

**A Study on supply chain management with reference
To LN ENTERPRISES , Salem.**

Submitted in partial fulfilment of the requirement for the reward of

MASTER OF BUSINESS ADMINISTRATION

By

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REGISTER NO:42410100



DEPARTMENT OF BUSINESS ADMINISTRATION

SCHOOL OF MANAGEMENT STUDIES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A++" by NAAC I 12B Status by UGC I

CATEGORY - 1 UNIVERSITY BY UGC I Approved by AICTE

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December 2023



SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
CATEGORY - 1 UNIVERSITY BY UGC**

SCHOOL OF MANAGEMENT STUDIES

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of **JOSIKA.M.N (42410100)** who carried out the project training “**A Study of Supply Chain Management at LN ENTERPRISES**” under my supervision from September to October 2023.

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Submitted for viva voce Examination held on _____

Internal Examiner

External Examiner



LN ENTERPRISES

Mfrs. Of All Kinds Of PVC Pipes

Date:12/10/2023

TO WHOMSOEVER IT MAY CONCERN

Sub: Academic Project Completion Certificate

We like to confirm that Ms. Josika M N (42410100) who is doing MBA in Sathyabama institute of science and technology, Chennai has successfully completed the project in operations specialization in our concern titled **"A STUDY ON SUPPLY CHAIN MANAGEMNT WITH REFERENCE TO LN ENTERPRISES, SALEM"** from 05/09/2023 to 05/10/2023.

During this period her conduct and behaviour was observed to be good.

We wish success in all the future endeavours,

Sincerely

For LN ENTERPRISES

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DECLARATION

I **JOSIKA .M.N (42410100)**. Hereby declare that the Project Report entitled “**A Study on supply chain management with reference to LN Enterprises, Salem**” done by me under the guidance of **Dr. John Britto, Assistant Professor**, School of Business Administration is submitted in partial fulfilment of the requirements for the award of **MASTER OF BUSINESS ADMINISTRATION** degree.

DATE:

PLACE:

A square image showing a handwritten signature in blue ink. The signature is stylized and appears to read 'Josika.M.N'.

JOSIKA.M.N

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I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

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I wish to express my thanks to all Teaching and Non-teaching staff members of the School of Business Administration who were helpful in many ways for the completion of the project.

A handwritten signature in blue ink, appearing to read 'Josika.M.N.', is shown within a rectangular frame.

JOSIKA.M.N

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ABSTRACT

This report conducts a comprehensive analysis of supply chain management in a PVC manufacturing company, traversing the intricacies of raw material procurement, manufacturing processes, and distribution logistics. The sourcing phase scrutinizes efficient procurement strategies and robust supplier relationships for critical raw materials, emphasizing quality control. Manufacturing optimization is explored through polymerization, blending, and extrusion processes, incorporating technology for enhanced efficiency. Post-production, the report delves into inventory management, evaluating the company's adeptness in balancing stock levels through JIT principles, demand forecasting, and advanced tracking systems. The distribution phase focuses on transportation strategies, warehousing practices, and meticulous order fulfillment processes. Supplier relationships and risk management are paramount considerations, with an investigation into the company's strategies for mitigating supply chain disruptions and ensuring business continuity. The report aims to identify strengths, opportunities for improvement, and best practices in the company's supply chain. By offering a holistic view, this analysis seeks to contribute insights that facilitate continuous enhancement of supply chain management, enabling the PVC manufacturing company to thrive in a dynamic market environment. The overarching goal is sustained success through the optimization of procurement, manufacturing, distribution, and risk management processes.

CHAPTER 1

1.1 INTRODUCTION:

Supply chain management (SCM) is the process of planning, optimizing, and overseeing the flow of goods, services, information, and finances as they move from the point of origin to the point of consumption. It involves the coordination of various activities, including procurement, production, transportation, distribution, and even customer services to ensure that products or services are delivered to customers efficiently, cost-effectively and with high quality.

SCM aims to streamline operations, minimize costs, reduce lead times, and enhance overall supply chain efficiency. It often involves the use of technology, data analysis, and strategic decision-making to achieve these goals. Effective supply chain management is critical for businesses to meet customer demands, maintain competitiveness, and adapt to changing market conditions.

Supply chain management is the management of the flow of goods and services and includes all processes that transform raw materials into final products. It involves the active streamlining of a business's supply-side activities to maximize customer value and gain a competitive advantage in the marketplace.

5 Parts of SCM

The supply chain manager tries to minimize shortages and keep costs down. The job is not only about logistics and purchasing inventory. According to Salary.com, supply chain managers “oversee and manage overall supply chain and logistic operations to maximize efficiency and minimize the cost of organization's supply chain.” Productivity and efficiency improvements can go straight to the bottom line of a company. Good supply chain management keeps companies out of the headlines and away from expensive recalls and lawsuits. In SCM, the supply chain manager coordinates the logistics of all aspects of the supply chain which consists of the following five parts.

Planning

Plan and manage all resources required to meet customer demand for a company's product or service. When the supply chain is established, determine metrics to measure whether the supply chain is efficient, effective, delivers value to customers and meets company goals.

Sourcing

Choose suppliers to provide the goods and services needed to create the product. Then, establish processes to monitor and manage supplier relationships. Key processes include: ordering, receiving, managing inventory and authorizing supplier payments.

Manufacturing

Organize the activities required to accept raw materials, manufacture the product, test for quality, package for shipping and schedule for delivery.

Delivery and Logistics

Coordinate customer orders, schedule deliveries, dispatch loads, invoice customers and receive payments.

Returning Create a network or process to take back defective, excess or unwanted products.

Types of Supply Chain Models

Supply chain management does not look the same for all companies. Each business has its own goals, constraints, and strengths that shape what its SCM process looks like. In general, there are often six different primary models a company can adopt to guide its supply chain management processes.

Continuous Flow Model: One of the more traditional supply chain methods, this model is often best for mature industries. The continuous flow model relies on a manufacturer producing the same good over and over and expecting customer demand will little variation.

Agile Model: This model is best for companies with unpredictable demand or customer-order products. This model prioritizes flexibility, as a company may have a specific need at any given moment and must be prepared to pivot accordingly.

Fast Model: This model emphasizes the quick turnover of a product with a short life cycle. Using a fast chain model, a company strives to capitalize on a trend, quickly produce goods, and ensure the product is fully sold before the trend ends.

Flexible Model: The flexible model works best for companies impacted by seasonality. Some companies may have much higher demand requirements during peak season and low volume requirements in others. A flexible model of supply chain management makes sure production can easily be ramped up or wound down.

Efficient Model: For companies competing in industries with very tight profit margins, a company may strive to get an advantage by making their supply chain management process the most efficient. This includes utilizing equipment and machinery in the most ideal ways in addition to managing inventory and processing orders most efficiently.

Custom Model: If any model above doesn't suit a company's needs, it can always turn towards a custom model. This is often the case for highly specialized industries with high technical requirements such as an automobile manufacturer.

Why is supply chain management important?

Effective supply chain management systems minimize cost, waste and time in the production cycle. The industry standard has become a just-in-time supply chain where retail sales automatically signal replenishment orders to manufacturers. Retail shelves can then be restocked almost as quickly as product is sold. One way to further improve on this process is to analyze the data from supply chain partners to see where further improvements can be made. By analyzing partner data, the CIO.com post identifies three scenarios where effective supply chain management increases value to the supply chain cycle:

Identifying potential problems. When a customer orders more product than the manufacturer can deliver, the buyer can complain of poor service. Through data analysis, manufacturers may be able to anticipate the shortage before the buyer is disappointed.

Optimizing price dynamically. Seasonal products have a limited shelf life. At the end of the season, these products are typically scrapped or sold at deep discounts. Airlines, hotels and others with perishable “products” typically adjust prices dynamically to meet demand. By using analytic software, similar forecasting techniques can improve margins, even for hard goods.

Improving the allocation of “available to promise” inventory. Analytical software tools help to dynamically allocate resources and schedule work based on the sales forecast, actual orders and promised delivery of raw materials. Manufacturers can confirm a product delivery date when the order is placed — significantly reducing incorrectly-filled orders.

Key features of effective supply chain management

The supply chain is the most obvious “face” of the business for customers and consumers. The better and more effective a company's supply chain management is, the better it protects its business reputation and long-term sustainability. IDC's Simon Ellis in The Path to a Thinking Supply Chain

defines what is supply chain management by identifying the five “Cs” of the effective supply chain management of the future:

Connected: Being able to access unstructured data from social media, structured data from the Internet of Things (IoT) and more traditional data sets available through traditional ERP and B2B integration tools.

Collaborative: Improving collaboration with suppliers increasingly means the use of cloud-based commerce

networks to enable multi-enterprise collaboration and engagement.

Cyber-aware: The supply chain must harden its systems and protect them from cyber-intrusions and hacks, which should be an enterprise-wide concern.

Cognitively enabled: The AI platform becomes the modern supply chain's control tower by collating coordinating and conducting decisions and actions across the chain. Most of the supply chain is automated and self-learning.

Comprehensive: Analytics capabilities must be scaled with data in real time. Insights will be comprehensive and fast. Latency is unacceptable in the supply chain of the future. Many supply chains have begun this process, with participation in cloud-based commerce networks at an all-time high and major efforts underway to bolster analytics capabilities.

SCM encompasses the integrated planning and execution of processes required to manage the movement of materials, information and financial capital in activities that broadly include demand planning, sourcing, production, inventory management and storage, transportation -- or logistics -- and returning excess or defective products. Supply chain management relies on both business strategy, specialized software and collaboration to work.

Because it's such an expansive, complex undertaking, each partner -- from suppliers to manufacturers and beyond -- must communicate and work together to create efficiencies, manage risk and adapt quickly to change.

In addition, supply chain sustainability -- which covers environmental, social and legal issues, in addition to sustainable procurement -- and the closely related concept of corporate social responsibility -- which evaluates a company's effect on the environment and social well-being -- are areas of major concern for today's companies.

Benefits of supply chain management

Supply chain management creates a number of benefits that translate to higher profits, better brand image and greater competitive advantage. These include the following:

- better ability to predict and meet customer demand;
- better supply chain visibility, risk management and predictive capabilities;
- fewer process inefficiencies and less product waste;
- improvements in quality;
- increased sustainability, both from a societal and an environmental standpoint;
- lower overhead;
- improvements in cash flow; and
- more efficient logistics.

Example of SCM

The most basic version of a supply chain includes a company, its suppliers and the customers of that company. An example would be: raw material producer, manufacturer, distributor, retailer and retail customer.



Most supply chains are far more complex and layered. This is why examples of unsuccessful supply chain management, where risk is not managed or disruption occurs, can be so helpful.

Food shortages due to COVID-19 are a good example of supply chain management gone awry. The food supply chain was disrupted in a number of ways. For example, many restaurants and schools closed to accommodate stay-at-home orders, causing products meant to go to institutional settings in bulk to no longer be needed. Instead, an exponential number of consumers were eating at home, which had different packaging requirements, among other issues. The meat industry also ran into supply chain management disruptions due to issues such as COVID-19 outbreaks in slaughterhouses.

The role of supply chain management software

Technology is critical in managing today's supply chains, and ERP vendors offer modules that focus on key functions within SCM. There are also business software vendors that focus specifically on SCM. A few important areas to note include the following:

- supply chain planning software for activities such as demand management;
- supply chain execution software for activities such as day-to-day manufacturing operations;
- supply chain visibility software for tasks such as spotting and anticipating risks and proactively managing them;
- inventory management software for tasks such as tracking and optimizing inventory levels;
- logistics management software and transportation management systems for activities such as managing the transport of goods, especially across global supply chains; and
- warehouse management systems for activities related to warehouse operations.

Infor, Blue Yonder (formerly JDA Software), Manhattan Associates, Oracle and SAP are well-known vendors of supply chain software.

The increasingly global nature of today's supply chains and the rise of e-commerce, with its focus on nearly instant small deliveries straight to consumers, are posing challenges, particularly in the area of logistics and demand planning. A number of strategies -- such as lean manufacturing -- and newer approaches -- such as demand-driven material requirements planning -- may prove helpful.

Technology -- especially big data, predictive analytics, IoT technology, supply chain analytics, robotics and autonomous vehicles -- is also being used to help solve modern challenges, including in the areas of supply chain risk and disruption and supply chain sustainability.

As just two examples, IoT can help with transparency and traceability to help boost food quality and safety by using sensors to monitor the temperature of perishable food while it's in transit. And analytics can help determine where to put smart lockers in densely populated areas to cut the number of single-item deliveries and lower greenhouse gas emissions.

Different Types Of Supply Chain Models

Seven Different Supply Chain Models

Continuous flow model

The Continuous Flow model is focused on maintaining consistent and smooth supply chain operations. This model maximizes efficiency by keeping supply steady and not allowing for supply or demand fluctuations. An example of a company using this supply chain model is Amazon. Their supply chain is designed to deliver products constantly, with little to no pauses in supply flow. This allows them to maintain their reputation as a quick and reliable delivery service.

Fast chain model

The Fast Chain supply chain model is all about speed. This model prioritizes quick delivery and timely responses to changes in supply or demand. An example of a company using this supply chain model is Zara, the clothing retailer. They are known for their speedy supply chain, and the ability to design and release new fashion trends within weeks instead of the typical six-month period other retailers follow.

Efficient chain model

The Efficient Chain supply chain model is focused on reducing waste and improving overall supply chain efficiency. Toyota, with its highly efficient and successful lean manufacturing system, is an example of a company using this supply chain model. They strive to eliminate unnecessary steps or resources in their supply chain operations to increase efficiency and reduce waste.

Agile supply network model

The Agile Supply Network model focuses on creating a supply chain that is responsive and able to adapt quickly to changes in supply or demand. This requires strong communication and collaboration within the supply chain network and flexibility in processes and technology. Nike is an example of a company using this supply chain model, being able to respond quickly to changes in consumer demand for its products.

Virtual supply chain model

The Virtual supply chain model is characterized by using virtual technology, such as cloud computing and data analysis, to improve supply chain operations. This allows for greater visibility and communication within the supply chain network and increased efficiency and flexibility. An example of a company using this supply chain model is Procter & Gamble, which implemented virtual supply chain technology to increase supply chain responsiveness and reduce costs.

Custom-configured supply chain model

The Custom-configured supply chain model involves customizing the supply chain according to specific customer demands or preferences. This requires strong communication with customers and a high level of customization in processes and products. Dell is an example of a company using this supply chain model, offering individualized computer configurations to meet their customers' specific needs.

Flexible supply chain model

The Flexible supply chain model emphasizes flexibility in supply chain operations, adapting to changes and meeting varying customer demands. An example of a company using this supply chain model is Hewlett Packard, which implemented flexible supply chain processes to respond quickly to changing market conditions and customer preferences.

Trends in Supply Chain Management

1. Remember, we heard that technology would work side-by-side with humans one day. That is turning out to be true. Companies use technology in every step of their operations. AI and automation are replacing manual strengths to bring supply chain resiliency.
2. Companies are adopting customization for different parts of the supply chain rather than relying on standard processes. This is because, today, companies are fighting to offer more personalized services to their customers.
3. Today, brands believe in supply chain models that give them transparency and more visibility of supply chain operations.

Importance of Supply Chain Management

An efficient supply chain is crucial for any business to succeed. And supply chain models can play a big role in ensuring that success. They are simply ways of organizing the various participants and processes within a supply chain, with each model offering unique benefits.

So why are supply chain models important? They help businesses streamline their supply chain operations, leading to reduced costs, improved customer satisfaction, and, ultimately, higher profits. Additionally, supply chain models allow a business to tailor its approach to meet its specific needs and goals. In short, having a well-developed supply chain model can make or break a business. Now let's look at some examples of supply chain models and how they can benefit a company.

One popular supply chain model is the fast chain supply chain, which focuses on quickly and efficiently meeting customer demand. This model is particularly useful for businesses in industries with rapidly changing trends or high levels of competition, such as fashion or technology.

Another model is the agile supply chain, which prioritizes flexibility and quick adaptation to changing market conditions. Multiple companies may collaborate, sharing resources and information to achieve a common goal.

By carefully selecting and implementing the right supply chain model for their needs, businesses can greatly enhance their competitive edge and overall success. So, consider how supply chain models can benefit your organization.

What is a Global Supply Chain?

A global supply chain is an integrated system of processes, people, technology, and data across multiple countries and organizations. It is a complex network of suppliers, manufacturers, warehouses, distributors, shippers, and customers that are all connected to move products and services from one location to another.

The global supply chain is an ever-evolving system that plays an integral role in the success of businesses worldwide. It involves the coordination of various activities, such as sourcing, manufacturing, logistics, distribution, and customer service, to ensure that goods and services are efficiently and cost-effectively delivered to the right place at the right time.

By leveraging the latest technology and data analytics, businesses with global supply chains can optimize processes, reduce costs, and increase customer satisfaction.

Advantages of a Global Supply Chain

There are several advantages to managing a global supply chain. Here are some of the most common benefits:

1. **Lower costs:** Global supply chains allow businesses to take advantage of lower costs associated with foreign markets. Companies can source materials from countries with cheaper labor and production costs, resulting in more cost-efficient operations.

