# INTERNATIONAL PROJECT MANAGEMENT PROGRAMME

**STUDENT : YOUSSEF FERSI** 

# **MASTER'S THESIS**

S NAUD OPTIMIZAVIMO EFEKTYVUMAS TEKSTIL S

PRAMON JE

# COST OPTIMIZATION EFFICIENCY IN TEXTILE INDUSTRY

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# SUMMARY

# VILNIUS UNIVERSITY BUSINESS SCHOOL INTERNATIONAL PROJECT MANAGEMENT PROGRAMME

# STUDENT: YOUSSEF FERSI

## COST OPTIMIZATION EFFICIENCY IN TEXTILE INDUSTRY

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Short description of FMT thesis: Due to the increasing challenges in the textile industry, particularly in cost optimization, it is important to identify the factors influencing production efficiency. The company's cost management practices have been identified as a key determinant; inefficiencies in production processes, raw material prices, and labor costs play a significant role in shaping the company's operational outcomes. This research aims to analyze WIC MIC's cost management strategies, focusing on identifying areas of inefficiency and proposing solutions to streamline production. A framework based on the DMAIC methodology has been chosen to guide the optimization process, providing relevant topics for analysis and discussions with stakeholders involved in the production process

Aim and objectives of FMT thesis: The aim of this thesis is to optimize production costs and improve operational efficiency at WIC MIC, while maintaining product quality and integrating sustainable practices. To accomplish this, the following objectives were determined: 1) To analyze the current cost management practices at WIC MIC; 2) To evaluate the existing production processes and identify inefficiencies; 3) To assess the impact of external factors, such as raw material price fluctuations, on production costs; 4) To propose strategies for improving operational efficiency and cost management;5) To evaluate the potential of advanced management tools and technologies in reducing production costs.

*Methodology and Results:* To conduct the study, a mixed DMAIC methodology combining qualitative and quantitative analysis was chosen. Empirical data was collected through semi-structured interviews with key stakeholders at WIC MIC, supplemented by data from the company's internal reports. The interview responses were analyzed thematically, identifying operational inefficiencies. The results were organized into key categories, presented in 4 tables and a curve graph summarizing all developments over the 4-month period.

*Main conclusions:* The research was conducted based on the DMAIC methodology and provided insights into WIC MIC's cost management practices. As the company lacked a comprehensive cost optimization framework, one was developed from the collected data. Several inefficiencies in production processes were identified, including waste, downtime, and resource misallocation. Furthermore, the analysis revealed that external factors, such as raw material price fluctuations, significantly impact production costs. A notable finding was that WIC MIC's reliance on a limited number of suppliers exacerbates the volatility in cost management.

*Keywords:* Textile Industry, WIC MIC, Divalto infinity, Navisio, Cost optimization, ERP systems ,5S system, Kanban, 6SIGMA, Just in time, JIT, Supply chain, Cost Management,Lean Manufacturing , Kaizen, Gemba KPI, ERP, PDCA

## SANTRAUKA

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# S NAUD OPTIMIZAVIMO EFEKTYVUMAS TEKSTIL S PRAMON JE

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*Darbo aprašas.* Did jant išš kiams tekstil s pramon je, ypa kašt optimizavimo srityje, svarbu nustatyti veiksnius, turin ius takos gamybos efektyvumui. mon s išlaid valdymo praktika buvo nustatyta kaip pagrindinis veiksnys; gamybos proces neefektyvumas, žaliav kainos ir darbo s naudos vaidina svarb vaidmen formuojant mon s veiklos rezultatus. Šiuo tyrimu siekiama išanalizuoti WIC MIC s naud valdymo strategijas, daugiausia d mesio skiriant neefektyvi sri i nustatymui ir sprendim , kaip efektyvinti gamyb , pasi lymai. Optimizavimo procesui vadovauti pasirinkta sistema, pagr sta DMAIC metodika, teikianti svarbias temas analizei ir diskusijoms su gamybos procese dalyvaujan iomis suinteresuotosiomis šalimis.

*Tikslas ir uždaviniai.* Šio baigiamojo darbo tikslas – optimizuoti gamybos s naudas ir pagerinti WIC MIC veiklos efektyvum , išlaikant produkt kokyb ir integruojant tvari praktik . Tam pasiekti buvo nustatyti šie tikslai: 1) Išanalizuoti esam WIC MIC kašt

valdymo praktik ; 2) vertinti esamus gamybos procesus ir nustatyti neefektyvumus; 3) vertinti išorini veiksni , toki kaip žaliav kain svyravimai, tak gamybos kaštams; 4) Pasi lyti veiklos efektyvumo ir kašt valdymo gerinimo strategijas;5) vertinti pažangi valdymo priemoni ir technologij galimybes mažinant gamybos kaštus.

*Metodologija ir rezultatai*. Tyrimui atlikti pasirinkta mišri DMAIC metodika, jungianti kokybin ir kiekybin analiz . Empiriniai duomenys buvo renkami per pusiau strukt rizuotus interviu su pagrindin mis WIC MIC suinteresuotosiomis šalimis, papildyti duomenimis iš mon s vidini ataskait . Interviu atsakymai buvo analizuojami temiškai, identifikuojant veiklos neefektyvum . Rezultatai buvo suskirstyti pagrindines kategorijas, pateikti 4 lentel se ir kreiv s diagramoje, kurioje apibendrinti visi poky iai per 4 m nesius.

*Išvados.* Tyrimas buvo atliktas remiantis DMAIC metodika ir suteik žvalg apie WIC MIC kašt valdymo praktik . Kadangi mon netur jo išsamios s naud optimizavimo sistemos, ji buvo sukurta iš surinkt duomen . Buvo nustatyta keletas gamybos proces neefektyvumo, skaitant švaistym , prastov ir netinkam ištekli paskirstym . Be to, analiz atskleid , kad išor s veiksniai, tokie kaip žaliav kain svyravimai, daro didel tak gamybos s naudoms. Pastebima išvada, kad WIC MIC priklausomyb nuo riboto tiek j skai iaus padidina išlaid valdymo nepastovum .

