“A Study On Fabric Production at Krishna Textile, Kadegaon”

Project Report Submitted to

Chhatrapati Shahu Institute of Business Education & Research

(An Autonomous Institute)

As a Partial Fulfillment for the Award of Degree of

Master of Business Administration

By

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(An Autonomous Institute)

Kolhapur

(2023-2024)

DECLARATION

I, the undersigned, hereby declare that the project report entitled "**A Study On Fabric Production at Krishna Textile, Kadegaon",** written and submitted by me as a partial fulfillment for the award of degree of Master of Business Administration under the guidance of **Dr. R. S. KAMAT Mam** is my original work.

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CERTIFICATE

This is to certify that the project report entitled **“A Study On Fabric Production at Krishna Textile, Kadegaon"** is a bonafied work prepared by **Ms**. **Rohini Dnyandev Khot** as a partial fulfillment for the award of degree of Master of Business Administration, submitted to Chhatrapati Shahu Institute of Business Education & Research (CSIBER), Kolhapur, has been completed under my supervision and guidance.

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Place: Kolhapur. **(Dr. R. S. KAMAT)**

Acknowledgement

It is indeed a pleasure to acknowledge the contribution of those who have helped me in carrying out this project report successfully.

My heart-felt thanks goes to my project guide **Dr. R. S. Kamat** for his scholarly guidance and inputs to make this report in a logical order during the project period. I would like to thank all my teachers for all the help and suggestions extended in this regard.

I sincerely thank the Managing Trustee **Prof. Dr. R. A. Shinde, CSIBER, Dr. S. P. Rath, Director, CSIBER, and Mrs. Madhura K. Mane, Dean-School of Business**, **CSIBER** for providing all the facilities and help to carrying-out the project successfully.

I would like to take this opportunity to convey my humble gratitude and thanks to **Mr. Abhinandan Kate** for his timely support and guidance, the management, officers, and the staff of **"Krishna Textile, Kadegaon".** Finally, I acknowledge the help and support given by my family members and friends during the course of study.

Miss. Rohini Dnyandev Khot.

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CHAPTER I

INTRODUCTION AND RESEARCH METHODOLOGY

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INTRODUCTION AND RESEARCH METHODOLOGY

1.1. Introduction:

Production management is a key aspect of any manufacturing or service oriented organization. It involves planning, organizing, directing and controlling the production process to make efficient use of resources and achieve the objectives of the organization.

Production management is the process of managing a company's operations to provide the services and products it wants to produce. It involves organizing, executing and managing the processes that transform raw resources into finished products and services. The manufacturing process at Textile Industry Innovations involves the systematic transformation of raw fibers into high-quality shirts. It includes spinning, weaving, dyeing and quality assurance to deliver exceptional textile products. Production management is the process of managing production inputs (raw materials, capital and labor) in order to produce outputs (finished products).

A textile fabric can be defined as a flexible assembly of fibers or yarns, either natural or man-made. It can be made by a number of techniques, the most common of which are weaving, knitting, splicing, felting or tufting. Classic fabrics (woven, knitted) are produced by first turning the fibers into yarn and then turning the yarn into fabric. Fabrics can also be made directly from the fibers. Such fabrics are called non-woven fabrics. Each of these methods is capable of producing a large number of fabric structures depending on the raw material, machinery and process used. These fabrics are used for a wide range of applications from apparel to technical purposes.

Consequently, it can be stated that product management is concerned with the acquisition of resources such as managerial inputs, natural resources, manpower, capital, machinery, etc., to create or manufacture finished goods. Production control is the process between these two control points. Production control is the control and execution of the process that transforms raw materials into finished products.

The choice of suitable production processes for a certain product also becomes decisive. It is necessary to make decisions about the best type of machinery and technology, the necessary capital expenditure and other issues. Planning is necessary before production. The amount of output, order of operation control and other options are planned. It is necessary to maintain high standards. We also incorporate modern technologies into our machines to optimize energy consumption and reduce waste, contributing to a more sustainable production process.

We are aware of the fact that utility is the desire-satisfying force of any commodity or service. Obviously, countries that have a high level of production accompanied by the production of a wide variety of goods are called golden economies. In the light of the above facts, we can conclude that production is the process of working on natural resources and promoting or creating their benefits in order to satisfy the wants of consumers.

Production management is important because it reduces costs when done efficiently, meaning that processes maximize resources to improve a business' competitiveness in the marketplace. This helps companies produce high-quality products that are delivered on time to meet business goals, thereby enhancing the company's reputation.

➢ History of Textile Industry in India

In the history of India’s industrial development, the Indian textile industry has a great heritage. India’s textile industry was enlarged and developed at a very early stage and its production technology was amongst the best. India is one of the largest manufacturer of the textiles, before the colonization India’s manually operated textile equipment’s were best in the world and after agriculture second in the world. So, it’s the pillar of Indian economy.

In textiles, there is huge employment for both skilled and unskilled labour. In textile manmade fiber, cotton, handloom, woolen, silk etc are included. Since ancient time, India has been making cotton cloth. From India to Europe, in 1725 approximately 300 lakhs meter cloth was being exported. In the Indus valley, authentication of cotton textiles industry at Mohanjo-Daro in the Indus Valley.

An important factor of India's exports have been historically formed by textiles. Followed by Dutch and French equivalents, the fast dyed multi-colored Indian prints on cotton in Europe led to the evolution of London East India Company in 1600. Merely by the British manufacturer, by 1880, the domestic market had grown to be serviced. Duty

were kept out of British market. To ban the imports of these cottons from India, by the late 1600's there was profuse demand from government.

The heritage of the Indian textile industry originated from its wealth in natural resources silk, cotton and jute. The technology used was great and the skills of the craftsman gave the finished product a most beautiful and ethnic look. In the 19th century introduction of steam-powered mills and mechanized looms led to the establishment of large-scale textile factories, primarily in regions like Mumbai, Ahmedabad, and Kolkata.

The Indian textile industry continues to evolve, facing challenges such as global competition, changing consumer preferences, and environmental concerns. Sustainable practices, technological innovation, and value addition in the textile value chain are becoming key focus areas for the industry.

Throughout the centuries, the Indian textile industry has been a dynamic force, adapting to changing economic, technological, and social landscapes while preserving its rich cultural heritage.

1.2. Statement of Problem:

Research has selected the topic for study as "**A Study On Fabric Production at Krishna Textile**".

1.3. Objectives of Study:

- To understand the concept of production process.
- To Study the steps involved in Fabric Production.
- To Evaluate the utilization of resources and materials
- To study the production efficiency in the company.
- To develop a dashboard using data visualization tools.

1.4. Scope of Study:

Studies include decision making on product design, manufacturing, resource alloc ation, production planning, control and scheduling. A good production schedule ensures that t he product is produced on time, in quantity and using appropriate resources. The goal of prod uction management is to maximize the efficiency of the organization while reducing costs an d increasing efficiency.

- Optimizing processes.
- Understanding Resource allocation
- Quality controlling
- Identifying Workforce efficiency
- Ensure effective and efficient manufacturing operations.

1.5. Research methodology:

For working in operation and production department for about two months gave a clear notion about the activities done in that department. Working with other departments as well as discussion with staff of those departments provides a lot of information.

1.5.1. Research Design:

Designing a research study for the production process involves careful planning to gather relevant data and insights into the efficiency, effectiveness, and improvement opportunities within the production system.

This research design provides a raw material measurement for investigating and improving the production process, incorporating both quantitative and qualitative methods to ensure a comprehensive understanding of the factors at play. Adjustments can be made based on the specific context and requirements of the organization.

1.5.2 Sources of data collection:

a) Primary Data:

It is the first-hand experience data is collected by researcher through individual observation visiting manager cabin, and different types of departments. Primary data has been collected through the observation and discussion made with Production manager

- Observation
- Personal Interview

b) Secondary Data:

Secondary data refers to information that has been collected, processed, and published by someone other than the primary user. Common sources of secondary data are information collected by government department, organizational records and data that was originally collected for other research purpose. Secondary data can be a valuable resource for researchers, providing a wealth of information from various sources.

Secondary data analysis can save time that would otherwise be spent collecting data and, particularly in the case of quantitative data, can provide larger and higher-quality databases that would be unfeasible for any individual researcher to collect on their own. Secondary Data is taken from Krishna Textile Records.