2. **Increased flexibility:** Global supply chains provide companies with the flexibility to quickly adjust their operations to meet customer demand. This allows businesses to respond quickly to changes in the market, such as new product releases or a shift in consumer preferences.
3. **Improved quality:** By leveraging the latest technology and data analytics, global supply chains can ensure higher levels of quality control. This can result in improved customer satisfaction and loyalty.
4. **Greater efficiency:** Global supply chains are designed to be efficient and streamlined. By optimizing processes and leveraging technology, businesses can reduce waste and increase productivity.
5. **Increased market reach:** Global supply chains allow businesses to expand their reach into new markets and tap into new sources of revenue.

Disadvantages of a Global Supply Chain

While there are many advantages to managing a global supply chain, there are also several potential risks and disadvantages. Here are some of the most common disadvantages:

1. **Complexity:** Global supply chains are complex and involve many different stakeholders. This can result in increased costs and delays.
2. **Regulatory risks:** Global supply chains must comply with numerous regulations and laws in different countries. This can be challenging to manage and can result in costly fines and penalties.
3. **Lack of visibility:** The global supply chain involves a number of different stakeholders, and it can be difficult to monitor and track the movement of goods and services. This can lead to delays and inefficiencies.
4. **Language and cultural barriers:** Global supply chains involve stakeholders from different countries, which can lead to language and cultural barriers. This can make it difficult to effectively communicate, resulting in misunderstandings and inefficiencies.
5. **Security risks:** Global supply chains are vulnerable to security threats, such as cyberattacks, data breaches, and theft. Companies must be prepared to invest in the right technology and processes to ensure the security of their global supply chains.
6. **Costly shipping:** Shipping costs can be high when dealing with global supply chains, as goods must be transported across long distances.

Strategies for Managing a Global Supply Chain

To successfully manage a global supply chain, companies must have strategies in place to address the potential risks and challenges. Here are some strategies for successfully managing a global supply chain:

1. **Leverage technology:** Companies should invest in the right technology to ensure that their global supply chains are efficient and secure. This includes investing in automation, data analytics, and real-time tracking.
2. **Develop partnerships:** Companies should develop strong partnerships with suppliers, manufacturers, and other stakeholders to ensure that all parties are working together to optimize the global supply chain.
3. **Monitor and track:** Companies should monitor and track the movement of goods and services to ensure that the global supply chain is running smoothly.
4. **Communicate effectively:** Companies should ensure that all stakeholders are able to effectively communicate to prevent misunderstandings and inefficiencies.
5. **Plan ahead:** Companies should plan ahead to anticipate and address potential risks such as regulatory compliance and security threats.

1.2 INDUSTRY PROFILE:

Market Condition

PVC pipes refer to tubular products made from polyvinyl chloride; a synthetic resin composed of polymerized vinyl chloride (PVC) monomers. They are primarily produced using polymerization and extrusion process. PVC pipes are widely used in drinking water systems, sewerage, irrigation, underground wiring, chemical transportation, fire sprinklers, and heating and cooling systems. They are cost-effective, durable, and lightweight products that are easy to install, require low maintenance, offer long service life, and provide resistance against corrosion. PVC pipes also offer several advantages, such as flexibility, high tensile strength, and low thermal conductivity.

The rising product utilization in the agriculture industry to ensure efficient water distribution without contamination and maximize crop yield is propelling the market growth. Additionally, the recent technological advancements in formulations and manufacturing techniques to produce more resilient, compatible, and durable products are contributing to the market growth. Furthermore, the rapid expansion of the housing and real estate sectors is facilitating product demand for plumbing, waste disposal, and other applications. Apart from this, the implementation of supportive policies by several governments across the globe endorsing the use of PVC pipes as an environmentally and economically beneficial material is positively influencing the market growth. Other factors, including increasing product application in water conservation efforts, extensive research and development

(R&D) activities, and growing consumer awareness regarding various benefits of PVC pipes, are anticipated to drive the market growth.

Here are some key factors that influence the PVC pipe manufacturing industry:

Growing Demand for Infrastructure Development: The demand for PVC pipes remains strong, primarily driven by infrastructure development, including construction of residential, commercial, and industrial buildings, as well as water supply and sewage systems.

Sustainability and Environmental Regulations: PVC pipe manufacturers are increasingly focusing on sustainable practices and products. Environmental regulations and consumer preferences for eco-friendly materials are driving innovation in recycling and reducing the environmental impact of PVC production.

Competitive Landscape: The PVC pipe manufacturing industry is competitive, with several established players. Companies often compete based on product quality, pricing, and innovation.

Global Market Dynamics: PVC pipe manufacturers may face fluctuations in raw material prices, such as PVC resin, which can impact production costs and pricing strategies. Global events and trade policies can also influence the supply chain.

Technological Advancements: Advancements in manufacturing technology and materials can impact the industry. For example, improvements in pipe design, durability, and ease of installation can provide a competitive edge.

Market Segmentation: The market can be segmented into various categories, such as PVC pressure pipes, PVC drainage pipes, and PVC sewer pipes, each with its specific demand drivers and market conditions.

Demand from Emerging Markets: The demand for PVC pipes is growing in emerging markets where urbanization and infrastructure development are on the rise.

Environmental Awareness: Customers and regulatory bodies are increasingly concerned about the environmental impact of plastic products. PVC pipe manufacturers may need to adapt to changing regulations and consumer preferences.

COVID-19 Impact: The COVID-19 pandemic had varying effects on different industries. It disrupted supply chains but also increased the need for healthcare infrastructure, which includes PVC pipes for medical gases and plumbing.

Innovation in Product Development: Companies that innovate and offer value-added products, such as low-lead PVC pipes for drinking water, can gain a competitive advantage.

How PVC Pipes are Made?

PVC pipes are manufactured by extrusion of raw material PVC, and generally follow the same steps of typical pipe extrusion operations:

- Feeding of raw material pellets / powder into the PVC twin screw extruder
- Melting and heating in multiple extruder zones
- Extruding through a die to shape into a pipe
- Cooling of the shaped pipe
- Cutting of PVC pipes to the desired length

However, despite having a similar manufacturing procedure to most plastic piping, PVC pipes have intrinsic characteristics that pose additional challenges to pipe manufacturers both in terms of production, as well as positioning their products on the market.

Where are PVC Pipes used?

The PVC pipes are widely used in sewage pipes, for water supplying and irrigation. PVC pipes are long-lasting and have properties like easy installation, lightweight, strong, durable, sustainable, cost-efficient and most important easily recyclable. A smooth surface of PVC pipes increases water flow as it has low friction than the concrete and cast-iron pipes. PVC pipes can manufacture in various lengths, wall thickness, diameters and also according to international standards like DIN 8061, ASTM D1785 and ASTM F441.

What are the challenges in PVC pipe Manufacturing?

Extruder Friction

As the nature of PVC plastic, the extruders have very high friction and stress. For the longer service life, the PVC pipe production line requires the special extruder for the twin-screw extruder and the robust construction materials are able to handle the extreme operating conditions.

Market Competition

As the PVC pipes are widely used for piping, there are lots of pipe manufacturers. So, to ahead in the race from competitors, manufacturers should deliver continuous product quality and also a wide

range of products at competitive prices. This can be solved by using excellent quality manufacturing equipment which increases productivity with minimum cost and able to manufacture various PVC pipe sizes. Pvc Industries provides machines that are equipped with Industry 4.0 functionality, easy integration, advance connectivity, and very important multi-layer die heads which save money.

Product Range

The PVC pipes come in various sizes and diameters and each size has a variety of fittings. So, PVC pipe makers have to introduce a wide range of products. Pvc Industries help PVC pipe producers with a variety of PVC pipe fittings which are available in various types and sizes and this provides marketing to your complete products.

PVC Pipe Production Line

The Industries provides a complete turnkey production line for PVC pipe manufacturing. There are twin screw PVC extruders that come in a wide range of types and sizes according to customer's manufacturing needs. We provide various production lines for PVC pipe manufacturing from 16mm to 100mm.

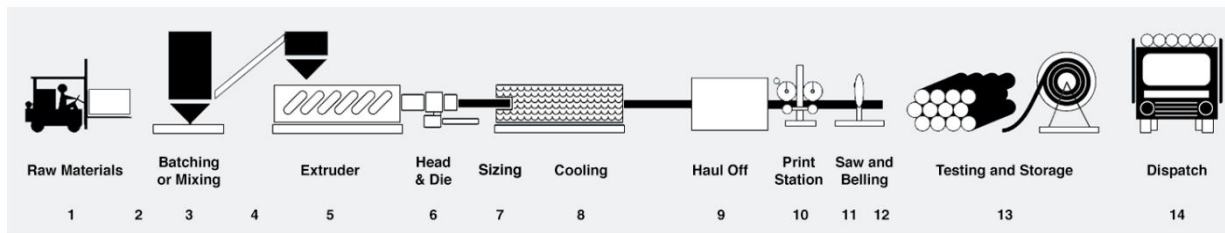
Pvc Industries provides not only machines but the best in After-sales service. With this machine customers can best quality products very fast with minimum production cost.

PVC Manufacture

Basically, PVC products are formed from raw PVC powder by a process of heat and pressure. The two major processes used in manufacture are extrusion for pipe and injection moulding for fittings.

Modern PVC processing involves highly developed scientific methods requiring precise control over process variables. The polymer material is a free flowing powder, which requires the addition of stabilisers and processing aids. Formulation and blending are critical stages of the process and tight specifications are maintained for incoming raw materials, batching and mixing. Feed to the extrusion or moulding machines may be direct, in the form of "dry blend", or pre-processed into a granular "compound".

Extrusion



Polymer and additives (1) are accurately weighed (2) and processed through the high speed mixing (3) to blend the raw materials into a uniformly distributed dry blend mixture. A mixing temperature of around 120°C is achieved by frictional heat. At various stages of the mixing process, the additives melt and progressively coat the PVC polymer granules. After reaching the required temperature, the blend is automatically discharged into a cooling chamber which rapidly reduces the temperature to around 50°C, thereby allowing the blend to be conveyed to intermediate storage (4) where even temperature and density consistency are achieved.

The heart of the process, the extruder (5), has a temperature-controlled, zoned barrel in which rotate precision “screws”. Modern extruder screws are complex devices, carefully designed with varying flights to control the compression and shear, developed in the material, during all stages of the process. The twin counter-rotating screw configuration used by all major manufacturers offers improved processing.

The PVC dryblend is metered into the barrel and screws, which then convert the dry blend into the required “melt” state, by heat, pressure and shear. During its passage along the screws, the PVC passes through a number of zones that compress, homogenise and vent the melt stream. The final zone increases the pressure to extrude the melt through the head and die set (6) which is shaped according to the size of the pipe required and flow characteristics of the melt stream. Once the pipe leaves the extrusion die, it is sized by passing through a precision sizing sleeve with external vacuum. This is sufficient to harden the exterior layer of PVC and hold the pipe diameter during final cooling in a controlled water cooling chambers (8).

The pipe is pulled through the sizing and cooling operations by the puller or haul-off (9) at a constant speed. Speed control is very important when this equipment is used because the speed at which the pipe is pulled will affect the wall thickness of the finished product. In the case of rubber ring jointed pipe the haul-off is slowed down at appropriate intervals to thicken the pipe in the area of the socket.

An in-line printer (10) marks the pipes at regular intervals, with identification according to size, class, type, date, Standard number, and extruder number. An automatic cut-off saw (11) cuts the pipe to the required length.

A bellling machine forms a socket on the end of each length of pipe (12). There are two general forms of socket. For rubber-ring jointed pipe, a collapsible mandrel is used, whereas a plain mandrel is used for solvent jointed sockets. Rubber ring pipe requires a chamfer on the spigot, which is executed either at the saw station or bellling unit. The finished product is stored in holding areas for inspection and final laboratory testing and quality acceptance (13). All production is tested and inspected in accordance with the appropriate Australian Standard and/or to specifications of the purchaser.

After inspection and acceptance, the pipe is stored to await final dispatch (14).

For oriented PVC (PVC-O) pipes, the extrusion process is followed by an additional expansion process which takes place under well defined and carefully controlled conditions of temperature and pressure. It is during the expansion that the molecular orientation, which imparts the high strength typical of PVC-O, occurs.

Injection Moulding

PVC fittings are manufactured by high-pressure injection moulding. In contrast to continuous extrusion, moulding is a repetitive cyclic process, where a “shot” of material is delivered to a mould in each cycle.

PVC material, either in dry blend powder form or granular compound form, is gravity fed from a hopper situated above the injection unit, into the barrel housing a reciprocating screw.

The barrel is charged with the required amount of plastic by the screw rotating and conveying the material to the front of the barrel. The position of the screw is set to a predetermined “shot size”. During this action, pressure and heat “plasticise” the material, which now in its melted state, awaits injection into the mould.

All this takes place during the cooling cycle of the previous shot. After a preset time the mould will open and the finished moulded fitting will be ejected from the mould.

The mould then closes and the melted plastic in the front of the barrel is injected under high pressure by the screw now acting as a plunger. The plastic enters the mould to form the next fitting.

After injection, recharge commences while the moulded fitting goes through its cooling cycle.

MARKET DEVELOPMENT

Sustainability Emphasis: In recent years, PVC recycling companies have witnessed a surge in interest and growth, largely driven by the global emphasis on sustainability and environmental responsibility. As the world

becomes increasingly conscious of plastic waste and its impact on the environment, the recycling of PVC (polyvinyl chloride) has gained prominence as a sustainable solution.

Regulatory Support: PVC recycling has benefited from the introduction of regulations and incentives in several regions and countries. These measures are designed to promote recycling practices and reduce plastic waste, creating a favorable environment for PVC recycling companies. Government support and compliance requirements have played a crucial role in shaping the industry's growth.

Technological Advancements: Advances in recycling technologies have significantly improved the efficiency and quality of PVC recycling processes. Innovations in material separation, purification, and PVC compounding have made recycling economically viable, encouraging more businesses to invest in recycling initiatives.

Circular Economy Initiatives: The concept of a circular economy, where materials are reused and recycled to minimize waste, has gained traction on a global scale. PVC recycling aligns perfectly with these sustainability goals, making it an attractive option for industries looking to reduce their environmental footprint.

Market Expansion: PVC recycling companies have diversified their operations to serve a broader range of industries. Recycled PVC can be utilized in various applications, including pipes, profiles, packaging, and more. This expansion of market applications has driven the growth of PVC recycling as a viable industry.

Partnerships and Collaborations: Recycling companies have recognized the importance of forming partnerships and collaborations with manufacturers, construction firms, and other stakeholders. These alliances ensure a consistent supply of recyclable PVC materials and provide a market for the recycled products, creating a sustainable and closed-loop system.

Consumer Awareness: Consumers are increasingly conscious of environmental issues and are making informed choices. More individuals are opting for products made from recycled materials, which has led manufacturers to seek out recycled PVC as a sustainable component in their products.

Investment and Funding: The growing interest in sustainable practices has attracted investment and funding to PVC recycling companies. These financial resources have supported research and development efforts, leading to continuous improvements in recycling technologies and processes.

Challenges: Despite the positive trends, PVC recycling companies face challenges that include maintaining consistent quality standards for recycled PVC, sourcing sufficient quantities of recyclable PVC materials, and addressing the complexity of recycling mixed PVC materials, which can pose technical and logistical challenges.

Global Expansion: Some PVC recycling companies have expanded their operations internationally, tapping into global markets with a rising demand for recycled PVC products. This expansion has allowed them to capitalize on opportunities beyond their domestic markets.

Start Your Own PVC Pipe Manufacturing Business

PVC pipes are widely used in various industries, such as electricity, construction, and irrigation. With their versatility and durability, PVC pipes have become a popular choice, replacing wood, paper, and metal in many applications. If You are considering starting a business in the manufacturing sector, PVC pipe manufacturing can be a profitable venture. In this article, we will guide you through the process of starting your own PVC pipe manufacturing business, covering various aspects such as market potential, investment requirements, raw materials, machinery, manufacturing process, marketing, and more.

Market Potential of PVC Pipe in India

The market potential for PVC pipes in India is promising, thanks to the government's significant investment in infrastructure development. The country's construction and rural sectors are expected to drive the demand for PVC pipes in the future. PVC pipes are used for a variety of purposes, including Water supply, irrigation, deep tube well plans, and land drainage plans. These pipes are also crucial in areas where waterlogging is unavoidable. With the rapid growth of the construction industry and increasing demand for rural water supply, the demand for rigid PVC pipes is steadily rising. Currently, 60% of the total demand for PVC pipes in India is for sizes up to 110 mm in outer diameter.

Investment for PVC Pipe Business

To start a PVC pipe manufacturing business, you will need to invest in machinery, equipment, raw materials, and other expenses. The initial investment may include the cost of PVC pipe making machines, which can range from 20 to 30 lakhs INR. Additionally, you will need to allocate funds for equipment, raw materials, and space, with a total investment ranging from 30 to 40 lakhs INR. However, once you have made these initial investments, you can expect long-term benefits as the demand for PVC pipes continues to grow.

