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THE IMPACT OF GREEN SUPPLY CHAIN MANAGEMENT ON PRODUCT QUALITY MANUFACTURING FIRMS

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Abstract

The main objective of this article to study the links between Green Supply Chain Management (GSCM) methods and performance outcomes have been studied by previous scholars. However, just a few studies have been done to look into the link between GSCM and product quality improvement. In Malaysia, there is a low degree of participation in green projects, and there is also a lack of research on GSCM. As a result, the goal of this study is to look into the link between GSCM and product quality improvement. This study took a quantitative approach, with a questionnaire serving as the primary data collection tool. The sample size for this study was 425 manufacturing companies in Peninsular Malaysia with ISO 14001 certification. This study used simple random sampling with a sample size of 208 people. This study accepted all three hypotheses, proving that there was a substantial association between eco-design, green purchasing, and reverse logistics and product quality improvement. Overall, the accepted hypotheses and modest correlation coefficient value show that there is a moderate association between GSCM and product quality improvement. Implementing GSCM methods has been shown to improve the quality of a product. Peninsular Malaysia's GSCM techniques include eco-design, green purchasing, and reverse logistics. These three principles operate best when they are implemented into the operation and production line as much as feasible.

Keywords: Impact, environmental, Green Supply, Management, Product, improvement, Manufacturing and Firms

A. Background

This chapter discuss the context with business organisations are concerned about global and environmental concerns and are aware of them. Business organisations are being pushed to strike a balance between environmental and economic performance by environmental issues, competition, regulatory, and community concerns. Business organisations are constantly looking for new solutions to solve environmental challenges while also increasing their market competitiveness. Hansmann and Claudia (2021) Business enterprises that successfully manage environmental concerns will acquire new competitive advantages and bring additional value to their core business, according to experts. Green Supply Chain Management (GSCM) is thought to be one of the best techniques for incorporating environmental considerations into current operations (Srivastava, 2015). Purchasing and inbound logistics, manufacturing, distribution, and reverse logistics are all part of the supply chain (Sarkis, 2015). Greening the supply chain is an action that adds a "green" component to Supply Chain Management and changes how it interacts with the natural environment. GSCM improves environmental performance, reduces waste, and decreases manufacturing costs while also increasing eco-efficiency and synergy amongst business partners. Organizations that employ GSCM techniques will benefit financially, operationally, and environmentally, according to Bowen et al. (2020).

Companies must adopt strategies to lessen the environmental impact of their goods and services (Lewis & Gretsakis, 2020). In order to create more profit, the organisation needs also considerably increase its quality and performance. Today's supply chain initiatives, according to Beamon (2015), are centred on enhancing environmental management in industrial operations. This is because many people believe that manufacturing and production processes are to blame for environmental damage, such as waste generation, ecosystem disruption, and natural resource depletion (Fiksel, 2020).

The relationships between Green Supply Chain Management (GSCM) Previous scholars have looked at practises and performance results. Environmental, economic, and operational problems have been the subject of previous studies. The GSCM study's findings are intended to reveal how successfully green supply chain initiatives are implemented. The ability of a company's supply chain to be more environmentally friendly has a direct influence on its operational performance. Operations are the foundation that leads to financial success in distribution and manufacturing.

The most well-known functional results are an increment in things conveyed, a lessening in stock, an abatement in piece rate, an improvement in item quality, a product offering augmentation, and an expansion in limit use (Zhu et al., 2018; Zhu, Sarkis and Lai, 2018; Zhu, Sarkis and Lai, 2018; Zhu et al., 2015). Item quality improvement is a fundamental rule in functional execution since it has the most noteworthy mean worth when contrasted with different results, as indicated by the information. As indicated by the examination, GSCM strategies are urgent in further developing item quality and functional execution. Thus, quality administration and crisis the board are inseparably connected (Zhu and Sarkis, 2021).

B. Problem Statement

As previously stated, past research has shown that product quality improvement is a significant criterion in operational success, with the highest mean value among the other criteria. Notwithstanding this, the examination local area has not given sufficient consideration to item quality. Past research hasn't taken a gander at the connection between green store network the executives (GSCM) and better item quality. Moreover, Eltayeb, Zailani, and Ramayah (2019) investigated the connection between green store network drives and cost decrease, one of the functional exhibition results, and suggested that they investigate the impact of green production network drives on different sorts of functional results like quality, adaptability, and conveyance later on.

Aside from that, in Malaysia, GSCM is still a relatively new idea. In Malaysia, just a few studies on GSCM adoption and implementation have been conducted. Many Malaysian businesses, according to Seman et al. (2020), are still trailing behind and have no plans to incorporate the green supply chain concept in their operations. It's still unclear to what extent corporations are willing to become green. Malaysia has a low degree of interest and participation in green activities, according to a study done by Wooi and Zailani (2019). This is owing to the fact that the green notion is still a new concept in Malaysia, as well as a lack of environmental knowledge, resources, and skills. In Malaysia, GSCM adoption is further hampered by the company's size and the expenses of implementing green supply chain practises.

As a result, the purpose of this research is to see if there is a link between GSCM and improved product quality in Malaysia. This research can shed light on the effects of GSCM deployment and how it affects organisational performance, particularly in terms of product quality.

C. Research Objectives

In line with the research questions, there were two main research objectives in this study which were listed below.

RO1: To examine the level of implementation of Green Supply Chain Management (GSCM) of Manufacturing firms in Malaysia.

RO2: To examine the relationship between Green Supply Chain Management (GSCM) and product quality improvement

RO3: To identify the dimensions of Green Supply Chain Management (GSCM) practices within Manufacturing firms in Malaysia.

D. Research Questions

Based on the problem statement, there were three research questions that are developed in this study.

RQ1: What is the extent to which a manufacturing organisation has implemented Green Supply Chain Management (GSCM)?

RQ2: What is the link between Green Supply Chain Management (GSCM) and improving product quality?

RO3: What are the aspects of manufacturing organisations' Green Supply Chain Management (GSCM) practises?

E. Literature Review

1 Introduction

This chapter contains a review of the literature on the main topic of the present study. This review of the literature gives you a better understanding of the subject as well as the study's objective. It started with definitions of "green" and "supply chain management," then moved on to a range of "green supply chain management" definitions from different people, as well as a definition of "quality." The paper then goes through previous studies in green supply chain management before explaining the conceptual framework used in this research.

2 Definition

Green is defined as interested with environmental conservation or green politics in embracing a greener lifestyle. The Oxford Advanced Learner's Dictionary defines "advanced learner's dictionary" as "a dictionary for advanced (2041). According to Vachon and Klassen, "green has been a widely used strategy to express the environmentally friendly image of products, processes, systems, and technology, as well as commercial organisations" (2016). The term "greening" may also apply to how various professionals respond to environmental issues (Rao, 2020). As a consequence, we may define "going green" as an environmental concept that we can apply to our daily lives, systems, production, and commercial enterprises.

2.1 Supply Chain Management

A production network utilizes both immediate and circuitous methods to address a client's issues (Chopra and Meindl, 2020). As portrayed in Figure 2.1, a run of the mill inventory network might incorporate an assortment of stages, including clients, retailers, wholesalers or merchants, producers, and providers.

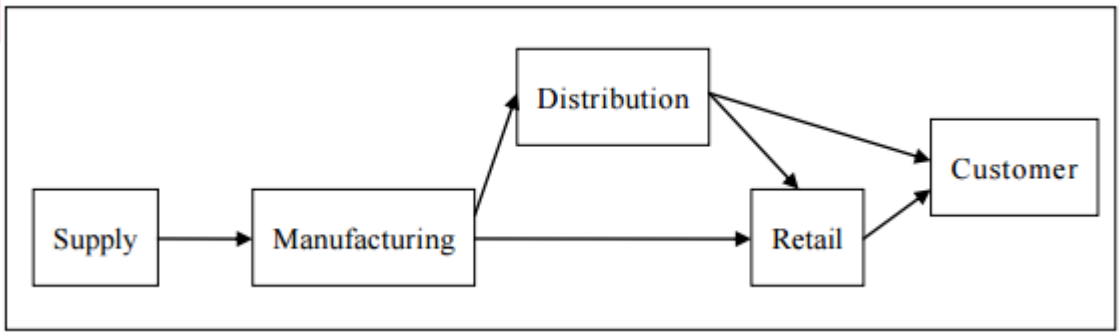


Figure 2.1: Supply chain structure (Beamon, 1999).