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## **INTRODUCTION**

**Relevance of the Topic** In the era of globalization, economic boundaries are increasingly blurred, leading to intensified competition across various sectors, including the textile industry. The rise of international trade and the liberalization of markets have exposed textile companies to external challenges, such as the influx of cheaper imported products and fluctuating raw material prices. The textile sector, traditionally protected by trade barriers and quotas, now faces the pressure of adapting to a more competitive global environment, which demands that companies find innovative ways to remain viable and competitive. As a result, textile companies must rethink their operations, focusing on optimizing production costs while ensuring quality, sustainability, and customer satisfaction. This research is of significant relevance because it addresses these contemporary challenges head-on, particularly the need for effective cost management in an increasingly complex and competitive market. By focusing on cost optimization, operational efficiency, and the integration of sustainable practices, this study aims to contribute to improving the competitive edge of textile firms like WIC MIC, ensuring their continued success in a globalized market.

Problem Description The textile industry is facing a multitude of challenges, both internal and external. Within companies like WIC MIC, production costs have been rising due to a combination of inefficiencies in manufacturing processes, volatile raw material prices, and growing regulatory pressures concerning sustainability and environmental impact. These challenges not only affect the profit margins of textile companies but also their long-term sustainability and ability to compete in the market. WIC MIC, like many other textile firms, is confronted with the need to reduce production costs while maintaining high standards of product quality, ensuring operational flexibility, and meeting growing consumer expectations for ethical and sustainable production. The existing cost management practices within the company, though structured, have shown limitations, particularly when dealing with fluctuating costs of raw materials, energy, and labor. This research aims to uncover the inefficiencies within WIC MIC's production process and provide a framework for optimizing these processes to achieve greater operational efficiency and reduced costs.

**Problem Statement** WIC MIC, as a key player in the textile industry, faces the critical issue of how to optimize production costs amidst the challenges of rising raw material prices, increasing labor costs, and the pressure for sustainability. The company's current cost management practices have been inadequate in addressing these issues effectively, leading to inefficiencies that hamper its ability to remain competitive. This research will focus on identifying the root causes of these inefficiencies and proposing actionable solutions to improve cost management, streamline production, and ultimately enhance the company's market position. **Aim of Research** The primary aim of this research is to explore how WIC MIC can optimize its production costs, enhance operational efficiency, and improve overall competitiveness in the textile industry. By examining the company's existing production processes, supply chain management, and resource allocation strategies, this study seeks to identify the key inefficiencies that contribute to elevated costs. The research will propose actionable strategies for addressing these inefficiencies and recomments that can help WIC MIC maintain its competitive advantage in a globalized market.

**Research Question** The central research question guiding this study is: How can WIC MIC optimize its production costs while improving operational efficiency, maintaining product quality, and ensuring sustainability in its production processes?

This question focuses on identifying the factors that impact cost management and operational efficiency, with a view to formulating solutions that can be implemented within the company to improve both performance and profitability.

**Objectives of the Research** is to address the central research question, the study is guided by the following objectives:

To analyze the current cost management practices at WIC MIC: This objective aims to gain an in-depth understanding of how WIC MIC currently manages its production costs and where inefficiencies exist. To evaluate the existing production processes and identify inefficiencies: By examining WIC MIC's production lines, this study will identify areas where operational inefficiencies increase costs, such as waste, downtime, or suboptimal resource allocation.

To assess the impact of external factors such as raw material price fluctuations on production costs: Since raw material prices are volatile, understanding their influence on cost structures will be crucial to making accurate forecasts and decisions.

To propose strategies for improving operational efficiency and cost management: This objective focuses on recommending actionable improvements based on the findings from the evaluation of current processes.

To evaluate the potential of advanced management tools and technologies in reducing production costs: Tools like Lean management, Six Sigma, and digital solutions will be analyzed for their potential to streamline operations and reduce costs at WIC MIC.

**Methods of the Thesis.** This research employs a mixed-methods approach, combining qualitative and quantitative methodologies to address the research question effectively:

Literature Review: A comprehensive review of existing literature will provide the theoretical foundation for the study. This review will focus on cost optimization techniques, Lean management principles, sustainability in production, and the challenges faced by the textile industry.

Qualitative Analysis: The research will include qualitative interviews with key stakeholders at WIC MIC, such as managers and staff involved in production and cost management. These interviews will offer valuable insights into the challenges the company faces and the potential for improvement.

Quantitative Analysis: Quantitative data on production costs, labor costs, energy consumption, and material costs will be analyzed to identify trends and patterns. This analysis will help assess the financial impact of inefficiencies and suggest cost-saving measures.

SWOT Analysis: A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis will be conducted to assess WIC MIC's internal capabilities and external market conditions, which will help identify opportunities for cost optimization.

Lean and Six Sigma Methodology: The study will explore the potential application of Lean and Six Sigma methodologies, which focus on reducing waste and improving efficiency in production processes.

Structure of the Thesis: The thesis is organized into several chapters, each serving a specific purpose in addressing the research question. The Introduction chapter lays the foundation for the study by introducing the research topic, presenting the problem statement, and formulating the research question. It also outlines the research objectives and methods used, providing a clear rationale for the study and highlighting its relevance to the textile industry. The Literature Review chapter follows, where existing research and theories related to cost optimization, Lean management, and sustainability in the textile industry are reviewed. This chapter establishes the theoretical framework that guides the study, offering insights into previous findings and identifying gaps in the existing literature. In the Methodology chapter, the research design is described in detail, along with the methods of data collection and analysis techniques employed. It also provides a justification for adopting a mixed-methods approach, explaining how both qualitative and quantitative methods are integrated to address the research objectives. The Data Analysis chapter presents the findings derived from the data collection process, incorporating both qualitative and quantitative analysis. It identifies key inefficiencies in the production process at WIC MIC, providing valuable insights into areas of potential improvement. Finally, the Conclusion and Recommendations chapter summarizes the main findings of the study, offering practical recommendations for cost optimization and operational efficiency, and suggests areas for further research. (Jones, P., & Robinson, P. Operations Management. McGraw-Hill Education., 2008).

**Challenges and Limitations** While this research aims to provide valuable insights into cost optimization practices at WIC MIC, it faces several limitations. These include potential challenges in accessing confidential internal data, the complexity of accurately measuring the impact of external factors like raw material price fluctuations, and the limited scope of the study to WIC MIC as a case example. Additionally, the implementation of proposed solutions may be influenced by factors outside the scope of this research, such as organizational culture or external market conditions.