Location for the Business

The location for your PVC pipe manufacturing business does not have to be in a prime area. You can set up your manufacturing unit outside of the city, as long as you have access to essential facilities such as water supply, drainage, and electricity. A minimum of 500 square feet of space is sufficient to start your manufacturing operations. By choosing a cost-effective location, you can minimize your expenses and maximize your profits.

Business Registration and License

Before starting your PVC pipe manufacturing business, it is essential to complete the necessary registrations and obtain the required licenses. You will need to register your business, obtain a trade license from the municipal authority, and Apply for a factory license as per your state's rules. It is also important to acquire VAT registration and apply for online MSME registration. Additionally, obtaining a No Objection Certificate from the state's pollution control board and ensuring quality control through certifications like ISO can enhance your business's credibility. Opening a Current bank account and registering a trademark for your brand image are other important steps in the process.

Raw Materials for PVC Pipe Manufacturing

The quality of the final product depends largely on the raw materials used in PVC pipe manufacturing. The major raw materials include PVC resin, stabilizers, processing aids, lubricants, colors, and fillers. These materials are mixed with precision to improve the stability and processing of PVC resin. Electricity and water are the major utilities required for the manufacturing process.

PVC Pipe Manufacturing Machines

To start your PVC pipe making business, you will need specific machinery and equipment. These include a high-speed mixer, a rigid pipe extruder plant, dies and mandrels of different sizes, a scraper and grinder, overhead water tanks, recycling Pump units, weight balancing industrial models, and

pipe storage racks. Additionally, various testing equipment and chemical testing lab equipment are needed to ensure quality control.

PVC Pipe Manufacturing Process

The manufacturing process of PVC pipes involves several steps. It begins with extrusion, where PVC resin is mixed with additives like plasticizers, stabilizers, lubricants, and fillers. The composite PVC resin is then fed into a double screw extruder and passed through a heated chamber, where it melts and changes the pipe's size. The pipe is cooled in a sizing operation and then undergoes traction and cutting. Finally, the pipes are tested for quality control before being transported to buyers.

Transport and Logistics

Once the PVC pipes are manufactured, it is essential to have suitable vehicles for transportation. Arrange for transportation services to deliver your products to retailers, wholesale markets, or directly to customers. Efficient logistics and distribution play a crucial role in ensuring Timely delivery and customer satisfaction.

PVC Pipe Marketing

Creating a robust marketing plan is crucial for the success of your PVC pipe manufacturing business. You can target the local retailer market, sell your products to wholesalers, register your business on B2B websites for bulk orders, and explore online platforms for direct customer sales. Building a strong brand image through trademark registration and focusing on quality control certifications like ISO can help you establish a competitive edge in the market.

1.3 COMPANY PROFILE:

HISTORICAL BACKGROUND OF LN ENTERPRISES

LN Enterprises, a prominent PVC recycling and manufacturing company, traces its roots back to the visionary founder, M. Nagarajan, and its establishment in 1998. The company's journey is a testament to entrepreneurial spirit and dedication to sustainability.

M. Nagarajan embarked on his career with humble beginnings as a worker in the PVC industry. Within just one week of diligent work, his dedication and potential were evident, leading to his elevation to a partner within the company. Recognizing the immense potential in the PVC sector,

Nagarajan ventured further and, in a matter of months, founded his own enterprise named RG Plastics.

RG Plastics quickly gained a reputation as a reliable manufacturer of PVC pipes, ranging from small 0.5-inch pipes to large 10-inch pipes. The company's commitment to quality and its wide product range made it a preferred choice for plumbing and wireline projects. Beyond pipes, RG Plastics offered a comprehensive selection of fittings essential for plumbing and wiring works, meeting the diverse needs of its customers.

Tragically, on December 29, 2022, M. Nagarajan passed away, leaving behind a legacy of entrepreneurial excellence and a thriving business. In the wake of this loss, the co-founder and dedicated partner, N. Latha, faced the responsibility of carrying forward the vision and values established by Nagarajan.

In honor of their founder and as a symbol of their commitment to preserving his legacy, N. Latha decided to continue the business under a new name, LN Enterprises. This transition marked a new chapter in the company's history while paying homage to the founder's initials.

Under the leadership of N. Latha and with the same unwavering dedication to excellence, LN Enterprises continues to flourish, contributing to the PVC industry's sustainability and growth. The company's commitment to innovation, quality, and environmental responsibility has solidified its reputation as a trusted leader in PVC recycling and manufacturing.

LN Enterprises remains a shining example of how one individual's passion and determination can shape an industry and leave a lasting impact on the world business and sustainability.



PROFILE OF LN ENTERPRISES

FOUNDER	M NAGARAJAN IN 1997
CO FOUNDER	N LATHA
WEEKLY SALES	20,000
DAILY SALES	2857
TYPE OF INDUSTRY	SMALL SCALE MANUFACTURING
CONSUMERSHIP	3,00,000
ANNUAL TURNOVER	6,00,000
MANUFACTURING CENTER	SALEM
DISTRIBUTION STATES	TAMIL NADU, KERALA, KARNATAKA.

LOGO



LN Enterprises, located in the heart of Salem, stands as a testament to the power of a diverse and inclusive work culture. With a workforce exceeding 30 individuals, our dynamic team is composed of men, women, and individuals of all genders, each bringing a unique perspective and set of skills to our collective success. Beyond the conventional norms of employment, LN Enterprises takes pride in providing opportunities for older individuals, offering not just financial support but also a sense of purpose, contributing to a workplace that values experience and wisdom.

At the core of LN Enterprises' philosophy is the belief that our employees are not just coworkers; they are family. This sentiment is embodied in our annual employee trip, a gesture of gratitude and

appreciation for the hard work and dedication of each team member. This trip serves not only as a reward but also as a catalyst for building stronger bonds within the LN Enterprises family.

Fostering inclusivity is not merely a company policy at LN Enterprises; it is a way of life. Our commitment to diversity is reflected not only in our hiring practices but also in our day-to-day operations. Every individual, regardless of gender or age, is not just welcomed but celebrated for their unique contributions to our workplace. This commitment goes beyond the standard employment practices, as we actively seek to empower and support older individuals, recognizing the value of their experience in our organizational tapestry.

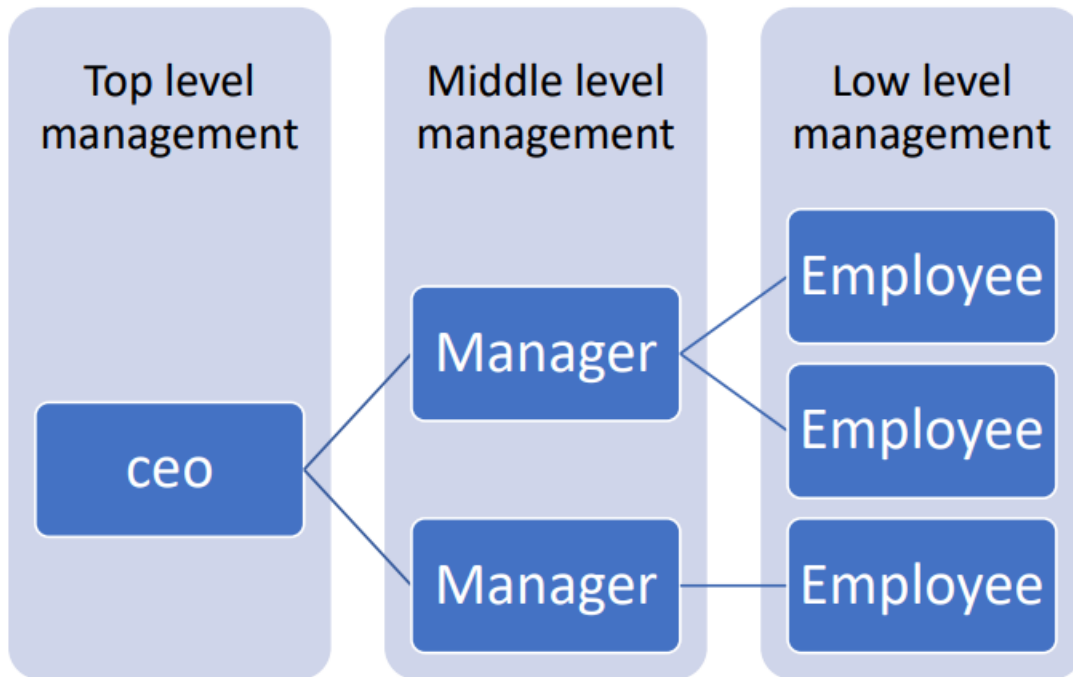
One of the distinctive features of LN Enterprises is our approach to festivities. We believe in celebrating not just the professional achievements of our team but also the diverse cultural backgrounds that make up our workforce. From the vibrant lights of Diwali to the harvest festivities of Pongal, the joyous spirit of Christmas, and the reverence of Ayudha Pooja, our workplace transforms into a cultural mosaic during these celebrations. These moments of joy and camaraderie strengthen the familial bond among our employees, creating an environment where everyone feels a sense of belonging.

Our commitment to a family-centric approach is ingrained in our values. We see our employees not just as contributors to our success but as integral members of our extended family. This outlook shapes our work culture, creating an environment where mutual respect, collaboration, and support thrive. Our values extend beyond the office walls, fostering a sense of responsibility toward the broader community.

As we reflect on our journey, LN Enterprises takes pride in its humble beginnings and the significant milestones achieved along the way. From overcoming challenges to embracing opportunities for growth, our story is one of resilience and determination. Looking forward, LN Enterprises envisions a future where our positive impact extends beyond Salem, contributing to the larger tapestry of global progress.

In conclusion, LN Enterprises is not just a workplace; it is a community of individuals dedicated to shaping futures and building bonds. Our commitment to diversity, inclusivity, and a family-centric approach sets us apart. As we continue our journey, we remain steadfast in our values, eager to embrace the challenges and opportunities that lie ahead. LN Enterprises is more than a company; it is a story of people coming together, celebrating diversity, and creating a lasting legacy of success and camaraderie.

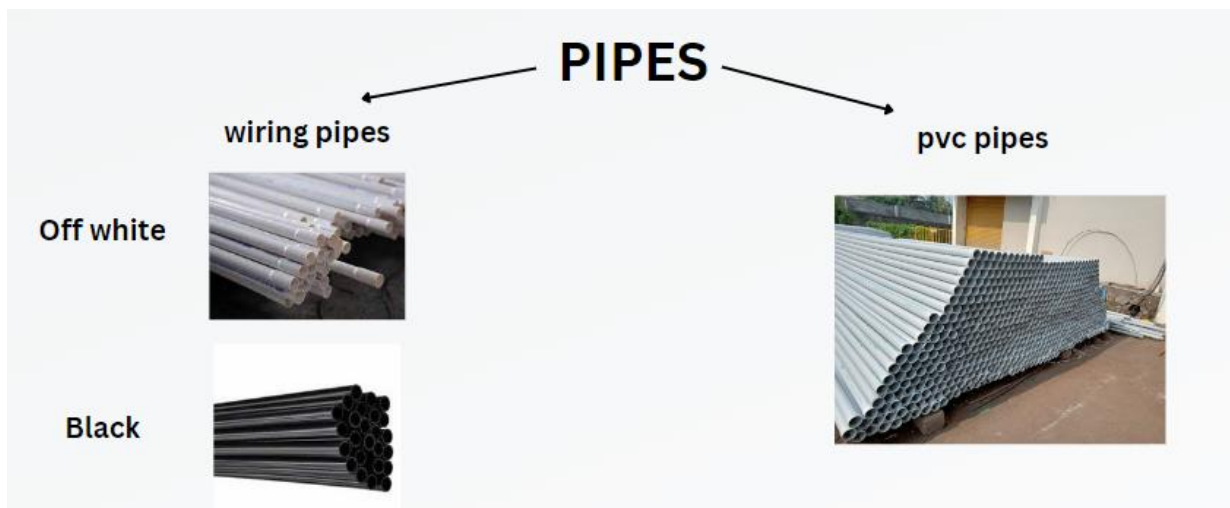
Organization Structure



PRODUCT PROFILE

SIZE CHART OF PIPES

PVC Pipe Size <i>IPS - The industry standard PVC pipe size (size shown on website)</i>	Actual Outside Diameter of Pipe <i>"See guide below this chart for how to measure Outside Diameter *"Inside diameter of a socket fitting will be approx. OD of same size pipe"</i>
1/2"	Pipe Outside Diameter: 0.840" <i>Applies to: Schedule 40, Schedule 80, & Furniture Grade PVC Pipe</i>
3/4"	Pipe Outside Diameter: 1.050" <i>Applies to: Schedule 40, Schedule 80, & Furniture Grade PVC Pipe</i>
1"	Pipe Outside Diameter: 1.315" <i>Applies to: Schedule 40, Schedule 80, & Furniture Grade PVC Pipe</i>
1-1/4"	Pipe Outside Diameter: 1.660" <i>Applies to: Schedule 40, Schedule 80, & Furniture Grade PVC Pipe</i>
1-1/2"	Pipe Outside Diameter: 1.900" <i>Applies to: Schedule 40, Schedule 80, & Furniture Grade PVC Pipe</i>
2"	Pipe Outside Diameter: 2.375" <i>Applies to: Schedule 40, Schedule 80, & Furniture Grade PVC Pipe</i>
2-1/2"	Pipe Outside Diameter: 2.875" <i>Applies to: Schedule 40 & Schedule 80 PVC Pipe</i>
3"	Pipe Outside Diameter: 3.500" <i>Applies to: Schedule 40 & Schedule 80 PVC Pipe</i>
4"	Pipe Outside Diameter: 4.500" <i>Applies to: Schedule 40 & Schedule 80 PVC Pipe</i>
5"	Pipe Outside Diameter: 5.563" <i>Applies to: Schedule 40 & Schedule 80 PVC Pipe</i>
6"	Pipe Outside Diameter: 6.625" <i>Applies to: Schedule 40 & Schedule 80 PVC Pipe</i>
8"	Pipe Outside Diameter: 8.625" <i>Applies to: Schedule 40 & Schedule 80 PVC Pipe</i>
10"	Pipe Outside Diameter: 10.750" <i>Applies to: Schedule 40 & Schedule 80 PVC Pipe</i>



Elbow



A PVC elbow is a pipe fitting that joins two lengths of PVC pipe together. When the direction of the pipe needs to be adjusted during laying, then the PVC elbow comes in handy!

According to the different extension directions of the pipe, the elbows are roughly divided into 45-degree elbows and 90-degree elbows according to different curvatures.

Of course, if you have other special requirements for the curvature of the elbow, you can also choose to customize the elbow.

Tee



Tee has three ends. Both ends are straight, and one end is 90 degrees vertical. It allows the flow of liquid to flow in two directions.

Tee can be divided into the equal tee and reducing tee according to the size of the ends.

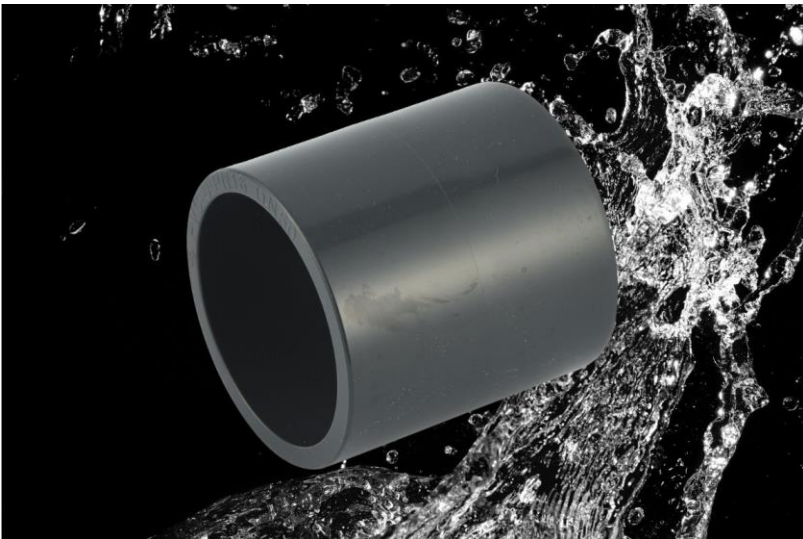
Cross



PVC cross is a pipe fitting suitable for plumbing systems. It has four ends, one of which is the water inlet and the other three are water outlets. And, they are distributed perpendicular to each other.

PVC cross can connect four pipes together and change the flow of liquid in the pipe.

Coupling



PVC coupling is one of the simplest and most common plumbing fittings. It is mainly used to join two lengths of tubing together. Because of its strong adaptability, it can be used with various PVC pipe fittings, such as elbows, tees, crosses, and more.

Because PVC coupling is usually connected with PVC glue, it is only used once.

Union



PVC union is functionally similar to PVC coupling. It joins two lengths of tubing together. It has one of the biggest features, namely, that it is detachable!

It has two ends and is ready to be split. When the pipe is aging, cracked, or needs to be replaced, there is no need to cut the pipe or replace the whole pipe, just disassemble the PVC union and replace the damaged part.

