSCM10 observed with 0.777, 0.796, 0.738, 0.784, 0.776, 0.720, and 0.726 respectively. The outer-loading values of market performance MP4, MP5 and MP6 observed with 0.890, 0.882 and 0.877 respectively. The outer-loading values of operational performance OP1, OP2, OP3 and OP4 observed with 0.772, 0.805, 0.807 and 0.745 respectively.

Discriminant Validity: Discriminant Validity, within the setting of Partial Least Squares Structural Equation Modeling (PLS SEM), refers to the approach used to determine a construct's uniqueness compared to other constructs in a model (Michalos, 2014) it is essential in assessing the uniqueness of a construct. To assess discriminant validity, three primary tests are typically employed: cross loadings, the Fornell-Larcker Criterion, and the Heterotrait-Monotrait Ratio (HTMT). In our analysis, we specifically focused on evaluating and reporting the results for two of these parameters: the Fornell-Larcker Criterion and the Heterotrait-Monotrait Ratio (HTMT).

Fornell-Larcker criterion:

	BP	EP	GSCM	MP	OP
BP	0.799				
EP	0.573	0.771			
GSCM	0.581	0.615	0.760		
MP	0.792	0.496	0.462	0.883	
OP	0.684	0.469	0.654	0.591	0.783

The Fornell-Larcker criterion, developed by C. Fornell and D. Larcker in 1981, is a technique employed in structural equation modeling (SEM) to evaluate discriminant validity. Discriminant validity measures how distinct a construct is from others within a model. This criterion involves comparing the square root of the average variance extracted (AVE) for each variable with the relationship among those variables. The underlying principle is that a construct should exhibit a higher AVE, indicating it captures more variance within itself, than the squared correlation it shares with any other construct (Gefen et al., 2011). In the provided table, it's evident that the diagonal values exceed the non-diagonal ones, affirming that discriminant validity is met.

Heterotrait-Monotrait Ratio (HTMT):

	BP	EP	GSCM	MP	OP
BP	1				
EP	0.644	1			
GSCM	0.656	0.696	1		
MP	0.909	0.554	0.524	1	
OP	0.824	0.556	0.773	0.716	1

The Heterotrait-Monotrait Ratio (HTMT) serves as a metric for evaluating discriminant validity within structural equation modeling (SEM). Henseler et al. (2015) introduced it as an alternative to the Fornell-Larcker criterion, which assesses how different constructs are from one another. Typically, HTMT ratios should be below 0.85 or 0.9, with some references even suggesting 0.95, though the ideal threshold is 0.85. A value of 0 indicates perfect discriminant validity, signifying that the two constructs are entirely distinct. As the value nears 1, it indicates increasing overlap or a lack of discriminant validity between the constructs (Henseler et al., 2015). Our research findings align with the criteria for discriminant validity.

Analyzing Structural Models: After obtaining satisfactory outcomes from the measurement model, the subsequent phase involves evaluating the results of Partial Least Squares Structural Equation Modeling (PLS SEM) using the structural model. The standards for this evaluation include the examination of the Coefficient of Determination (R2), the Blindfolding-based Cross-validated Redundancy Measure Q2, and the statistical relevance and significance of the path coefficients. Moreover, the models out of sample predictive power should be analyze by research through using PLS predict procedure (Shmueli et al., 2016).

R2 and Q2:

	R-square	R-square adjusted	Q-Square Predict
BP	0.723	0.712	0.317
EP	0.378	0.372	0.352
MP	0.214	0.206	0.189
OP	0.428	0.422	0.402

The variance is measured through R2 which explain through endogenous constructs and for the reason it is the measure of model's explanatory power (shmueli & Koppius, 2011). Ideally accepted values for the R2 should be greater than 0.20 based on the context, R2 values in some domains 0.10 is also satisfactory (Raithel et al., 2010). The findings of R2 values in our study for dependent variables business performance, environmental performance, market performance and operational performance observed 0.723, 0.378, 0.214 and 0.428 respectively.

The other measure to analyze PLS path model's predictive accuracy is Q2 value (Geisser, 1974; Stone, 1974). As recommended by Henseler et al., (2009) the general principle for Q2 values For a certain endogenous construct, it must be higher than zero to express that the values are well reconstructed and to express structural model's predictive accuracy for that construct but if the value of Q square is less than zero or equal to zero it elaborates the weakness of predictive relevancy. The findings of Q2 values in our study for dependent variables business performance, environmental performance, market performance and operational performance observed 0.316, 0.351, 0.188 and 0.402 respectively hence, our model has predictive relevance.

