

SUSTAINABILITY AS STRATEGY: GSCM IMPACT ON FIRM EFFECTIVENESS IN DEVELOPING ECONOMIES

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DOI: <https://doi.org/10.5281/zenodo.15385856>

Keywords

Article History

Received on 01 March 2025

Accepted on 23 April 2025

Published on 30 April 2025

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Abstract

This study explores the influence of Green Supply Chain Management (GSCM) practices on organizational effectiveness within manufacturing firms in Karachi, Pakistan. Grounded in the Resource-Based View (RBV) and 4R Theory, the research investigates four critical GSCM dimensions: green procurement, green manufacturing, green distribution, and green information systems. Using a quantitative approach, data were collected from 217 supply chain professionals through a structured questionnaire and analyzed using Structural Equation Modeling (SEM) via SmartPLS. The findings reveal that green procurement, green distribution, and green information systems significantly and positively impact organizational effectiveness, whereas green manufacturing does not exhibit a significant influence. These results emphasize the strategic importance of embedding environmental sustainability into core supply chain functions to enhance firm performance and resilience. The study contributes empirical evidence from a developing economy context, suggesting that effective GSCM practices can yield competitive advantages, bolster stakeholder satisfaction, and foster long-term success. Limitations include the study's narrow sectoral focus and sample size, which future research could address by expanding across industries and including moderating variables like regulatory frameworks. This research provides actionable insights for managers and policymakers aiming to align environmental goals with organizational performance in the face of increasing ecological and competitive pressures.

INTRODUCTION

Despite their societal benefits, firms and organizations in the world are facing increasing pressures to respond to the impact of the ecological and sustainable influence of their functions. Some of the agencies of various agencies include non-governmental organizations (NGOs), academia, and governments (Ageron, Gunasekaran, & Spalanzani,

2012; In respondent countries' (Britain, Australia, USA, Canada, Germany & Spain) (Marrewijk & Were, 2003; Steger, Ionescu-Somers, & Salzmann, 2007; United Nations Global Compact [UNGC], 2010), industry competitive (Svensson, 2009), or even the opinions of the leaders within the companies have pressured organizations to select

good sustainability principles and practises (Larkin, 2006; Laszlo, 2008). The environmental and the social impacts of their actions create risks and costs for the company.

Yet, however, one might state that addressing such problems brings strategic potentials from the company's standpoint as well (Rao & Holt, 2005). Cost effective balancing and the advantages of environmental and social issues regarding may be a cause of long term profitable organization's long term competitive advantage (Shi, Koh, Baldwin, & Cucchiella, 2012). The intensity of returning environmental and social issues has been complicated by firms greater dependency on global supply chain to produce quality products at cost effective price (Christopher et al, 2011; Lai, Harjati, McGinnis, Zhou, & Guldberg (2008; Zhu ,Sarkis & Lai 2008). People of the integrated supply chain may have different opposing views regarding the advantages of addressing the environmental and social issues.

Strategies that can be employed for facing these complications and yet various capabilities of doing so, when it is compared with the supply chain's focal company. A focal company, which the participants of supply chain that coordinate the supply chain is referred to, is commonly original equipment manufacturers (OEMs) (Seuring, 2008). The firm is a focal company in this research.

Who's supply chain is under the auditing? (Catalan & Kotzab, 2003; Pfeffer & Salancik, 1978; Wolf, 2014). A strategic SCM that brings together, coordinates, and integrates the activities of each supplier within the chain is meant to manage societal challenges effectively (Carter and Rogers 2008,). Morali & Searcy, 2013).

These include many organizations such as Ford Motor Company, Hewlett-Packard (HP), and Wal-Mart claimed to have grown and implemented SCM strategies that optimize environmental, social, and economic aspects of producing goods or services along the value stream (Laszlo & Zhexembayeva, 2011, Wong 2013). For instance, Wal-Mart being the largest corporation in the world by value of sales revenue (\$476 billion US in Fiscal Year 2014) administers a massive global logistics chain that has transformed the integrated management of environmental, social and economic challenges,

referred to as sustainable supply chain management or SSCM, into a kind of rivalry advantage (Laszlo & Zhexembayeva, 2011). Ford Motor Company has integrated SSCM into its corporate sustainability strategy and the objective of that strategy is to make mobility affordable on terms of the environment, society, and economy. The sustainability goals of Ford's supply chain include human rights, environmental care, and fruitfulness to diversity and decent working atmosphere throughout the supply chain; communications over human right and environmental concerns of such materials found in raw materials (Ford Sustainability Report, 2013). For sustainability and SSCM with partners as a whole supply plans, both HP and Ford connect with TBL in the way they account for it.

1.1 Background of study

Environmental pollution is currently the world's most critical problem. The contamination and contamination of risk operational venture by businesses emanating their contaminated gases is a serious source of environmental contamination. Sustainability concepts must be included in supply chain sustainability to cut down environmental pollution. In addition, environmental concern has become a major consideration in the manufacturing and service industries throughout the world. As a consequence, the world over, companies are paying great attention to GrSCM. In accordance with Srivastava (2007), GrSCM is "integrating environmental thinking into supply-chain management, including product design, material handling and selection, production, delivery of the final product to consumers, and end-of-life management of the product to its beneficial life. Businesses have a lot of pressure to reduce cost, enhance their reputation, and reduce supply time in order to maintain a competitive edge in the market worldwide. By concentrating on these objectives, environmental factors are left out in other levels in the supply chain. Even further, lack of responsibility and lack of education are a major part of environmental degradation, one should fear environmentally friendly production and services. As Rao (2002) mentions the major part of the world's manufacturing business will be moved to Asia in the future and plenty of factors contribute to this