Due to this characteristic of PVC union, it is often used where the piping system is more prone to damage, such as swimming pools, irrigation systems, or industrial piping systems.

Adapter



PVC adapter is another form of PVC coupling. It is generally used to connect two pipes of different types and sizes.

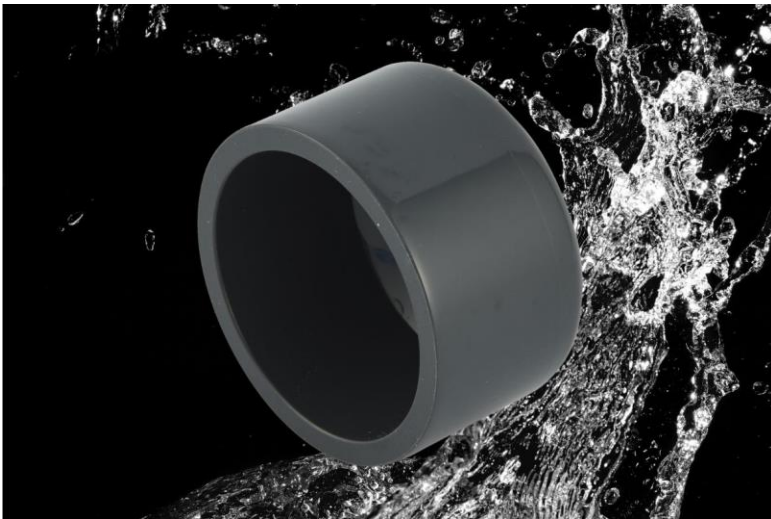
It has two ends. One end is used for threaded or glued connections, and the other end is used to match pipes or fittings of different sizes.

Reducer



A wide variety of PVC pipes and fittings of different sizes are often used in piping systems. Changing the size of the tubing is very common. If you need to reduce the size of the pipe, then you need to use PVC reducer.

PVC End Cap



The shape of the PVC end cap is very simple, it is a kind of round cover. It has two connection methods, thread connection or glue connection, and is mainly used to cap the end of the pipe.

When the end of the pipe is not used or connected to other pipes, or when the pipe needs to be temporarily stopped due to maintenance or construction, the PVC end cap can be used!

Plug



The function of the PVC plug is the same as that of the PVC end cap, which is to seal the end of the pipe.

The biggest difference between the two lies in the way they are used. The PVC end cap is to cover the outside of the end of the pipe, while the PVC plug is inserted into the inside of the end of the pipe.

Clamp Saddle



PVC clamp saddle comes in handy when you want to add a new branch to an existing PVC pipe for connecting other pipes and fittings!

You can make a hole in the pipe, then clamp the pipe with a clamp saddle, connect it tightly with screws, and finally import new pipes and fittings into the clamp saddle.

1.4 STATEMENT OF THE PROBLEM

A STUDY ON SUPPLY CHAIN CARRIED OUT BETWEEN THE SUPPLIER AND THE MANUFACTURERS OF PIPE PRODUCTION.

The production of PVC (Polyvinyl Chloride) pipes involves various processes, and suppliers and manufacturers in this industry may encounter several challenges. Some common problems faced by suppliers and manufacturers of PVC pipe production include:

Raw Material Costs and Availability: Fluctuations in the cost of raw materials, especially PVC resin, can impact production costs.

Availability issues or price volatility of key additives and compounds used in PVC pipe production.

Environmental Regulations: Stringent environmental regulations related to the production and disposal of PVC materials may require compliance measures, leading to additional costs and complexities.

Quality Control: Ensuring consistent quality of PVC pipes is crucial. Variations in raw material quality or production processes can result in defects and performance issues.

Market Demand Fluctuations: The demand for PVC pipes can be influenced by factors such as construction activity, infrastructure projects, and economic conditions. Fluctuations in demand can pose challenges for production planning.

Competition and Price Pressures: Intense competition in the PVC pipe market can lead to price pressures, affecting profit margins for manufacturers and suppliers.

Supply Chain Disruptions: Interruptions in the supply chain, such as shortages of raw materials, transportation issues, or geopolitical factors, can impact production schedules and lead to delays.

Technological Advancements: Staying technologically updated to incorporate the latest advancements in PVC pipe production methods and machinery can be challenging for some manufacturers.

Energy Costs: The energy-intensive nature of PVC production can make manufacturers vulnerable to fluctuations in energy prices.

Global Economic Conditions: Economic downturns or global economic uncertainties can impact construction and infrastructure projects, directly affecting the demand for PVC pipes.

Waste Management and Sustainability: Addressing concerns related to the environmental impact of PVC production and finding sustainable solutions for waste management can be challenging.

Regulatory Compliance: Compliance with safety, quality, and environmental regulations requires ongoing efforts and investments in monitoring and adherence.

Technology Adoption and Automation: Adopting and integrating new technologies and automation into the production process may pose challenges in terms of costs, workforce training, and system integration.

Logistics and Transportation: Efficient transportation and logistics are critical for timely delivery. Challenges such as transportation costs, delays, and logistics coordination can impact the overall supply chain.

Human Resource Challenges: Recruiting and retaining skilled labor in PVC pipe production, along with providing ongoing training, can be a challenge.

Addressing these challenges requires a combination of strategic planning, continuous process improvement, technology adoption, and collaboration with suppliers and other stakeholders in the supply chain. Manufacturers and suppliers in the PVC pipe industry need to stay agile and proactive in responding to market dynamics and evolving industry trends.

1.5 OBJECTIVE OF THE STUDY

- **To understand Strategic Supplier Collaboration.**
- **To find out the satisfaction level of improvement in product offering.**
- **To identify & diagnose supply chain visibility.**

1.6 NEED FOR THE STUDY

The study is crucial for assessing and optimizing the operational aspects of the supply chain in the PVC pipe manufacturing company. This involves streamlining processes, reducing lead times, and enhancing overall efficiency to meet production demands.

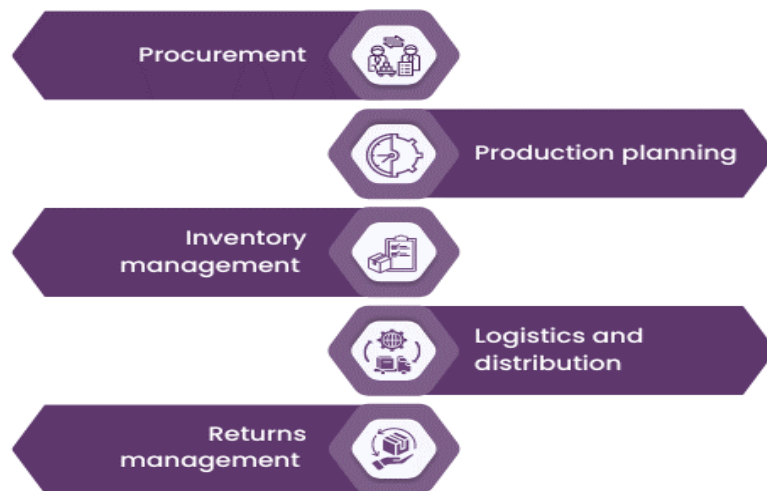
A thorough examination is needed to identify opportunities for cost reduction and efficient resource utilization throughout the supply chain. This includes evaluating procurement costs, transportation expenses, and overall resource management.

Evaluating and improving relationships with suppliers is a key aspect. The study helps identify opportunities for collaboration, negotiation, and improved communication to enhance the reliability and efficiency of the supply chain.

The study is necessary to enable the PVC pipe manufacturing company to adapt to dynamic market conditions. By staying informed about market trends and consumer preferences, the supply chain can be adjusted to meet changing demands and maintain competitiveness.

1.7 SCOPE AND SIGNIFICANCE OF THE STUDY

The Scope of SCM is vast and encompasses a wide array of activities, each contributing significantly to a company's operations. Five key components are integral to understanding it, all of which are



expanded as follows;

Procurement

This is essentially the process of selecting and purchasing goods or services that a company needs to fulfil its business model. In the wider context of Supply Chain Management, procurement plays a vital role in maintaining profitable operations.

Production planning

This component focuses on coordinating all the activities needed to create a product or service. Production planning is all about efficiency as it involves the following:

- a) Product design
- b) Production engineering
- c) Production planning
- d) Material sourcing

It requires a thorough, real-time understanding and management of all factors involved in production, including manpower, raw materials, production capacity, and time considerations.

Inventory management

Inventory management involves overseeing the quantities of goods that are held in an organization's stock. It is a balancing act of predicting demand, planning for reordering points, and maintaining just the right amount of stock to meet the customers' needs without incurring unnecessary holding costs. Inventory management is critical in Supply Chain operations as it directly impacts customer satisfaction as well as the overall costs of business operations.

Logistics and distribution

This involves the management of how the resources are acquired, stored, and then transported to their final destination. It includes processes such as the following:

- a) Warehousing
- b) Transportation
- c) Material handling
- d) Packaging
- e) Order fulfilment

In Supply Chain Management, effective logistics and distribution systems ensure that the products reach their intended destinations in the most cost-effective and efficient manner possible. Thereby satisfying customer needs and enhancing profitability.

Returns management

Often overlooked, returns management is a crucial part of SCM. It involves handling customers' returned products effectively and efficiently, thereby minimizing the associated costs and enhancing customer satisfaction.

CHAPTER 2

REVIEW OF LITERATURE

2.1 REVIEW OF LITERATURE

In this chapter, the researcher has undertaken an effort to explore the fundamental principles of supply chain management within the context of supply chain management. This exploration involves an analysis of prior research conducted by scholars, focusing on the strategies employed by companies to engage their employees effectively in the supply chain domain. To accomplish this, the researcher has delved into various sources, including books, research journals, and websites. A comprehensive list of these sources is provided in the bibliography. Through this literature review, the researcher aims to identify the key factors and parameters that play a significant role in enhancing supply chain management in the context of supply chain management.

1. Rômulo Marcos Lardosa Rebelo, Susana Carla Farias Pereira, Maciel M. Queiroz (2022) - The interplay between the Internet of things and supply chain management: challenges and opportunities based on a systematic literature review

This study conducts a systematic literature review of how Internet of Things (IoT) technology influences supply chain management (SCM) performance. The review covers 20 years of academic papers, selecting 171 from important journals. Most IoT-related studies focus on enhancing order fulfillment, manufacturing flow management, and demand management processes within the SCM framework. Notably, there is a lack of studies addressing Supplier Relationship Management processes, suggesting that IoT applications are more valuable downstream. The findings emphasize the significance of enabling technologies to maximize IoT's potential for enhancing SCM performance and identify future research directions related to product development, returns management, new SCM models, and business models.

2. Ziwen Lu (2022)- Advantages and Countermeasures of Integrating Supply Chain Management under the Internet of Things Technology on Complex Theory to Promote the Clustering of Cultural Industries

This article explores the slow development of the cultural industry amid the rapid growth of the Internet of Things (IoT) technology in various sectors in our country. Utilizing data from the China Publishing Group Corporation's integrated supply chain over the past five years, combined with IoT technology and complex theories, the paper analyzes an opposing model for the integrated supply chain. Focusing on the actual efficiency of the integrated index structure within IoT on uncertain data flow, the research introduces an efficient query processing method for the integrated supply chain based on an opposition model. By sampling data in a sliding window of uncertain data streams and establishing a TPL tree index structure, the method aims to enhance cultural industry clustering and improve industrial efficiency compared to traditional unintegrated approaches.

3. Péter Lengyel ,Attila Bai ,Zoltán Gabnai (2021) - Development of the Concept of Circular Supply Chain Management—A Systematic Review

This systematic review examines Circular Supply Chain Management (CSCM) research and its connection to the COVID pandemic. The study analyzed a sample of 6,095 documents and divided them into two periods, before and after 2012. Sustainability gained prominence after 2012, while the circular approach became more significant after 2017, driven partly by EU policies. The US played a key role, but Far Eastern contributions have been growing. The International Journal of Supply Chain Management is vital for CSCM, and the journal Sustainability has focused on the impact of COVID on supply chains, potentially furthering the circular economic model.

4. Ananna Paul ,Nagesh Shukla ,Sanjoy Kumar Paul and Andrea Trianni (2021) - Sustainable Supply Chain Management and Multi-Criteria Decision-Making Methods: A Systematic Review

This paper reviews the use of Multi-criteria decision-making (MCDM) methods in Sustainable Supply Chain Management (SSCM). It analyzes 106 journal articles, highlighting that MCDM methods are commonly employed to address various aspects of SSCM, such as barriers, drivers, and performance. There's a recent trend toward integrating multiple MCDM methods, although most papers focus on just two methods. However, the integration with other techniques, like optimization and simulation, remains limited. This review identifies research gaps and suggests future research opportunities in the field of SSCM and MCDM.

5. Aichih (Jasmine) Chang, Nesreen El-Rayes and Jim Shi (2021) - Blockchain Technology for Supply Chain Management: A Comprehensive Review

This study delves into the world of Blockchain technology (BCT), a disruptive force gaining attention due to its association with cryptocurrencies like Bitcoin and Ethereum. It clarifies the distinction between cryptocurrencies and BCT and examines BCT's applications in various fields. Notably, it highlights how BCT's traceability feature is driving its use in supply chain management (SCM). The research finds that BCT studies are thriving in SCM, healthcare, and government, while declining in banking and cybersecurity. Geographically, China, the U.S., and India lead in BCT-related publications, with untapped potential in environmental sciences and agriculture.

6. Amulya Gurtu and Jestin Johny (2021) - Supply Chain Risk Management

The increasing risks in global supply chains have sparked discussions among practitioners and academics, leading to a need for better risk management. Economic policies and globalization have introduced unpredictability and challenges for supply chain organizations, affecting their financial performance and even national economies. Supply chain risk management plays a crucial role in addressing these challenges and promoting business competitiveness. Implementing risk mitigation strategies is essential to minimize the impact of both natural disasters and human-made disruptions.

7. Javid Moosavi, Leila M. Naeni, Amir M. Fathollahi-Fard & Ugo Fiore (2021) - Blockchain in supply chain management: a review, bibliometric, and network analysis

Blockchain, a distributed ledger technology, has gained significant attention in both industry and research. This study conducts a systematic review using bibliometric and network analysis to explore its impact on supply chain management. Key areas of contribution include supply chain management, finance, logistics, and security, with emerging technologies such as IoT and smart contracts playing crucial roles. While highly cited articles show the potential for enhancing transparency, traceability, and efficiency, empirical research remains limited, highlighting the need for future exploration in implementing blockchain in real-world supply chains.

8. Lanyan Zeng , Shi Qiang Liu , Erhan Kozan , Paul Corry , Mahmoud Masoud (2021) - A comprehensive interdisciplinary review of mine supply chain management

This study delves into the intricate world of mine-to-customer supply chains, which involve a multitude of equipment and facilities, from excavators to processing plants and railways, to deliver minerals from remote mines to global clients efficiently. With a surge in interest from both academic

researchers and industry professionals, the focus has shifted towards developing advanced mine supply chain management (MSCM) methodologies. To meet this growing demand, the study conducts an extensive review of MSCM research, analyzing over 200 papers primarily published in the past decade (2010–2021). These papers are categorized into nine key areas, including capacity planning, logistics, inventory control, network design, economic considerations such as pricing, efficiency assessment, risk management, environmental protection, and production scheduling. The analysis not only identifies promising research avenues but also offers practical insights for managerial applications in the realm of MSCM

9. Hendrik Birkel , Julian M. Müller (2021) - Potentials of industry 4.0 for supply chain management within the triple bottom line of sustainability – A systematic literature review

This paper conducted a systematic review of 55 academic articles to explore the intersection of Industry 4.0, advanced technologies, with supply chain management and sustainability. The study revealed that Industry 4.0 holds significant potential to enhance supply chain management, considering the triple bottom line, encompassing economic, social, and ecological factors. It emphasized the importance of understanding how these dimensions interact and where potential conflicts might arise. Moreover, the research highlighted that technology plays a pivotal role in enabling sustainable practices within the supply chain. However, the study also identified several research gaps that warrant further investigation, including the role of small and medium-sized enterprises in Industry 4.0, supply chain management in developing economies, information sharing throughout the supply chain, and the complex interplay of economic, social, and ecological elements in emerging business models. In essence, this work sheds light on how advanced technologies can drive sustainability in supply chain management while pinpointing areas in need of deeper exploration.

10. Syed Abdul Rehman Khan PhD (Postdoctoral Fellow) , Zhang Yu , Heris Golpira , Arshian Sharif , Abbas Mardani (2021) - A state-of-the-art review and meta-analysis on sustainable supply chain management: Future research directions

In this study, the researchers looked at the trends in sustainable supply chain management (SSCM) over the past sixteen years (from 2004 to 2019). They reviewed 362 research papers from reputable journals.

Drivers and Barriers: They studied what motivates and hinders sustainable supply chain practices. Companies are driven by various factors like environmental concerns and cost savings, but they also face obstacles such as regulatory challenges.

Research Methods: Many studies in this area use a method called Multiple-criteria decision making (MCDM). This method helps organizations make decisions by considering multiple factors or criteria.