It works like an organization, with information, merchandise, and assets moving to and fro between stages. Everything began with the improvement of an item that could satisfy a client's need. Supplies and hardware will be given by the suppliers. From that point forward, the finished item can be put away in a distribution centre until it is scattered and conveyed to dealers. Clients can purchase the products through wholesalers or stores. Sarkis (2020), then again, depicted inventory network in a more convoluted methodology, expressing that it is a framework that incorporates activities like buy and approaching coordination’s, creation, appropriation, and opposite coordination’s. Inventory network the executives (SCM) is the administration of upstream and downstream connections from providers to clients to give worth to clients

while keeping store network costs low (Christopher, 2018). As per Stadtler (2018), inventory network the executives (SCM) is the method involved with incorporating authoritative units all through an inventory network, planning material, data, and monetary streams to satisfy client demands and increment the production network's seriousness. It is basic to the organization since it interfaces all parts of the creation and dissemination process, from unrefined components to definite things. Subsequently, SCM is basic in overseeing and observing entire production network exercises, as its essential objective is to expand benefit.

2.2 Green Supply Chain Management

Green store network the board (GSCM) is a methodology for joining "green parts" into the inventory network. Obviously, customary production network alludes to the change of natural substances into completed merchandise, which are then provided to customers by means of a wholesaler or retailer. As indicated by Green, Morton, and New, a green production network is a SCM advancement wherein modern obtainment strategies are lined up with natural rules (2021). They say that buy choices benefit organizations and help to further develop inventory network natural administration. GSCM, then again, incorporates green plan, green obtainment systems, complete quality ecological administration, harmless to the ecosystem bundling, transportation, and end-of-life item the board, just as green plan, green acquirement techniques, all out quality natural administration, harmless to the ecosystem bundling, transportation, and end-of-life item the executives (Hervani, Helms & Sarkis, 2015).

2.3 Operational Performance

Green design, resource conservation, hazardous material reduction, and product recycling or reuse are examples of possible measures. This requires putting the "green notion" into practise across the supply chain, from suppliers to customers. GSCM is a complicated activity, according to Zhu and Sarkis (2017), because it entails active monitoring of environmental management processes such as purchasing, operations, marketing, and logistics, as well as more practical practises such as recycling, reuse, remanufacture, and reverse logistics, as well as some innovations. Over appropriation, operations would be those necessary establishments. Furthermore, production generates fiscal returns. Expense reductions, improved result nature, upgrades in conveyance, and adaptability are some of the operational conclusions that could be ordered (Rao, 2017; Vachon & Klassen, 2016). It also testifies to the manufacturing's ability in terms of efficiently producing and delivering things to customers.

2.4 Quality and Product Quality Improvement

The term "quality" refers to the characteristics of both tangible and intangible goods and services. Quality can be defined as "the standard of anything when it is compared to other things like it," according to the Oxford Advanced Learner's Dictionary (2031). Consumers can determine how good or poor a product is by comparing its quality to that of another identical product. Quality, according to Goetsch and Davis (2015), refers to products, services, people, processes, and environments that meet or exceed consumer expectations. According to Russell and Taylor (2016), quality can be classified into two types of customer perspectives: fitness for use and design quality. Customers' views of quality are shaped by specifications,

standards, and other factors that help define and quantify "quality." According to Garvin (2020), there are five popular definitions of quality: (1) philosophy's transcendent perspective, (2) economics' product-based approach, (3) economics, marketing, and operations management's user-based approach, (4) manufacturing-based, and (5) value-based methods. Quality is described as "innate excellence" in the transcendent approach. Quality is defined as a set of globally recognised high standards that demonstrate exceptional fine quality as opposed to low quality.

The purpose of quality improvement is to enhance a product or service's quality over time. It is concerned with comparing the quality of the upcoming service to that of earlier offerings. "The purposeful formation of productive change and the achievement of already unimaginable degrees of execution," says Gryna (2020). Quality improvement, as indicated by Gryna (1999), is an improvement that lessens absconds while expanding the yield of industrial facility tasks, diminishes botch rates in workplaces, and decreases the field of disappointments.

2.5 Green Supply Chain Management Importance (GSCM)

Greening the inventory network can decrease negative ecological impacts by lessening garbage removal, buying of risky materials, reusing of items and wastage, and diminishing contamination through cleaner creation. Moreover, it had the option to raise ecological mindfulness among providers, purchasers, and makers, further develop conveyance time and item quality, and lift client bliss. Subsequently, Green Supply Chain Management (GSCM) creates as a deliberate way to deal with SCM that is progressively being recognized and embraced by organizations. The goal of GSCM was to reduce and eliminate harmful environmental effects and waste generated during the manufacturing process. Large enterprises, such as Taiwan's, may use GSCM to create partnership systems that boost their global competitiveness, product quality, environmental performance, and manufacturing costs (Antonio, 2015). In China, GSCM is also utilised to help reduce environmental impact by managing end-of-life objects and disposal (Puckett & Smith, 2017).

2.6 Importance of Product

Raising people's living standards A continual process aimed at improving quality is known as quality improvement. Quality improvements, according to Gryna (2019), occur in two sorts of positive changes: increases to product features and the removal of faults. An better product can perform without failure, has a more appealing design, and reduces the risk of injury when using it. Customer happiness and product fault rates can both be improved by improving quality. Furthermore, it has been demonstrated that improving quality can boost a company's performance (Peters & Austin, 1985).

2.3 Previous Research Findings

This section summarises previous research on Green Supply Chain Management (GSCM) and product quality improvement by researchers.

2.4 Green Supply Chain Management (GSCM) in Developed Countries

Green Supply Chain Management has been studied for its environmental, economic, and operational effects (GSCM). The conclusions of the GSCM research are meant to show how well green supply chain initiatives are implemented. According to previous studies, there is a considerable link between GSCM and operational performance (Szwilski, 2015 & Tooru, 2016). The results of previous investigations on GCSM conducted between 2018 and 2015 were summarised in Table 2.2. This study has referred to a few earlier studies since they are more closely related to the issue. These researches are carried out in China, Japan, and Korea.

Table 2.2: Summary of few previous studies done in developed countries

Year	Findings and Conclusion	Scope
2017	•In order to boost adoption of GSCM, Chinese businesses faced supply chain, pricing, marketing, and regulatory challenges. •Chinese businesses are still learning about GSCM practises and need to be trained in order to become more aware. • GSCM has enhanced the environmental and operational performance of Chinese businesses. It only has a minor impact on economic success.	In China, there are manufacturing and processing sectors.
2018	•Regulatory and global market constraints have forced Chinese automobile companies to embrace GSCM methods. • Eco-design and investment implementation When compared to green purchasing and consumer collaboration, recovery procedures are high. •The installation of GSCM increased environmental and operational performance marginally but had no effect on economic performance.	89 automotive enterprises in China

	•The findings also revealed that the study's pioneering car industry organisations have begun to use GSCM techniques in China.	
2019	•A comparison was made between Japanese major firms and Chinese manufacturers, and the results revealed that the Japanese had a higher rate of internal environmental management implementation than the Chinese. •When compared to Chinese manufacturers, additional GSCM activities such as green purchasing, customer participation with environmental considerations, eco-design, and investment recovery obtained similar levels of acceptance. •GSCM has resulted in considerable improvements in terms of environmental and economic performance for Japanese companies, while operational improvements are comparable to those of Chinese companies. In both organisations, the promotion of product quality is a key factor in operational performance. • The Japanese government has made a concerted effort to promote green supply chain practises by enacting legislation and policy.	Nine large Japanese manufacturers
2020	•Indirect relationships between the deployment of GSCM practises and company performance, mediated through operational and relational efficiency features. •Small and large purchasing organisations working together will improve GSCM implementation, relationship efficiency, and, ultimately, corporate performance. •Since 2017, there has been an increase in the number of Korean SMEs that have incorporated ISO 14001 in their management systems. •Implementation of GSCM approaches capable of accomplishing company-wide objectives	Korea's electronic industry's small and medium companies (SMEs)

	goals while also putting pressure on personnel to meet environmental criteria.	