movement. The current situation shows that most manufacturing companies in grow countries are moving from grow countries to Asia to harness the low labour cost, low energy cost, good location and less environmental regulation. Consequently in order to compete globally, proactive thought and practice of GrSCM must be adopted. GrSCM practises became more important than they have ever been before with the escalation of the level of manufacturing activity. Many environmental-related activities in developing nations are typically not aggressive owing to the economic insatiability or limitation in finances. Moreover, the gain from the practices including financial and social benefits realised by companies from these practises are non-existent in developing countries and therefore commercial paychecks are not optional if proper implementation is to be determined. All industries irrespective of the sector are under enormous pressure to innovate, become more efficient, and integrate products – according to Bauman (2004). The number of interests in supply chain (SC) optimization and development has been really high recently. “Supply chain management includes the planning and management of all aspects of sourcing and procurement, conversion and all logistics management activities,” writes the council of supply chain management professionals. It is also important to mention that it includes coordination and collaboration efforts with channel partners. Which may include suppliers, intermediaries, third party service providers, and customers. In effect, supply chain management combines supply and demand management within and between corporations. This has seen a shift from corporate focus from the singular desire to pursue full-scale growth to a reliance on core competencies to be able to find reliable suppliers to outsource to as much as possible. This change in business operation thus highlights the need for SC management, which is accompanied by a higher volume of purchase needed for the process of product development, which leads to the emergence of new problems concerning environmental protection/ degradation. All SC tiers need to be focusing on the preservation of the environment. The environment has a strong influence on organizational effectiveness and market share. Consequently, the environmental dimension,

just as cost-cutting, quality, price, and time-to-market effectiveness, should be incorporated into organizational strategy. Over the past few years, the integration of green practises in firms across the world has increased with regard to business management and customer satisfaction. Due to the global and national importance of the green concept, the legislators all over the world paid more attention to affixing regulations to the business to help them to safeguard the environment. The regulations have been adjusted to satisfy contemporary needs for environmental conservation and remediation which puts great pressure on businesses to develop more environmental effectiveness. Different international rules and regulations, such as ISO standards have also ensured environments would be environmentally friendly in the manufacturing processes and SC of the companies. Even though there exist international legislation, its outcome is varied between nations, specifically between grow and developing nations. Companies are more aware of the environment in their operation than ever before. Based on Sarkis (2003) and Shecterle and Senxian (2008), environmental management has already acquired importance and support among most companies. In the past, companies tried to avoid operations that were clearly infringing on environmental regulations, like achieving emission standards and waste management, in order to avoid bans and fines. Greening is now regarded as a competitive advantage rather than simply a strategy for improving corporate image so integrating the green concept into any organisation has the benefits of social and financial rewards. According to the USEPA (2000), although well aware of the various monetary benefits, a large proportion of supply chain managers do not make environmental issues their top point. The reason why interruption of GrSCM is not relevant is that a lot of advantages from green intelligence are hidden. But for businesses to undertake environmentally friendly operations they first need to demonstrate their financial stability. Over the years, GrSCM has been described in different ways. Sustainability SC management (SSCM) and environmental SC management (ESCM) are other names of GrSCM (Seuring 2004). As Sarkis and Tamarkin (2005) point out, GrSCM unites diverse actions arising from the adoption of

the green concept in materials management, purchasing, distribution, manufacturing, reverse logistics, and marketing. Moreover, the major aim of the companies implementing the GrSCM practises is to enhance the environment and have financial gains.

1.2 Problem Statement

Such domination of the construction industry over 39% of total global carbon emissions, that may produce severe environmental pollution (United Nations Environmental Program, 2017) calls upon the industry to take initiatives to reduce environmental impacts in operations, especially that the customers become more environmentally developed or governments regulate more heavily on environmental issues (Mathiyazhagan, Govindan, NoorulHaq, & Geng, 2013). This situation creates the developing concept of sustainable construction. In order to achieve a balance between marketing effectiveness and concerns on environment, the green supply chain was introduced. A number of organizations had managed to create green supply chain by putting up supplier chains to obtain environmentally superior products or developing traditional methods of wastage reduction as well as operation efficiencies to respond to a plethora of environmental challenges, including energy conservation and pollution abatement (Kumar & Chandrakar, 2012).

From the literature review there are at least two opposing camps within the debate of whether the concept of green supply chain management helps to corporate effectiveness. Some learners believe that TBL's environmental and social legs need to be embedded into business policies and practises (Brown, 2006; Elkington, 1997, 1998; Gibson, 2001). Other researchers expressed a view that the integration of environmental or social concerns into business is good or GSCM should only be applied if one proves otherwise that it contribute the companies economic objectives (Friedman, 1970; Norman & Macdonald, 2004; Robins, 2006). Although evidence based on empirical grounds for the positive impacts of SSCM in corporate effectiveness are few, the theoretical bounding for arguing in support of a TBL approach to SCM as a strategy to minimize the interaction of

environmental-social-economical factors to the needs of all business men is persuasive. Many researchers, for their part, focus mainly on the environmental and social legs of TBL that constitute the foundation for SSCM. Economic leg, which is fundamental to the focal companies and suppliers, is frequently the case that is ignored or simply assumed, while factually it is that crucial if we look into the business case for SSCM. The question therefore becomes, can SSCM be a viable concept without supportive theoretical and empirical arguments it must have for all departments.

The aim of this study is to examine the effects, that SCM or integration of the use of TBL to GSCM have on the environmental, social and economic effectiveness of the focal company responsible for the management of the supply chain. Positive consequences in all three dimensions would give G SCM professionals a stronger business an attempt to incorporate a TBL based sustainability approach to GSCM. The fact that effectiveness is a top priority for all chain participants notwithstanding this study will be focusing its effectiveness analysis (environmental, social, and economic) on the focal company on the one hand, has not necessarily posed new challenges to the supply chains on the other hand. It exposed unknown vulnerability in some areas formerly, and, of course, there are many organizations to experience staff shortages and losses because of contribution of researcher. However, it has only compounded and sped up already existing supply chain issues. The COVID-19 pandemic left no trade, finance, health, or education systems, in addition to businesses and societies, undisturbed like few other phenomena of the past century have done. And it is not surprising, then, that only 2% of the companies polled declared themselves fully prepared for the pandemic. Major disruptions affected 57 percent of respondents, and 72 percent reported a negative impact therefrom (17 percent claimed a strong negative effect, while 55 percent reported mostly negative). Based on the findings, 60 per cent of the executives believe the pandemic has heightened the strategic importance of their supply chain. Consequently, firms need to urgently design a supply chain organization that is suitable for the new digital and autonomous driven era.