Research Focus: Most research has been at the firm level, looking at how individual companies implement sustainable practices. The researchers suggest that future studies should explore larger scales like countries or regions. Overall, this study provides insights into what's driving and inhibiting sustainable supply chain practices and the research methods commonly used in this field. It also encourages broader research on a larger scale

11. Reza Toorajipour , Vahid Sohrabpour , Ali Nazarpour , Pejvak Oghazi , Maria Fischl (2021) - Artificial intelligence in supply chain management: A systematic literature review

This paper conducted a systematic review of existing literature to understand how artificial intelligence (AI) contributes to supply chain management (SCM). The goal was to identify the current and potential AI techniques that could improve both the study and practice of SCM. The study also aimed to pinpoint areas in the literature that require further scientific research. By examining papers from various SCM fields, including logistics, marketing, supply chain, and production, this review provides valuable insights through systematic analysis and synthesis.

12. YS Reddy, PR Gangadasari, S Prakash (2020) - Exploring Industry 4.0 and Circular Economy

Industry 4.0 (I4.0) and Circular Economy (CE) were previously viewed as two individual streams. The world of industry has now come to realize how advantageous the integration of both concepts would be. This concept note provides a clear picture of how I4.0 helps enable the CE by covering each concept's aspects in detail. It showcases how important the role of digital technologies is and how they enable the path to CE.

It is observed that CE is still at the stage of infancy and the application of the I4.0 concept is still to be recognized to be used in a full-fledged manner in industries in the future. The major conclusion on the relationship of CE with that of I4.0 highlights the resource-efficient requirement in the future by adopting industry 4.0 technologies and principles.

13. Rashed Mahmud Shakil, Md. Alamgir Mollah, Shawkat Tanveer Rahman, Md. Mamun Habib (2020) - A Bibliometric Review of Global Research on Human Resources Management and Supply Chain Management

This study delves into the emerging field of Human Resource Management (HRM) and Supply Chain Management (SCM) research. By analyzing 469 articles from the Scopus database, it provides

insights into the size and geographic distribution of this literature, key authors, influential journals, and emerging topics. This is the first bibliometric analysis in the HRM-SCM field and serves as a valuable reference for researchers, offering guidance on frameworks and areas for future research.

14. Abderahman Rejeb , Steve Simske , Karim Rejeb , Horst Treiblmaier , Suhaiza Zailani (2020) - Internet of Things research in supply chain management and logistics: A bibliometric analysis

This study delves into Internet of Things (IoT) research within the realm of supply chain management (SCM) and logistics. It encompasses a comprehensive review of 807 journal articles spanning two decades. The research identifies key journals, prolific authors, and institutions contributing to IoT in SCM and logistics. It also uncovers central themes like RFID technology, Industry 4.0, and reverse logistics across various industries such as food, retail, construction, and pharmaceuticals. This review offers both researchers and practitioners insights into IoT's current state and areas for future exploration in SCM and logistics.

15. Abbas Mardani , Devika Kannan , Robert E. Hooker , Seckin Ozkul , Melfi Alrasheedi , Erfan Babaee Tirkolaee (2020) - Evaluation of green and sustainable supply chain management using structural equation modelling: A systematic review of the state of the art literature and recommendations for future research

This article conducts a comprehensive review of how Structural Equation Modelling (SEM) is used in assessing sustainable and green supply chain management (SCM). It categorizes papers based on various aspects, including application areas, research problems, methods, and more. The findings reveal that SEM has been applied in green SCM, primarily in the manufacturing sector. The majority of papers used SmartPLS, and the resource-based theory (RBV) was the dominant theoretical framework. The Journal of Cleaner Production and the year 2016 had the most publications, while the United States led in contributions. This review provides valuable insights for both researchers and practitioners in the SCM field.

16. Miguel Núñez-Merino, Juan Manuel Maqueira-Marín ORCID Icon, José Moyano-Fuentes ORCID Icon & Pedro José Martínez-Jurado (2020) - Information and digital technologies of Industry 4.0 and Lean supply chain management: a systematic literature review

This research paper delves into the connections between Industry 4.0's Information and Digital Technologies (IDT) and Lean Supply Chain Management (LSCM). It aims to provide a comprehensive overview of the current state of research in this field.

Here's what they did:

They performed a systematic review, which means they carefully selected and evaluated 78 relevant research papers. These papers were collected from important databases like Web of Science, Scopus, and ABI/Inform, covering the years from 1996 to December 2019. The research was then analyzed and synthesized to categorize the findings.

In simple terms, this research looked at how modern digital technologies, like those in Industry 4.0, impact the efficiency of lean supply chains. They gathered and analyzed lots of relevant studies to understand what's currently known and where more research is needed, and they shared suggestions for both researchers and people managing supply chains.

17. Song Xu,Xiaotong Zhang,Lipan Feng &Wenting Yang (2020) - Disruption risks in supply chain management: a literature review based on bibliometric analysis

This research is all about understanding how disruptions in supply chains (like unexpected events that mess things up) can harm the performance of companies involved. They've studied this field quite a bit, and this paper takes a close look at all the research done. The researchers examined 1,310 publications to see who the most influential authors and organizations are, and what important keywords come up a lot. They used visual tools to help them do this. They also figured out which publications are the most important and grouped the research topics into clusters to find out what the main areas of study are. This can help researchers and business people see what's hot in the field and where there are opportunities for more research. This research is all about understanding how disruptions in supply chains (like unexpected events that mess things up) can harm the performance of companies involved. They've studied this field quite a bit, and this paper takes a close look at all the research done. The researchers examined 1,310 publications to see who the most influential authors and organizations are, and what important keywords come up a lot. They used visual tools to help them do this. They also figured out which publications are the most important and grouped the research topics into clusters to find out what the main areas of study are. This can help researchers and business people see what's hot in the field and where there are opportunities for more research.

18. Swapnil Lahane , Ravi Kant , Ravi Shankar (2020) - Circular supply chain management: A state-of-art review and future opportunities

This paper delves into the concept of the circular economy (CE), which has gained significant attention lately due to concerns about excessive waste generated throughout a product's life cycle. CE offers an alternative to the traditional linear model of production and consumption. It's all about reusing and recycling to minimize waste. When we apply this circular approach to supply chain management, we call it Circular Supply Chain Management (CSCM). The study's goal is to provide an up-to-date review of CSCM using a content analysis method. The review looks at existing literature about circular supply chains, identifies trends in research, and pinpoints areas that need further investigation.

19. L.J.R. Nunes, T.P. Causer, D. Ciolkosz (2020) - Biomass for energy: A review on supply chain management models

This study looks at how we organize the process of getting biomass, a renewable energy source, from where it's collected to where it's used. For renewable energy like biomass to work well, we need a well-structured and efficient supply chain that includes collecting, transporting, storing, and distributing it. Models are like blueprints that help us understand and improve how this supply chain works. Until now, these models have mainly focused on making things cheaper, but there's a lot of room to make the supply chain work even better. In this article, we'll review different models used in recent research to handle various situations. In the end, we'll see that these models should consider different factors and also the challenges that come with using biomass for energy.

20. Nirmal Kumar, Ajeya Jha (2019) - Application of principles of supply chain management to the pharmaceutical good transportation practices

Through this study, an exclusive perspective for pharmaceutical good transportation practice (GTP) has been propagated in alignment with seven principles of SCM by Anderson. This study offers guidance to pharmaceutical industry for transportation of products by conceptualizing basic supply chain features such as segmentation, customization of requirement, market signals, differentiation, technology orientation and channel spanning performance.

21. Eleni Georgiou , Marie Raffin , Keith Colquhoun , Aiduan Borrion , Luiza C. Campos (2019) - The significance of measuring embodied carbon dioxide equivalent in water sector infrastructure

To address the escalating demands of a growing population and anticipated climate change impacts on water-related infrastructure, there is a pressing need for increased construction output. Despite

advancements in operational energy efficiencies and grid decarbonization, the study underscores the escalating importance of embodied carbon dioxide equivalent (CO₂e) resulting from water sector infrastructure construction and maintenance. This significance, disputed in current literature, necessitates practitioners in water and construction sectors to comprehend and account for embodied CO₂e. Analyzing the Old Ford Water Recycling Plant, the research reveals a substantial impact, with embodied CO₂e constituting 50.7% (TWU analysis) and 77.3% (Ecoinvent) of the total carbon footprint. The study highlights challenges in assessments, emphasizing the imperative for higher-quality data from manufacturers and suppliers regarding the embodied CO₂e content of materials, components, and equipment. Furthermore, it illustrates differences between calculations using generic data (Ecoinvent) and supply chain data, emphasizing the complexities in generating functionally equivalent life cycle inventories for water-related infrastructure.

22. Samuel McKinney (2019) - Graph-Based Analysis for IoT Devices with Manufacturer Usage Descriptions - An ScM Research Project

This project explores how graph embedding representations of network traffic can be leveraged with Manufacturer Usage Descriptions (MUD) to improve analysis and security for Internet of Things devices. To expand on previous approaches, this project builds graph embeddings from NetFlow-style network traffic statistics readily available for enterprise networks and compares them using graph kernel-based algorithms and finds promising results for device identification and classification.

23. Sulafa Badi , Niamh Murtagh (2019) - Green supply chain management in construction: A systematic literature review and future research agenda

This paper conducts a systematic literature review to explore the concept of green supply chain management (GSCM) in the construction industry. Out of 207 papers, 44 were analyzed, focusing on publication details, geographic context, methodologies, stakeholder roles, and practical implications. The review categorizes GSCM approaches and proposes a comprehensive definition. It highlights the need for more holistic perspectives, industry-specific considerations, emphasis on environmental sustainability, practical guidance, theoretical insights, critical perspectives, and broader inclusion. This paper provides valuable insights for advancing GSCM in construction.

24. Swayam Sampurna Panigrahi, Bikram Bahinipati, Vipul Jain (2019) - Sustainable supply chain management: A review of literature and implications for future research

This paper discusses the growing emphasis on sustainable supply chain management (SSCM) in businesses, which aims to balance economic performance, environmental concerns, and social responsibility. Through a structured literature review, it explores various theories in SSCM, highlighting the significance of supply management in improving organizational competitiveness. The study provides valuable insights for both practitioners and researchers, shedding light on governance mechanisms for successful SSCM implementation. It identifies research gaps and offers future research opportunities in an area where theoretical development is lacking.

25. Tobias Rebs , Marcus Brandenburg , Stefan Seuring (2019) - System dynamics modeling for sustainable supply chain management: A literature review and systems thinking approach

This paper explores the use of system dynamics (SD) modeling in sustainable supply chain management (SSCM). SD models are suitable for simulating complex and dynamic systems, aiding long-term decision-making. The review of SSCM-related SD models reveals a focus on macroscopic analysis, with limited attention to intra- and inter-organizational supply chains. Most models incorporate environmental and social sustainability metrics, but uncertainties and risks are often overlooked. The review suggests the need for better model validation, hybrid models combining various approaches, and outlines a framework for a systems thinking perspective on SSCM to guide future research.

26. Lavanya Meherishi, Sushmita A. Narayana, K.S. Ranjani (2019) - Sustainable packaging for supply chain management in the circular economy: A review

This research looks at how packaging, which is used to transport products, affects the environment and supply chain costs. With supply chains becoming longer and more complex, there's more packaging and waste. The study focuses on the idea of a circular economy, where products and their packaging are used sustainably.

Here's what they found:

Trends in Sustainable Packaging: Sustainable packaging practices are in line with circular economy principles, but they often don't consider how products interact with their packaging.

Environmental and Economic Focus: Most research in this area looks at how packaging impacts the environment and supply chain costs. It's mainly concentrated in developed countries.

Supply Chain Structures: The study identified three main ways supply chains are organized in relation to packaging, and there's growing attention to smaller parts of the supply chain and relationships between companies.

The research also connects these findings with organizational theories like institutional theory, stakeholder theory, and ecological modernization theory. These theories help understand how sustainable packaging can be applied in different organizations. In summary, this study sheds light on how packaging affects sustainability and supply chains, especially in the context of a circular economy. It also suggests future research directions.

27. Ming-Lang Tseng , Md Shamimul Islam , Noorliza Karia , Firdaus Ahmad Fauzi , Samina Afrin (2019) - A literature review on green supply chain management: Trends and future challenges

This study is all about looking at the research on green supply chain management (GSCM) from 1998 to 2017. They collected data from various databases and analyzed 880 papers to learn more about this field. They found that there is a growing interest in using math and optimization models to make decisions about environmental performance. They also saw a trend in evaluating the practices and performance of GSCM. The study showed that research in this area has been steadily increasing, especially after 2010. They identified important authors, journals, countries, and institutions that contribute to this field. Overall, this study gives a good picture of the research on green supply chain management and suggests areas for future exploration

28. Maciel M. Queiroz, Renato Telles, Silvia H. Bonilla (2019) - Blockchain and supply chain management integration: a systematic review of the literature

This paper aims to identify, analyse and organise the literature about blockchains in supply chain management (SCM) context (blockchain–SCM integration) and proposes an agenda for future research. This study aims to shed light on what the main current blockchain applications in SCM are, what the main disruptions and challenges are in SCM because of blockchain adoption and what the future of blockchains holds in SCM.

29. Amulya Gurtu, Jestin Johny (2019) - Potential of blockchain technology in supply chain management: a literature review

This paper explores the world of blockchain technology and its potential in supply chain management (SCM). It reviews existing literature related to blockchain and identifies trends in this field. The key

findings suggest that blockchain is rapidly gaining traction across various industries and holds great promise in streamlining SCM processes by reducing the need for intermediaries.

30. Muhammad Farooque , Abraham Zhang , Matthias Thüerer , Ting Qu , Donald Huisingsh (2019) - Circular supply chain management: A definition and structured literature review

The idea of a circular economy, which is a more sustainable approach compared to the traditional linear model of take, make, and dispose, is gaining attention. Circular Supply Chain Management (CSCM) takes this circular economy philosophy and applies it to supply chain operations, making supply chains more sustainable. There's a growing interest in researching this concept. However, current literature lacks a comprehensive view of CSCM, making it hard to distinguish from other supply chain sustainability ideas. This hampers the field's progress.

31. Esteban Koberg, Annachiara Longoni (2019) - A systematic review of sustainable supply chain management in global supply chains

This paper addresses the ongoing problems related to sustainability in global supply chains. It seems that companies with a presence all around the world struggle to make their supply chains more environmentally, socially, and economically sustainable. To tackle this issue, there's a concept called sustainable supply chain management, which is supposed to make supply chains greener and more socially responsible. However, global supply chains have their unique challenges.

32. Nima KazemiORCID Icon,Nikunja Mohan Modak &Kannan Govindan (2018) - A review of reverse logistics and closed loop supply chain management studies published in IJPR: a bibliometric and content analysis

To celebrate the 55th volume anniversary of the International Journal of Production Research (IJPR), this review analyzes 94 studies related to Reverse Logistics and Closed Loop Supply Chain Management (RL&CLSCM) published in the journal from 2000 to July 2017. The study conducts bibliometric and content analyses, categorizing the papers into two main groups and subcategories. The analysis reveals several research gaps in IJPR that require further exploration in the field of RL&CLSCM.

33. Dhanavanth Reddy Maditati , Ziaul Haque Munim , Hans-Joachim Schramm , Sebastian Kummer (2018) - A review of green supply chain management: From bibliometric analysis to a conceptual framework and future research directions

This study reviews the literature on green supply chain management (GSCM) and constructs a comprehensive framework of the relationships among GSCM drivers, practice indicators, and performance measures. The analysis is based on 1523 articles from the ISI Web of Science database, revealing influential journals, institutions, and top articles in the GSCM field. It identifies six key research streams within GSCM and proposes a logical framework of factors and relationships. The study also aligns future research directions from trending articles with key papers, promoting a more forward-looking approach to GSCM research.

34. Chencheng Fang, Jiantong Zhan (2018) - Performance of green supply chain management: A systematic review and meta analysis

This study examines the relationship between green supply chain management (GSCM) practices and firm performance, focusing on 54 selected research papers. It reveals that both internal and external GSCM practices positively influence firm performance, with the strongest impact on environmental performance, followed by operational and economic performance. The research also identifies several moderating factors such as industry type, ISO certification, export orientation, and cultural dimensions. However, it's important to consider the limitations of this study while interpreting the results.

35. Bhavana Mathur, Sumit Gupta, Makhan Lal Meena, G.S. Dangayach (2018) - Healthcare supply chain management: literature review and some issues

This paper explores the connections between supply chain practices, supply chain performance, and organizational performance in Indian healthcare industries. It develops a framework linking healthcare supply chain practices to organizational performance and emphasizes the significance of effective supply chain performance for overall organizational improvement. However, the study is industry-specific and limited to medical device supply chains, suggesting a need for broader research. It highlights the importance of supply chain practices in healthcare and their potential to enhance patient satisfaction.