- Data is taken from year 2017 To 2022.

c) Tool used:

- **Power BI:**

A Power BI dashboard is a single page, often called a canvas, that uses visualizations to tell a story. Because it's limited to one page, a well-designed dashboard contains only the most important elements of that story. Creating a production analysis dashboard involves defining objectives, selecting relevant metrics, collecting accurate data, designing an intuitive layout with visualizations, using Power BI tool.

d) Sample Year:

Sampling is a process in statistical analysis where researchers take a predetermined number of observations from a larger population. Sampling allows researchers to conduct studies about a large group by using a small portion of the population. The method of sampling depends on the type of analysis being performed

1. 2017-18
2. 2018-19
3. 2019-20
4. 2020-21
5. 2021-22.

1.6. Limitation of the study:

- **Technical Complexity:** Understanding intricate production processes often requires expertise in various disciplines such as engineering, chemistry, and management

- **Data Availability**: Challenges in accessing real-world production data for analysis and research due to proprietary constraints or lack of transparency

- **Industry Dynamics:** Production systems are influenced by market trends, technology advancements, and regulatory changes, making it challenging to keep study materials up-to-date**.**

- **Interdisciplinary Nature:** Effective production study often requires knowledge integration across multiple fields, which can be demanding for students and researchers.

1.7. Chapter Schemes:

The research student has categorized the present study under the five respective chapters. They are

Chapter I - Introduction and Research Methodology

In this chapter the research student has covered all the introductory details of the study i.e. statement of the problem, objectives of the study, scope of the study, research design, data collection and limitations of the study etc.

Chapter II - Company Profile

In this chapter researcher has covered all the organizational related aspects. It includes introduction and history of the organization, organization structures, objectives, mission, vision, Activities, product profile, COVID-19 impact on industry, etc.

Chapter III - Theoretical Background of the Subjects

In this chapter the research student has cleared all the conceptual details of Production management i.e. Production Management, Objectives, Scope, Advantages, Disadvantages, 5M in production Management, Production System, Types, Production planning, controlling, Scheduling, and Quality Control.

Chapter IV - Data Analysis and Interpretation

In this chapter the research student has analyzed all the collected data facts and figures with the help of selected statistical tools i.e. Excel and another tool for visualization of data i.e. Power BI.

CHAPTER II

COMPANY PROFILE

CHAPTER II

COMPANY PROFILE

2.1. Introduction:

Name	: M/S Krishna Textile Kadegaon.
Founder	: Milind Kumar Mali.
Type	: Proprietorship
Location	: Weavers Park, Phase II, Shivaji nagar Industrial Area Kadegaon MIDC, Kadegaon
Software Used	**:** Ample system
Size of Factory	**:** Plot area: - 33.70 square meter. Main factory building: -1300 square meter Garden area: -700 square meter Gap road to factory:-100 meter

Total Manpower	: Sixty (60)
Machinery	: 25 Machineries
Working Time	: 24/7 Hours in 3 shifts (each shift contains 8 hours)
Production Capacity	**:** 3500 m/day
Items Produced	**:** Fabric
Fabric Brands	: Raymond luxury Cotton, Premium
Physical Infrastructure	• Administrative office. • Account Department. • Production Department. ✓ Weaving section. • Quality Control Section. ✓ Quality testing(Sample) ✓ Quality checking (Fabric Produced) • Humidity maintainance. • Canteen. • Rooms for the workers. • Security Cabin. • Parking.

2.2. History of Organization:

The founder of Krishna textile industry is Mr. Millind Kumar Mali. Since 2012, Krishna textile, Kadegaon has been thriving to bring maximum excellence in its products. Krishna textile industry is well aware of the expectation of the international customer and has realized the place of quality deeply.

Krishna Textiles is old Proprietorship Firm incorporated on 23-May-2012, having its registered office located at Plot No. E-92, Weavers Park Phase II, Shivaji Nagar, Industrial Area, Kadegaon M.I.D.C., Kadegaon, Maharashtra

This industry is one which export Raymond cloth and they export the product to Kagal M.I.D.C kolhapur. Raymond fabric is extensively industrial application like suiting and shirting etc. Krishna textile industry is a reputed manufacturer-exporter of wide range of Raymond, since 2013. Minimum shuttle less loom for Raymond fabric in weight (s) ranging from 30 kg to 70kg and width (s) from 1500m to 3000m.

The major activity of Krishna Textiles is Manufacturing, Sub-classified into Manufacture of textiles and is primarily engaged in the Weaving. In the dynamic landscape of the textile industry, small and medium-sized enterprises, particularly proprietorship firms, play a vital role in contributing to local economies.

Krishna textile industry kadegaon is a public ltd company. Krishna textile industry is the manufacturer and exporter of Raymond cloth.

➢ VISION, MISSION AND GOALS:

Vision, mission, and goals are fundamental elements that guide an organization, providing a sense of direction and purpose.

Vision:

1. Testing of cotton and product and raw material as per quality standards.
2. To ensure consumer rating of our yarn as IS with regard to loom efficiency wrapping performance and fabric appearance.

Mission:

1. Care for our employee.
2. We are committed to provide remunerative price and essential inputs to cloth producer.
3. Serve quality product.
4. We will strive for growth in our net worth.

Goals:

1. To find out importance key future and play important role in export business.
2. To make profitable business in the changing scenario.
3. To developing new fabric and manufacturing technology.

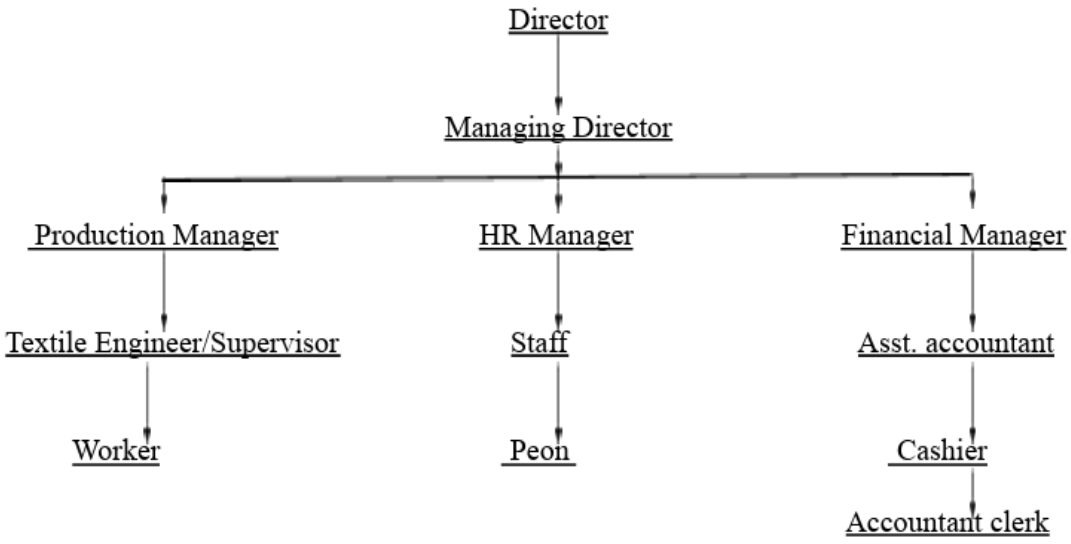
2.3. Activities /Products of the company:

➢ **Activities**:

- **Weaving**: Interlacing yarns at right angles to create woven fabrics such as cotton.
- **Dyeing**: Applying colour and to fabrics.
- **Supply Chain Management:** Managing the flow of materials, information, and products throughout the fabric manufacturing process, including sourcing raw materials, production planning, and distribution.

➢ **Product**: They are actually producing fabric which is not passed through Finishing process. They produce Raymond and Premium Fabric.

2.4. Organization Structure:



2.5 COVID-19 Impact on Industry

The COVID-19 pandemic significantly impacted the textile industry by causing supply chain disruptions, production slowdowns, and shifts in consumer demand. Lockdowns led to factory closures and reduced capacities, Deficiency in raw material, affecting global supply chains. Changes in consumer behaviour and economic uncertainties influenced demand patterns, with a rise in home textiles and a decline in fashion products. The industry adapted by adopting health and safety measures, embracing technology, and exploring sustainable and local production. Overall, the pandemic prompted the textile sector to rethink and innovate in response to unprecedented challenges.

CHAPTER-III
REVIEW OF LITERATURE

CHAPTER-III
REVIEW OF LITERATURE

3.1. Introduction:

The review of literature serves as a comprehensive exploration and synthesis of existing research and scholarly works relevant to the subject matter, providing valuable insights, identifying gaps, and laying the foundation for further inquiry.

3.2. Review of Literature:

A review of literature is an essential component of academic research, wherein existing scholarly works, such as books, journal articles, conference papers, and other sources, relevant to the research topic are critically analyzed, synthesized, and evaluated. It aims to provide a comprehensive understanding of the current state of knowledge on the subject, identify gaps or inconsistencies in existing literature, and offer insights for further research or practical applications.