2.5 Green Supply Chain Management (GSCM) in Malaysia

In Malaysia, there is somewhat little review on green inventory network the executives (GSCM), and the outcomes are lopsided. GSCM reception is still low in Malaysia, and many firms presently can't seem to consolidate it into their tasks (Woof and Zailani, 2019). Malaysia has a low level of commitment and association in natural projects. As indicated by Woof and Zailani (2019), the high costs of carrying out green inventory network rehearses, which fluctuate contingent upon the size of the association, are the significant obstructions forestalling Malaysian organizations from becoming green. Moreover, Eltayeb and Zailani (2020) observed that Malaysia actually has a low reception pace of green production network endeavors, as indicated by their examination. The degree of preparation among Malaysian modern undertakings to practice environmental awareness and utilize green innovations is yet obscure.

2.6 Dimensions of Green Supply Chain Management (GSCM)

When Zhu and Sarkis (2017) conducted their study on GSCM in China, they came up with the uniqueness dimensions of GSCM practises. Internal environmental management, external GSCM practises, investment recovery, and eco-design are the four key GSCM practises. These four genuine polishes would come together to produce Finally, Tom's research leads him to academic experts, authority, and endeavours in academic ecological management. These are the four major polishes that were widely used at the time. Tom gradually shifts his focus from GSCM to another analysts' research (Zhu, Sarkis & Geng, 2018; Zhu, Sarkis & Lai, 2018). Those who believe they are being guided Tom eventually read Zhu et al. (2021) in Japan, which contained the GSCM polishes. Tom's rumination eventually comes to an end. Zhu and Sarkis (2017) employed Zhu and Sarkis (2017) to study the relationship between GSCM hones and displays (2017). After that, Zhu et al. (2015) sorted the GSCM polishes into five real polishes, placing the outer GSCM hones in green and soliciting user feedback based on natural factors. In the study conducted by Tom, Lee, Kim, and Choi (2020) in Korea, however, only four GSCM hones were used. Based on prior investigations done in China, certain GSCM hones demand support. There are also a few changes to the client cooperation. It's also environmentally friendly. On the other side, Eltayeb Zailani (2021.

2.7 Eco-design

Eco-design, sometimes known as "design for the environment," refers to the steps taken during product creation to reduce a product's environmental effect and packaging throughout its life cycle (Zhu, Sarkis & Lai, 2018). In other words, it's a green design that reduces environmental impacts throughout the production process, from material sourcing to product manufacturing, usage, and disposal, while still meeting product goals like performance and cost (Johansson, 2017).

2.8 Reverse Logistics

The return of products, components, and results to the supplier is known as reverse logistics. The provider can then recycle, repackage, remanufacture, remanufacture, remanufacture, remanufacture, remanufacture, remanufacture, remanufacture, remanufacture, remanufacture, reman an ecologically conscious technique in which commodities and resources are returned alternatively upstream development outcomes, beginning with reuse, reusing, or transfer, is known as opposite logistics (Carter & Ellram, 1998). Rather of transferring objects with clients, it maintains track of getting back outcomes from them first. This opposing conveyance also allows for the reduction of trash. Furthermore, it creates a more productive future by reversing diffusion strategies. A well-managed reverse logistics programme has several advantages, including cost savings in inventory movement and garbage disposal, as well as improved customer service.

2.9 Dimensions of Quality

To analyse the link between GSCM and product quality improvement, we must first establish the essential features of quality. These are identified by Gouldson (1994) as utility, comfort, style, security, and efficacy, as well as features that are variously traits of result or administration. Garvin (1984) deconstructs the metrics from claimed calibre into eight separate measurements. Performance, features, dependability, conformity, durability, serviceability, and feel are among the eight dimensions. These eight aspects might be used to create a framework for claiming essential components of item personal fulfilment. As a consequence, it is evaluated and utilised as a dependent variable to examine if there is a relationship between GSCM and improved product quality.

2.10 Theories

Since there are not many investigations in the writing that show a connection between Green Supply Chain Management (GSCM) and further developed item quality, a hypothesis to clarify this relationship is required. Deming's hypothesis and frameworks hypothesis are the best fit for depicting and supporting the connection.

10.1 Deming’s Theory

William Edwards Deming's hypothesis is a well-known quality management method. Deming's approach to quality management focuses on laying the groundwork for change in order to improve an organization's performance (Deming, 1982). This method is made up of 14 quality management style concepts that explain how to increase quality, productivity, and competitiveness, as well as the role of management in these areas. Process management, according to one of Deming's ideas, is essential for continuous quality improvement (Anderson, Rungtusanatham, & Schroeder, 1994). The management level is critical in continually researching methods to improve products and processes, which leads to quality improvements. To increase quality and productivity, management should constantly upgrade the production and service systems. Costs are also reduced as a result of this.

10.2 Systems Theory

Frameworks hypothesis is an interdisciplinary hypothesis that might be applied to occasions in nature, society, an assortment of logical fields, and entire structures (Capra, 1997A framework is a gathering of pieces that work together to accomplish a specific outcome. A genuine framework, as indicated by Von Bertalanffy (1968), is open or communicating with its current circumstance, and can arise new improved characteristics, bringing about ceaseless turn of events. The beginning of frameworks believing is an adjustment of consideration from the part to the entirety. Specialists should have the option to view at a peculiarity overall rather than separating it into its constituent parts and modifying it.

At the point when the combination of parts that work in the worth creation process is assessed, an all-encompassing methodology can increment corporate execution. At the point when an assembling organization utilized GSCM, we viewed at item quality improvement as a wellspring of significant worth creation in this exploration. Makers, we accept, are boosted to green their inventory chains by further developing item quality. We ought to examine a peculiarity in its entire rather than separating it, as per this hypothesis. As an outcome, this review inspected GSCM as a full cycle that straightforwardly influences item quality. As per this review, the connection among GSCM and item quality improvement is a comprehensive methodology since it centers around their communications and connections between parts to get a handle on the inventory network's association, working, and results. This association permits the system to be made, as displayed in Figure 2.2.

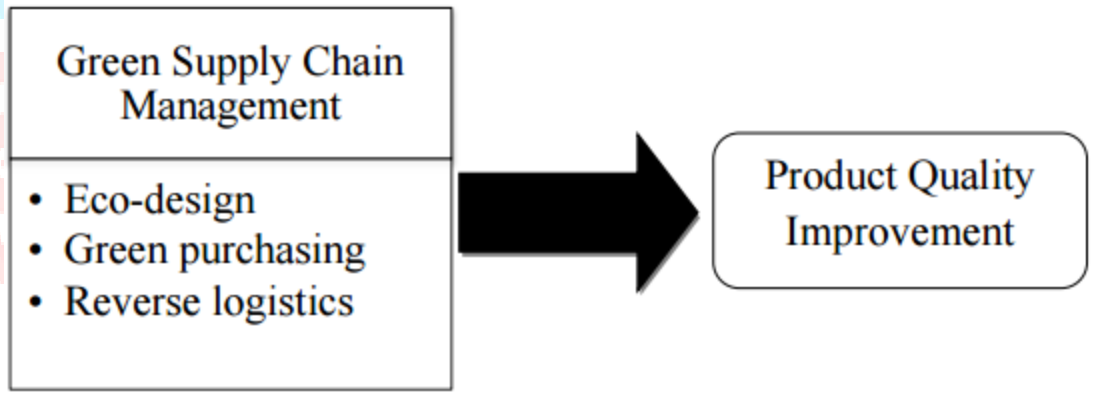


Figure 2.2: The conceptual framework.

The conceptual framework established based on past study findings is depicted in Figure 2.2. Because there has been minimal research, Deming's theory and systems theory are utilised to imply a relationship between GSCM and product quality improvement. Eco-design, green procurement, and reverse logistics are the three elements of GSCM. These parameters were used to determine the extent of GSCM acceptability in manufacturing organisations, as well as whether GSCM implementation had a positive or negative influence on product quality improvement.