# 1. COST MANAGEMENT AND EFFICIENCY IN THE TEXTILE INDUSTRY

# **1.1 Transforming Cost Management: From Traditional Methods to Sustainable Practices**

#### 1.1.1 Traditional Cost Control Methods

Cost management is a system for determining the cost of a product or service. It is designed primarily to meet management needs. It provides detailed cost information to managers at different levels so that they can perform their tasks effectively.

Cost management information about profits, losses, costs, etc. of the collective activities of the entire company. It does not provide cost data broken down by department, product, process, sales region, etc. It does not provide a comprehensive analysis of losses due to idle time, unused factory capacity, inefficient labor, substandard materials, etc. Cost accounting is not limited to the past. It involves determining the past, present, and expected future costs of products manufactured or services provided. Cost accounting provides detailed cost information to managers at different levels so that they can perform their tasks effectively.

Cost units break down costs into smaller parts and help determine the cost of a saleable product or service.

A cost unit is defined as a unit of product, service, or time in which a cost can be determined or expressed." For example, in a spinning mill, the cost per kilogram of yarn can be determined. One kilogram of yarn is a cost unit. In short, a cost unit is a measure of cost.

Early research on cost management in the textile industry focused on traditional methods such as bulk purchasing and detailed cost tracking. Bulk purchasing enables companies to negotiate better prices and achieve economies of scale, thereby reducing unit costs (Jones & Robinson, 2008). Cost tracking involves carefully monitoring production costs to identify and address inefficiencies. While these techniques provide a basis for cost control, they generally fail to address the complexity of modern textile manufacturing.

#### 1.1.2 Costing methods

There are two type of costing method in Textile industry.

Job costing is the costing is taken to be a job or work order for which costs are separately collected and computed.

Process costing is the mass production industries manufacturing standardized products in continuous processes of manufacturing. Cost is accumulated for each process or department.

Classification of cost. (Horngren, C. T., Datar, S. M., & Rajan, M. V. 2014).

Standard cost is the cost of producing the requested product at the requested quantity detailed to the consumed component level of both materials and cost elements such as labor, energy etc.

This can be achieved by calculation of the cost per machine hour, broken down to the smallest measurable element:

• Proactive costing is Knowing the cost and margin of each order line before acceptance allows decision makers to confirm or reject an order price by actually knowing the accurate margin of that order before production, this leads to rejecting lines far under the variable cost, avoiding rejection of prices above variable cost but under "full average" cost and prioritizing orders by maximizing contribution per scarce resource hour.



Source: Sahira construction

#### **1.1.3** Importance of cost management

- Calculating overall profit and loss margin of industry.

- Control costs with special techniques like standard costing and budgetary control.

- Cost data and other related information for managerial decision making such as introduction of a new product, replacement of machinery with an automatic plant etc.

-Maintaining the selling prices, particularly during depression period when prices may have to be fixed below cost.

-It helps in inventory control.

-It helps in the introduction of a cost reduction program and finding out new and improved ways to reduce costs. (Sultan Chand & Sons Maheshwari, S. N. (2012)

-Cost audit system which is a part of cost accountancy helps in preventing manipulation and frauds and thus reliable cost can be furnished to management.

#### 1.1.4 Impact of Sustainable Practices

In recent years, the concept of sustainable development has become one of cost management in the textile industry. Niinimäki (2017) argues that while sustainable practices do have high implementation costs (e.g., environmentally friendly materials and energy-saving technologies), they can bring cost savings and operational benefits over a long period of time. In many cases, they reduce costs associated with waste management and regulatory compliance, earning them the status of potential cost optimization strategies.

- Sustainable practices in the textile industry are essential to reducing environmental impact and promoting ethical production.

- Reduced water consumption

The textile industry is known for its high-water consumption, especially in processes such as dyeing and finishing. Sustainable practices aim to reduce water consumption through :

-Water recycling and reuse: Implementing water recycling and reuse systems in the production process. (Fletcher, K. 2018)

-Low-water dyeing technology: Using innovative dyeing methods that consume less water.

-Use of environmentally friendly materials

-Sustainable textiles often involve the use of organic or recycled materials, thereby reducing the environmental footprint:

-Organic cotton is not grown using synthetic pesticides or fertilizers.

-Recycled fibers use materials such as recycled polyester, reducing the need for raw materials.

-Energy efficiency

-Improving the energy efficiency of textile production can help reduce greenhouse gas emissions.

-Renewable Energy Use solar, wind or other renewable energy sources in production facilities.

-Energy-efficient machines are replaced with machines that use less energy.

-Chemical Management Reducing the use of harmful chemicals in textile production is essential for the environment and human health.

-Non-toxic dyes and finishes: Use dyes and finishes that do not contain harmful chemicals.

-Closed-loop systems: Implement systems that capture and reuse chemicals, preventing them from entering the environment.

-Waste Reduction Minimizing waste through various strategies helps create a more sustainable textile industry.

-Zero Waste: Garments are designed to minimize fabric waste.

-Recycling and Upcycling: New products are made from textile waste.

-Social Responsibility Ensuring fair labor practices and improving working conditions are also important aspects of sustainable development:

-Fair wages and safe working conditions: Ensure workers are paid fairly and work in a safe environment.

-Community Engagement Supports local communities and economies.

#### 1.1.5 Examples of Cost Reduction through Sustainability

It also ensures that costs are reduced through investments in sustainability. Kozlowski et al. (2015) stated that investments in water recycling and energy-efficient machinery contribute to environmental sustainability and reduce operating costs. Such investments reinforce how integrated sustainable practices can improve cost efficiency and their contribution to profits beyond environmental benefits.

-Energy efficiency: Implementing energy-efficient technologies and practices can significantly reduce operating costs. For example, using LED lighting, energy-efficient machines, and optimizing production processes can reduce energy consumption and costs.

-Water management: The textile industry is known for its high-water consumption. Adopting water-saving technologies such as closed water loops and water recycling can reduce water consumption and related costs. (Norrman, A., & Jönson, G. 2016)

-Waste reduction: Minimizing waste through better material use and recycling can save costs. For example, using leftover fabrics to make new products or recycling waste into new textiles can reduce raw material costs.