3.2.1. STEPHEN F. SMITH, (1992): This paper reviews the integration of AI into production management, discussing challenges, opportunities, and various approaches such as rule-based, simulation-based, and fuzzy scheduling. It explores integrating different methods, multi-level management, distributed systems, and automated learning. The paper concludes by assessing current and future prospects while acknowledging existing challenges.

3.2.2. Emrah Alkaya,(2014), This research demonstrates the successful implementation of sustainable production measures in a Turkish woven fabric manufacturing mill, resulting in significant reductions in water and energy consumption, wastewater generation, greenhouse gas emissions, and salt consumption. The study showcases tangible environmental and economic benefits, with a short payback period of approximately 1.5 months. By adopting these measures, the Turkish textile industry can enhance its competitive position in the global market while promoting environmentally responsible practices.

3.2.3. Mantesh Basappa Khot, K.S. Sridhar, D. Sethuram, (2023), This article examines recent research (2015-2021) on recycling textile waste for use as reinforcement in composite manufacturing. It emphasizes the economic and environmental significance of the textile industry and discusses various recycling techniques, barriers, and potential applications in thermoplastic and thermosetting matrices. The review concludes by highlighting the need for continued research to advance engineering solutions and meet sustainability goals.

3.2.4. Esra Enes, Şölen Kipöz, (2020), This study addresses the cut-and-sew waste problem in fashion production, which stems from inefficient fabric usage during conventional pattern cutting. With fabric being a significant portion of garment costs, reducing waste is both economically and environmentally important. The research focuses on minimizing this waste at the marker planning stage to enhance fabric efficiency and decrease costs. Through a case study on summer dress marker plans, various fabric factors like width and type are compared to identify the most efficient options. By aiming to bridge the gap between academia and the fashion industry, the study seeks to offer practical solutions for reducing cut-and-sew waste in garment manufacturing.

3.2.5. M.R. Rotab Khan, (1999), The paper introduces TEXSIM, a user-friendly software for simulating weaving production systems without programming expertise. It simplifies simulation model building and analysis, making it accessible to textile managers without simulation background. By leveraging WITNESS, it enables quick creation of simulation models and produces results for understanding system behavior and improving productivity. TEXSIM's simplicity and practicality offer a valuable tool for weaving factories to enhance manufacturing efficiency through simulation-based management analysis and production scheduling.

3.2.6. Richard J. Schonberger (2007), The article examines the evolution and impact of Japanese Production Management (JPM) on operations management. It delves into how JPM's key elements spread globally and influenced practices. While highlighting its evolution and contributions, the article also questions JPM's sustainability amidst contemporary challenges. Utilizing longitudinal research, it provides insights into JPM's diffusion and uneven outcomes. Overall, the article offers a nuanced perspective on JPM's past, present, and future in operations management. It stimulates further research and discussion on the ongoing relevance and viability of JPM in today's rapidly evolving business landscape.

3.2.7. Fadi Shrouf (2015), The article offers a timely exploration of the intersection between green manufacturing and the Internet of Things (IoT), acknowledging the growing importance of energy efficiency in today's manufacturing landscape. By leveraging smart sensors and meters, IoT technology enables real-time monitoring of energy consumption at the machine and production line levels, facilitating data-driven decision-making to improve energy efficiency. Through a comprehensive literature review and expert insights, the paper sheds light on energy-efficient production management practices enhanced by IoT technology. It emphasizes the benefits of adopting such practices and proposes a framework for integrating energy consumption data into existing information technology platforms. Overall, the article provides valuable guidance for energy managers seeking to leverage IoT adoption to enhance energy management practices. By emphasizing a benefit-driven approach and considering factors such as company maturity and available information systems, the paper offers practical insights for improving energy efficiency and competitiveness in manufacturing companies.

3.2.8. Samuel Y.L. Yin(2009), This article proposes an innovative approach to improving management efficiency in the precast industry through the integration of RFID technology and Personal Digital Assistants (PDAs). By utilizing RFID tags and readers, coupled with PDAs and wireless Internet connectivity, the system aims to streamline data collection and dissemination across various aspects of precast production management. The author highlights the benefits of RFID technology, such as its ability to recognize multiple markers, communication range, and extensive data storage capacity, in addressing management challenges related to data storage, record

reviewing, and feedback mechanisms. The proposed system covers crucial areas including material management, quality control, inventory, and transportation. Through the author's developed precast production management system, which includes processes for inspecting incoming materials, production, molds, specimen strength feedback, and logistics management, the article offers a practical framework for implementing RFID-based solutions in the precast industry.

3.2.9. Marcello Colledani (2014), The article presents a compelling argument for the adoption of "production quality" as a new paradigm in manufacturing, particularly in technology-intensive sectors. It effectively outlines the limitations of traditional six-sigma approaches in dynamic production contexts and highlights the need for innovative methods and tools to achieve high-quality production. The discussion on integrated quality, production logistics, and maintenance design is insightful, offering practical solutions for addressing the challenges faced by manufacturing industries. Overall, the article provides a comprehensive overview of the concept of production quality and its implications for the future of manufacturing.

CHAPTER IV

THEORETICAL BACKGROUND OF THE SUBJECT

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THEORETICAL BACKGROUND OF THE SUBJECT

4.1. Introduction:

Production management is the collective term for the various management tasks involved in producing certain goods. Men, machinery, plants, services, and processes are the basic inputs used in manufacturing. The products of mines, farms, the sea, and forests are utilized as raw materials, after which processing is carried out to improve and produce usefulness. Finding the correct raw materials is essential to the textile industry's ability to produce high-quality fabrics and finished goods. Cotton and natural fibers, synthetic fibers, yarns and threads, dyes, and chemicals are the raw materials used in the textile industry.

4.2. Production Management:

4.2.1. Definition:

Production is referred to as "the step-by-step conversion of one form of material into another form through chemical or mechanical process to create or enhance the utility of the product to the user."

The set of interrelated management activities, which are involved in manufacturing certain products is called production management.

Production is therefore a process that adds value. Value addition will occur at every processing step.

4.2.2. Objectives to study Production Management:

- To ensure that products meet customer Expectation in terms of quality.
- To incorporate adaptation and flexibility into the manufacturing process
- To analyse improvement aspects in production process.
- To understand Quality Aspects.
- To Optimize resource utilization.

- To minimize production costs.
- To enhance productivity.

4.2.3. Scope of Production Management

Production management's goals are to provide businesses with goods and services that will meet their customers' needs. The production system is impacted by both strategic and operational decisions, the production process and product design are the primary topics of discussion when making decisions at the strategic level. These are choices that will have a lasting impact. Production management is the idea of a long chain. The final product, or output, is what comes out at the end of the production process. A summary of the production management ranges within Plant layout and material handling, Production Management, Planning and controlling production, Maintenance, Process design, Location, etc.

➢ 5M’s of Production Management

The manufacturing or production process's essential elements are referred to as the "5Ms" of production management. These elements support knowledge of and management of numerous production-related aspects. The five m's are:

- **Manpower**: This is the collective term for the knowledgeable and unskilled labor force that works on a production. Aspects of managing workforce effectively include hiring, training, and making sure the appropriate people are available to perform production duties.

- **Machines**: This category includes tools, machinery, and technological devices used in the manufacturing process. Achieving efficient production requires proper machine maintenance, calibration, and use.

- **Materials**: This group includes the components, raw materials, and other resources needed for production. Successful production management depends on effective material quality control, inventory management, and procurement.

- **Methods**: This is a reference to the procedures, methods, and methods of production used to turn raw resources into final goods. In this regard, constant optimization, improvement, and adherence to best practices are crucial.

- **Measures (or Metrics):** This entails tracking and measuring performance during the production process. Key performance indicators (KPIs) direct decision-making and improvement initiatives by assisting in the evaluation of production's efficacy and efficiency.

Production managers can take a complete look at several factors and guarantee a successful and well-coordinated manufacturing process by using the 5M framework.

4.2.4. Production System

Production system are a type of software development that is used to control the production process. Systems for producing specialized machine tools or heavy duty construction equipment, specialty chemicals, and processed food products.

An organization's production system is the section that generates its products. It is the process by which resources move through a system and are combined and altered under control to create value in line with management-communicated policies.

- **Basics For Comparision:**
  - Variety
  - Volume
  - Flexibility
  - Skills Required
  - Per unit manufacturing Cost
  - Ease of Supervision
  - Work in Process
  - Material Handling
  - Machines Required (General or Special Purpose)
  - Capital Investment Required

- Job satisfaction and security
- Machines Breakdown/Bottleneck Situations.
- Production Planning, Controlling and Scheduling.