2.11 Supply Chain Management as a Set of Management Processes

The binding up of important business forms throughout a retail network is increasingly being seen as supply chain management. The three key components that drive execution are the inventory network

organisation structure, store network forms, and administration segments. When it comes to inventory network structure, it's critical to coordinate decisions about acquiring, producing, stocks, warehousing, and delivery, as well as define goals and methods for achieving them.

The Global Supply Chain Discussion (GSCF), SCOR (Supply-Chain Operations Reference Model), CPFR (Collaborative Planning, Determination, and Replenishment), and Rosseta Net are just a few of the organisations working to develop cross-industry best practises. Encouragement is needed, CPFR. SCOR structures will also be explained. In the global supply chain discussion, the stock organise organisation is discussed. As an example, "Beginning with the end customer and ending with exceptional suppliers who provide items and administrations, the consolidation begins with claiming key business benefits. In addition, data that includes consideration for customers and partners is available.

i. Customer Relationship Management (CRM) is a term that refers to the
ii. Management of customer service.
iii. Demand Control.
iv. Order Processing.
v. Production Flow Management
vi. Product Development and Commercialization.
vii. Supplier Relationship Management.
viii. Product Development and Commercialization.
ix. Returns Administration.

Those eight main business structure benefits continue to flow along the store system and cut across organisations, resulting in more utilitarian storehouses within each firm. Despite the fact that service domination has been established, executing processing organise organisation needs converting from a helpful Acquaintanceship with a person amassed for business forms, first within an association and then across associations earlier, a store organises. At the same time, the total affiliations are gathered by the organisation. Previously, any stock organisation should consider these eight procedures; however, the proportional importance of each technique and the specific actions included may vary. This approach paradigm is appropriate for successful communication "among partners in the retail system." The graphic "From the association's supplier to the association's client" may be used to illustrate those levels of the SCOR model (Supply chain Council, 2018). It is built on the foundation of five unique organisational systems.

SCOR Process	
Plan	Processes for balancing aggregate demand and supply in order to determine the optimal course of action for sourcing, production, and delivery.

Source	Processes for obtaining products and services in order to fulfil anticipated or real demand.
Make	Processes that turn a product into a final product in order to fulfil anticipated or real demand.
Deliver	Order management, transportation management, and distribution management are examples of processes that offer completed goods and services to fulfil projected or real demand.
Return	Processes for returning or receiving items that have been returned for whatever reason. These procedures also apply to post-delivery customer service.

Table2.6: Distinct Management Processes

Each of these forms can be filled out. Between claiming a site of interest and claiming it, there were formerly four steps. The amount for supply chains, as well as the measures that will be utilised, are decided by the level at which you cease giving it. The planning and execution procedure are described at the second level. On the subject of material flow The inputs, outputs, and streams of each transitional component are detailed at level three (Lambert, 2018, p. 29). Each strategy is scrutinised. Business process reengineering, benchmarking, and best practise analyses were also implemented.

2.12 Key Supply Chain Processes

Regardless of the approach used by the company for their production network, the system's execution should include design areas of interest in procedures, applications, and data. There are four basic elements to handle engineering.

1. A flowchart depicting supply chain processes and their relationships.
2. A diagram depicting the relationships between store network forms and whatever survives of the centre venture forms.
3. A representation of the IT applications required to enable production network forms, including data and execution points.
4. A description of how the applications will work together, including data determination and recurrence of correspondence.

Have a high level of integrity in terms of incorporated applications, precise data, and documented procedures. To improve the foundation of competition, the firm must select best-in-class practises and

procedures that actually fit the approach while avoiding the trap of selecting expensive front-line hones that provide just modest support.

Table 2.7: Supply Chain Practices and Basis of Competition

strategy	
Innovation	• Integration of the design and supply chains • Supplier collaboration for innovation • Dedicated supply chain for new product innovation
Cost	• Factory planning and scheduling that is integrated • Standardization of raw materials and industrial processes • Manufacturing design, procurement, and order management
Service	• Collaborative planning with customers • Segmentation of customers • Postponement
Quality	• Traceability at the product and batch levels • Tracking the life cycle of items that have been sold

Whether those expenses are the primary hotspot from claiming aggressive preference, the state of the specialty polishes that camwood assist the individual's methodologies would be identified with coordinated plant arranging and scheduling, crude materials, and manufacturing methodology institutionalisation, as shown in figure 3-5. Prepare item specs as well to verify they are suitable for efficient manufacture, procurement, and request handling. When a firm competes on radiant service, the most perplexing techniques are those linked with community-oriented planning with customers, client division with the ability to suit distinct client section demands and, furthermore, potential, and outcome separation. As an example, late in the metamorphosis If the customer changed their demands as soon as possible, which is known as postponement, the illustration should be

2.13 Importance of Quality Control in Supply Chain Management

1. Imperfections and Scrap

If rough materials are imperfect, it may result in entire era lines being wasted, as well as an increase in disfigurement rates on completed goods stock. Similarly, common materials may require further machining or refining, which may expand representatives' duties while also increasing prices. Merchants and the materials they provide must be evaluated on a regular basis by generation organise personnel with confidence rough materials satisfy points. Tom's reading would eventually restrict how production information sources were handled, guaranteeing that stock system officials were truthful about their company's operations.

2. Outer Failures

When store system calibre control is insufficient, things may most likely break alternatively wreck in front of them ensure time lapses. There may be a considerable number of disappointments when anything leaves an amassing office, depending on the approach for those organisations. Customers who are pressured to return things may lose faith in the company from which they purchased them. Finally, the personal satisfaction control of a stock organisation ensures a company's reputation. The rarer those in charge of supplier inputs, the greater the chance of advantages and perhaps dangerous thing disappointments.

3. Assessments

Organizations that deal with large amounts of deformities and various types of trash generated during assembly routinely conduct manual investigations to ensure customer satisfaction. Working liabilities are increased by examinations. Furthermore, it is unnecessary to inquire whether nature controls demand support in truly attempting. High-quality control frameworks Furthermore, supplier organisation checks are required to avoid erroneous era transportation evaluations. Filling in the hours may result in the loss of surveying materials.

4. Dangerous Materials

Dangerous materials would be used all over the universe for various functions coupled alongside assembly, particularly in obstruction-related businesses. Caliber control protects workers and other associates from being exposed to dangerous signs of harmful elements on a regular basis. Those of you. Faced with urban deterioration as a result of deindustrialization, engineers devised, and government lodgi. For the transportation of hazardous chemicals, the division of claiming transportation implements discriminating regulations. Caliber control is critical since imperviousness can result in disciplinary action or penalties. Every single one of those is simply the top of the iceberg expertly. Risky materials, too, require thinking in the handling network, with the preference for everyone inward. Furthermore, there are outside collaborators.

5. Supplier Performance

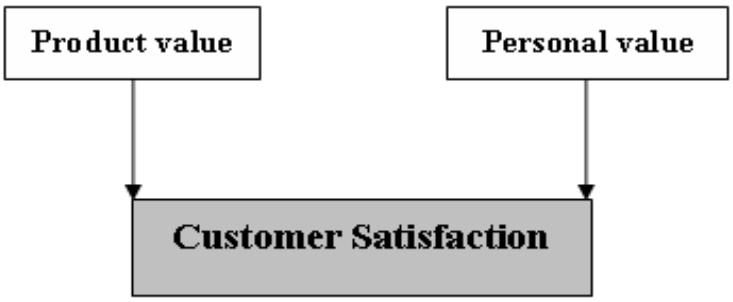
Provider execution check demonstrates genuine concern for organisations; without it, organisations or consumers would not feel safe. Here, one question arises: how to check, measure, and assess a provider's

performance. While this topic cannot be properly addressed, the following are the critical focuses that are concerned with this assessment.

5. Customer Satisfaction

Consumer loyalty refers to an individual's or an organization's willingness to compare the actual execution with their desires. Regardless of execution, consumer loyalty is a critical factor in determining provider execution; if consumer loyalty is high, it means provider execution is meeting requirements. Aside from that, there are a few focuses associated with customer loyalty. Two things stand out when it comes to customer loyalty.