36. Abhishek Behl & Pankaj Dutta (2018) - Humanitarian supply chain management: a thematic literature review and future directions of research

While supply chain management has been well-studied, its role in disaster relief operations is a growing area of research. This study reviews 362 papers from 2011 to 2017, highlighting nine key themes in Humanitarian Operations and Supply Chain Management (HOSCM). These themes cover

areas like humanitarian logistics, theoretical research, case studies, mathematical models, and resource management for effective humanitarian operations. The review provides a roadmap for further research and the advancement of debates in this field.

37. Deepa Mishra, Angappa Gunasekaran, Thanos Papadopoulos & Stephen J. Childe (2018) - Big Data and supply chain management: a review and bibliometric analysis

This paper is all about looking at research on "Big Data and supply chain management (SCM)" from 2006 onwards. They analyzed 286 articles to get a better understanding of the field. They found the top authors, countries, and key research topics. They also looked at which works were the most influential based on citations and PageRank. The paper then identified six research clusters where future studies could focus, and it provides insights for managers on using Big Data and analytics for supply chain management. In a nutshell, this paper helps us understand what's happening in the world of Big Data and supply chain management research and suggests areas for further investigation.

38. C.L. Martins , M.V. Pato (2018) - Supply chain sustainability: A tertiary literature review

Through a detailed analysis of the content, the study organized and evaluated the surveyed material based on different categories related to both methods and content. The findings revealed that systematic literature reviews are becoming the standard method for examining sustainability in the supply chain. However, many reviews often fall short in terms of rigor and methodological quality. While most reviews focus on the triple bottom line concept of sustainability (covering economic, environmental, and social aspects), social considerations are somewhat neglected, especially when compared to environmental factors. This comprehensive study offers a critical overview of the current state of research on supply chain sustainability.

39. Bin Shen,Tsan-Ming Choi &Stefan Minner (2018) - A review on supply chain contracting with information considerations: information updating and information asymmetry

Supply chain management relies on both contracting and the use of information, but there's limited knowledge about how they work together in different information settings. To address this gap, a review has been done, and the supply chain contracting literature has been categorized into three groups based on information considerations. These groups are (1) updating demand information, (2) updating supply information, and (3) dealing with information imbalances.

40. Truong Nguyen , Li ZHOU , Virginia Spiegler , Petros Ieromonachou , Yong Lin (2018) - Big data analytics in supply chain management: A state-of-the-art literature review

The use of big data analytics (BDA) in supply chain management (SCM) has gained significant attention from both academics and professionals. To keep up with this trend, a review of the latest research is needed to guide future developments in the field. This review offers a new classification framework that paints a comprehensive picture of how and where BDA is applied within SCM.

The framework is structured around four key research questions: (1) Where in SCM is BDA being used? (2) How advanced is the analytics level in these SCM areas? (3) What kinds of BDA models are applied in SCM? (4) Which BDA techniques are employed to create these models?

41. Yiyi Fan, Mark Stevenson (2018) - A review of supply chain risk management: definition, theory, and research agenda

The purpose of this paper is to review the extant literature on supply chain risk management (SCRM, including risk identification, assessment, treatment, and monitoring), developing a comprehensive definition and conceptual framework; to evaluate prior theory use; and to identify future research directions.

42. Dmitry Ivanov, Alexandre Dolgui, Boris Sokolov & Marina Ivanova (2017) – Literature review on disruption recovery in the supply chain

This paper reviews the current research landscape regarding supply chain design and planning, focusing on disruptions and recovery strategies. It categorizes various quantitative methods and application areas related to managing disruption risks and recovery measures. The study identifies research gaps and outlines future directions, offering insights for both operations and supply chain managers in choosing appropriate tools and highlighting the need for further research in supply chain risk management.

43. Rameshwar Dubey, Angappa Gunasekaran, Stephen J. Childe, Thanos Papadopoulos, Samuel Fosso Wamba (2017) - World class sustainable supply chain management: critical review and further research directions

This paper presents a comprehensive review of sustainable supply chain management (SSCM) literature. It identifies discrepancies in SSCM definitions and methodologies and advocates for the adoption of "world-class SSCM" (WCSSCM). A theoretical framework is introduced, categorizing 18

dimensions under six SSCM constructs. The paper also suggests future research directions for WCSSCM. This contribution offers a fresh perspective on SSCM, promotes WCSSCM, and provides valuable guidance for further research.

44. Vijay Kumar Sharma , Pankaj Chandna , Arvind Bhardwaj (2017) - Green supply chain management related performance indicators in agro industry: A review

This paper addresses environmental sustainability in the food sector by examining green supply chain management (GSCM). Through a comprehensive literature review and expert consultations, the study identifies 13 performance indicators and 79 sub-indicators for GSCM implementation. The top three performance indicators are internal environmental management, environmental design, and regulatory pressure. Sensitivity analysis is performed to assess the impact of weightage on the performance indicator ranking. This study is a valuable resource for agro-based companies looking to implement GSCM practices and enhance their environmental performance.

45. Deniz Köksal ,Jochen Strähle ,Martin Müller and Matthias Freise (2017) - Social Sustainable Supply Chain Management in the Textile and Apparel Industry—A Literature Review

While sustainability in supply chain management has received significant attention, the focus on social aspects remains limited. This literature review aims to address this gap, specifically in the textile/apparel sector. Examining 45 articles from peer-reviewed journals, the study highlights the need for more research on the social dimension of sustainable supply chain management. It emphasizes the importance of a company's internal practices and supplier collaboration in enhancing social performance. However, suppliers, especially in developing countries, face significant barriers in improving their social practices. This calls for further empirical research and a closer look at supplier-level dynamics.

46. Yunting Feng , Qinghua Zhu , Kee-Hung Lai (2017) - Corporate social responsibility for supply chain management: A literature review and bibliometric analysis

This research is all about looking at Corporate Social Responsibility (CSR) in supply chain management (SCM). They wanted to see how much research has been done on this topic and what the key areas are. They analyzed 628 research articles to figure out what's been studied the most and what areas need more research. They found that most of the research is theoretical and conceptual, and it often focuses on topics like sustainable development and economic and social effects. But they also identified gaps in the research, such as a lack of practical and normative

modeling research and not enough focus on the perspectives of suppliers in emerging economies. In simple terms, this study helps us see what's been studied in CSR and supply chain management and highlights areas where more research is needed.

47. Zulfiquar N. Ansari, Ravi Kant (2017) - A state-of-art literature review reflecting 15 years of focus on sustainable supply chain management

This research is all about studying papers related to sustainable supply chains (SSC), which have become increasingly important over the years. The researchers dug into 286 papers published between 2002 and 2016 to see what we've learned so far. They looked at various aspects like the year the papers were published, the journals they appeared in, the methods used in the research, the industries studied, and much more. Their goal was to find gaps in our knowledge about SSC and identify areas that need more research. What they discovered is that a lot of the research is qualitative, meaning it's based on descriptions and interpretations rather than numbers. When there are quantitative studies (which do use numbers), linear programming is a popular method for solving complex problems related to sustainable supply chains

48. Mohamed Ben-Daya,Elkafi Hassini & Zied Bahroun (2017) - Internet of things and supply chain management: a literature review

This paper reviews what past research has said about how the Internet of Things (IoT) is changing supply chain management (SCM). It covers the basics of IoT in SCM, sorts the research into different categories, and shows what topics have been studied the most. The findings reveal that most studies have been more about explaining the concept of IoT's impact rather than diving into the details. They've mostly looked at delivery in supply chains, especially in the food and manufacturing industries. The paper also points out areas where more research is needed to make IoT work best in SCM.

49. A. Rajeev , Rupesh K. Pati , Sidhartha S. Padhi , Kannan Govindan (2017) - Evolution of sustainability in supply chain management: A literature review

This paper looks at how the increasing demand for products is affecting the environment and society through industrial production and supply chains. It discusses the growth of Sustainable Supply Chain Management (SSCM) and how it addresses these challenges. The study analyzes a large number of articles from 2000 to 2015 and proposes a framework to categorize sustainability issues. It finds that there's a need for more industry-specific studies, especially for industries that heavily pollute, and

more focus on measuring social impacts in supply chains. The paper suggests future research directions for SSCM while considering the triple bottom line perspective.

50.Christian F. Durach, Joakim Kembro Andreas Wieland (2017) - A New Paradigm for Systematic Literature Reviews in Supply Chain Management.

The traditional way of doing thorough research reviews (SLRs) has been very helpful in fields like medicine, but it hasn't been as useful in supply chain management. The reason is that supply chain research has some unique characteristics that need to be considered when we gather, select, and combine studies for a review. So, we're suggesting a new way to do these reviews in supply chain management that takes into account the special features of this field. This new approach looks at existing studies with a focus on things like the theory they use, what they study, where they get their data, and how they define and measure things. The goal is to improve or update the existing theories. This new way of doing things will help advance supply chain management research and make future reviews even better.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 METHODOLOGY

Research methods are the techniques and tools by which you research a subject or a topic. Research methodology involves the learning of various techniques to conduct research and acquiring knowledge to perform tests, experiments, surveys, and critical analysis.

Research methodology simply refers to the practical “how” of any given piece of research. It's about how a researcher systematically designs a study to ensure valid and reliable results that address the research aims and objectives.

3.2 RESEARCH DESIGN:

- Systematic framework data collection and analysis is adopted.
- Aim to reducing the miscommunication carried out between the supplier and the manufacturer.

- They well chosen by primary data was collected by interview method.

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with “A STUDY ON SUPPLY CHAIN MANAGEMNT WITH REFERENCE TO LN ENTERPRISES, SALEM “in procedure. This Research design applied for the study is ‘Descriptive Research’.

3.2.1 DESCRIPTIVE RESEARCH DESIGN :

Descriptive research aims to accurately and systematically describe a population, situation or phenomenon. It can answer what, where, when and how questions, but not why questions. A descriptive research design can use a wide variety of research methods to investigate one or more variables.

3.3 SAMPLING TECHIQUE

3.3.1 Non-probability sampling:

Non-probability sampling is defined as a sampling technique in which the researcher selects samples based on the subjective of the researcher rather than random selection.

3.3.2Convenience sampling:

A convenience sample is a type of non-probability sampling method where the sample is taken from a group of people easy to contact or to reach.

3.4 SOURCES OF DATA

In the pipe industry, various sources of data play pivotal roles in decision-making, design, production, marketing, and understanding consumer preferences, and Sources of Data begins with figuring out what sort of data is needed, followed by the collection of a sample from a certain section of the population. Next, you have to utilize a certain tool to gather the data from the chosen sample. The two types of sources of data are:

3.4.1 primary data:

The primary data for this study was collected through questionnaire.

3.4.2 secondary data:

Secondary data was collected from external sources like websites, journals etc.

3.5 STRUCTURE OF THE QUESTIONNAIRE:

Creating a comprehensive questionnaire for the pipe industry involves understanding the specific objectives of the research or data collection. However, here's a structured approach to designing a questionnaire that can be used to gather insights related to scm between the supplier and organization .

The structure of questionnaire used in this project is as follows.

3.6 SAMPLE SIZE

The sample size for the project had a target of 30 participants. The fixed target of the sampling size has been achieved as the total number of respondents for the survey questionnaire was 30. Total of 30 responses helped the project to analyze more response and it helped to derive a conclusion recording people's perception towards a study of satisfaction of employees how they consider it.

3.7 PERIOD OF STUDY:

This is one-time research where the research is conducted only for one-time and that the project is based on the responses derived from a definite period of time. The period of study for the project of about 30 days project is based on the responses collected from the 30 participants in the one month time period.

3.8 PROFILE AREA OF THE STUDY:

- My survey location is SALEM (SALEM DISTRICT)
- My survey targeted people is both Men and Women at the age group of (18-60)

3.9 HYPOTHESIS / ANAYTICAL TOOLS:

- CHI-SQUARE TEST:

A Chi-square Statistic Is One Way To Show A Relationship Between Two Categorical Variables. In Statistics, There Are Two Types Of Variables: Numerical (Countable) Variables And Non-numerical (Categorical) Variables.

Null Hypothesis (H0): There Is No Significant Difference In The Durability And Quality Of Rework Footwear Compared To Newly Manufactured Footwear.

Alternative Hypothesis (H1): Reworked Footwear Exhibits A Significant Improvement In Durability And Quality Compared To Newly Manufactured Footwear.

- **CORRELATION TEST**

Correlation test is used to evaluate the association between two or more variables. For instance, if we are interested to know whether there is a relationship between the heights of fathers and sons, a correlation coefficient can be calculated to answer this question.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

The following consist of the data analysis and interpretation of my questionnaire:

4.1 PERCENTAGE ANALYSIS:

Table No. 4.1:

Gender Of the Candidate

Options	No of respondent	Percentage
Male	17	56.7%
Female	13	43.3%
Total	30	100%

Interpretation:

From the above table, it is interpreted that 57 of respondents are of Male category and 43 of them belong to Female category. It is also to be noted that none of them have opted for the option others .

Chart No. 4.1

Gender
30 responses

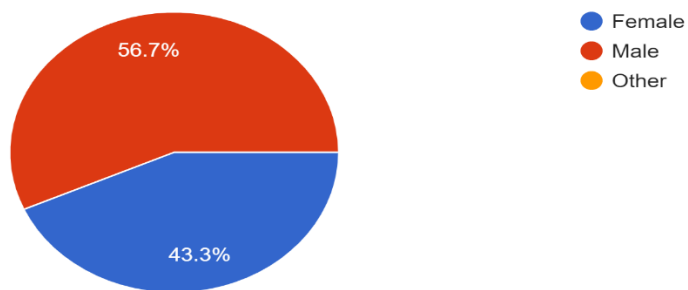


Table no 4.2

AGE

Options	No of responses	Percentage
18 – 25	7	23.3%
25- 35	9	30%
35-45	9	30%
Above 50	5	16.7%
Total	30	100%

Interpretation:

From the above table, it is interpreted that 23 of respondents are of age group of 18- 25 , 30 of them belong to age group 25-35 and 30 belong to the age group 35-45 and 17 belong to age group more then 50.

Chart no 4.2

Age
30 responses

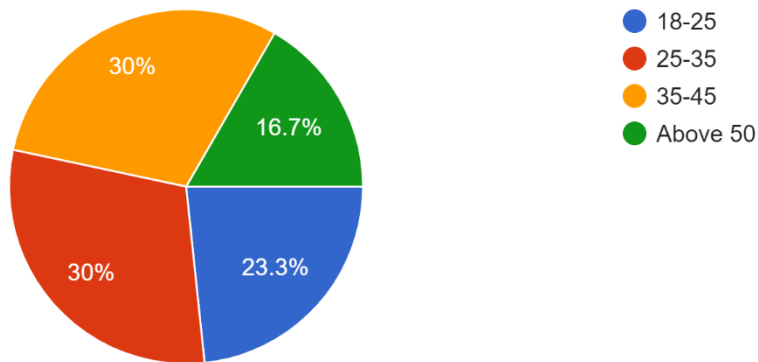


Table no. 4.3

Monthly income:

Options	No of responses	Percentage
Below (10,000)	0	0%
25,000-30,000	14	46.7%
40,000-50,000	11	36.7%
Above 50,000	5	16.7%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents are below (10000), 47 of respondents are 25000-30000, 37 of respondents are 40000-50000, 17 of the respondents are above 50000.

Chart no:4.3

Income level
30 responses

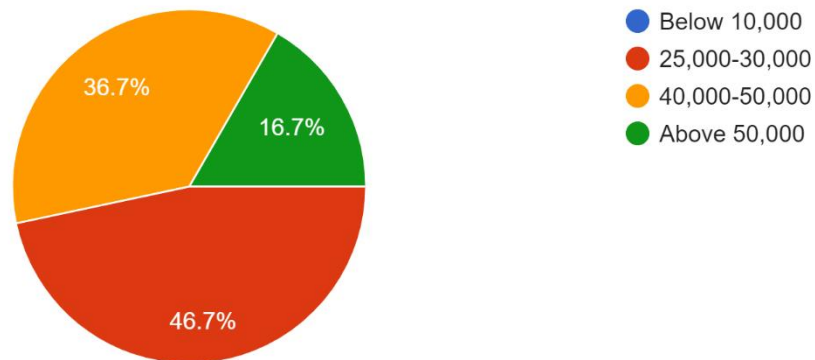


Table no. 4.4

Occupation:

Options	No of responses	Percentage
CEO	2	6.7%
Employee	14	46.7%
Driver	4	13.3%
Operator	2	6.7%
Helper	5	16.7%

Sales Executive	1	3.3%
Manager	2	6.7%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 7 of respondents are CEO , 47 of respondents are employees , 13 of respondents are drivers, 7 of respondents are operators, 17 of respondents are helpers, 3 of the respondents are sales executives, 7 of the respondents are managers.