The supply chains of the future need to be agile, flexible, efficient, resilient and sustainable, as well as green supply chain strategies and ideas to increased visibility. It is because of this reason that organizing efforts should be directed towards enhancing organizational effectiveness through implementation of GSCM.

1.3 Purpose statement

The aim of this research is to examine in how ways SCM - incorporation of other parameters into SCM - affects environmental, social and economic effectiveness of the anchor company which is managing the supply chain. Positive impact on all dimensions would give SCM professionals a strong business case to have a sustainable approach to SCM. While effectiveness is a significant issue for all the chain participants, this research will limit analysis of effectiveness (environmental, social, and economic) to the organizations that is considered the major architect of GSCM for the supply chain. The study also analyzes green procurement manufacture of company size, industry collaborative structure, and regulatory framework on GSCM's effect towards effectiveness of focal company.

1.4 Research Objectives

Formerly a lot of researcher explain about green supply chain and its necessity in industrial now we can improve this research to analyse the effects of green supply chain management practices on organizational effectiveness. But in order to reach this goal this research has specific objectives with which organization can attain its primary goal.

- O1: To test the influence of green procurement on organizational effectiveness
- O2: To test the influence of green manufacturing on organizational effectiveness
- O3: To test the influence of green distribution on organizational effectiveness
- O4: To test the influence of green information system on organizational effectiveness

1.5 Research Questions

- R1: Does Green procurement has an influence on organizational effectiveness?
- R2: Does Green manufacturing has an influence on organizational effectiveness?

R3: Does Green Distribution has an influence on organizational effectiveness?

R4: Does Green Information system has an influence on organizational effectiveness.

Literature review

In the 1980s, the global demographic came to appreciate environmental issues more strongly, with the aim of protecting the ecosystem, especially in the aftermath of acid rain, depletion of the ozone layer, and climate change, meaning environmentalists received attention from the global demographic (Vanilla et al 2018). Incidentally, the businesses started to follow environmentally responsible practices, for instance, towards green supply chain strategies. The issue of environmental degradation research and monitoring appeared historically to be a key problem for humanity related to questioning of the ability to use environmentally friendly methods. Green environmental management solutions have been associated with the supply chain management concept to formulate the Green Supply Chain Management (GSCM) (Sarkis; Zhu; Lai; 2011). In line with various studies, an increasing consciousness of global issues has opened the door for the idea of a green supply chain to come into existence. As per Luther et al. (2017) a global supply chain management (GSM) is that which integrates environmental thinking into SCM. These include product development, procurement, selection, production right through to the final customer delivery. Among the companies that have participated are Dell, Xerox, Target, Kellogg's and Hilton. A business which takes into account such factors as economy, the environment and the firm's effectiveness. How effective a company is economically is its profitability and cost control capability. Businesses are compelled by environmental awareness into reducing the harmful gas emissions into the open air - this means reducing pollution. A firm's effectiveness in its marketing and supply chain management are matters of organizational effectiveness.

2.0 Hypothesis Development

2.1. Impact of Green Procurement in Organizational Effectiveness

Green procuring, or sustainable procuring (SP), is a novel subject in the procurement. It involves

consideration of social or environmental considerations, in addition to financial considerations in procurement decisions. Green procurement is about discovering outside ethical economic parameters, and making decisions through the total life cost, threats, success indicators, and social and environmental development. The findings of the research revealed that there are more than one factors that influence effectiveness of manufacturing industry. The green procurement characteristics contribute to the increase of effectiveness. The knowledge of the members on green procurement concepts was a great tool to the effects of green procurement on effectiveness. Over the years, there has been a recurrence of occurrences banding energy crisis and common consumerist behavior, which promotes high demand especially for the raw materials by individuals and organizations. The decline in raw material outsources has seen the focus of conservation and recycled material used. Green Procurement is an increasing numbers figure. It is a holistic approach because it incorporates organization, people, processes and technology. It is also known as sustainable procurement and some business have observed long term efficiency in operation as they conserve power usage, avoid waste generation and use water, and as such recurrent purchasing of tightly recycled materials.

Led to money savings (Victor & John, 2009). In the long run companies effectiveness has been bound to economic figures such as profitability liquidity growth, and stock market effectiveness. Growth has been broken into three buckets: sales, employees, and assets. According to Higgins (1977), the concept of sustainable growth rate had to be combined with organization's effectiveness, financial policy, the ratio of the dividend payout. To upgrade progress toward goals in a business world, organizational effectiveness management responds to crises as and when they arise; reversing broken systems, replacing failed management and redefining un-meet able goals. Progress monitoring techniques such as system's efficiency, sub-system's efficiency, department's efficiency and worker's efficiency are applied to realize this goal. It examines effectiveness statistics in general to learn how far you have progressed toward your goals. However, OPM has been reprimanded for not taking into account intangible goals and how

to measure them. Other variables also accessed include the number of years' experience working in a green procurement environment and any additional training levels. Substantial work has been done on sustainable procurement as a key paradigm of planning.