4.2.5. Types of Production System

The four most widely utilized forms of production are as follows. The kind of product being made, its demand, and the availability of raw materials will determine which production method the company should employ. The four types of production are listed below:

1. Continuous Production System
2. Mass Production System
3. Batch Production System
4. Job shop Production System.

➢ Continuous Production System

A manufacturing process that runs continuously, creating materials or items in a steady stream, is known as a continuous production system. High volume, automated procedures, and a constant manufacturing rate define this kind of system.
Production Facilities are arranged as per the sequence of production operations from the first operations to the finished product. The items are made to flow through the sequence of operations through material handling devices such as conveyors, transfer devices etc.

Example- Paper Manufacturing Plant:

In a paper manufacturing plant, a continuous production system is commonly employed. The process involves a series of interconnected machines that work seamlessly to transform raw materials (such as wood pulp) into paper. The key stages include continuous pulping, refining, forming, pressing, drying, and cutting. The raw materials are continuously fed into the system, and the paper is produced in a continuous roll or

sheet form. This allows for a steady output of paper products without interruptions. The machinery is designed to operate continuously, optimizing efficiency and ensuring a consistent supply of paper for various applications.

Feature of Continuous Production System

- Has the highest level of capacity utilization.
- Low unit costs due to a high volume of production.
- Used in dedicated plants (e.g., steel, iron, chemical) with zero flexibility
- Component materials are heavily processed, and the finished product can't be identified with the source material.
- Requires high initial investment, so competition is limited.

➢ Mass Production System

Mass production is the manufacturing of large quantities of **standardized** products, often using assembly lines or automation technology. Mass production facilitates the efficient production of a large number of similar products. Mass production is also referred to as flow production, repetitive flow production, series production. Product and process standardization exists and all outputs follow the same path.

Example- One of the best example of mass production is the manufacturing process adopted by Ford. Mass production is also known as flow production or assembly line production. Henry Ford's Model-T automobile is a good example of mass production. Each car turned out by Ford's factory was identical, right down to its color.

Features of Mass production system

- Standardization of product and process sequence.
- Dedicated special purpose machines
- Lower work in progress inventory
- Material handling can be completely automatic
- Shorter cycle time of production.
- Production Planning and control is easy.
- Large Volume of products.

➢ Batch Production Process

Batch manufacturing involves large quantities of raw materials being processed in batches through the production process. Any subsequent stage or batch must wait until the current batch is complete. Batch production is the default production process for many manufacturers.

It is characterised by the manufacture of limited number of products produced at regular interval and stocked awaiting sales.

Example- It is easy to produce 200-bed sheets, 1000 large pillow covers, 700 small pillow covers, 500 curtains, etc with the help of one set of machinery. With the flexibility of the batch process textile industry can attain the demands of that particular hotel immediately.

Features of Batch Production

- Production done in batches.
- Cheaper than other processing methods.
- Inherently flexible, enabling manufacturers to produce different batches of new products quickly.
- Ideal for small production runs and seasonal items.
- Reduces inventory.

➢ Job Shop Production System

Manufacturing of one or few quantity of products designed and produced as per the specification of customers within prefixed time and cost. Job production is the production of high-quality, customised products that meet customers' specific needs. Usually, one product is completed at a time.

Job production processes involve a highly-skilled individual, a group of workers, or a company working on one task at a time. A job shop comprises of general purpose machines arranged into different departments. Each job demands unique technological requirements, demands processing on machines in a certain sequence.

Example- A typical example would be a machine shop, which may make parts for local industrial machinery, farm machinery and implements, boats and ships, or even batches of specialized components for the aircraft industry.

Features of Job shop production

- Use of general purpose machine and facilities.
- High variety of products and low volume.
- Large inventory of materials, tools, parts.
- High flexibility.
- Highly skilled workers. Lower capital investment.

4.2.6. Production Planning Controlling and Scheduling:

➢ Production Plan:

A production plan describes in detail how a company's products and services will be manufactured. It spells out the production targets, required resources, processes and overall schedule. The plan also maps all of the operational steps involved and their dependencies. The goal is to design the most efficient way to make and deliver the company's products at the desired level of quality. A well-designed production plan can help companies increase output and save money by developing a smoother workflow and reducing waste.

➢ Production Planning:

Production planning involves developing a comprehensive strategy for making the company's products and services. Initially adopted by large manufacturers, production planning has since become more popular among small and midsize businesses in multiple industries — largely because technology has made it easier to plan and track production processes with less effort. Production planning covers many different aspects of production, from forecasting demand to determining the raw materials, workforce, equipment and steps needed to make the company's products.

- **Production Controlling:**

Production controlling, also known as production control, is a crucial aspect of managing manufacturing processes to ensure efficiency, cost-effectiveness, and timely delivery of products. It involves monitoring, regulating, and optimizing various elements of the production process to meet organizational goals.

- **Production Scheduling:**

Production scheduling is a critical aspect of manufacturing management that involves planning and organizing production activities to optimize efficiency, meet customer demands, and utilize resources effectively. The primary goal is to create a feasible and realistic timetable for the production process.

4.2.7. Advantages of Production management:

- **Efficient Resource Utilization:** Production management ensures optimal utilization of resources such as raw materials, labor, machinery, and time. This efficiency leads to cost savings and higher profitability.
- **Improved Productivity:** By streamlining processes, setting performance standards, and implementing effective scheduling, production management helps to enhance productivity levels. This results in increased output with the same or fewer resources.
- **Quality Control:** Production management techniques include quality control measures that ensure products meet predefined standards. Consistently high-quality products enhance customer satisfaction, loyalty, and brand reputation.
- **Timely Delivery:** Effective production planning and scheduling minimize delays and ensure timely delivery of products to customers. Meeting delivery deadlines enhances customer trust and strengthens relationships with clients.
- **Inventory Management:** Production management helps in managing inventory levels efficiently by adopting techniques like Just-in-Time (JIT) inventory, reducing carrying costs, minimizing stockouts, and preventing obsolescence.

- **Cost Reduction:** By optimizing processes, reducing waste, minimizing downtime, and improving resource utilization, production management contributes to cost reduction. Lower production costs lead to increased competitiveness and higher profitability.
- **Employee Engagement:** Effective production management involves empowering employees, fostering teamwork, and providing opportunities for skill development and advancement. Engaged employees are more motivated, productive, and committed to achieving organizational goals.
- **Continuous Improvement:** Production management encourages a culture of continuous improvement by implementing feedback mechanisms, conducting performance evaluations, and seeking opportunities for innovation and optimization.

4.2.8. Disadvantages of Production Management:

- **Initial Investment:** Implementing production management systems often requires a significant initial investment in technology, training, and infrastructure. Small and medium-sized enterprises (SMEs) may find it challenging to afford these upfront costs.
- **Complexity:** Production management systems can be complex, especially in large-scale manufacturing environments with multiple processes, products, and production lines. Managing this complexity requires skilled personnel and sophisticated software.
- **Dependency on Technology:** Production management heavily relies on technology, such as enterprise resource planning (ERP) systems, manufacturing execution systems (MES), and automation tools.
- **Overemphasis on Efficiency:** A narrow focus on efficiency and productivity may lead to overlooking other important factors such as product quality, employee well-being, and environmental sustainability. Pursuing efficiency at the expense of these factors can have negative long-term consequences.

- **Rigidity:** Some production management systems may become rigid and inflexible, making it difficult to adapt to changing market conditions, customer preferences, or technological advancements. Businesses risk being left behind if they cannot quickly adjust their production processes.

4.2.9. Production Process: Weaving Process:

In this process the woven fabrics are produced by interlacement of two set of yarns perpendicular to each other i.e. warp and weft as shown in Fig. The first set includes the threads running lengthwise in the fabric, while the second is represented by the threads placed in cross or width direction. The fabrics have varying structure, depending on the interlacement pattern of the yarns.

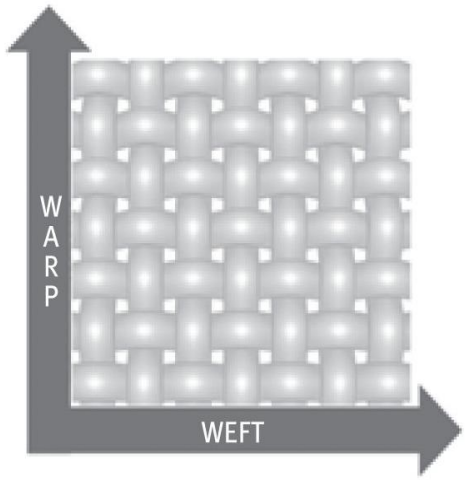

Fig 1: Schematic of Wrap and Weft in Woven fabric

On the basis of the yarn interlacement or weaving the different types of weave designs are formed. The weft yarn is weaving in horizontal direction and the wrap yarn is weaving in vertical direction. Interlacement of both the weft and wrap yarn leads to formation of fabric.