Chart no:4.4

Occupation

30 responses

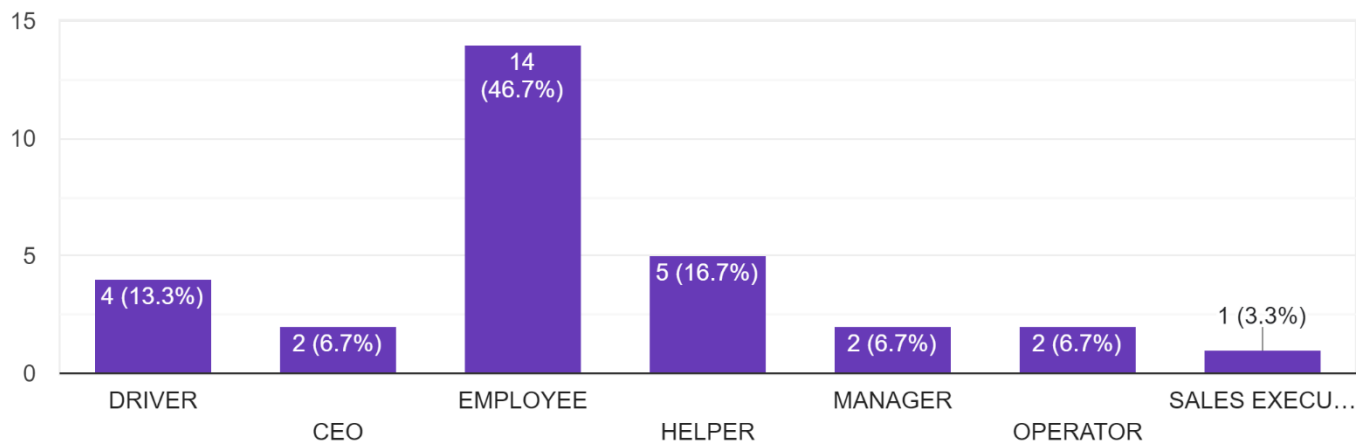


Table no. 4.5

Your organization rely on few dependable suppliers.

Options	No of responses	Percentage
Strongly Disagree	1	3.3%
Disagree	2	6.7%

Neutral	6	20%
Agree	16	53.3%
Strongly Agree	5	16.7%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 3 of respondents have strongly disagreed, 7 of respondents have disagreed, 20 of respondents are neutral, 53 of the respondents have agreed, 17 of respondents have strongly agreed.

Chart no.4.5

our organisation rely on few dependable suppliers.

30 responses

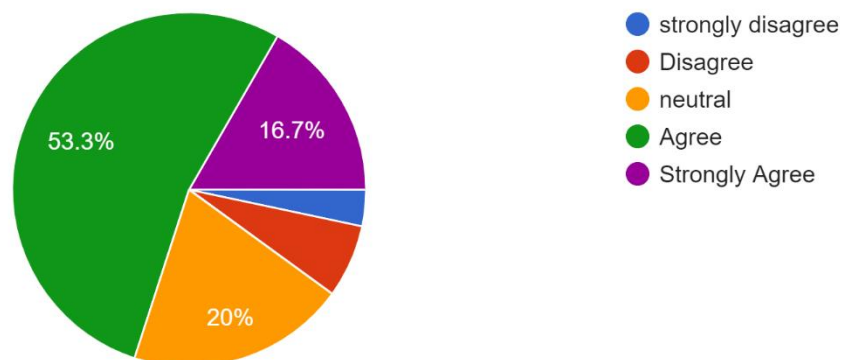


Table no. 4.6

your organization rely on few high quality suppliers.

Options	No of responses	Percentage
Strongly Disagree	0	0%
Disagree	0	0%
Neutral	11	36.7%
Agree	7	23.3%

Strongly Agree	12	40%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents have strongly disagreed, 0 of respondents have disagreed, 37 of respondents are neutral, 23 of the respondents have agreed, 40 of respondents have strongly agreed.

Chart no.4.6

our organisation rely on few high quality suppliers.
30 responses

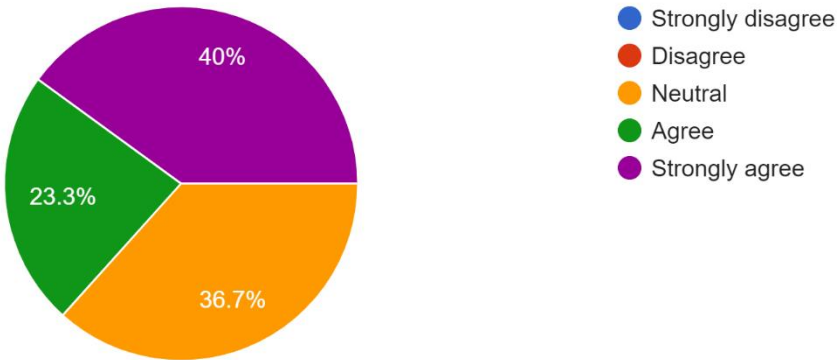


Table no. 4.7

your organization consider quality as number one criterion in selecting suppliers.

Options	No of responses	Percentage
Strongly Disagree	1	3.3%

Disagree	2	6.7%
Neutral	5	16.7%
Agree	12	40%
Strongly Agree	10	33.3%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 3 of respondents have strongly disagreed, 7 of respondents have disagreed, 17 of respondents are neutral, 40 of the respondents have agreed, 33 of respondents have strongly agreed.

Chart no.4.7

our organisation consider quality as number one criterion in selecting suppliers.

30 responses

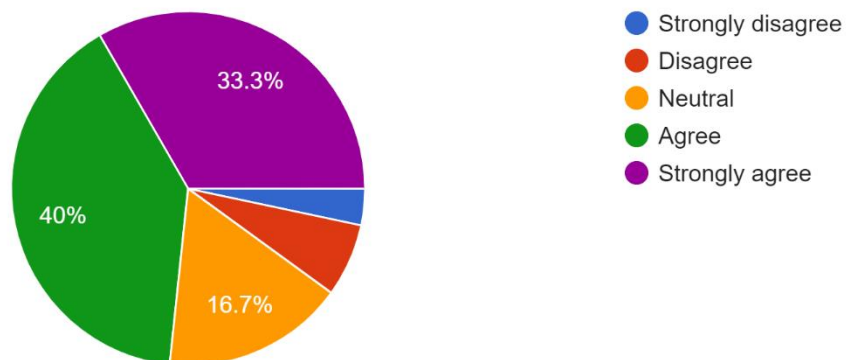


Table no. 4.8

your organization strive to establish long term relationship with its suppliers.

Options	No of responses	Percentage
Strongly Disagree	1	3.3%

Disagree	1	3.3%
Neutral	14	46.7%
Agree	10	33.3%
Strongly Agree	4	13.3%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 3 of respondents have strongly disagreed, 3 of respondents have disagreed, 47 of respondents are neutral, 33 of the respondents have agreed, 13 of respondents have strongly agreed.

Chart no.4.8

our organisation strive to establish long term relationship with its suppliers

30 responses

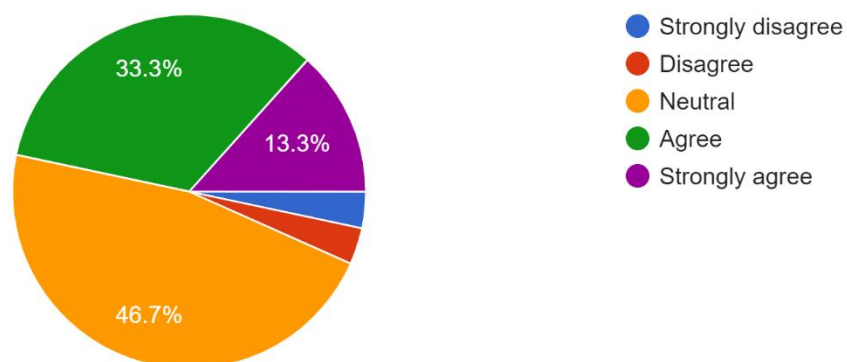


Table no. 4.9

your organization helps its suppliers to improve their product quality .

Options	No of responses	Percentage
Strongly Disagree	0	0%
Disagree	0	0%
Neutral	10	33.3%
Agree	13	43.3%
Strongly Agree	7	23.3%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents have strongly disagreed, 0 of respondents have disagreed, 33 of respondents are neutral, 43 of the respondents have agreed, 23 of respondents have strongly agreed.

Chart no.4.9

our organisation helps its suppliers to improve their product quality

30 responses

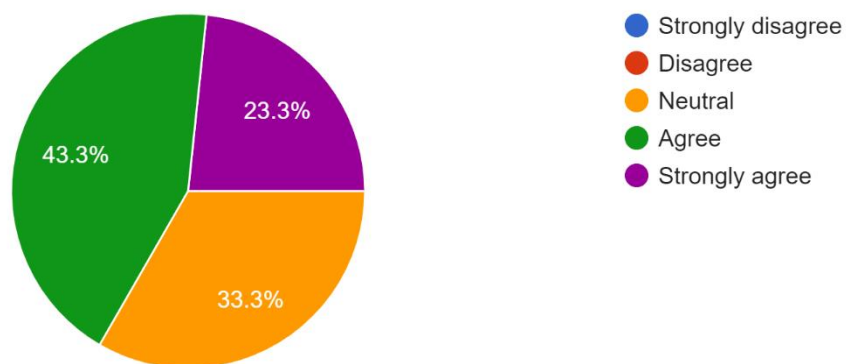


Table no. 4.10

your organization has continuous improvement programs that include its key activities .

Options	No of responses	Percentage
---------	-----------------	------------

Strongly Disagree	0	0%
Disagree	4	13.3%
Neutral	2	6.7%
Agree	17	56.7%
Strongly Agree	7	23.3%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents have strongly disagreed, 13 of respondents have disagreed, 7 of respondents are neutral, 57 of the respondents have agreed, 23 of respondents have strongly agreed.

Chart no.4.10

our organisation has continuous improvement programs that include its key activities
30 responses

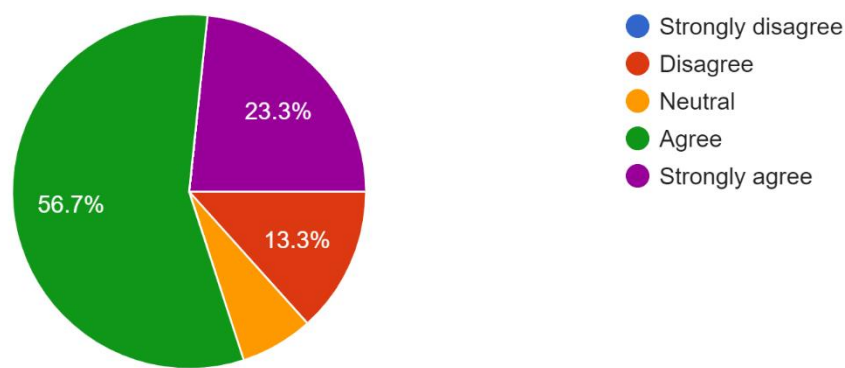


Table no. 4.11

your organization actively involves its key suppliers in new product development.

Options	No of responses	Percentage
Strongly Disagree	0	0%
Disagree	0	0%
Neutral	6	20%
Agree	13	43.3%
Strongly Agree	11	36.7%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents have strongly disagreed, 0 of respondents have disagreed, 20 of respondents are neutral, 43 of the respondents have agreed, 37 of respondents have strongly agreed.

Chart no.4.11

your organistaion actively involves its key suppliers in new product development
30 responses

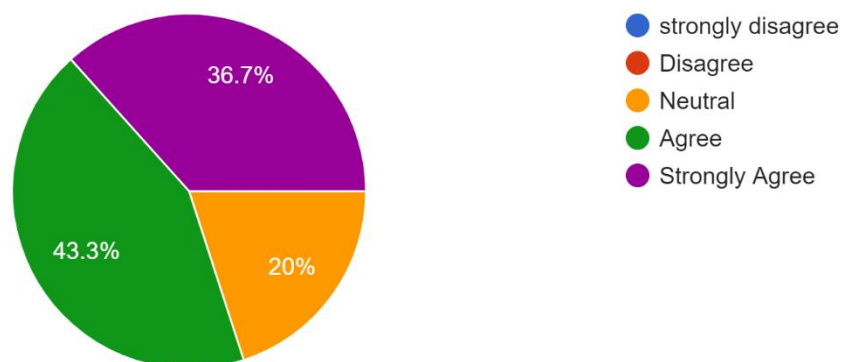


Table no. 4.12

your organization certifies its suppliers for quality.

Options	No of responses	Percentage
Strongly Disagree	0	0%
Disagree	1	3.3%
Neutral	7	23.3%
Agree	11	36.7%
Strongly Agree	11	36.7%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents have strongly disagreed, 3 of respondents have disagreed, 23 of respondents are neutral, 37 of the respondents have agreed, 37 of respondents have strongly agreed.

Chart no.4.12

your organisation certifies its suppliers for quality

30 responses

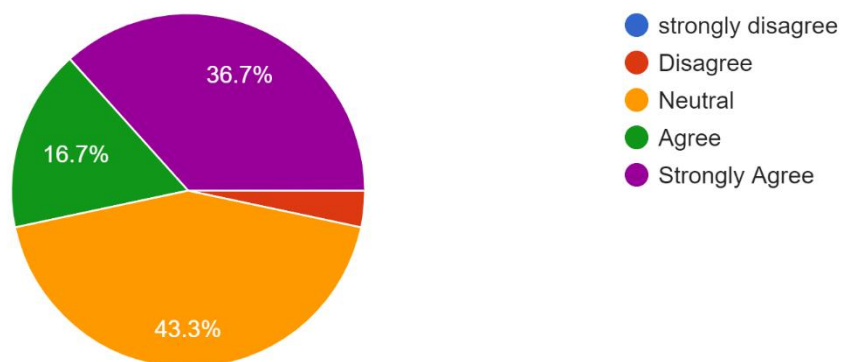


Table no. 4.13

your organization regularly solve problems jointly with its suppliers.

Options	No of responses	Percentage
Strongly Disagree	0	0%
Disagree	2	6.7%
Neutral	10	33.3%
Agree	15	50%
Strongly Agree	3	10%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents have strongly disagreed, 3 of respondents have disagreed, 10 of respondents are neutral, 15 of the respondents have agreed, 3 of respondents have strongly agreed.

Chart no.4.13

our organisation regularly solve problems jointly with its suppliers

30 responses

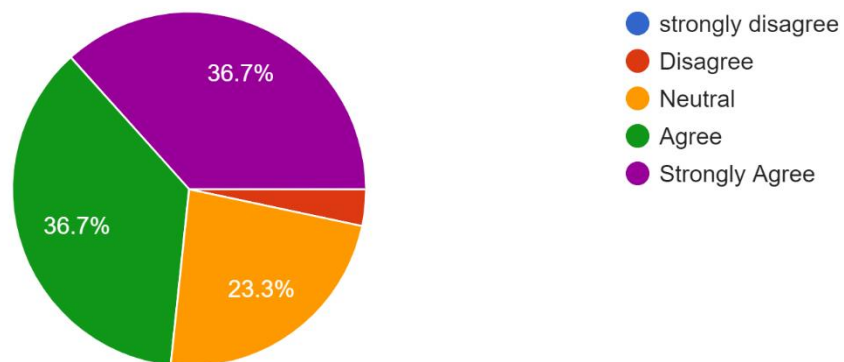


Table no. 4.14

your firms extend its supply chain beyond its customers / suppliers.

Options	No of responses	Percentage
Strongly Disagree	0	0%
Disagree	2	6.7%
Neutral	10	33.3%
Agree	15	50%
Strongly Agree	3	10%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents have strongly disagreed, 7 of respondents have disagreed, 33 of respondents are neutral, 50 of the respondents have agreed, 10 of respondents have strongly agreed.

Chart no.4.14

our firms extends its supply chain beyond its customers / suppliers

30 responses

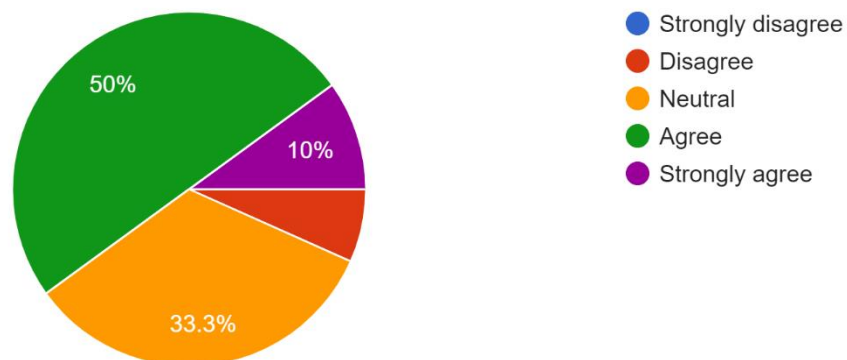


Table no. 4.15

your firm participates in the sourcing decision of its suppliers.

Options	No of responses	Percentage
Strongly Disagree	1	3.3%
Disagree	2	6.7%
Neutral	10	33.3%
Agree	10	33.3%
Strongly Agree	7	23.3%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 3 of respondents have strongly disagreed, 7 of respondents have disagreed, 33 of respondents are neutral, 33 of the respondents have agreed, 23 of respondents have strongly agreed.