Measurement and management of internal organisational effectiveness has been constrained; however, supply chain effectiveness measures and management has been lacking, especially in inter-organizational realm where organizations engage other organizations in another tier. Gunasekaran along with rest of the team (2004)

H1: Green procurement has significant & positive influence on organizational effectiveness

2.2 Impact of Green manufacturing on Organizational Effectiveness.

For quite a few years now, manufacturing practices have mainly aimed at meeting or devising Needs and maintaining competitiveness in terms of quality of the product, time to market and innovation. In particular, lean manufacturing, introduced in Japan for the automotive industry in the first place, has a strong influence. One of the most pervasive manufacturing trends producing with focus on efficiency gives organizations the necessary tools to enhance their competitiveness by increasing the value they add to their customers in terms of productivity, efficiency, quality and customer satisfaction by reducing the resources that are spent on Waste removal consumes resources. Green practices concentrate on harm reduce emissions, eliminate wasteful resource consumption, recycle, and reduce medical threats throughout the entire production process by minimizing environmental footprint throughout the entire product life cycle [14]. Nevertheless, although green practices can satisfy the greener expectations of the market with the expansion of the "waste reduction" concept from lean manufacturing communities but in terms of a waste reduction, pollution, raw materials, and energy use, the linkage between the green practices and their effectiveness economically is beyond clarification. Going green can save you money, and to some degree it can be an easy process. For instance, installing energy-efficient lighting can greatly reduce your long term electric bills. It also

states that reducing water consumption as well as waste disposal requirements may have significant savings in the long run. Regarding the technical aspect of the chosen articles, multiple experts have focused their attentions on examining the co-existence and divergence of lean and green practices to that can serve as a rewarding place to start in charting their combination strategy. While others disagree, many researchers agree that, if the lean and green approaches to manufacturing may not be fully compatible, they do actually differ in their primary focus, it is useful to know their similarities and differences, and, more importantly, be able to address them, in fact it can really present practitioners an opportunity to enhance both methods such so that they can effectively align. Similarly, proponents of integration have discussed the compatibility of lean and green practices (beyond their similarities and differences), figuring out to what extent lean and green practices can be synergistic, i.e. to what extent they can deliver additive effectiveness when combined, more effectiveness than would be possible when their individual effectiveness are summed. Investments in such technologies as solar, wind and geothermal heating can bring long term savings. Nevertheless, there may be a tax credit of up to 30% of the investment. Though in terms of developing the ability of lean-green manufacturing to enhance companies' sustainability effectiveness, conducted SLR demonstrate promising results, which have been obtained on the basis of qualitative studies conducted within various manufacturing environments, including construction, food, and automotive industries. Since literature lacks quantitative studies, most of these studies are survey. In truth, only three articles look at sustainability outcomes quantitatively. Scientists agree that in order to adequately tackle sustainability problems, it is vital to create understandably described, stable, and standardized sustainability scales. Similarly, there is a lack of benchmark data and results, so it is even harder to test the proposed approaches and compare their effectiveness to state-of-the-art.

H2: Green manufacturing has significant & positive influence on organizational effectiveness

2.3 Impacts of Green Distribution over Organizational Effectiveness

Green distribution is among the cardinal practice of green supplies chain management. The practice of green distribution more or less is the way of shipping the products & services via the sustainable and eco-friendly network to the end customers. In its general terms, the process of green distribution implies storage, order processing, picking, packaging and loading products for delivery to the end consumers. Green distribution practice involves some activities and actions that remove Co2 from the environment and help in making economically viable policy and provide a good standard of living in the present environment for future population of earth (Mwaura et al., 2016). "Green" is the word that make us enable to think about an earth without pollution (Panya et al., 2021). So long as the importance of environment is concerned, the significance of ecological problems is rising every day. For which the integration of eco based issues to the literature and studies of SC has growing and prospering (Mwaura et al., 2016). The application of green distribution is a keen participant in limiting the use of material for packaging to ensure organizations conserve on quantity of fossil fuels used. Green distribution and intensify the use of greenhouse gases in their manufacturing and process of distribution in increasing the importance of the environment throughout the process of product and service distribution (Ninlawan et al ; 2010. Panya et al., 2021).

The development of the distribution practice on green in the business of overall world is in order to be able to wrap a lightweight material, reusable, ecofriendly, decomposable material and consequently to reduce the use of harmful and non-environmental material (Çankaya & Sezen, 2019). During distribution related activities, deprivation and humiliation of the environment incurs high level of costs such as unavoidable opportunities and offers, defensive spending, cost of replacement, unescapable and unavoidable future opportunities that can be used to affect firm effectiveness (Wanja & Achuora, 2020). In detail from earlier research studies it was observed that Green distribution has major effect on the effectiveness of an organization as it enables the firm to make it happen for it to

follow the concept of eco-friendly transportation, distribution and bulk control of handling the bulk quantity product, protect the product from the effect of the outside environment and its experience certain factors that may lead to pollution for the sake of the health of the consumers and their safety. Consumer behavior, concerning the green practices of a firm is also affected by green distribution practices (Delis et al. 2020).

H3: Green Distribution has significant & positive influence on organizational effectiveness

2.4 Impact of Green information system on the organizational effectiveness.

The practice of green information communication (GIS) is linking the use of an information system that encourages manageable and supportable development and also promotes the trend of eco-friendly operations. GIS partially promote the functions of an organization so that all of them are directed to the realization of green innovation concepts and green sustainable practices (Henkel & Kranz, 2018; Wang et al., 2015). In organizations execution and implementation of green IS are very supportive of information sharing relating to eco-friendly initiatives in end to end supply chain system in the form of coordination which leads to increase in firm effectiveness (Henkel & Kranz, 2018). In the same domain, GIS represents the power of the efforts of green management and record the degree of coordination and report requirements of multiple members of supply chain network (Khan & Qianli, 2017). Research findings of a study by a scholar Zhu & Sarkis (2004) point to the fact that organizations do green practices concerning information system in order to give a boost to their competence status and ecological effectiveness in relation to efficiency, quality & reduction of cost. Furthermore, with organizations deploying green & sustainable technology in firms to find relation based opportunities in that fashion we should get a high level of useful operations & strategies, which will produce a response for the enhancement of organizational efficiency (Rehman Khan & Yu, 2021). In the earlier research studies scholars believe that if the quality of data which is applied in the firms are not credible then the comparative study between the ecological efficiency and level of