- **Product Design: Weave Design**

The woven fabric is produced by interlacement of warp and weft, and this interlacement pattern is called weave design of the fabric. The types of the weave of the fabric can determine the smoothness, comfort, thickness, durability, tear strength, and even drape of the fabric.

In the most basic of fabric weaving, the threads (lengthwise warps and crosswise wefts) go criss-cross in the simplest pattern at right angles to each other. But in others, they are woven in many exciting ways – artistically and decoratively. The three basic weave designs are plain, twill and satin.

- **Plain**

The simplest interlacing pattern for warp and weft threads is over one and under one as shown in Fig 4. The weave design resulting from this interlacement pattern is termed as plain or 1/1 weave. The 1/1 interlacement of yarns develops more crimp and fabric produced has a tighter structure. The plain weave is produced using only two heald frames. The variations of plain weave include warp rib, weft rib and matt or basket weave.

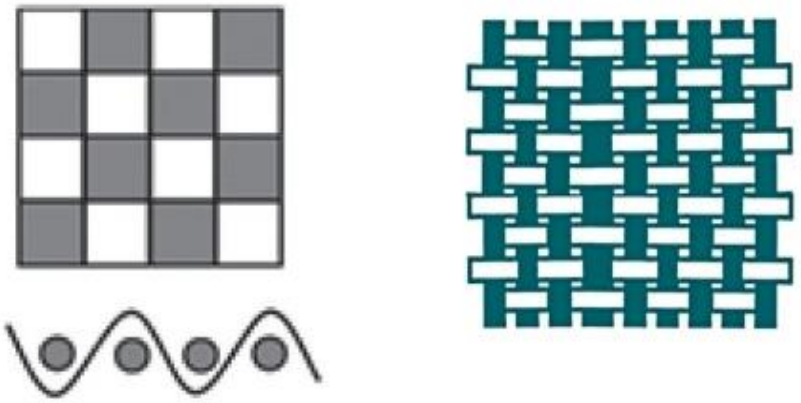

Fig 2: Plain weaves and cross sectional view

The advantage of this weave is that it is quite strong and durable and produces very fine good quality fabrics. **Percale** is a type of plain weave that produces a very smooth high thread count fabric by the same name. **Poplin** weave is an unbalanced plain weave in which two weft threads and one warp thread of the same color cross each other. As weft threads are more than the warp thread, a ridge on the weft thread creates a ribbed weave. In this weave, cotton polyester and nylon fibers are used**.** Plain weave fabric includes Rib weave, Basket weave.

In most plain weave fabrics, the weft thread and the warp thread are of the same color resulting in an even-colored material. Still, for some fabrics like end-on-end poplin and cambric, the weft thread will be white or some other color, while the warp thread will be colored – this results in a subtle shade of color.

- **Twill**

This weave is characterised by diagonal ribs across the fabric. It is produced in a stepwise progression of the warp yarn interlacing pattern. The interlacement pattern of each warp starts on the next filling yarn progressively. The two sub categories based on the orientation of twill line are Z- and S-twill or right hand and left hand twill, respectively.

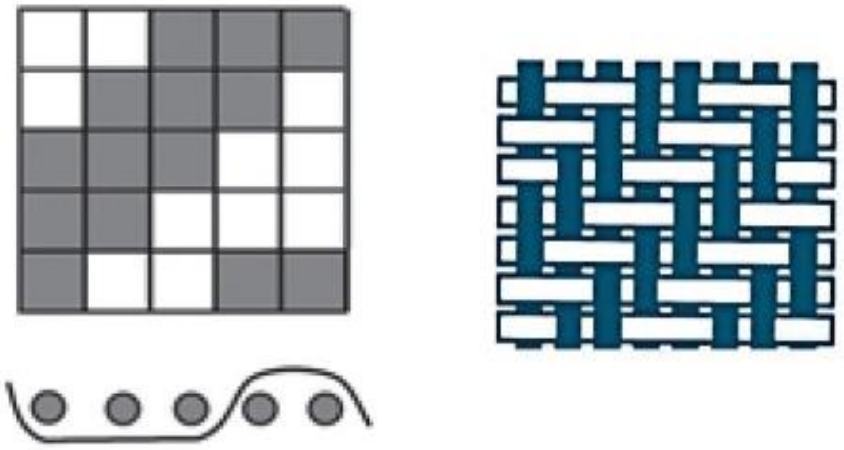

Fig 3: Twill weave and cross sectional view

This results in a strong and soft fabric which has more drape than all other weaves with a self-design effect, with parallel diagonal ribs formed left-to-right or right-to-left but the fabric has a smooth surface.

One and one (Pick & Pick) has light and dark warp and weft. **3 by 1 twill** has three threads crossing over one weft thread. This is a common denim weave. **2 by 1 twill** has two warp threads crossing over one weft thread. The **herringbone** weave is also called feather twill or arrowhead twill. Other than the attractiveness of its design, it has all the qualities of a twill weave.

- **Satin/Sateen**

The satin weave is characterised by longer floats of one yarn over several others. The satin weave is warp faced while sateen is a weft faced weave. A move number is used to determine the layout in a weave of satin, and number of interlacement is kept to a minimum as shown in fig 6. The fabrics produced in satin weave are more lustrous as compared to corresponding weaves.

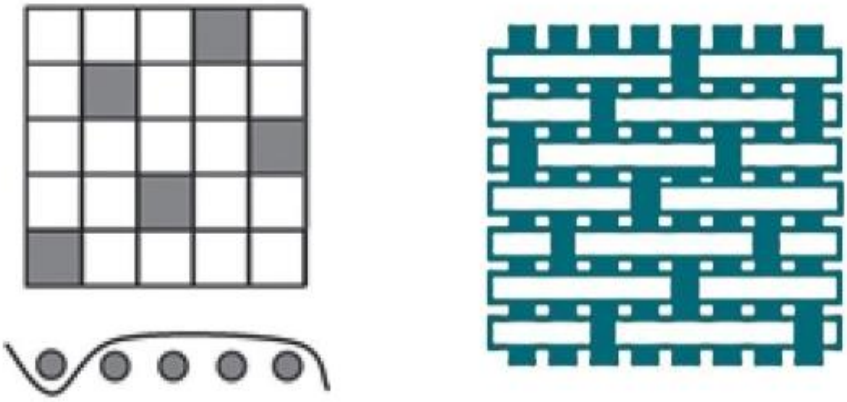

Fig 4: Satin weave and cross sectional view

This is a variation of the twill weave but with continuous warp yarn, with as few interruptions of weft as possible i.e. it has fewer intersections of warp and weft threads – weft yarns are floated over warp yarns, which results in a smooth and shiny surface.

The fibers used are filament fibers like silk or nylon. Because of the long floats, the fabric in this woven pattern will be very smooth and has a flexible structure. The greatest luster will be in the lengthwise direction.

The disadvantage is that the fabric fibers will easily snag, so this weave is not considered as strong as the other. The advantage of this weave is its disadvantage – the long floating yarns snag.

4.3Quality Control

In manufacturing a measure of excellence or a state of being free from defects, deficiencies and significant variations. It is bought about by strict and consistent commitment to certain standards that achieve uniformity of a product to satisfy specific customer or user requirements. Quality Control is used in all industries to ensure that a predefined level of quality is consistently maintained. Along with quality assurance and inspections, quality control for manufacturing helps companies verify that their products meet relevant regulations and are consistent.

In this industry there are two departments for quality control. First one is quality checking, where small size sample is produced and then checking for quality. is the sample is fulfilling the requriments as per the demand.