Path Coefficient:
Hypothesis Testing:

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P values	Decision
EP -> BP	0.138	0.069	1.982	0.048	Accepted
GSCM -> BP	0.088	0.071	1.228	0.219	Rejected
GSCM -> EP	0.615	0.074	8.254	0.000	Accepted
GSCM -> MP	0.654	0.085	5.438	0.000	Accepted
GSCM -> OP	0.538	0.067	9.777	0.000	Accepted
OP -> BP	0.244	0.102	5.300	0.045	Accepted

The path coefficients table as mentioned below clearly shows that environmental performance has significant effects on corporate performance. and the value of T statistics must be more than 1.96 which is 1.982 and acceptable for this relationship The p-value observed with 0.048 i.e. less than 0.05 and having coefficient value which shows the relationship strength is 0.138 i.e. positive in nature that shows that there is positive and significant influence of environmental performance on business performance.

The study also observed that there is non-significant influence of green supply chain management on business performance, and the value of T statistics must be more than 1.96 which is 1.228 observed and not acceptable for this relationship The p-value observed with 0.219 i.e. greater than 0.05 not meeting the standard criteria and having coefficient value which shows the relationship strength is 0.088 i.e. positive in nature that shows that there is positive and non-significant influence of green supply chain management on business performance.

The study also observed that there is significant influence of green supply chain management on environmental performance., and the value of T

statistics must be more than 1.96 which is 8.254 and acceptable for this relationship The p-value observed with 0.000 i.e. less than 0.05 and having coefficient value which shows the relationship strength is 0.615 i.e. positive in nature that shows that there is positive and significant influence of green supply chain management on environmental performance.

The study also observed that there is significant influence of green supply chain management on market performance., and the value of T statistics must be more than 1.96 which is 5.438 and acceptable for this relationship The p-value observed with 0.000 i.e., less than 0.05 and having coefficient value which shows the relationship strength is 0.462 i.e., positive in nature that shows that there is positive and significant influence of green supply chain management on market performance.

The study also observed that there is significant influence of green supply chain management on operational performance., and the value of T statistics must be more than 1.96 which is 9.777 and acceptable for this relationship The p-value observed with 0.000 i.e., less than 0.05 and having coefficient value which shows the relationship strength is 0.654 i.e., positive in nature that shows that there is positive and significant influence of green supply chain management on operational performance.

The study also observed that there is significant influence of market performance on business performance., and the value of T statistics must be more than 1.96 which is 5.300 and acceptable for this relationship The p-value observed with 0.000 i.e., less than 0.05 and having coefficient value which shows the relationship strength is 0.538 i.e., positive in nature that shows that there is positive and significant influence of market performance on business performance.

The study also observed that there is significant influence of operational performance on business performance., and the value of T statistics must be more than 1.96 which is 2.005 and acceptable for this relationship The p-value observed with 0.045 i.e., less than 0.05 and having coefficient value which shows the relationship strength is 0.244 i.e., positive in nature that shows that there is positive and significant influence of operational performance on business performance.

Discussion

This study aimed to explore the influence of Green Supply Chain Management (GSCM) on various aspects, including Environmental Performance (EP), Operational Performance (OP), Market Performance (MP), and Business Performance (BP) within the setting of manufacturing companies in Pakistan. Additionally, the study examined the relationships between EP, MP, OP on BP. The outcomes of this research hold significance for the advancement of the manufacturing sector, particularly the pharmaceutical industry in Pakistan. In this study, we adopted an explanatory research approach, opted for a quantitative research design, and employed the purposive sampling technique. To analyze the data, we utilized structural equation modeling, specifically the widely recognized method known as partial least squares (PLS-SEM). In fact, PLS-SEM has gained extensive usage across various fields within the social sciences, including supply chain management (Kaufmann & Gaeckler, 2015). This software is known for its user-friendliness, demanding only minimal technical expertise (Ringle et al., 2015). Furthermore, PLS-SEM provides effective solutions even when dealing with small sample sizes (Hair et al., 2017b). The research targeted professionals, frontline managers, and supply chain representatives engaged in the pharmaceutical manufacturing sector of Pakistan.