Figure 1: Major elements of customer satisfaction [6]



2.14 The Supplier Quality Process

Another method for selecting the best supplier is to use the provider quality procedure. SQP's real components are following:

1. **Provider Quality Assessment (SQA):** The purpose of the SQA is to evaluate the provider's quality management framework, continuous change forms, and capacity to gather steadily rising requests. When final items or services are "formed," appraisals are performed.
2. **Measuring Supplier Performance:** Various criteria, such as the least execution for a quality administration framework, item or administration quality execution metrics, such as conveyance execution, lead time, and yield execution, should be assessed to keep suppliers functioning at the required level. Data for these execution metrics should be maintained in frameworks such as the provider quality execution estimation framework.
3. **Provider Process and Performance Improvement:** Year after year, the purchaser's supply base's approaches and execution are predicted to improve. Both the seller and the customer must be proactive in the producing process, going above and above the fundamental criteria of quality, delivery, cost, and unwavering quality.

4. **Provider Certification:** Providers who meet or exceed set-up standards while attaining exceptional levels of cost, quality, and delivery execution are recognised through the Provider Certification Program. To be assessed for this distinction, providers must exhibit a solid and convincing quality

management framework, offer certification and flexibility with delivery and lead time, and uncover world-class item/benefit quality levels.

5. **Cost of Quality (COQ):** The COQ model examines delivery, lead times, regulatory costs of restorative actions, and potential line down scenarios to assess provider quality execution. In e-barters and sourcing efforts, the notion may also be utilised to assist institutionalise suppliers.

2.15 A Customer-and supply-Chain-Cantered Organization

The restorative administrations climate has quickly changed over the most recent 20 years because of evolving economics, rising degrees of worldwide rivalry, vertical coordination of the human administrations industry and the ascent of regulated psyche as a standard human administrations strategy, and moving government controls all throughout the planet. Because of these market contemplations, BDC is devoted to giving precisely fantastic products to customers through basic, adaptable, and speedy means. These loads have likewise shown BDC the need to work on the use of its resources by framing commonly advantageous associations with its customers, offering some incentive that reaches out past items and administrations.

2.16 Green Supply Chain Management Environmental Sustainability

Those Green supply chain management, biological sustainability, and global as well as local biological concerns in recent years involving demarcation and delayed consequences of the natural environment persuasive cause get will be a challenging issue to profit from business interactions. Around these concerns, overgrown mug oak may be seen in outsourcing, manufacturing, and logistics operations. As an example, organisation orgs such as such-and-such begin by ensuring business, workers, neighbours, and not-for-profit organisations, As an example, the individuals' weight begins with many stakeholders both inside and outside those relationships, and they also want assistance under Extending inspection.

2.17 Green Supply Chain Management and Investigation Strategy

Existing imbalance may be standing up to specific worries, such as safeguarding humanity's people in general coliseum in the cosmos for such significantly possession tiredness from biological contamination. The success of a company might have an influence on a scenario. We looked at every facet of the usage of coercive property in connection to societal issues, as well as the amount of time available for projects. As a consequence, those who fund project benefits, environmental preservation, and property usage are also living in equality and pursuing sustainable progress in nature's domain. Push for a green supply chain organisation norm, as well as particular societal demands and looking possessions. In addition, unique fact preparation is required.

F. Research Methodology

This research is quantitative method and the data was analysed using Statistical Packages for Social Sciences to assess the pattern of the data and to be used in the study's conclusion (SPSS). The objective of this examination is to decide if there is a connection between Green Supply Chain Management (GSCM) and more noteworthy item quality. The review plan, information gathering techniques, and information investigation approaches will be in every way controlled by the examination destinations. These subjects will be canvassed inside and out in this section. The sort of data assortment technique, data gathering procedures, and data examination frameworks will be generally explored. To direct legitimate exploration, the methodology should be express, determined to guarantee that the data procured is exact. For this situation, the assessment will incorporate a model review examination to respond to the gave research questions. There are additionally targets.

1. Research design

In research, a research study's approach is typically categorised as a quantitative or qualitative strategy or direction, or as a mixed technique, which incorporates both quantitative and qualitative elements. Those quantitative metrics, according to Salkind (2015), Scrutinize is a social or behavioural science inquiry that uses exploratory approaches to dig at the mechanisms that underlying human behaviour. In the same manner as interviews, surveys, case studies, and other similar methods are used. Qualitative brings solid competition on the value of depth over quantity. It also matches expectations. In examining and obtaining those contacts, courses, current experiences, and conviction frameworks that would and only individuals, institutions, social groupings, and even those who are regular.

This is a concise list of the data that must be collected and the things that can be measured. The investigation's goal could be to see if there's a link between GSCM and other things. In addition, item personal happiness varies. Furthermore, it encompasses data collection and analysis, both of which pertain to factual or numerically spellbinding data. As a result, it's possible that the quantitative Scrutinize plan was adopted. The data acquired from the respondents may have been investigated and will be able to meet the study's goal.

2. Data Collection

The data collected for this study was divided into two categories: primary data and secondary data.

- **Primary data**

In this study, the principal sourball will be created using a review process that begins with responders, and the questionnaire will be displayed. The reports concerning the first worth of effort or understanding about various professionals are considered primary data (Salkind, 2015). Questionnaire is unable to construct a clear, easy, and rapid inquiry that allows respondents to respond and view all of the essential questions. It is also permissible for those experts who require feedback in large numbers to do so, as well as to use it as a resource for responding to the destination question. The questionnaire used in this study may have been prepared in accordance with the study's goal and requirements.

- **Secondary data**

Starting with the current wellspring, secondary data might be assembled. Optional information is dispersed information that is alternatively gathered by other gatherings and the information gathered in the secret word. Auxiliary information serves as a guideline in the same way. Supporting the specialist will also help to defend the researcher's position. Optional information is acquired in this study through written sources such as journals, books, and websites, as well as government-funded recorded organisations. Optional information is trustworthy because it is based on previous research conducted by scientists. Furthermore, camwood makes use of a verification for the ponder in relation to illustration.

G. Data Analysis

The data analysis obtained for this inquiry, as well as the outcomes of data analysis, are discussed in this chapter. The data was analysed using Statistical Packages for Social Sciences to assess the pattern of the data and to be used in the study's conclusion (SPSS). Reliability analysis, demographic analysis, descriptive analysis, and correlation analysis were all performed on the data. This section's most ambitious goal will be to make efficient use of the data acquired. Finally, Tom's reading is based on a fascinating investigation that focuses on the extent of GSCM usage in the manufacturing firm. The results were achieved by the use of SPSS (Statistical Package for Social Science) programming to dissect the data.

1 Survey Return Rate

In Peninsular Malaysia, there were 400 manufacturing firms with ISO 14001 certification, with a sample size of 200. The total number of questionnaires distributed was 208, with 40 being returned. As a result, the survey response rate is 20%. Table 1 summarises the findings.

Table 1: Survey return rate

Population	**Sample**	**Questionnaire Distributed**	**Returned Questionnaire**	**Percentage**
400	200	200	40	20%

2 Reliability Analysis

A reliability analysis was undertaken for a pilot study to confirm the questionnaire's validity and reliability. The validity and reliability of sections B and C of the questionnaire were examined before and after data collection. Green supply chain management (GSCM) questions were found in Section B, whereas product quality improvement questions were found in Section C. The Cronbach's Alpha value can be used to determine a questionnaire's validity and reliability (Neuman, 2015). The questionnaire's questions are suitable and can be used in a genuine study if the Cronbach's Alpha score is more than 0.70. (George & Mallery, 2021).

3 Reliability Analysis on Pilot Study

Table 2 shows the findings of the pilot study's reliability analysis.

Items	Cronbach's Alpha, α	Number of questions, N	Number of questions, N	Internal Consistency
GSCM		15	12	Good
Product Quality Improvement		25	12	Excellent

To assess the validity and reliability of Section B, Green Supply Chain Management (GSCM), and Section C, Product Quality Improvement Using GSCM, a reliability study for pilot research was undertaken. This pilot study had a total of 40 questions and 12 responses, as shown in Table 2. The GCSM questionnaire has a Cronbach's Alpha of 0.870, indicating that it is well-designed and intelligible to respondents. Cronbach's Alpha, a measure of internal consistency, is 0.969, suggesting that the product is of good quality. This demonstrated that the questions are extremely trustworthy and valid, allowing them to be used in a real research.