CHAPTER V

DATA ANALYSIS AND INTERPRETATION

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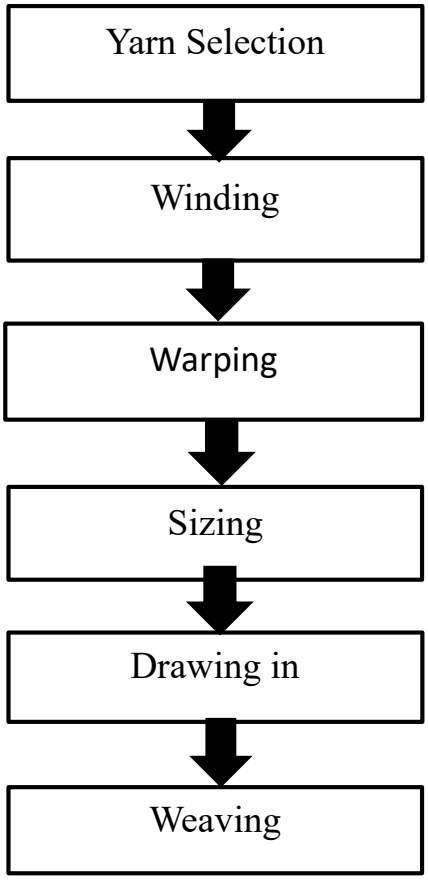
DATA ANALYSIS AND INTERPRETATION

5.1 Warp Preparatory Process:



- **Here is the Some steps which are involved in Warp Preparatory process:**

1. **Yarn Selection** **:** Choosing the appropriate yarn based on the desired properties of the final fabric

2. **Warping** **:** This involves winding the selected yarn onto a beam, creating a parallel set of yarns. The process ensures that the warp yarns are evenly tensioned and aligned. Weft yarn is then provided to loom and the warp yarns are processed to give a sheet of yarns on a warp beam by the process called warping.

3. **Sizing** **:** Sizing is the application of a protective coating, known as sizing or warp sizing, on the warp yarns. This coating helps improve the yarn's strength and abrasion resistance during the weaving process.

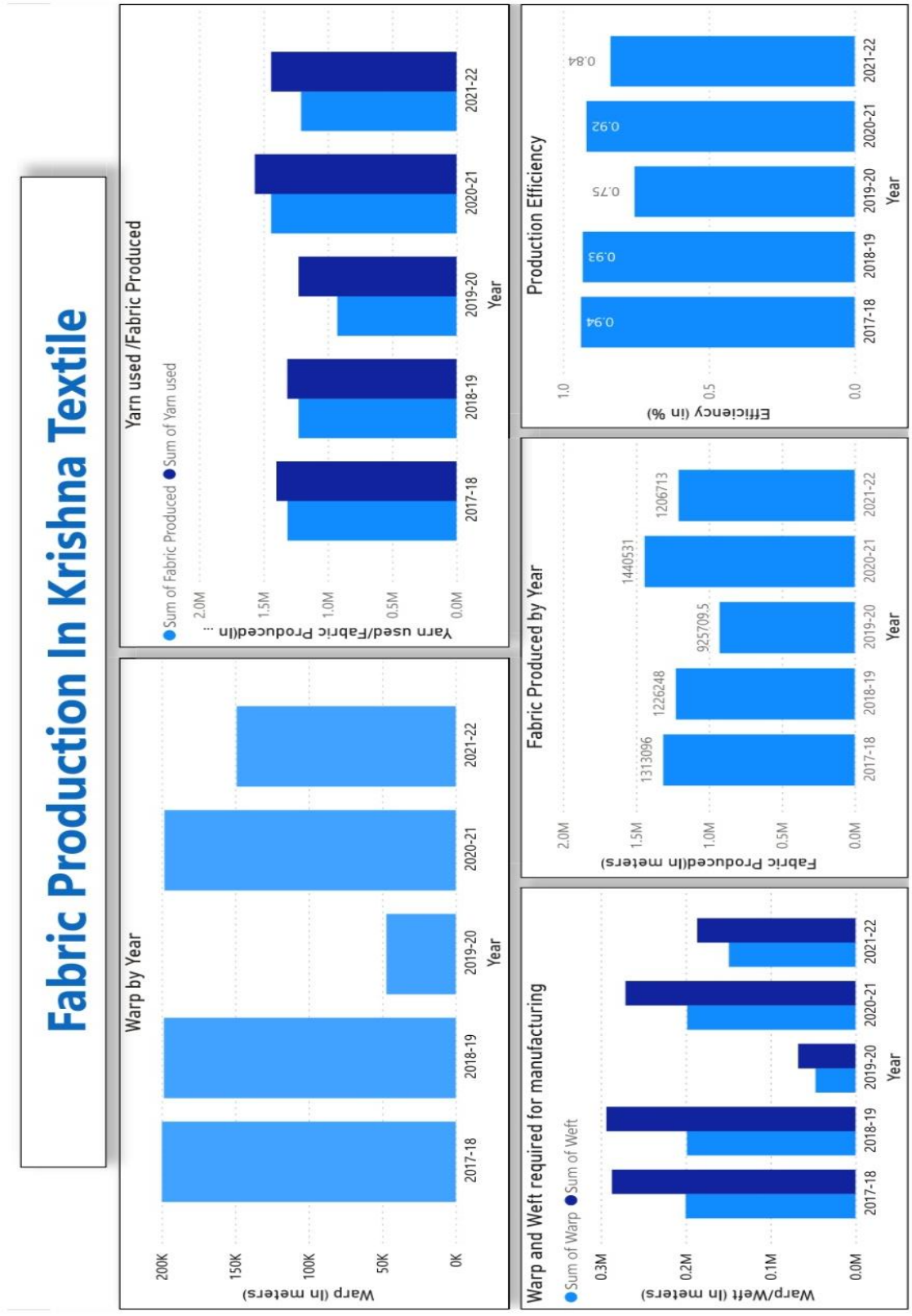
4. **Drawing-in** **:** This step involves threading the warp yarns through the heddles and reed of the loom according to the desired weave pattern.

5.2 Tested Data: Production Data

Table 5.2:

Year	Weft	Warp	Yarn used	Fabric Produced	Efficiency
2017-18	286726.51	199741.50	1399503.00	1313096.00	93.83%
2018-19	293088.96	198411.00	1315012.00	1226248.00	93.25%
2019-20	67442.76	46988.13	1226399.00	925709.50	75.48%
2020-21	270676.97	198006.60	1566987.00	1440531.00	91.93%
2021-22	186195.25	148843.70	1440531.00	1206713.00	83.77%
Total	**1104130.45**	**791990.93**	**6948432.00**	**6112297.50**	AVG=87.65%

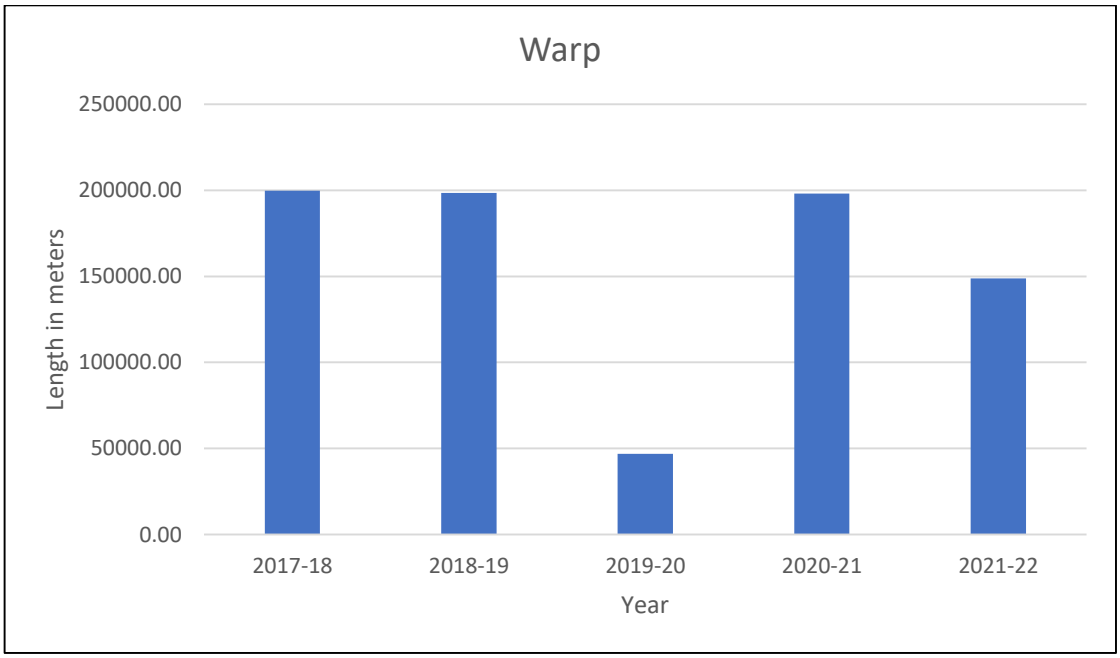
Production analysis Dashboard



5.3 Tested Data: Warp Required for production

Table 5.3:

Year	Warp
2017-18	199741.50
2018-19	198411.00
2019-20	46988.13
2020-21	198006.60
2021-22	148843.70
Total	**791990.93**