financial effectiveness for the firm could be problematic situation for the organization (Khan & Qianli, 2017). Negative impact of green IS is the positive influence of coordination and integration level of firm to their SC members and also greatly foster the ecological and economic effectiveness of firm (Schniederjans & Hales, 2016). Now it strongly emphasizes in current research studies how the great information technology actually has profound effect on firm effectiveness and are really essential for the manufacturing firms (Wang et al., 2015). If an organization is to be able to develop competitive benefits and increase effectiveness that are too difficult for the rivalries to replicate, green technology usage and implementation will help (Moosa & He, 2022). The same will apply by applying the green practices in organization, the infrastructure ability and its competitiveness favorably and directly influence the high effectiveness of an organization (Alkathoori et al., 2021 Wang et al., 2015). In the end to end supply chain system of firm, the GIS implementation in the firm may improve the efficiency level of an organization with respect to; financial, effective operation with the use of increased allocation of resources (Daugherty et al. 2005). GIS also contribute to the enhancement of firm green development capabilities & competencies & actively contribute to provoking the firm overall effectiveness (Hertel & Wiesent, 2013; Yang et al., 2020). Therefore it is arrived at that green information system highly associate with improving firm effectiveness. Thus we hypothesized that

H4: Green Information system has significant & positive influence on organizational

2.5 Underpinning and supporting theory

2.5.1 4R theory support Green Manufacturing (IV2)

The populace becomes more and more interested as the environment gets worse. The essence of Green Manufacturing globalization through balance between manufacturing and ecosystem is the end goal. Green Manufacturing is not a new concept that recently came into force in the recent years. It is interesting that some scholars found several negative effects that manufacturing has on the environment as far back as the start of the Industrial Revolution.

Over the last several years, more corporations have positioned Green Manufacturing as an essential strategic location. The practice of Green Manufacturing is specific for the industry because the core of Green Manufacturing is the same, but the particular techniques should be applied in absolutely different processes in absolutely different works.

These are a few examples of typical green production patterns. 4R theory supporting the green manufacturing which is now normal in use in form to reduce chemical effects reuse the waste and recycle it in many ways.

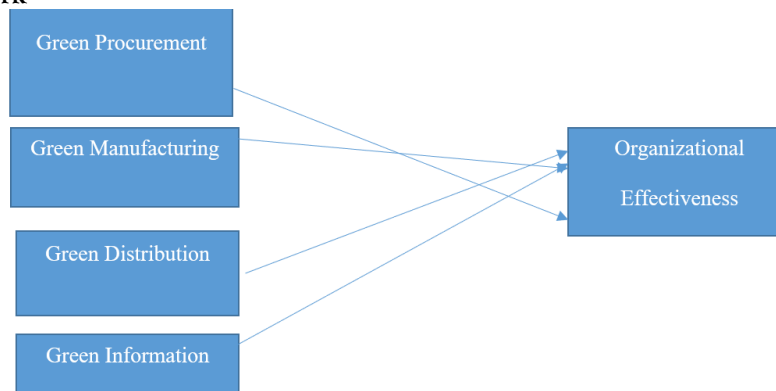


2.5.2 RBV theory support green procurement (IV1) and firm s effectiveness (DV)

According to the resource based view, RBV, firms have resources, a subset of them that enables a firm to obtain advantage over other firms and another subset of them that yields superior long-term effectiveness. Competition advantage is possible over the use of scarce and valuable resources. The Resource based view (RBV) (Barney 1991) helps

businesses to build agility, adaptability and alignment in SCM (Dubey et al 2018). Therefore we can say that the RBV theory promotes green procurement and firm effectiveness because it enables us to create strong norms not to mention the value we add to our purchasing power and create a strong ambiance in our company.

2.6 Research Frame work



Introduction

According to the business management tendencies and ethical standards, the literature research identified that there is the theoretical framework for justifying sustainability approach to SCM.

3.1 Research methodology**3.1.1 Research approach**

According to Golicic and Davis (2012) the quantitative approach technique and the qualitative approach method are the two basic sorts of research approaches. The investigator has opted to use the detective quantitative technique to pursue a direction of investigation in this research. Under well controlled conditions, quantitative research is able to determine cause and effect when a causal relationship between variables is observed. The strength of this technique though, is the fact that the investigator can use numerical or statistical approaches to evaluate the data that has been provided by the respondents. Approaches to research, however, refer to the mechanisms of gathering data to be used to study groups of individuals during research.

3.1.2 Research design

Explanatory in nature is the research design. Quantitative-based strategy was applied in constructing the study. Citation in References column) (heir, 2010) The research design means the whole set of integrating different elements of research in a logical and understandable way and defines strategy for collecting, estimating and exploring data. It can be used to estimate the presence or absence of a positive or negative relationship between the two variables and the strength or weakness of the relationship and it also measures the effect of the independent variables on the dependent variables.

3.2 Sampling design**3.2.1 Target population**

The target audience is just the group of people from whom data is drawn in computing and interpretation of accurate information. Population for this research includes all manufacturing organizations that are present in Karachi, Pakistan. Target of the research population are all the

employees that are specifically working in the supply chain department of firms.

3.2.2 Sample Size

Our sample size has been shown by heir.et al (2010) 30(5)=(150).