-Sustainable materials: Using sustainable materials such as organic cotton or recycled fibers can reduce environmental impact and sometimes reduce costs in the long run. These materials often require less water and chemicals, resulting in cost savings. (Muthu, S. S. 2020)

- Supply chain optimization: Streamlining the supply chain to reduce transportation costs and improve efficiency can significantly reduce costs. This includes optimizing logistics, reducing packaging waste, and sourcing materials locally.

-Process innovation: Implementing clean production technologies and eco-efficient processes can reduce costs. For example, enzymatic textile processing can reduce energy and water consumption compared to traditional methods. (Azizi, S., & Wong, J. K. W. 2017)

-Circular economy practices: Adopting circular economy principles, such as design for durability, repairability, and recyclability, can extend the life of products and reduce costs associated with waste disposal and raw material sourcing.



Figure 2: Logistics costs impact on the efficiency of supply chain sustainability

Source: Capstera staff

#### **1.2** Innovative approaches to lean manufacturing and supply chain optimization

In the context of the textile industry, the optimization of production processes and the supply chain plays a crucial role in meeting the requirements of efficiency and competitiveness. First, we will address the principles of Lean manufacturing and associated systems. We will then explore the application of Just-in-Time methods, supply chain management strategies specific to the textile industry, the impact of transportation costs on this chain, as well as the integration of advanced technologies to improve the management and performance of supply chains.

#### 1.2.1 Lean Manufacturing and Systems

Lean manufacturing is the most widely used methodology by various business sectors and manufacturing industries. This article explores the essence of lean manufacturing, its techniques, and their impact on textile-based garment production. Many business sectors and manufacturing industries have adopted lean tools and techniques to improve their productivity and efficiency, which ultimately improve their profitability rates. After the implementation of lean manufacturing, industries start adopting various advantages and benefits that will enhance growth in the competitive market. Apparel product manufacturers must focus on improvement in product quality, overall production speed, and operational efficiency to keep their position at the best level and also for the creation of pace in a competitive industry. (Ohno, T. 1988. Toyota Production System: Beyond Large-Scale Production).

Lean manufacturing is a wider and endless concept that was started by Toyota's production system which is also called TPS. Toyota's production system was first used in an automobile manufacturing industry known as The Toyota Way in the US. (Hino, O. (2006). The Toyota Production System: A Cultural Approach to Lean Manufacturing. Productivity Press). The first operational model was implemented in post-World War 1950-60 in Japan at TPS. This concept of lean manufacturing was based on two main pillars which are JIT (Just-In-Time), the inventory management system and JADOKA which means Automated Quality Control. The actual concept

of lean manufacturing is to deal with the reduction and elimination of wastage from the ongoing processes. This wastage is divided into three different categories namely.

- Muda Wastefulness
- Mura Unbalancing
- Muri Overload or Overburdening

These wastages are considered dangerous in the context of lean manufacturing. Implementation of lean tools and methodology reduces and eliminates these various wastages and serves the continued growth of the organization.

In the apparel industry, lean manufacturing, which focuses on lowering production costs, improving overall output, and minimising production times and total lead time, may be the answer. This concept guarantees significant advantages, such as increased productivity, reduced lead times from raw material sourcing to the finishing of goods, shorter cycle times, enhanced product quality, and ultimately, increased profitability. (Lean Thinking: Banish Waste and Create Wealth in Your Corporation. Free Press Womack, J. P., & Jones, D. T. (2003)

#### 1.2.1.1 Lean Tools and Techniques

In garment production, lean manufacturing requires a healthy and lean culture and the implementation of lean tools. In the apparel industry, the VA activities stand for value-added activities, which means the transformation of raw material goods into the finished product that the customer wants, without any waste. These wastages vary depending on the type of department and type of ongoing activity. Individuals can implement lean tools and techniques to reduce work-in-process (WIP) time, minimise production costs, reduce time loss, and improve profitability. However, the whole organisation needs to be involved in discussions to understand the importance and approach of lean tools. So, these are applied to improve manufacturing operations of garment production. Now let us understand the important tools and techniques of lean manufacturing. (Liker, J. K. (2004). The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. McGraw-Hill)

The 5S is the most basic and important tool of lean. It is called the first step of implementing lean manufacturing. It provides serval benefits to the organisation and workplace by keeping cleanliness. 5S implementation in the garment production process is nothing but the ultimate tool for continuous improvement.

The process of implementing 5S is given below:

- Select a workplace to implement 5S.
- Make a list of all the items, pieces of equipment, machines, materials, booklets, paperwork, documents, and other things.

(Note: The list of items or materials will vary from department to department)

- Now do the first step of 5S which is SORT.
- SORT the things based on Necessary items and non-necessary items.
- Then implement the second step of 5S which is SET IN ORDER.
- Now keep the items based on Regular (Daily) use, monthly use, yearly use etc.
- Set the items as per the convenience and preferences of use or application.

(Note: One can add labels, names, or numbering of items, it will help to understand the workplace better)

- After implementing these two S, focus on third S which is SHINE.
- SHINE means cleanliness or cleaning. Keeping the workplace clean and shiny is the objective of this S.

(Note: A daily or monthly calendar of SHINE can be created)

• Standardisation, this is the fourth important tool of 5S. After implementing the above three S. Now there is a primary responsibility of Standardisation. All the team members or the employees working in their respective departments have to take care of standardising the above three steps. Create a habit of it. This lean tool creates a consistent way of doing things and it maintains all the activities, monitoring is also an important step under 5S.

• The last step is Sustain. Sustaining the 5S system is the last but very important. Sustaining the above four steps with consideration of sustainability is also important. It simply means following the good practices going over time.

So, by implementing the above steps a better and healthy workplace can be achieved.

#### - Kanban Board

Kabana is a Japanese word that means visual representation, or visual display board. Kanban boards are mostly used for visualising to do list, and commands related to different activities like, what to do, what is done, and others. They are used in the apparel industry to reduce overproduction on the manufacturing floor, helping to eliminate excess production of goods and create a smarter plan to achieve higher efficiency on the sewing floor. (Ramesh, M., & Thirumalai, S. (2010).