In this section, we discussed the process of gathering information from our study participants using a research instrument adapted from previous literature. Prior to commencing data collection, we conducted a pilot study involving 30 respondents to assess the reliability of the instrument. The pilot study yielded a Cronbach's alpha value of 0.943, indicating the instrument's reliability, and subsequently, we proceeded with data collection. Additionally, we employed software, namely Daniel Sooper calculator, to calculate our sample size for use in the Structural Equation Modeling (SEM) technique. The software recommended a sample size of 269, but we collected 101 honest responses for our study. Our initial step involved conducting a demographic analysis of the personal profiles of our participants. Furthermore, various tests were performed in SPSS to screen the information, including checks for out-of-range values, missing data analysis, and the identification of

univariate or multivariate outliers. After removing seven identified outliers, we were left with 94 honest responses, which we subsequently used for SEM analysis. In Smart PLS, we applied three tests: the PLS algorithm, bootstrapping, and blindfolding. After analyzing the results, we transferred these findings from Smart PLS to an Excel data sheet.

Conclusion

The outcomes of the analysis demonstrated (GSCM) has positively but statistically insignificant influence on business performance. This contradicts with findings from certain prior studies (for example, Shi et al., 2012; Chien, 2014). This outcome suggests that when a constructing firm embraces GSCM, it may not immediately enhance its corporate performance. This is primarily attributed to the fact that the adoption of environmentally friendly activities necessitates additional investments and expenses, resulting in increased costs, which in turn negatively affects business performance.

Moreover, the results indicate that (GSCM) exerts positively and significantly influence on (EP). This outcome aligns with the outcomes of prior research studies (for example, Diab et al., 2015; Kumar et al., 2017). While studies in the past have supported the usefulness of GSCM, the study reinforces the critical role of GSCM in enhancing Environmental Performance within the setting of establishing nation Pakistan. When a manufacturing company incorporates environmental perspectives from the design stage, focusing on reusable and recyclable products through environmentally-friendly processes and materials, collaborates with suppliers to implement eco-friendly procedures that mitigate adverse environmental effects, and adopts environmental management standards, it contributes to environmental protection by reducing pollution and toxic substance emissions while also reduce resource consumption.

Furthermore, the research has unveiled that (GSCM) exerts positively and significantly influence on market performance, indicating that GSCM practices enhance market performance. This outcome aligns with the results obtained in studies (Agyabeng-Mensah et al. (2020a, b, c, d, e) conducted within the logistics and manufacturing sectors, as seen through the lens of competitive edge, market performance is vital in affecting corporate performance.

Additionally, the outcomes indicate that (GSCM) exerts positively and significantly influence on Operational Performance. The outcome is consistent with some earlier research' conclusions (for example, Laosirihongthong et al., 2013; Yu et al., 2014). The adoption of GSCM guidelines is reflected in operational performances, which consequently lead to reduced expenses, enhanced quality, and improved delivery times. Adopting environmentally-friendly practices can lower product costs through the creation of eco-friendly products, thereby reducing the need for excess materials and producing reusable items that, in turn, reduce inventory levels and associated cost.

Furthermore, the study also concludes that Environmental Performance (EP) exert positively and significantly influence on business success. This result suggests that when a business takes measures to reduce its adverse environmental influence by minimizing waste, emissions, and hazardous substances, it not only enhances its image but also fosters an improved reputation, a stronger market position, and increased sales. Consequently, this contributes to an enhanced market performance, ultimately leading to an overall improvement in business performance. According to Rao and Holt (2005), if a firm's environmental supply chain practices are questionable, customers may promptly cease their business dealings with that firm.

Finally, it was also determined that Business success is significantly and positively affected by operational performance (OP). This outcome aligns with the conclusions of certain prior investigations (for example, Laosirihongthong et al., 2013; Yu & Ramanathan, 2016). The finding suggests that enhancing a firm's operational efficiency and effectiveness translates into enhanced business performance. The benefits of decreased expenses, elevated quality standards, and increased flexibility contribute to heightened customer satisfaction, increased sales, an enhanced market position, and greater profitability, all of which collectively enhance business performance. In essence, implementing environmentally friendly procedures has positively influenced the economic performance of firms. This finding suggests a growing environmental awareness among manufacturing companies in Pakistan.

Furthermore, it emphasizes the need for additional initiatives from the Pakistani government to encourage the widespread implementation of (GSCM) practices in the country.

In general, this research offered further understanding of the expanding realm of environmentally friendly practices and their influence on business outcomes. It is evident that the area of (GSCM) has significant potential for further exploration in both research and practical application. Future research might examine the potential relationship in industries other than manufacturing to judge the ability to be generalized of our work. Thirdly, this study involves quantitative methodology so, in future researchers may think to opt for qualitative methodology. Fourthly, analysis has been completing just in Pakistan the data gathered was limited to Pakistani manufacturing industries, future research may collect data and information from other developing country's context. Fifthly, the data collected for the research focused on pharmaceutical sector so future research may collect data from other manufacturing industries like textile, automobile.

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