3.2.3 Sample Technique.

Sampling (Wang & Sarkis, 2013) is one of those things that influence the correctness of survey/research outcome the most. If you are not successful in your sample then it will follow through on the end result. In research, sampling is very much convenient. There are two types of sampling methods: probability and non-probability; for this study non-probability sampling was used to gather data. For purposes of explaining the results or conclusion, a purposive sampling was decided upon for conducting the research in non-probability. Purposive sampling (also known as judgmental, selective, or subjective sampling) is when the researchers pick members of the population that the researchers are going to include in their study based on the subjective judgment of those researchers.

3.3 data source and instrumentation**3.3.1 Data source and instruments**

The review tool used in this inquiry was according to sampling Wang & Sarkis (2013) which was adjusted from other studies which endorsed the estimating requirements of this investigation. Across a 5-point Likert Scale of assembling undertakings, the instrument contains items measuring many sizes of board discernment. It has been arranged in such a way that the builds are sorted and in such a way it is easy to wrap the replies. All is stated on the bases of the perception of respondents, thereby making it easy for them to react, as they agree to each proposition as shown by the manifestation. Each assertion comes with a five point Likert Scale.

(1 = strongly Agree, 2= Agree, 3= Neutral, 4= Disagree, 5= strongly Disagree).

DATA ANALYSIS AND RESULTS**4.1 Introduction**

Thus chapter contains the demographic profile of data and the response rate of survey. It starts with descriptive statistics followed by reliability analysis,

bivariate correlation, construct validity among variables and overall statistical model in which all hypothesis were tested through SEM path analysis.

4.2 Response rate

The grow questionnaire were sent to targeted population that was takes form manufacturing firms. The total responses that were revert back was 217.

4.3 Demographic Profile of participant

The demographics profile of the respondents are shown in given below table:

Demographic variable	Category	Frequency	Percentage
Gender	Male	174	80.2
	Female	43	19.8
Age	Less than 25 years	42	19.4
	25- 30 years	126	58.1
	36-40 years	49	22.6
	Above 40 years	0	0
Experience	less than 3 years	94	43.3
	3 to 6 years	97	44.7
	7 to 10 years	26	12.0
	above 10 years	0	0
Designation	Executive	108	49.8
	Assistant Manager	77	35.5
	Manager	32	14.7
	Senior Manager	0	0
	Director	0	0
Income	25,000- 40,000	94	43.3
	41,000- 70,000	64	29.5
	71,000- 100,000	51	23.5
	Above 100,000	8	3.7
Education	Diploma	17	7.8
	Intermediate or less	57	26.3
	Graduation	85	39.2
	Masters	51	23.5
	M Phil/PhD	7	3.2

4.4 Descriptive Statistics

The descriptive statistics was carried out to examine the normality of data. It include the mean, standard deviation, skewness and kurtosis. The value of

skewness and Kurtosis should not be less than and greater than +2.5 (Hair Jr et al., 2009). Given below table indicate the descriptive outcomes for this study:

Table 1 Descriptive Statistics

Construct	Mean	Std. Dev.	Skewness	Kurtosis
Green Procurement	3.45	0.76	-.451	-.214
Green manufacturing	3.52	0.65	-.254	.139
Green distribution	3.58	0.72	-.712	.200
Green information system	3.50	0.69	-.498	.311
Organizational effectiveness	3.47	0.79	-.885	1.35

According to calculated outcomes presented in given above table, the maximum value of Skewness (sk=

0.885) is for construct Organizational effectiveness (Mean=3.47, S.D=0.79) while the minimum value of

skewness ($sk = 0.254$) is for construct Green manufacturing (Mean=3.52, S.D=0.65). On the other hand the maximum value of kurtosis ($k=1.35$) is for construct Organizational effectiveness (Mean=3.47, S.D=0.79) whereas the minimum value of kurtosis ($k=0.139$) is for construct Green manufacturing (Mean=3.52, S.D=0.65). Since all these values are exist in acceptable range so that all adapted constructs has no issue with univariate normality.

Table 2 Reliability Analysis

Construct	Standardized Cronbach's Alpha s	Mean	Std. Dev.
Green Procurement	.791	3.45	0.76
Green manufacturing	.801	3.52	0.65
Green distribution	.768	3.58	0.72
Green information system	.784	3.50	0.69
Organizational effectiveness	.782	3.47	0.79

The calculated outcomes presented in given above table shows that the minimum value of reliability (Alpha =0.768) is for construct Green distribution (GD) (Mean =3.58, S.D=0.72) while the maximum value of reliability (Alpha = 0.801) is for construct Green manufacturing (GM) (Mean=3.52, S.D=0.65). However, the reliability values for each construct has not less than 0.70 so that all adapted constructs are reliable for this research study.

4.5 Reliability Analysis

The reliability analysis was carried out to determine the internal consistency of data it also eliminate the error related to data collection while the value of reliability for each construct should not be less than 0.70 (Hair et al., 2018). The given below Table illustrate that summarized outcomes for reliability analysis:

4.6 Correlation Analysis

To check the multicollinearity issue with construct and uniqueness of constructs bivariate correlation analysis was applied. It illustrates the strength of association among each pair of variables so the value of correlation analysis should be from ± 0.30 to ± 0.90 (O'Brien & Sharkey Scott, 2012). The summarized calculated outcomes for correlation analysis are presented in given below Table:

Table 3 Bivariate Correlation

Construct	T_GP	T_GM	T_GD	T_GIS	OP
Green Procurement	1				
Green manufacturing	.484**	1			
Green distribution	.461**	.498**	1		
Green information system	.465**	.401**	.537**	1	
Organizational effectiveness	.468**	.384**	.574**	.522**	1

** Correlation is significant at the 0.01 level (2-tailed).

According to the calculated results presented in the above table, the strongest correlation ($r = 0.574$) was observed between Organizational Effectiveness (OE) (Mean = 3.47, SD = 0.79) and Green Distribution (GD) (Mean = 3.58, SD = 0.72). Conversely, the weakest correlation ($r = 0.384$) was found between

Organizational Effectiveness (OE) and Green Manufacturing (GM) (Mean = 3.52, SD = 0.65). As all correlation values fall within the acceptable range, it can be inferred that there is no issue of multicollinearity. Furthermore, these findings

support the assumption that each construct measures a distinct concept.