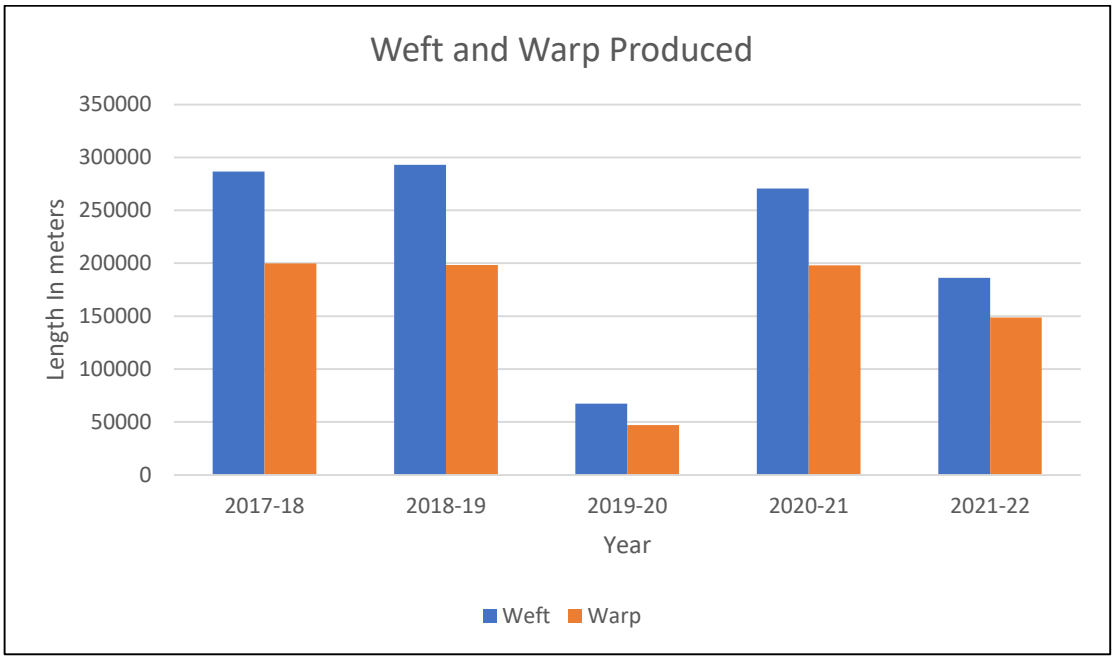
Interpretation:

In above graph the bar displays values for "Warp" over the years 2017-2018 to 2021-2022. There's a fluctuating trend: starting high, decreasing, a sudden drop in 2019-2020, a recovery, and then a decrease again. In year 2019-20 the warp requirement is low. The total "Warp" value over these years is 791990.93.

5.4 Tested Data: Comparing Weft and Warp required For Manufacturing

Table 5.4:

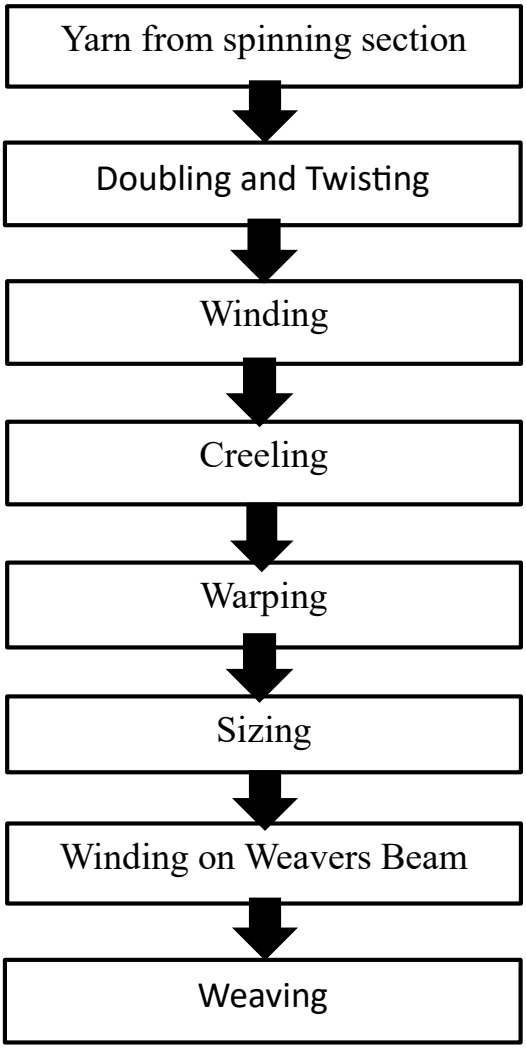
Year	Weft	Warp
2017-18	286726.51	199741.50
2018-19	293088.96	198411.00
2019-20	67442.76	46988.13
2020-21	270676.97	198006.60
2021-22	186195.25	148843.70
Total	**1104130.45**	**791990.93**



Interpretation:

This graph represents "Weft" and "Warp" values for each year from 2017-2018 to 2021-2022, along with the total values for each. Both "Weft" and "Warp" values fluctuate over the years. The total "Weft" value is 1104130.45, and the total "Warp" value is 791990.93. It shows that requirement of weft is more than the warp.

5.5 Fabric Manufacturing and Weaving



- **Here is the Some steps which are involved in Fabric Manufacturing**

1. Yarn From spinning section : For Fabric Manufacturing the yarn is taken from the spinning section where the yarn spinning is competed.

2. Doubling and Twisting : Here two or single yarn is twisted and the process is called doubling.

3. Winding : This is the process of transferring yarns from ring, bobbin into a suitable package. The working principle of winding is change in volume of winding and increase the capacity of yarn winding

4. Creeling : It includes sampling of yarn, passing through tensioner, thread guide, drop wire and on to the beam. There are numbers of creels which are used for different purposes.

5. Warping : It is the process of arranging yarns or threads lengthwise on a loom. During the process parallel threads are wound onto a beam in preparation for the weaving process.

6. Sizing : The process of applying a sizing agent to the warp yarn so as to improve the strength of the warp yarn to resist the mechanical stress applied to the yarn during weaving. Sizing agents like Polyvinyl alcohol, Starch and acrylic- based sizing agent.

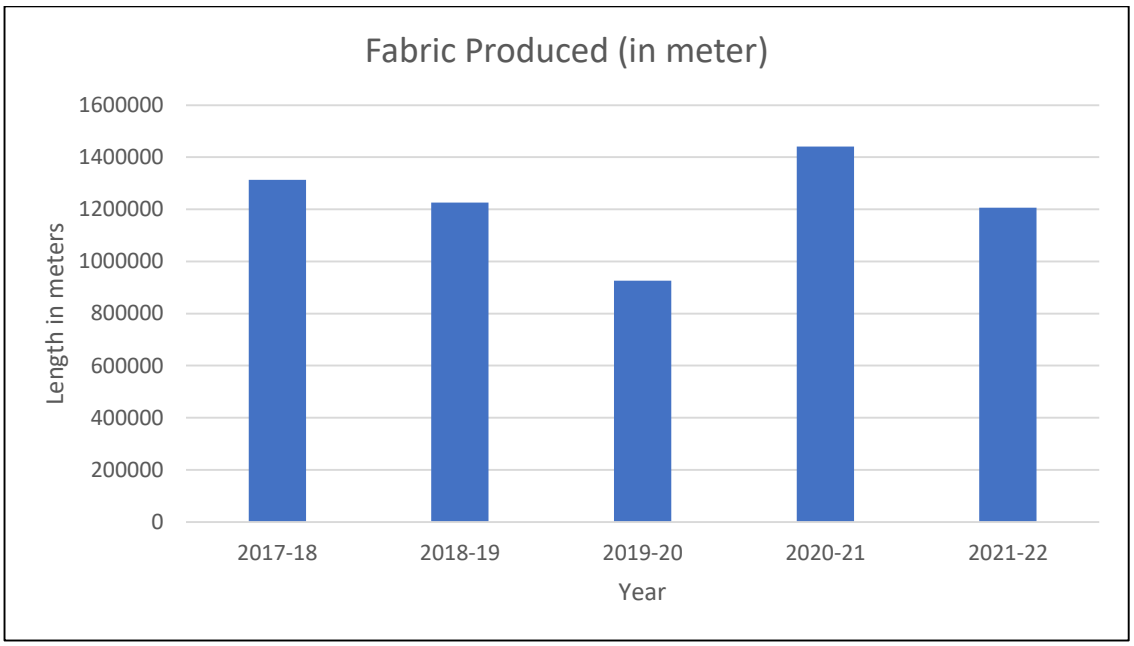
7. Winding on weavers beam : Beaming include winding the full width of the yarns in a single winding operation on the weaving beam.