#### - Kaizen or Continuous Improvement

Kaizen is the most commonly used and most popular lean tool. It means continuous improvement or change for betterment. It is a simple philosophy, but it has a never-ending approach and applications. Kaizen in apparel industries' is used for improving ongoing efforts, improving productivity, and strengthening services or processes. At the end of its implementation, one can seek 'incremental' improvement over some time. (Imai, M. (1986).

#### - Value Stream of a Product

VSM in lean stands for Value Stream Mapping. It is one of the popular techniques of lean manufacturing and is widely used for documentation, analysing and improving process flow, and improving man and material movement. VSM also provides information related to materials produced like WIP (work in progress) of different departments, ready-to-sew, ready-to-ship, and others. (Rother, M., & Shook, J. (2003)

#### - Gemba

Gemba is another Japanese term that represents a problem-solving approach by visiting or attending to the actual place where a problem is occurring. A Gemba walk involves various processes and a series of activities, such as asking and collecting the right information from the root cause area. It is considered the best way to solve real problems, as it entails physically being at the location rather than sitting in an office and depending on others to collect data before taking corrective actions. The Gemba team understands the problem and subsequently implements the right tools or techniques to address it.

#### - KPIs

KPIs, also known as KRAs (Key Result Areas), are highly important in any manufacturing organisation. They are tools used for measurement to understand a company's current situation, enabling them to focus on implementing new practices to achieve their next goals. KPIs vary from department to department and from one organisation to another. Without KPIs, it is challenging to sustain competitiveness in the business world. They assist in achieving goals through a problem-solving approach. (Neely, A., Gregory, M., & Platts, K. (1995).

#### - Bottleneck Analysis

Bottlenecks are operations where the required outputs are not generated efficiently or as per capacity. In the production of garments, bottleneck operations can significantly impact the total productivity of the sewing floor. Therefore, eliminating bottleneck operations is a crucial step. To achieve this, bottleneck analysis is carried out in the sewing and finishing departments with the aim of removing operations that hinder the production flow. (Goldratt, E. M. 1990).

#### - Total Quality Management (TQM)\*

TQM is a powerful technique for quality improvement. Total Quality Management is a lean management approach that focuses on quality assurance and quality control of goods, centralising quality. It aims to achieve optimum quality and, consequently, customer satisfaction. However, the implementation of TQM requires a longer time period, extensive teamwork,

leadership qualities, team building, and management involvement, especially from top management. (Evans, J. R., & Lindsay, W. M. 2014)

#### - Root Cause Analysis

RCA in the apparel industry stands for Root Cause Analysis. It employs a problem-solving approach. This tool mostly works on the principle of identifying the root causes of problems, and various departments use this methodology to identify and solve the problems permanently. In the apparel industry, industrial engineers, the quality department, the finishing department, and even the merchandising department adopt this tool to address and eliminate problems through the implementation of lean tools and techniques.

#### **Right First Time (RFT)**

RFT is a tool that ensures the quality and production of apparel goods. Simply put, it is a quality improvement tool. In the apparel industry, everyone focuses on achieving a certain level of right the first time.

#### - PDCA

Lean tools always aim to eliminate hazardous waste from the production process. PDCA stands for Plan, Do, Check, Act or Adjust. These four steps are part of a management process that assures quality standards and focuses on continuous improvement. Planning is the most important step in solving any problematic situation, and taking corrective action based on the problem is 'Do'. After implementing the corrective action, checking or cross-checking is also important. In the last step, action or adjustment based on the result is necessary. If the outcome is different than expected, then cycling through these four steps is necessary until the desired results are achieved. (Deming, W. E. 1986).

#### - **Overall Equipment Effectiveness (OEE)**

OEE is one of the best lean techniques for assessing a manufacturing process's productivity. It is defined in terms of percentage. If OEE is 100 per cent, the manufacturing factory is considered fully productive. It also indicates that the produced goods meet the highest quality standards, and there are no idle processes. However, if OEE is 50 per cent, it signifies those various factors are affecting the quality and performance, prompting the need for process improvement. (Santos, J. R., & Silva, S. S. 2015).

#### - Poka-Yoke (Mistake Proofing)

Poka-yoke is a Japanese word which means mistake-proofing or error-proofing. These tools help to reduce and eliminate mistakes throughout the manufacturing process and aim to achieve high-quality levels of the goods. Poka-yoke is a quality control technique.

#### - Zero Quality Defects

This technique of lean is not easy to implement, but after the successful implementation, the industry can achieve all the possible outcomes related to product quality and service. Zero quality defects involve maintaining a process with no defects, and it can be achieved through 100 per cent production inspection. (Bicheno, J., & Holweg, M. 2016).

#### - Lean Six Sigma

Six Sigma is a tool which has a data-driven approach and is mainly implemented to reduce defects and variations throughout the manufacturing processes. It uses statistical methods to deal with achieving high levels of quality and consistency while manufacturing apparel products or goods. Lean Six Sigma is widely used in apparel and other industries to enhance quality, reduce costs, and increase customer satisfaction. It is the best and most powerful tool for organisations seeking to optimise their operations. (Chiarini, A., & Vagnoni, E. 2015).

#### **Benefits of Lean Implementation:**

- Different tools and methodologies of lean aim to "improve productivity and quality of apparel products".
- The primary objective of lean projects is to 'eliminate waste and problems.
- Tools like 5S, JIT, and kaizen 'reduce the Work in Process (WIP) inventory from the respective departments.
- Implementing appropriate lean techniques "reduces inventory area, overall cycle, and total lead time".
- It smoothens the production flow at "controlled manpower, through utilising time and space".
- Kanban boards and systems improve the "visual management system' in the workplace and organization".
- Right lean approach can "reduce machine downtime, the total cost of manufacturing and regular maintenance problems".
- It optimises resources, sustainability, employee satisfaction, and increases profit'.
- Lean highlights the "efficiency gains achieved through streamlined processes, resulting in faster production cycles".
- And last but not the least "improved customer satisfaction' by providing goods with optimum quality, at higher efficiency, which provides customer satisfaction and increases the rate of profitability".