4.7 Construct Validity

Construct validity refers to the extent to which a measurement scale accurately represents the underlying theoretical concept, distinguishing it from scales such as ordinal, nominal, or ratio scales. Constructs are generally considered latent variables that are not directly observable but are inferred through multiple measured items. Typically, a construct should be measured using three or more items, with each item representing a statement or question in the research questionnaire.

To ensure construct validity, it is crucial to verify two aspects: **convergent validity** and **discriminant validity**. Convergent validity refers to the degree to which multiple items intended to measure the same

construct are correlated with each other. On the other hand, discriminant validity ensures that items measuring one construct are not highly correlated with items measuring a different construct, thereby confirming that the constructs are distinct.

4.7.1 Convergent Validity

Convergent validity was assessed using three criteria:

1. **Factor loadings** for each item should be at least 0.40 (Hsieh & Hiang, 2004; Shammout, 2007).
2. The **Average Variance Extracted (AVE)** for each construct should be 0.50 or higher (Fornell & Larcker, 1981).
3. The **Composite Reliability (CR)** should be no less than 0.70 (Hair et al., 2018).

The summarized outcomes based on these three standards are presented in the table below.

Table 6 Convergent validity

Construct	Items	Factor loading	AVE	Composite reliability(CR)
Green Procurement	GP2	0.731	0.572	0.842
	GP3	0.77		
	GP4	0.726		
	GP5	0.795		
	Green manufacturing	GM1		
	GM3	0.741		
	GM5	0.718		
Green distribution	GD1	0.656	0.518	0.842
	GD2	0.712		
	GD3	0.78		
	GD4	0.79		
	GD5	0.66		
Green information system	GIS1	0.747	0.586	0.85
	GIS2	0.793		
	GIS3	0.792		
	GIS4	0.729		
Organizational effectiveness	OP1	0.682	0.543	0.856
	OP2	0.761		
	OP3	0.714		
	OP4	0.775		
	OP5	0.749		

The calculated results presented in given above table shows that the minimum value of factor loading is (0.660) which shows that all rest factor loading is not less than 0.66 so that first criteria was establish. The AVEs for each construct is not less than 0.50 beside this the values of CR are also not less than 0.70. Since the outcomes are fulfilling all three criteria so that convergent validity was established.

4.7.2 Discriminant Validity

Discriminant validity was assessed to evaluate the uniqueness of constructs and the

Table 7 Discriminant Validity

Construct	T_GP	T_GD	T_GIS	T_GM	T_OP
Green Procurement	0.756				
Green distribution	0.491	0.72			
Green information system	0.48	0.55	0.766		
Green manufacturing	0.453	0.458	0.369	0.737	
Organizational effectiveness	0.494	0.575	0.581	0.35	0.737

According to the calculated results shown in the table, the minimum diagonal value (i.e., square root of AVE) is 0.720, while the highest observed correlation between any pair of constructs is 0.581. Since the maximum correlation does not exceed the minimum square root of AVE, all constructs satisfy the criteria for discriminant validity. This indicates that each construct in the study is distinct and measures a unique concept, thereby confirming the adequacy of discriminant validity.

relationships among them. This assessment was conducted using the method proposed by Fornell and Larcker (1981), which requires that the square root of the Average Variance Extracted (AVE) for each construct be greater than the correlation between that construct and any other construct in the model. The consolidated results are presented in Table 8, where the diagonal values represent the square roots of the AVEs.

4.8 Testing Overall Model SEM

The proposed tested model has four independent variables which are Green Procurement, Green distribution, Green information system and Green manufacturing. Whereas, this model has one dependent variable which is Organizational effectiveness. The output of estimated path model is presented in given below Figure 2:

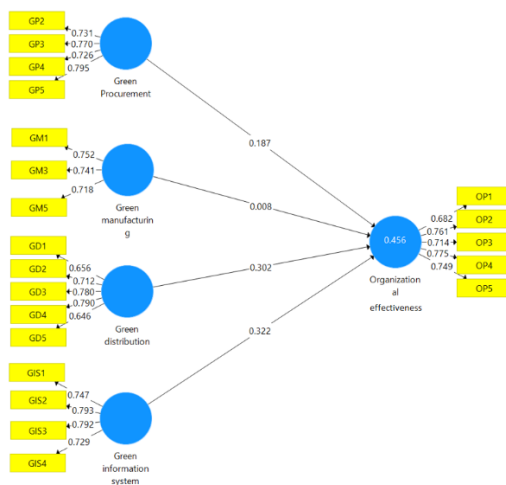


Figure 1: SEM path diagram

4.8 Assessment of Significance of the Structural Model

The proposed tested model includes four independent variables: green procurement, green distribution, green information system, and green

manufacturing. The single dependent variable in this model is organizational effectiveness. The model was evaluated using Smart PLS, and the results, including the model's overall significance, are presented in the table below::

Construct	Adjusted R-Square	T- statistics	P-value
Organizational Effectiveness	0.446	8.155	0.000

As shown in the table, the adjusted R-square value is 0.446, with a corresponding p-value of 0.000, which is below the conventional threshold of 0.05. These results indicate a statistically significant relationship between the independent variables and the

dependent variable. Specifically, the adjusted R-square value of 0.446 suggests that green procurement, green distribution, green information system, and green manufacturing collectively explain 44.6% of the variance in organizational effectiveness.

Table 8 Results of structural model.