8. Weaving : Here Parallel threads are wound onto a beam in preparation for the weaving process.

5.6. Tested Data: Fabric Production

Table 5.6:

Year	Fabric Produced (in meter)
2017-18	1313096.0
2018-19	1226248.0
2019-20	925709.5
2020-21	1440531.0
2021-22	1206713.0
Total	**6112297.5**



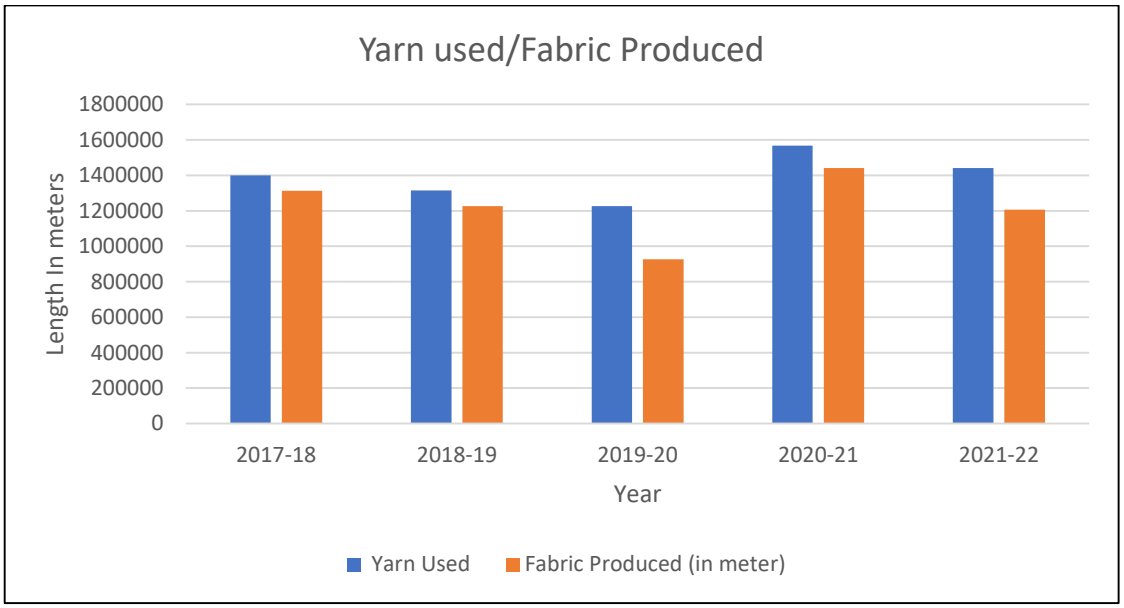
Interpretation:

The graph shows the amount of fabric produced (in meters) for each year from 2017-2018 to 2021-2022. Here on displayed on X axis and Fabric length in meters displayed on Y axis. In the year 2017-18 to 2019-20 Fabric production is decreasing and then increasing in 2020-21. The production fluctuates over the years, with a total production of 6112297.5 meters.

5.7. Tested Data: Yarn used/Fabric Produced

Table 5.7:

Year	Yarn Used	Fabric Produced (in meter)
2017-18	1399503	1313096
2018-19	1315012	1226248
2019-20	1226399	925709.5
2020-21	1566987	1440531
2021-22	1440531	1206713
Total	**6948432.00**	**6112297.50**



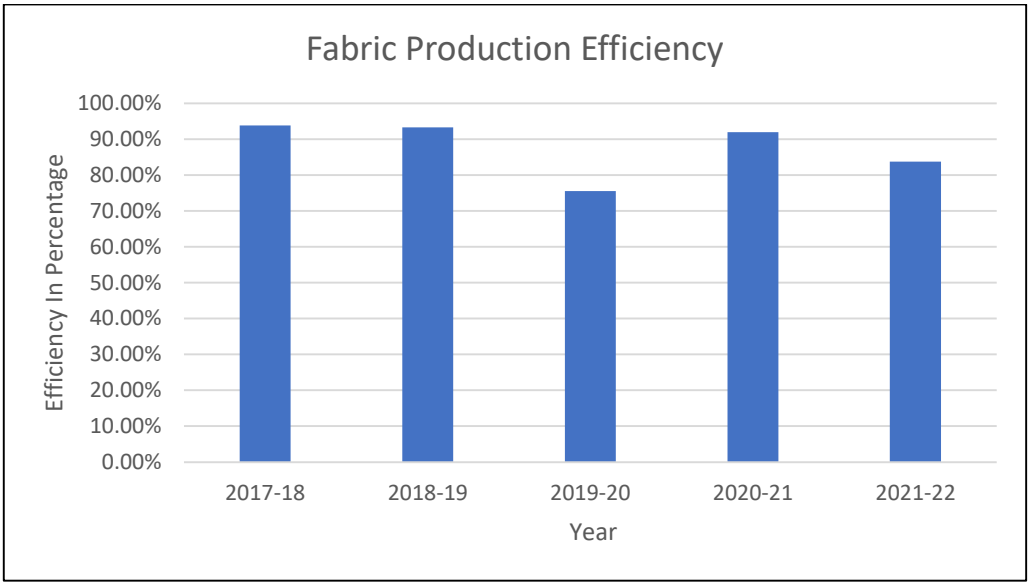
Interpretation:

This Graph represents data on yarn usage and fabric production in meters for each year from 2017-2018 to 2021-2022, as well as the total values for both. The total yarn used over these years is 6948432.00 units, resulting in a total fabric production of 6112297.50 meters. This suggests that there might be inefficiencies or losses in the production process, as the fabric produced is less than the yarn used.

5.8. Tested data: Production Efficiency:

Table 5.8:

Year	Yarn Used	Fabric Produced (in meter)	Efficiency
2017-18	1399503	1313096.0	93.83%
2018-19	1315012	1226248.0	93.25%
2019-20	1226399	925709.5	75.48%
2020-21	1566987	1440531.0	91.93%
2021-22	1440531	1206713.0	83.77%
Total	6948432	6112297.5	AVG= 87.65%



Interpretation:

The table compares the yarn used and fabric produced (in meters) for each year from 2017-2018 to 2021-2022, along with the graph of efficiency percentage. Efficiency is calculated by dividing the fabric produced by the yarn used and expressing it as a percentage. The average efficiency over the total period is approximately 87.65%. This suggests that, on average, around 87.65% of the yarn input is effectively converted into fabric output.

CHAPTER-VI

FINDINGS, SUGGESTIONS, CONCLUSION

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FINDINGS, SUGGESTIONS, CONCLUSION

6.1. Findings:

1. The warp quantity is notably low in 2019-20, suggesting a **potential issue or change** in production dynamics during that year. ***(Table 5.3)***

2. Comparing the total requirements of both the warp and weft, it's evident that the "Weft" requirement are higher than the "Warp" requirement over the same period which give smooth fabric texture. ***(Table 5.4)***

3. Fabric production fluctuates significantly year-to-year, suggesting the industry's susceptibility to various factors like market demand, raw material availability, and economic conditions, environmental condition***. (Table 5.6)***

4. The total yarn used and total fabric produced are close in value, suggesting an overall **efficient utilization of resources**. ***(Table 5.7)***

5. The Average production **efficiency** of the system has been **high** over the years, with minor fluctuations. The Average efficiency for the specified period (2017-18 to 2021-22) is **87.65%.** ***(Table 5.8)***

6.2 Suggestions:

1. Company need to investigate the production processes, supply chain dynamics, and machinery condition, with recommendations focusing on process optimization and machinery upgrades.

2. Company can explore weaving techniques such as twill or satin weaves to distribute tension evenly between warp and weft, enhancing fabric smoothness.

3. Company can expand supplier networks to mitigate risks associated with raw material shortages or price fluctuations, ensuring a stable supply chain.

4. Company should Continuously analyse and refine production processes to minimize waste, reduce downtime, and improve overall efficiency, leveraging lean manufacturing principles and automation technologies.

5. For enhancing efficiency, prioritize regular maintenance of machinery, streamline production processes, and Explore advanced technologies in weaving processes.

6.3. Conclusion:

In the fabric production, analysis highlights consistently change in overall efficiency and suggests a need for careful management in yarn and fabric production, as well as optimization in weft and warp utilization. The analysis reveals that weft requirements consistently exceed warp requirements suggests a potential imbalance in resource utilization. To address this, developing robust production planning strategies, Cost optimization, a focus on sustainability and quality control, and implementing efficient inventory management practices is crucial. Additionally, exploring advanced weaving technologies and investing in employee training can optimize resource utilization and minimize wastage. By implementing these measures, the textile industry can enhance efficiency, production planning, and overall competitiveness in the market.

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