Source: Medium Press

#### 1.2.2 Lean Manufacturing and Just-in-Time Systems

Just-in-time is a Japanese manufacturing management method developed in the 1970s. It was first adopted by Toyota manufacturing plants by Taiichi Ohno. The main concern at that time was to meet consumer demands. Because of the success of JIT management, Taiichi Ohno was named the Father of JIT. The just-in-time manufacturing system is considered a pull system. The principle of Just in Time (JIT) is to eliminate sources of manufacturing waste by getting the right quantity of raw materials and producing the right amount of products in the right place at the

## right

The ultimate goal of JIT is a balanced, smooth, and rapid flow of materials through the system.

This can be achieved by approaching the following supporting purposes first;

- Zero defects.
- Zero inventories.
- Zero set–up time.
- Zero handling.
- Zero breakdown.

The objectives of JIT can be mentioned as shown:

- Produce with perfect quality.
- Produce with minimum lead time.
- Produce products with only those features the customer wants.
- Produce with no waste of labor, material, or equipment; every movement must have a purpose so that there is zero idle inventory.
- Produce with methods that allow for the development of people.

time.



*Figure 4 : Just In Time Objectives* Source: Market Business News

Just-In-Time (JIT) in Textile Manufacturing, Revolutionizing Efficiency and Quality. Streamlined Production Processes:

JIT focuses on reducing inventory and maintaining minimal stock levels. In garment manufacturing, this means having the suitable materials and components arrive precisely when they're needed for production. By eliminating excess inventory, manufacturers can free up space, reduce holding costs, and minimize the risk of wastage due to obsolescence.

Enhanced Efficiency and Cost Reduction:

Through JIT, garment manufacturers can optimize their processes, resulting in smoother workflows. It allows for more efficient use of resources, reduced lead times, and minimized setup times for equipment. This leads to cost savings as it reduces idle time and allows for a more agile response to changing market demands.

#### - Quality Improvement:

JIT emphasizes quality control at every stage of production. By receiving materials exactly when needed, manufacturers can ensure the quality of inputs and address issues promptly. This stringent control minimizes defects and rework, leading to higher-quality end products and increased customer satisfaction.

- Flexibility and Adaptability:

Implementing JIT in garment manufacturing enhances the ability to respond swiftly to changes in consumer demands and market trends. This adaptability allows manufacturers to adjust production schedules, change product designs, and meet custom orders more efficiently, maintaining a competitive edge in the market.

- Collaborative Supplier Relationships:

JIT fosters strong relationships between manufacturers and suppliers. Close collaboration ensures that suppliers understand the specific needs and timelines of the manufacturer, leading to smoother material flow and timely deliveries. This relationship is built on trust and reliability, crucial elements in JIT implementation.



Source: Mazharul Islam Kiron

#### **1.2.3** Supply Chain Strategy in Textile Industry

Supply chain strategy plays a central role in the textile industry as it shapes the smooth flow of raw materials, production processes, and final product delivery. In the textile industry, where efficiency and precision are paramount, a well-defined supply chain strategy becomes the cornerstone of success. The strategy includes an integrated approach that considers sourcing, manufacturing, logistics, and distribution. In the textile industry, the importance of a robust supply chain strategy must be constantly emphasized as it not only optimizes costs but also ensures timely availability of materials and quick flow of goods. Strategic alliances among suppliers, manufacturers, and distributors foster collaboration and improve overall supply chain efficiency, enabling the textile industry to adapt to market dynamics and meet customer needs effectively. In conclusion, a fine-tuned supply chain strategy for the textile industry is key to operational excellence and the ability to gain a competitive advantage in the global market. (Christopher, M. 2016).

A profound revolution is taking place in the evolving textile industry, reshaping the fabric of supply chain management. This wave of change represents a departure from entrenched methodologies as the industry enthusiastically embraces cutting-edge technologies and disruptive strategies. The convergence of artificial intelligence, data analytics, and an unwavering commitment to sustainability is paving a new path for how the textile supply chain operates. More than just cosmetic changes, these innovations are sparking fundamental reforms that improve efficiency while promoting environmental responsibility. (Cao, H., & Zhang, D. 2020).

The introduction of technologies such as artificial intelligence and blockchain is driving the textile supply chain into an era of interconnectedness and transparency. At the heart of this transformation is real-time data analysis, a game changer that provides stakeholders with valuable insights for accurate demand forecasting, prudent inventory management, and waste reduction. Beyond the technological frontier, a decisive shift toward sustainability is underway. The industry places a high priority on conscientious sourcing, prioritizing environmentally friendly materials, and advocating ethical manufacturing practices. (Zhao, X., & Xie, X. 2021).

#### **1.2.4** Transportation Costs and Supply Chain Impact

Among all other components of the overall supply chain cost, transportation cost plays a vital role that may contribute much to cost optimization. Many studies have found the share of transportation costs in the total cost of supply chain flow can be very high, and this depends on various factors, such as fuel prices, route efficiency, and logistics management, among others (Lambert et al., 1998). This includes integrating efficient route planning, shipment consolidation, and the use of technology to further improve logistics coordination. Innovations in TMS capability include real-time order tracking and analytics data. Each one of these would serve to enable companies to reduce their costs and enhance their delivery performance.

Transportation costs and supply chain disruptions have significantly impacted the textile industry, especially in recent years.

Increased Transportation Costs: The cost of shipping has risen dramatically. For example, transpacific container shipping costs increased by 300% in 2011. This rise is due to various factors, including fuel prices, labor shortages, and increased demand for shipping services.

Supply Chain Disruptions: The COVID-19 pandemic exposed the fragility of global supply chains. Lockdowns and restrictions led to factory closures and delays in production, particularly in countries heavily involved in textile manufacturing like China, Bangladesh, and Vietnam. This caused significant delays and increased costs for raw materials and finished goods.

Shift in Sourcing Strategies: Companies are now looking to diversify their supply chains to reduce dependency on a single country or region. This shift aims to mitigate risks associated with future disruptions. (Jain, A., & Kumar, R. 2021).

Operational Adjustments: Textile firms are adopting various strategies to optimize transportation costs. For instance, some are using operations research techniques to minimize distribution costs. These factors collectively contribute to higher costs and delays, affecting the overall efficiency and profitability of the textile industry.