4 Reliability Analysis on Real Study

The findings of the reliability analysis on the real study were shown in Table 3.

Reliability analysis on a genuine research (Table 3).

Items	Cronbach's Alpha, α	Number of questions, N	Number of questions, N	Internal Consistency
GSCM	0.877	15	40	Good
Product Quality Improvement	0.961	25	40	Excellent

The data collecting method involved a total of 40 persons. The reliability study was conducted utilising the questionnaire items as a reference. The Green Supply Chain Management (GSCM) component is represented in Section B by eco-design, green buying, and reverse logistics, whereas product quality enhancement was the emphasis of Section C. GSCM had a Cronbach's Alpha value of 0.877, while product quality improvement had a Cronbach's Alpha rating of 0.961. The results ranged from good to exceptional.

This showed that the data acquired in the genuine study was extremely valid and trustworthy. As a consequence, the questions used in this research were relevant to the topic

5 Descriptive Analysis

Descriptive analysis is a technique for describing the facts and features of the population or phenomenon under investigation (Neuman, 2015). The demographic information as well as the distribution of the mean score and standard deviation of the variables were examined in this study. This offered a detailed picture of the manufacturing processes involved and revealed Malaysia's level of GSCM adoption.

6 Demographic Analysis

The pattern of the respondent's background who participated in the survey was explained using demographic analysis. This survey has a total of 35 participants. This section looked at the type of manufacturing company involved, the number of years it has been in business, the respondents' positions, the manufacturing company's location, and the number of employees it employs.

5 Category of Manufacturing Firm

The frequency and percentage of manufacturing firms who participated in the survey were shown in Table 4. Figure 1 depicted the distribution of manufacturing firms in the form of a pie chart.

Table 4: Frequency and percentage of category of manufacturing firm

Category of Manufacturing Firm	Frequency (N)	Percentage (%)
Food products, beverages and tobacco	1	2.5
Pulp, paper and paper products, publishing and printing	4	10
Chemicals, chemical products and man-made fibres	2	5
Rubber and plastic products	5	12.5
Other non-metallic mineral products	2	5
Basic metals and fabricated metal products	1	2.5
Machinery and optical equipment	1	2.5
Transport equipment	1	2.5
Others	23	57.5
TOTAL	**40**	**100.0**

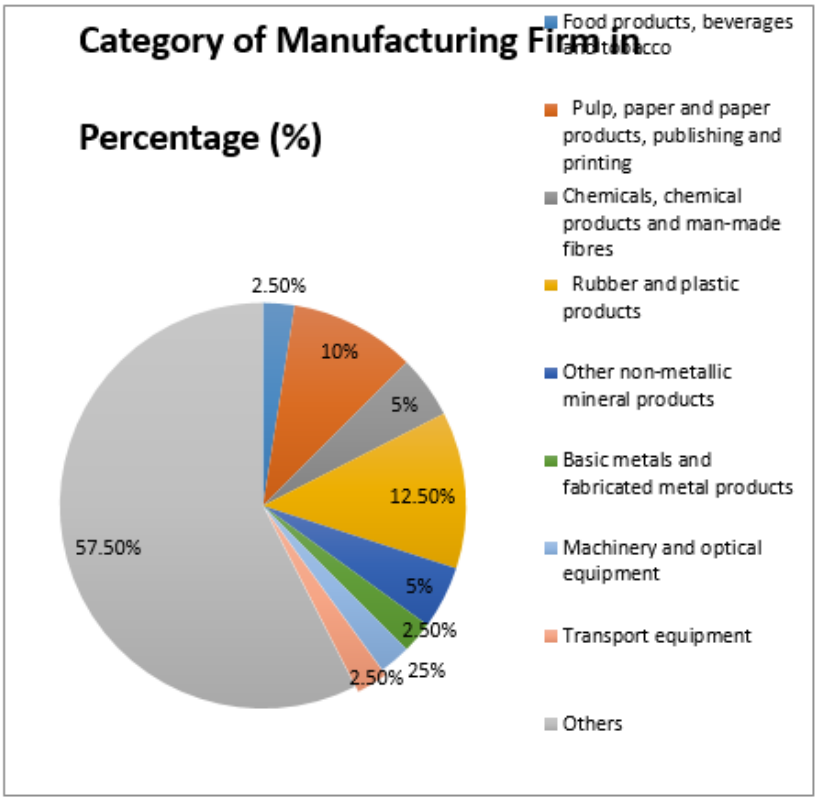


Figure 1: Category of manufacturing firm in percentage

The highest category of manufacturing business in the poll, according to Table 4 and Figure 1, is others, which received 23 out of a possible 57.5 percent. Other categories include electronic item manufacturing, palm oil, solder materials, ink, concrete, industrial brush, synthetic latex, and infrastructure. This is owing to the manufacturing firm's category list's lack of definition and accuracy. As a consequence, because the selections did not appropriately represent their firm's principal activity, the majority of respondents picked others as their response. With 5 replies, rubber and plastics was the second most popular manufacturing industry (12.5 percent). Following that, four replies from the pulp, paper, and paper goods, publishing, and printing categories received 10% of the vote. Manufacturing enterprises in the categories of chemicals, chemical products, and man-made fibres, as well as other non-metallic mineral goods, accounted for around 5% of the respondents, or two. Food, drinks, and tobacco goods all had one response with a percentage of 2.5 percent, as did basic metals and fabricated metal products, machinery and optical equipment, and transportation equipment.

4.6 Years of Establishment of Manufacturing Firm

The frequency and proportion of years since the manufacturing firm was founded were shown in Table 5. Figure 2 depicted the proportion of years a manufacturing firm has been in operation in a bar chart format.

Table 5: Frequency and percentage of years of establishment of the manufacturing firm

Years of Establishment	Frequency (N)	Percentage (%)
Less than 5 years	1	2.9
Between 6 to 10 years	2	5.7
11 years and above	37	92.5
TOTAL	**35**	**100.0**

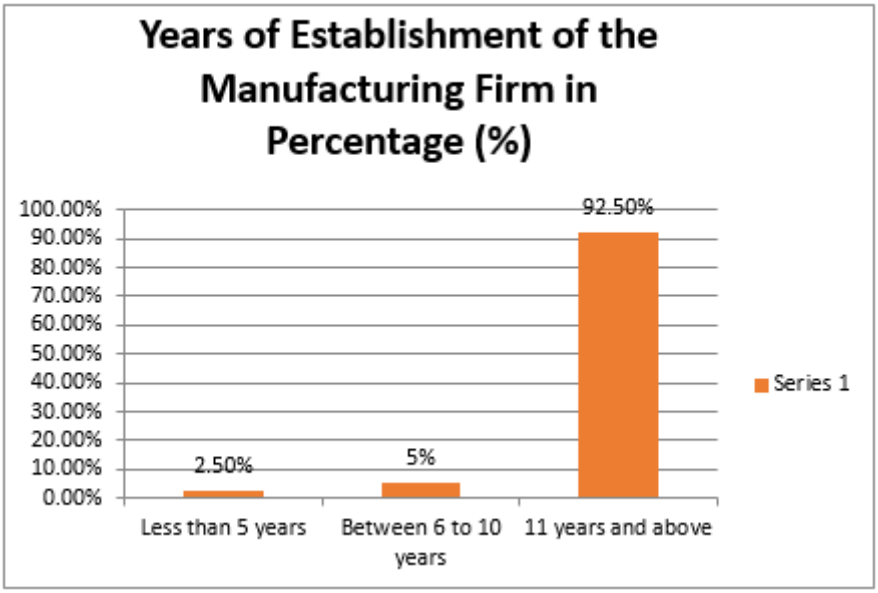


Figure 2: Years of establishment of the manufacturing firm in percentage (%)

According to Table 5 and Figure 2, the majority of manufacturing companies have been in operation for more than 11 years. There were 37 manufacturing companies, or 92.5 percent, that had been in business for 11 years or more. This showed that most long-established manufacturing companies have greater qualifications and are more interested in obtaining ISO 14001 accreditation. On the other hand, there were two responses from manufacturing firms that had been in business for 6 to 10 years and had a proportion of 5%. Only one responder (2.5%) worked for a manufacturing company that had been established for less than five years.