	Path coefficient	T statistics	P-value	Hypothesis	Support yes/No
Green Procurement -> Organizational effectiveness	0.187	2.239	0.026	H1	Yes
Green manufacturing -> Organizational effectiveness	0.008	0.126	0.899	H2	No
Green distribution -> Organizational effectiveness	0.302	4.035	0.000	H3	Yes
Green information system -> Organizational effectiveness	0.322	4.597	0.000	H4	Yes

According to the path model (refer to Figure 2), the factor loadings for all items were found to be at least 0.40 or higher, meeting the acceptable threshold as suggested by Hsieh and Hiang (2004) and Shammout (2007). Furthermore, the p-values for all factor loadings were below 0.05, indicating that all items were statistically significant.

The PLS path analysis results (refer to Table 9) reveal that green procurement has a significant and positive effect on organizational effectiveness ($\beta = 0.187, p < 0.05$), supporting Hypothesis 1. In contrast, green manufacturing was found to have an insignificant impact, leading to the rejection of Hypothesis 2. Green distribution demonstrated a significant and positive relationship with organizational effectiveness

($\beta = 0.302, p < 0.05$), supporting Hypothesis 3. Similarly, green information systems were shown to have a significant and positive influence on organizational effectiveness ($\beta = 0.322, p < 0.05$), thereby confirming Hypothesis 4.

4.9 Chapter Summary

This chapter presented the data analysis, including findings and hypothesis testing. The dataset met univariate normality assumptions and demonstrated internal consistency. Moreover, no multicollinearity issues were observed. Hypotheses were tested using Structural Equation Modeling (SEM), with Hypotheses 1, 3, and 4 being supported, while Hypothesis 2 was rejected due to insignificant results.

The following chapter will present the overall conclusions of the study, along with recommendations, limitations, and implications for future research and practice.

SUMMARY AND CONCLUSION

5.1 Conclusion

The current research study was conducted to examine the effects of Green Supply Chain Management (GSCM) practices on organizational effectiveness. The study was primarily grounded in established theoretical frameworks, including the 4R Theory and the Resource-Based View (RBV) Theory. Specifically, it investigated the impact of four key green practices—green manufacturing, green procurement, green distribution, and green information systems—on the effectiveness of organizations. The research was applied to manufacturing firms operating in Karachi, Pakistan. The target population comprised employees working in the supply chain departments of these firms. A sample size of 217 respondents was determined for the study. Data were collected using a structured questionnaire that was distributed among supply chain personnel. The responses were analyzed using statistical software, including SPSS and SmartPLS, to generate the study's findings. The results revealed that all proposed hypotheses were supported—except for the second hypothesis related to green manufacturing—and demonstrated a significant and positive relationship between GSCM practices and organizational effectiveness. The study concluded that the implementation of green supply chain practices plays a critical role in enhancing the financial and economic capabilities of firms, thereby enabling them to compete more effectively in the contemporary business environment.

5.2 Discussion

All the proposed hypotheses in this study were tested, and the majority were found to be consistent with prior research, thereby supporting the proposed model. The outcomes of each hypothesis and its alignment with previous literature are discussed below.

Hypothesis 1, which stated that “Green Procurement has a significant and positive influence on

organizational effectiveness,” was supported by the findings and answered the first research question: Does Green Procurement have an influence on organizational effectiveness? The results aligned well with existing literature, confirming that the characteristics of green procurement contribute positively to effectiveness. Specifically, employees’ understanding of green procurement principles emerged as a key factor influencing organizational performance. In response to ongoing challenges such as energy crises and rampant consumerism, which have led to high demand for raw materials, organizations are increasingly shifting toward conservation and the use of recycled inputs. Green procurement, as a holistic approach, addresses not only the environmental aspects but also integrates people, processes, and technology in the sustainability equation.

Hypothesis 2, which proposed that “Green Manufacturing has a significant and positive influence on organizational effectiveness,” was not supported by the data and was therefore rejected. The findings did not show a statistically significant effect, thus failing to answer the second research question: Does Green Manufacturing have an influence on organizational effectiveness?

Hypothesis 3, stating that “Green Distribution has a significant and positive influence on organizational effectiveness,” was retained, and the findings addressed the third research question affirmatively. These results are consistent with earlier studies, which have shown that green distribution contributes significantly to organizational effectiveness. This is primarily due to its focus on eco-friendly transportation, environmentally conscious handling of bulk goods, and protection of products from environmental harm. Moreover, green distribution initiatives tend to shape consumer behavior favorably, encouraging positive perceptions of the firm’s green commitment (Dellis, 2016).

Hypothesis 4, which asserted that “Green Information Systems (GIS) have a significant and positive influence on organizational effectiveness,” was also supported by the findings. This confirms the fourth research question: Does Green Information System influence organizational effectiveness? The

results align with prior literature indicating that GIS enhances sustainability by promoting the use of information systems to support eco-friendly operations and green innovation (Chen et al., 2008; Corbett, 2013; Watson et al., 2008; Watson et al., 2010). In practice, green information systems facilitate coordination and information sharing across the supply chain, ultimately enhancing organizational performance (Chandra et al., 2007).

5.3 Limitations and Recommendations

Like all empirical research, this study is subject to certain limitations, which also open avenues for future research. These are discussed below:

1. **Sectoral Scope:** This study was limited to the manufacturing sector and specifically examined the implementation of Green Supply Chain Management (GSCM) practices within manufacturing firms. Future research is recommended to extend the scope to other sectors such as wholesale and retail. This would allow for comparative analysis and enhance the generalizability of the research model.
2. **Sample Size:** Due to time constraints, the sample size was limited to 150 respondents. Future studies should consider increasing the sample size to improve the accuracy and reliability of findings.
3. **Scope of Dependent Variable:** The current research model focused solely on organizational effectiveness as the dependent variable. Future research may broaden the model by incorporating other performance indicators such as economic, environmental, and financial effectiveness. Additionally, introducing regulatory norms as a moderating variable could further elucidate the relationship between green practices and organizational effectiveness.

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