#### 1.2.5 Advanced Technologies in SCM

Advanced technologies are transforming Supply Chain Management (SCM) in the textile industry, enhancing efficiency, transparency, and sustainability.

- Internet of Things are used to track and monitor the movement of goods throughout the supply chain. This real-time data helps in managing inventory, reducing waste, and improving overall efficiency. (Gupta, R., & Patil, S. 2021)
- Artificial Intelligence are employed for demand forecasting, inventory management, and optimizing production schedules. AI can also be used for quality control, identifying defects in fabrics, and ensuring consistent quality.
- Blockchain technology provides a secure and transparent way to track the origin and journey of textile products. This enhances traceability and helps in verifying the authenticity of materials, which is crucial for sustainability and ethical sourcing. (Thomas, J., & Anderson, L. (2022).
- Big Data Analytics By analyzing large volumes of data, companies can gain insights into consumer behaviour, market trends, and supply chain performance. This information is used to make informed decisions and improve supply chain operations.
- 3D Printing technology is used to create prototypes and even final products, reducing the need for large inventories and enabling on-demand production.
- AR and VR are used for virtual prototyping, design collaboration, and even virtual shopping experiences. These technologies help in reducing the time and cost associated with product development and enhance customer engagement. (O'Connor, M., & Black, P. 2022)
- Advanced Materials Innovations in materials, such as anti-bacterial and anti-viral textiles, are improving the functionality and sustainability of textile products. (Smith, J., & Clarke, K. 2020).

#### **1.3 ERP Systems and Their Role in Cost Optimization**

They play a crucial role in the optimization of costs within the textile industry by managing and co-coordinating various operations with increased efficiency. (Basu, R. 2016).

They help to maintain the inventory at optimal levels. This reduces the cost of storage and decreases the amount of waste products. ERP systems automate various production-related processes, thereby reducing manual involvement and errors, which results in faster production cycles and reduced labor costs. They also facilitate better quality control by promptly detecting defects so that rework and scrap costs can be minimized. Improved communication and coordination with suppliers mean that procurement processes and logistics can be further optimized to reduce transportation costs. In addition, ERP systems allow for detailed financial insights, thereby enabling the precise tracking of costs and proper budget management. Overall, the ERP system will allow it to save costs and ensure long-term profitability by optimizing the use of resources and increasing the efficiency of operations within the textiles industry. (Wang, J., & Chen, C.2018).

#### **1.3.1** Evolution of ERP Systems in Cost Management

ERP systems have emerged as core enablers in organizations to optimize costs through the integration of a number of business functions into one system. Their implementation will let the organization conduct its operations with efficiency: from procurement and production through logistics to financial management. Over the years, ERP systems have transformed from simple operational systems to advanced platforms that can handle all kinds of cost management challenges. (Venkatesan, M., & Rajendran, R. 2019).

Advanced ERP systems such as SAP, Oracle, and Divalto Infinity are able to process data in real time, enhance analytics, and widen reporting. With improved visibility over business operations, managers are able to identify areas of inefficiency, reduce costs, and better allocate resources. This elevation of ERP functionality has caused ERP systems to become increasingly adopted across multiple industries, but this is especially so in those that are sensitive to cost, such as manufacturing and textiles. (Verma, H., & Mehta, A. 2021).

#### **1.3.2** Impact on Cost Management and Efficiency

ERP systems have a very deep impact on cost management, basically because of the capability to rationalize several business functions and processes. While integrating different operation areas like inventory control, production planning, and financial management, an ERP system itself updates data in real time, adding analytics that enable businesses to make informed decisions about cost control.

One of the huge advantages of modern ERP systems is their ability to become very effective in enabling the company to enhance its supply chain management. An ERP allows them to view the supply chain; hence, it improves demand forecasting, inventory management, and procurement to ensure a reduction in holding costs, minimal stockouts, and improved transportation logistics, making several opportunities for cost reduction. Sophisticated financial modules of the ERP systems confer on the firm's higher accuracy in tracking expenses and performance to find the opportunities for cost-cutting. (Pereira, P. 2019).

#### 1.3.3 Gaps in Existing Research on ERP Systems and Cost Optimization

#### **Integration of Sustainability Practices with ERP Systems**

Although ERP systems are widely recognized for their roles in operational and cost efficiency, there is a noticeable research gap concerning the integration of sustainability practices within ERP platforms. This is particularly critical since businesses increasingly face pressure to adopt sustainable practices, and thus understanding how ERP systems support environmental initiatives becomes as important as traditional cost-saving measures.

It would, for instance, be empirical research into the role of ERP systems in tracking and optimizing sustainability metrics that include energy consumption, waste reduction, and responsible resourcing. Other studies might explore how organizations could attain economic and environmental goals by adopting ERP systems in those industries where sustainability is turning out to be one of the chief cost management drivers. (Davenport, T. H. (2018).
### **Role of Emerging Technologies in ERP Systems**

In other words, there is a starting point from which the ERP systems are being reshaped with emerging technologies like AI, machine learning, and predictive analytics, although the potential for full benefits is at a limited research level. It is very probable that in such a context, these technologies revolutionize how cost management is handled within an ERP system by way of shifting from traditional process optimization to predictive and prescriptive capabilities. (Hwang, D., & Lee, H. (2021).

For example, embedding AI and machine learning into an ERP system can enhance demand forecasting, production scheduling automation, and transportation route optimization-all of which directly impact cost management. Predictive analytics would allow an organization to forecast future trends in the cost, inventory needs, and market condition. However, how far these technologies are used in ERP systems, especially on cost optimization, has to be researched more and empirically validated. (Tariq, M., & Khan, S. (2020).

## 1.4 Analytical and Strategic Framework

### **1.4.1** Ishikawa (Fishbone Diagram)

The Ishikawa diagram, which is commonly called the Fishbone diagram, or a Cause-and-effect diagram, gives a visual representation that makes it easy to identify and evaluate the underlying reason for a problem. In the textile industry, it aids in locating the sources of losses in production, quality control, and supply chain management. By grouping various possibilities (e.g., equipment, materials, procedures, personnel, surroundings), this approach helps not only in resolving problems but also in enhancing a number of business processes, reducing expenses and assuring quality management in the process. (Nayak, R., & Choudhury, A. 2015).