4.7 Position of the Respondents

The recurrence and extent of respondents who partook in the overview are displayed in Table 6. Figure 3 portrayed the appropriation of the respondent's situation as a bar outline.

Table 6: Frequency and percentage of the respondents

Position of respondent	Frequency (N)	Percentage (%)
Owner/CEO	2	5
Upper management	11	27.5
Production Manager	1	2.5
Purchasing Manager	1	2.5
Environmental Management Representative	6	15
Sales Manager	1	2.5
Others	18	45
TOTAL	**40**	**100.0**

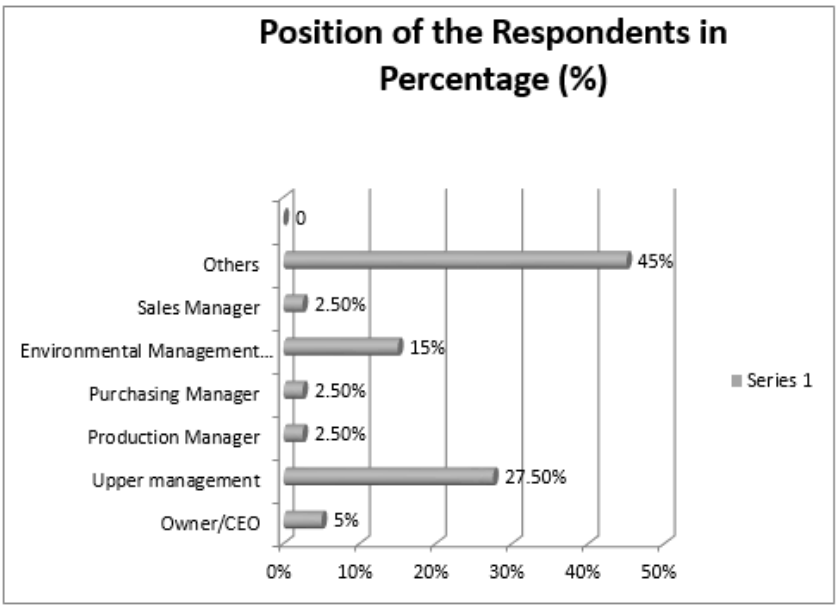


Figure 3: Position of the respondent in percentage (%)

According to Table 6 and Figure 3, the most common responder position is others, which has 18 replies (or 45 percent of the total) in the research. Other roles include corporate adviser, supervisor, engineer, human resource executive, and maintenance manager. These occupations aren't on the list of possibilities. Upper management was ranked second, with 11 replies (or 27.5 percent) in the research. The executive manager, senior manager, and general manager, all of whom are familiar with the operation line's functions and operations, made up upper management. The Environmental Management Representative post has 6 (15%) replies, followed by the owner/CEO position, which has 2 responders (5 percent). This survey received one answer, or 2.5 percent, from each production manager, buying manager, and sales manager that took part. These findings suggest that not only managers are aware of the firm's green supply chain policies, but that other employees in various positions are also aware of the firm's green activities.

8 Number of Employees of the Manufacturing Firm

Table 8 shows the frequency and proportion of workers at the manufacturing business. In a pie chart

style, Figure 5 illustrated the percentage distribution of manufacturing business personnel.

Number of Employees	Frequency (N)	Percentage (%)
Less than 100	12	30
Between 100 to 250	9	22.5
Between 251 to 500	8	20
Between 501 to 1000	5	12.5
More than 1000	6	15
TOTAL	**35**	**100.0**

Table 8: Frequency and percentage of number of employees of the manufacturing firm

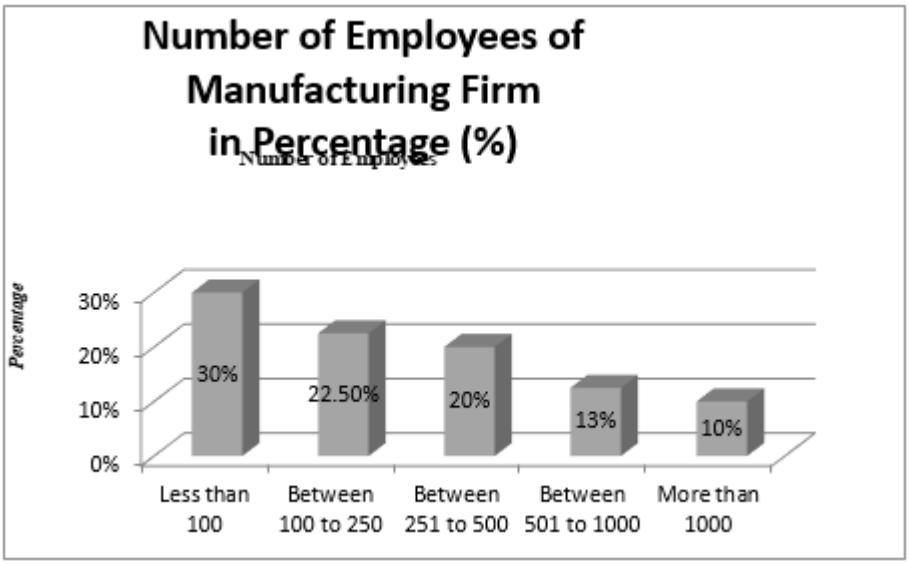


Figure 5: Number of employees in the manufacturing firm in percentage (%)

Table 8 and Figure 5 reveal that the number of employees in the manufacturing business who took part in the survey was pretty evenly distributed. With 12 or 30 percent of the surveys answered, the manufacturing business with fewer than 100 employees had the most replies. Manufacturing companies with 251 to 500 workers and 100 to 250 employees came in second and third, respectively, with 8 and 9 surveys answered. Both accounted for 20% and 22.5 percent of the total number of completed questionnaires, respectively. Despite this, 6 or 15% of respondents worked for a manufacturing company with more than 1000 employees, and 5 or 12.5 percent worked for a manufacturing company with 501 to 1000 people. We can see the different sizes of manufacturing companies that participate in the survey by looking at this distribution. In this survey, the number of small and medium-sized businesses was the highest.

9 Distribution of the Mean Score and Standard Deviation

This descriptive study looked at the mean score and standard deviation. The mean tendency level was used to characterise the mean range of each inquiry choice, while the standard deviation was used to define the data's dispersion. Neuman (Neuman, Neuman, Neuman, Neuman, Neuman, Neu Finally, in the following chapter, the mean score may be utilised to reflect the degree of GSCM practise application in Malaysia.

10 Eco-design

Table 9 showed the mean score and standard deviation for every question related to eco-design.

Table 9: Mean score and standard deviation of eco-design

No	Items	Mean	Standard Deviation	Mean Tendency Level
1	Design of products for reduced consumption of material or energy	4.40	0.695	**High**
2	Design of products for reuse, recycle and recovery of materials	4.14	0.974	**High**
3	Design the component parts of products for reuse, recycle and recovery	3.91	1.147	**High**
4	hazardous products and/or their manufacturing process	4.00	1.138	**High**
Total Mean Score Average		**4.11**	**0.698**	**High**

According to Table 9, the overall mean score average of eco-design was 4.11, indicating a high degree of tendency. This demonstrated that the manufacturing enterprises that participated in the research used eco-design in their operations and production. Eco-design has a standard deviation of 0.698. Manufacturers may follow and implement eco-design into their manufacturing and operations in general, which is thought to increase quality.

11 Green Purchasing

Table 10 showed the mean score and standard deviation for every question related to green purchasing.