Chart no.4.15

our firm participates in the sourcing decision of its suppliers

30 responses

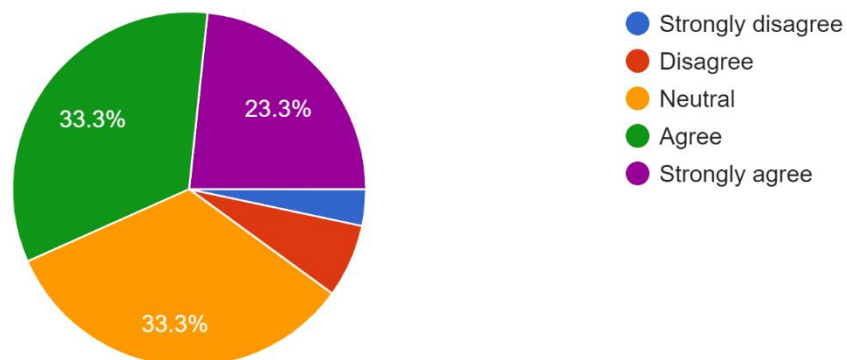


Table no. 4.16

sales.

Options	No of responses	Percentage
Very Poor	0	0%
Poor	2	6.7%
Average	7	23.3%
Good	15	50%
Excellent	6	20%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents as very poor, 7 of respondents as poor, 23 of respondents as average, 50 of the respondents as good 20 of respondents as excellent.

Chart no.4.16

sales
30 responses

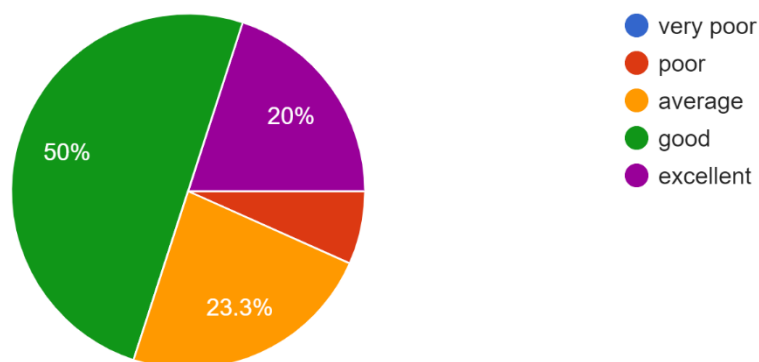


Table no. 4.17

order fill rate.

Options	No of responses	Percentage
Very Poor	0	0%
Poor	0	0%
Average	12	40%
Good	8	26.7%
Excellent	10	33.3%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents as very poor, 0 of respondents as poor, 40 of respondents as average, 27 of the respondents as good 33 of respondents as excellent.

Chart no.4.17

order fill rate
30 responses

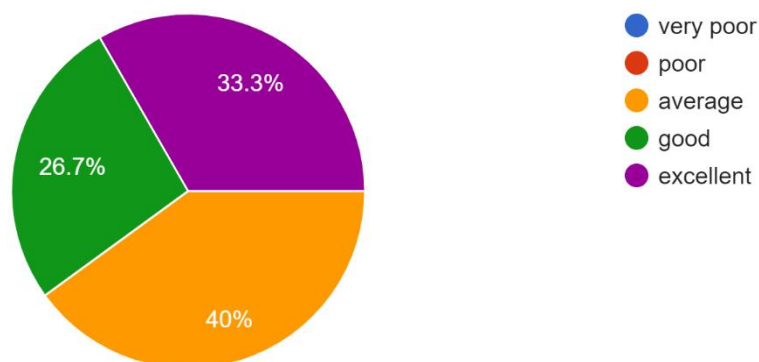


Table no. 4.18

on time deliveries.

Options	No of responses	Percentage
Very Poor	0	0%
Poor	0	0%
Average	3	10%
Good	16	53.3%
Excellent	11	36.7%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents as very poor, 0 of respondents as poor, 10 of respondents as average, 53 of the respondents as good 37 of respondents as excellent.

Chart no.4.18

on time deliveries
30 responses

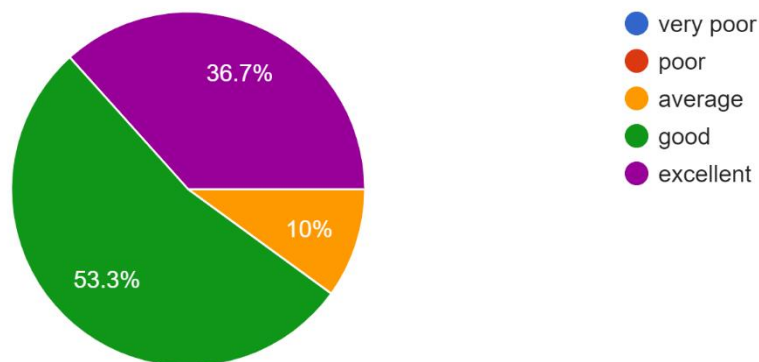


Table no. 4.19

customer complaints.

Options	No of responses	Percentage
Very Poor	8	26.7%
Poor	8	26.7%
Average	4	13.3%
Good	5	16.7%
Excellent	5	16.7%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 27 of respondents as very poor, 27 of respondents as poor, 13 of respondents as average, 17 of the respondents as good 17 of respondents as excellent.

Chart no.4.19

customer complaints
30 responses

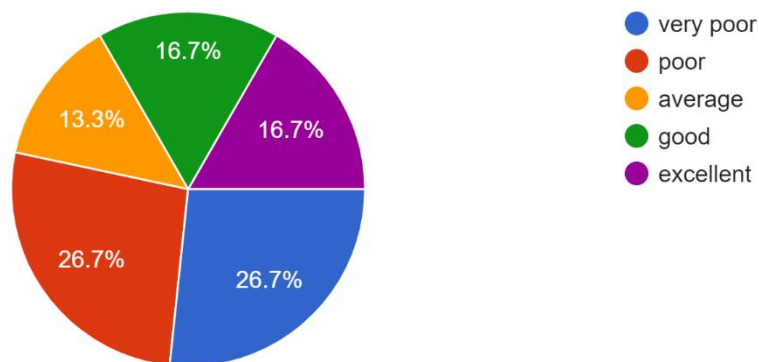


Table no. 4.20

manufacturing lead time .

Options	No of responses	Percentage
Very Poor	0	0%
Poor	2	6.7%
Average	10	33.3%
Good	15	50%
Excellent	3	10%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 0 of respondents as very poor, 7 of respondents as poor, 33 of respondents as average, 50 of the respondents as good 10 of respondents as excellent.

Chart no.4.20

manufacturing lead time

30 responses

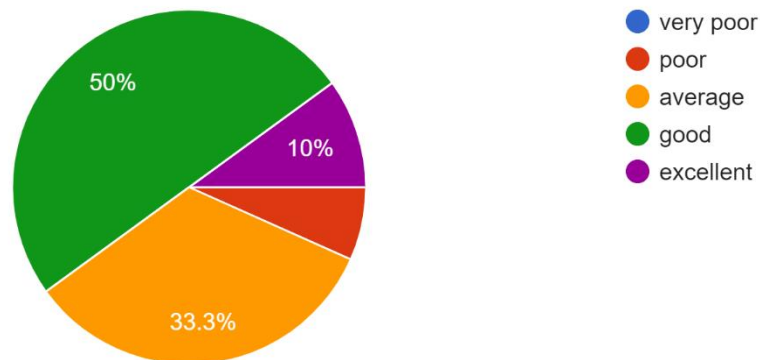


Table no. 4.21

customer response time .

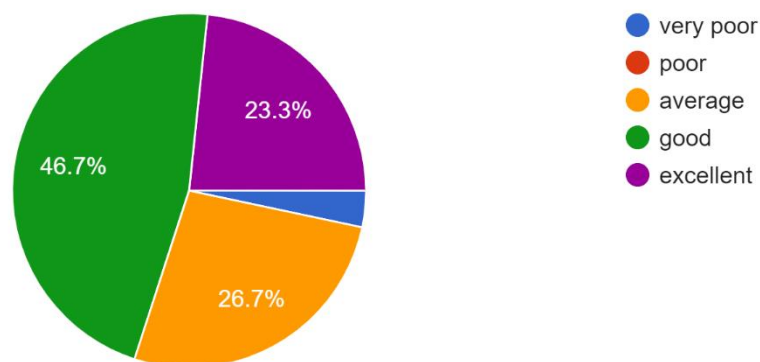
Options	No of responses	Percentage
Very Poor	1	3.3%
Poor	0	0%
Average	8	26.7%
Good	14	46.7%
Excellent	7	23.3%
Total	30	100%

Interpretation:

From the above table, it can be interpreted that out of the option given 3 of respondents as very poor, 0 of respondents as poor, 27 of respondents as average, 47 of the respondents as good 23 of respondents as excellent.

Chart no.4.21

customer response time
30 responses



4.2 STATISTICAL ANALYSIS:

Test 1 (chi-square)

H0: there is no significant difference between the age and our organization helps its suppliers to improve their product quality.

H1: there is a significant difference between the age and our organization helps its suppliers to improve their product quality.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Age * our organization helps its suppliers to improve their product quality	29	100.0%	0	0.0%	29	100.0%

Age * our organization helps its suppliers to improve their product quality Crosstabulation

			our organization helps its suppliers to improve their product quality			Total
			Agree	Neutral	Strongly agree	
Age	18-25	Count	2	3	2	7
		Expected Count	3.1	2.4	1.4	7.0
	25-35	Count	4	4	1	9
		Expected Count	4.0	3.1	1.9	9.0
	35-45	Count	4	3	1	8
		Expected Count	3.6	2.8	1.7	8.0
	Above 50	Count	3	0	2	5
		Expected Count	2.2	1.7	1.0	5.0
	Total	Count	13	10	6	29
		Expected Count	13.0	10.0	6.0	29.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.634 ^a	6	.592
Likelihood Ratio	6.267	6	.394
N of Valid Cases	29		

a. 12 cells (100.0%) have expected count less than 5. The minimum expected count is 1.03.

Interpretation

The p value is 0.592 is higher than the chosen significant level (0.05) hence null hypothesis (H0) is accepted , it suggests that there isn't to reject the alternative hypothesis (H1).

Inference

There is no significant difference between the age and our organization helps its suppliers to improve their product quality.

TEST 2 (CORRELATION)

Correlations			
		our organization rely on few high quality suppliers.	our organization consider quality as number one criterion in selecting suppliers.
our organization rely on few high quality suppliers.	Pearson Correlation	1	-.045
	Sig. (2-tailed)		.818
	N	29	29
our organization consider quality as number one criterion in selecting suppliers.	Pearson Correlation	-.045	1
	Sig. (2-tailed)	.818	
	N	29	29

Interpretation

The p value is -0.045 is higher than the chosen significant level (0.05) hence alternative hypothesis (H1) is accepted , it suggests that there isn't to reject the null hypothesis (H0).

Inference

There is significant difference between the quality and selection of suppliers

CHAPTER 5 FINDINGS AND SUGGESTIONS

Based on the analysis and discussion on primary data in the previous chapter.

Finding, Suggestions, and Conclusion of the study in logical manner.

5.1 FINDINGS

From the questionnaire, the following points are found and noted:

- Most (56.7%) of the respondents of my questionnaire have responded as male.

- Most (30%) of the respondents of my questionnaire have responded as age between 25-35 & 35-45.
- Most (46.7%) of the respondents of my questionnaire have responded as monthly income of 25,000-30,000.
- Most (46.7%) of the respondents of my questionnaire have responded as employee as occupation.
- Most (53.3%) of the respondents of my questionnaire have responded as agree.
- Most (40%) of the respondents of my questionnaire have responded as strongly agree.
- Most (40%) of the respondents of my questionnaire have responded as agree.
- Most (46.7%) of the respondents of my questionnaire have responded as neutral.
- Most (43.3%) of the respondents of my questionnaire have responded as agree.
- Most (56.7%) of the respondents of my questionnaire have responded as agree.
- Most (43.3%) of the respondents of my questionnaire have responded as agree.
- Most (43.3%) of the respondents of my questionnaire have responded as neutral.
- Most (36.7%) of the respondents of my questionnaire have responded as agree & strongly agree.
- Most (50%) of the respondents of my questionnaire have responded as agree.
- Most (50%) of the respondents of my questionnaire have responded as agree.
- Most (33.3%) of the respondents of my questionnaire have responded as agree & strongly agree.
- Most (50%) of the respondents of my questionnaire have responded as good.
- Most (40%) of the respondents of my questionnaire have responded as average.
- Most (53.3%) of the respondents of my questionnaire have responded as good.
- Most (26.7%) of the respondents of my questionnaire have responded as very poor and poor.
- Most (50%) of the respondents of my questionnaire have responded as good.
- Most (46.7%) of the respondents of my questionnaire have responded as good.

5.2 SUGGESTIONS:

Here are suggestions for addressing the challenges mentioned in the context of PVC pipe production:

- **Raw Material Costs and Availability:**

Diversify Suppliers: Work with multiple suppliers to reduce dependency and mitigate risks associated with fluctuations in raw material costs.

Long-Term Contracts: Establish long-term contracts with key suppliers to secure stable pricing and ensure a steady supply of raw materials.

➤ **Environmental Regulations:**

Invest in Sustainability: Proactively invest in sustainable practices and materials to align with environmental regulations and consumer preferences.

Regulatory Compliance Teams: Form dedicated teams to monitor and ensure compliance with evolving environmental regulations.

➤ **Quality Control:**

Regular Audits: Conduct regular audits of manufacturing processes and raw materials to maintain and improve product quality.

Supplier Collaboration: Collaborate closely with suppliers to ensure consistent quality standards in raw materials.

➤ **Market Demand Fluctuations:**

Demand Forecasting: Implement robust demand forecasting methods to anticipate market fluctuations and adjust production schedules accordingly.

Agile Manufacturing: Adopt agile manufacturing practices to quickly respond to changes in demand.

➤ **Competition and Price Pressures:**

Differentiation: Differentiate products through innovation, quality, or additional services to minimize the impact of price pressures.

Cost Optimization: Continuously optimize internal processes to maintain competitiveness without compromising on quality.

➤ **Supply Chain Disruptions:**

Diversified Supply Chain: Develop a diversified supply chain strategy to reduce vulnerabilities to disruptions in any single area.

Risk Mitigation Plans: Establish contingency plans for potential supply chain disruptions, including alternative suppliers and logistical routes.

➤ **Technological Advancements:**

Continuous Training: Invest in continuous training for staff to keep them updated on the latest technological advancements in PVC pipe production.

Research and Development: Allocate resources for ongoing research and development to integrate cutting-edge technologies into the manufacturing process.

➤ **Energy Costs:**

Energy Efficiency Measures: Implement energy-efficient technologies and practices to reduce overall energy consumption.

Renewable Energy Sources: Explore the possibility of incorporating renewable energy sources to mitigate the impact of energy price fluctuations.

➤ **Global Economic Conditions:**

Diversified Market Presence: Diversify market presence to reduce reliance on specific regions or economic conditions.

Flexible Production: Build flexibility into production processes to quickly adapt to changes in global economic conditions.

➤ **Waste Management and Sustainability:**

Recycling Programs: Develop and implement recycling programs for PVC materials to address environmental concerns.

Collaboration with Suppliers: Work closely with suppliers to source recycled materials and explore sustainable alternatives.

➤ **Regulatory Compliance:**

Continuous Monitoring: Establish a robust system for continuous monitoring of regulatory changes to ensure timely compliance.

Legal Advisory: Work with legal advisors to stay informed about regulatory developments and implications.

5.3 CONCLUSION

In conclusion, this thorough analysis underscores the critical role of supply chain management in the success of the PVC manufacturing company. The report has systematically examined each phase of the supply chain, from raw material procurement to distribution logistics, shedding light on key aspects that impact efficiency and competitiveness.

The sourcing phase emphasized the importance of efficient procurement strategies and strong supplier relationships, particularly for critical raw materials, while also underscoring the significance of stringent quality control measures. The exploration of manufacturing optimization showcased the integration of advanced processes and technology to enhance efficiency in polymerization, blending, and extrusion.

Post-production analysis revealed the company's adeptness in inventory management, particularly in achieving a delicate balance through JIT principles, demand forecasting, and the utilization of advanced tracking systems. The examination of the distribution phase highlighted the importance of

well-defined transportation strategies, effective warehousing practices, and meticulous order fulfillment processes.

Supplier relationships and risk management emerged as paramount considerations throughout the supply chain. The investigation into the company's strategies for mitigating disruptions and ensuring business continuity underscored the proactive measures taken to navigate challenges in a dynamic market environment.

The report's overarching goal is to identify strengths and areas for improvement, providing a holistic view that contributes valuable insights for the continuous enhancement of supply chain management. By optimizing procurement, manufacturing, distribution, and risk management processes, the company is poised to thrive in the face of market uncertainties. The report serves as a strategic guide for sustained success, emphasizing the importance of adaptability, technology integration, and strong partnerships across the supply chain. Through ongoing refinement and innovation, the PVC manufacturing company can maintain a competitive edge and navigate the complexities of the market landscape effectively

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APPENDIX

A STUDY ON SUPPLY CHAIN BETWEEN THE SUPPLIERS AND MANUFACTURERS