Table 10: Mean score and standard deviation of green purchasing

No.	Items	Mean	Standard Deviation	Mean Tendency Level
1	Provide design specification to suppliers that include	3.94	1.136	High
	environmental requirements for purchased item			
2	Cooperate with suppliers for environmental	4.11	1.157	High
	objectives			
3	Have environmental audit for	4.06	1.187	High

	suppliers' internal			
	management			
4	Have consideration of suppliers with ISO 14001	4.09	1.067	High
	certification			
5	Have second-tier supplier environmentally friendly	3.51	1.358	Moderate
	practice evaluation			
Total Mean Score Average		**3.94**	**1.017**	**High**

According to the statistics, the average total mean score for green purchasing is 3.94, showing a high level of mean tendency. This indicated that the industrial companies involved in the study had already implemented green purchasing into their operations and output. The data dispersion is significant, with a standard deviation of 1.017. The majority of items in the green purchasing category are likely to attain a high mean tendency level of 3.68. Only one question on environmentally friendly practises by second-tier suppliers has a moderate in mean tendency level, indicating that this practise has not yet reached the level of successful implementation.

12 Reverse Logistics

Table 11 showed the mean score and standard deviation for the questions in reverse logistic section.

Table 11: Mean score and standard deviation of reverse logistics

No.	Items	Mean	Standard Deviation	Mean Tendency Level
1	Have collect used products from customers for	3.23	1.646	Moderate
	reusing, recycling and remanufacturing			
2	Required the suppliers to collect back recyclable	3.46	1.314	Moderate
	products, packaging or manufacturable products			

3	Established the procedures for recycling	4.20	0.933	High
4	Involves reusing materials from used products and	3.46	1.421	Moderate
	components			
5	Have remanufacture procedure by returning product	3.37	1.437	Moderate
	to at least original performance specification			
6	Have remanufacture procedure involve upgrading	3.37	1.437	Moderate
	product up to as new quality level			
Total Mean Score Average		**3.51**	**0.961**	**Moderae**

The total mean score average of reverse logistics is 3.51, which is modest in the mean tendency level, according to the table. This could be because the majority of the manufacturing companies polled have had little success integrating reverse logistics in their production and operations. In Malaysia, reverse logistics implementation is still at a moderate level. The data dispersion in this region, however, was adequate, with a standard deviation of 0.961. Only one item, the recycling procedures, was able to achieve a high mean tendency level with a 4.25 score. It was discovered that the majority of manufacturing companies have recycling procedures in place.

13. Normality Test

Before moving on to correlation analysis, the data must be checked for normality. A normality test can be used to check the data for normalcy. We utilise the significant value of Shapiro-Wilk to evaluate the normality of the data gathered in this survey since it is the most powerful technique for normality testing and is appropriate for sample sizes of less than 50. The year 2019 (Razali & Wah). The results of the normality test for GSCM and product quality improvement are shown in Table 13.

Table 13: Result of normality test

	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	*Significant*	*Statistic*	*Significant*
GSCM	0.114	0.200	0.966	0.340
Product Quality Improvement	0.107	0.200	0.963	0.277

The significant values for GSCM and product quality improvement were 0.340 and 0.277, respectively. Because the significant value is more than 0.05, the GSCM and product quality improvement data distribution is normal. As a consequence, to evaluate the link between the two variables and verify the hypothesis, the Pearson correlation test was used.

H. Research Discussion

The data acquired in the preceding chapter was examined and explained using the SPSS software. The descriptive analysis and correlation analysis were two of the statistical methods employed in the data analysis. As a result, the outcomes and findings may be discussed and summarised in this chapter. Examine questions that have been highlighted will be answered. Also discussed in this section and continually contrasted for those outcomes beginning with previous analysts. Finally, there will be an opportunity for portion proposals. Provided to the creator and future experts, as well as a conclusion for the full investigation transformation. This inquiry might have been conducted to determine the extent to which GSCM hones are used at a manufacturing company that has received the ISO 14001 certification. This single section investigates as well as presents a summary of the research conducted in the manufacturing industry. The research's limitations, a summary of the findings, and recommendations for future Scrutinize Furthermore, organisations are extensively investigated in this Section.

❖ Level of Implementation of GSCM in Malaysia

As per past research, Malaysia has a low degree of support in green tasks, and the GSCM thought is still moderately new in Malaysia (Wooi and Zailani, 2021; Seman et al., 2015). The three aspects dissected in this review, eco-plan, green purchasing, and converse coordinations, are broadly used in Malaysia, and these aspects might be utilized to show the degree of GSCM reception among Malaysian assembling firms. As per the investigation of mean scores for each aspect, eco-plan had a high mean focal inclination, green purchasing had a high mean focal propensity, and opposite coordinations had a moderate mean focal inclination. This uncovered that most of the assembling organizations that partook in the review had effectively incorporated eco-plan and green buying rehearses into their tasks and creation lines.

Those manufacturing companies are able to create goods that consume less energy, have less hazardous ingredients, and can be reused, recycled, or remanufactured. They've also succeeded in implementing green purchasing methods, such as selecting ISO 14001-certified suppliers, forming environmental targets with them, and cooperating with them in implementing green practises in their management and production lines. In Malaysia, however, reverse logistics is less common than eco-design and green buying. Reverse

logistics is more difficult to implement since it necessitates the coordination of upstream and downstream movement (Hsu et al., 2020).

Customers were urged to return items for remanufacturing, recycling, and reuse. According to the information obtained, fewer manufacturing organisations have adopted this strategy since collecting old items from consumers or having suppliers collect them requires additional procedures and time. Recycling processes in the operation and production line are the only successful practises. As a result, manufacturing companies in Malaysia have begun to use green practises in their operations and production lines (Hsu *et al.*, 2020). They've started focusing on developing and maintaining an environmental management system, as well as choosing and assessing suppliers and designing goods with less negative environmental consequences. Other initiatives exist to encourage producers to recycle, reuse, and remanufacture their goods (Rusli, Rahman, & Ho, 2015). However, when it comes to applying reverse logistics methods in Malaysia, there is still a lack of regulatory enforcement and collaboration. Manufacturers should implement and improve on each GSCM dimension in order to get benefits such as cost savings and enhanced environmental images in such situations.

- **Relationship between GSCM and Product Quality Improvement**

Since there is negligible exploration on this theme, this segment surveys the three speculations inspected in the previous section and used to close and support the GSCM-item quality improvement interface. In a specific order, the three theories are tied in with improving item quality through eco-plan, green purchasing, and converse coordinations. Eco-plan has a little certain connection with item quality improvement, as per connection study, however the relationship is measurably huge since the relationship coefficient is 0.402 at a huge degree of 0.017. The invalid speculation is dismissed, exhibiting that eco-plan and improved item quality are connected. Individuals these days are more worried about the materials utilized in item fabricate, just as the ecological invitingness of the plan. Since an outcome, makers are putting more accentuation on consolidating eco-plan into their tasks and creation lines, as this will further develop item quality and functional productivity (Schischke, Hagelken and Steffenhagen, 2015; Behrisch, Ramirez and Giurco, 2019).

Green purchasing also has a moderately good link with product quality improvement, which is statistically significant, according to the correlation analysis. At a significance level of 0.002, the correlation coefficient is 0.510. The null hypothesis is rejected, and it is established that there is a strong link between green purchasing and improved product quality. One of the primary criteria in GSCM processes is green purchasing (Zhu, Sarkis & Lai, 2021). Manufacturers are placing a greater emphasis on obtaining items or materials that meet environmental standards.

This is also driving suppliers to participate in green projects, as buyers are increasingly gravitating toward green products and concepts. Quality must also be considered when supplying items or materials (Handfield et al., 2017). This showed that green purchasing has a major impact on product quality in manufacturing companies. In addition, reverse logistics has a weak positive link with product quality improvement. At a significance level of 0.003, the correlation coefficient is 0.493. The null hypothesis was rejected, indicating that there is a link between reverse logistics and improved product quality. Reverse

logistics was implemented by a manufacturing company since it was anticipated that this approach would improve product quality (Gecker & Vigoroso, 2016). The process of reusing, recycling, and remanufacturing was referred to as reverse logistics. It is possible to recondition the product and upgrade it to the specified quality level by following these processes (Khor & Udin, 2020).

As a consequence, it is feasible to relate reverse logistics to the improvement of product quality. As a result, a substantial correlation between GSCM and product quality improvement has been discovered. The three dimensions, as previously indicated, are extensively employed practises in Malaysia. The association between GSCM and product quality improvement may be validated if the three assumptions are accepted. The link was further confirmed by the correlation coefficient, which had a r value of 0.590 at a significance level of 0.000. The factors have a moderate but significant relationship.

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