## 1.4.2 SWOT Analysis

Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a strategic tool that helps analyze both the internal and external view of an organization. SWOT analysis template in textile industry allows companies to define their core strengths (such as skilled manpower and modern machines), counter weaknesses (high cost of production, old methods), seize opportunities (such as eco-friendly products and new markets), and respond to threats (intensifying competition, legislative restrictions). This adequate analysis maintains a consistency between cost control and strategic plans for growth. (Ravi, P., & Gaur, V. (2016).

### **1.4.3 PESTEL Analysis**

PESTEL stands for Political, Economic, Social, Technological, Environmental, and Legal factors that are relevant to the analysis of the external macro-environment of the company. In this regard, the focus is set upon trade policies and regulations in the textile industry, labor legislation, technologies and ecological factors. This analysis helps firms to manage their expenses in line with the external changes such as the requirements on sustainable development, technological change and change in economic conditions. (Verma, S., & Nair, M. (2020).

### 1.4.4 5why's Method

The acronym QQOQCCP refers to Who, What, Where, When, Why, How and How Much. This is an orderly methodology that guides in tackling a problem by focusing on all the important components of a particular case. In the textile industry, it helps in making decisions regarding, resource allocation, production planning, and logistics optimization among other aspects. This method, by addressing each of its elements, enables sound and cost-effective solutions as well as improvements in productivity. Kumar, S., & Soni, P. (2015).

### Conclusion

In the first part of this study, a complete set of analytical and strategic tools, including Ishikawa, PESTEL, SWOT, and QQOQCCP, have been proposed as tools to identify resource inefficiencies and cost minimization opportunities in the textile industry. These tools are valuable to better understand the internal and external environment behind the operations and to lay a solid foundation for further analysis.

In the second part of this study, we will outline the application of each stage of the DMAIC (Define, Measure, Analyze, Improve, Control) method to eliminate and reduce logistics costs, a key element of cost optimization in the textile industry. A data-driven approach is adopted to point out the needs of customers, analyze the impact on process efficiency, and then identify trending measures to improve the process. This work explains how to rationalize logistics processes, improve cost efficiency, and achieve sustainable optimization mechanisms using the DMAIC method.

This study focuses on WIC MIC, a leading industrial jeans manufacturer in North Africa, to provide a practical perspective. As a major player in the textile industry, WIC MIC's operations and logistics provide a useful background for us to find opportunities for cost reduction. This study aims to propose practical strategies for improving logistics, increasing cost savings, and improving continuous efficiency using the DMAIC method.

# 2. LOGISTIC ANALYSIS AND STUDY CASE (WIC MIC)

The second part of this study covers the use of the DMAIC methodology, which stands for Define, Measure, Analyze, Improve, and Control. Here we focus primarily on the first three steps: Define, Measure, and Analyze. These steps help us address the challenge of reducing logistics costs in the textile industry.

In this section, we use the example of WIC MIC, a leading jeans manufacturer in the North African textile market. In the Define step, we identify the logistics cost problem, set goals, and outline the specific issues facing WIC MIC. The Measure step involves collecting detailed information about its logistics activities, transportation costs, and other important processes, which provides a starting point for our analysis. In the Analyze step, we take a closer look at the data we have collected to identify the causes of inefficiencies and high costs in the company's supply chain.

By focusing on these three DMAIC steps in this section, we use a structured, data-driven approach to help us develop actionable recommendations. This analysis is essential to developing an effective cost optimization strategy in the subsequent parts of the study.

The key questions to be answered in this section are: What are the main reasons for WIC MIC's high logistics costs? How can these causes be systematically identified and analyzed to drive cost optimization?

### 2.1 Company introduction (WIC MIC)

WIC MIC Group was founded in 1974 by Eric Linczowski and has experienced periods of progressive development during its activities. WIC started with the manufacture of duvets which was the first area of its activity in 1974. In 1991, the group evolved to acquire a company that provides all the necessary treatments for all kinds of denim products namely washing, dyeing, sanding, finishing up to packaging. In order to develop in 2005, the group established a new MIC

platform "Manufacturing International Company" in Ras Jbal Bizerte. In addition, in 2006, the group established a MIC 2 warehouse in Ras Jbal Bizerte, specialized in fabric storage. But also, it generated more the MIC 3 warehouse in Ras Jbal Bizerte specialized in the collection of Jeans in 2007. Consequently, the WIC MIC group gave birth to a new company which called FIC company "Finishing International Company" in 2008, this company is specialized in the treatment of special effects of articles in Jeans in Manzel Abderrahmane in Bizerte. To finish with another creation in 2009 it was the OSALICE final company of confection in El Alia Bizerte.

## Figure 6: Company Structure

o Company name: Manufacturing International Company
o Legal form: Public limited company
o Share capital: 20,000,000
o Address: Route Metline, 7070 Ras Jebel-Bizerte Tunisia
o President (manager): Mr Éric Linczowski
o General manager: Mr Nadhir Kefi
o Deputy director: Mr Mabrouk el Bayathi
o Date of foundation: 2005
o Workforce: 470 employees
o Field (sector of activity): Textile
o Head office: Rue Ibn Nadim, 1073 Montplaisir-Tunis
o Main activity: manufacturing

Source: Composed by the author

## 2.1.1 The objectives of the MIC company

The objectives of MIC are as follows:

- Quality first and respect for deadlines.
- Produce the required quantity.
- Meet deadlines.
- Product conforming to the desired quality.
- Reduce costs.

These objectives allow the company to satisfy more needs in order to retain its customers and continuously increase its market share.

### • Customer satisfaction

Customer satisfaction is the main objective of the company, it is in fact the key to its success throughout its sustainability in the market, therefore each member of the company must be aware and available whether in direct or indirect contact with the customer.

### • Quality

The company must provide and offer a product that meets quality standards and customer expectations to meet their required needs such as raw material, finishing, etc. in such a way that the company requires a quality required to ensure total confidence on the part of the customer.

## • Deadlines

Respecting deadlines is an essential factor for the company to ensure the continuity of production lines, optimize its operation, avoid stock shortages as a result and respect delivery deadlines.

### • Safety

Human capital is the most important resource for MIC, this has led managers to think more about their motivation and safety by providing them with all the necessary means to work in good conditions. The company provides first aid training once a year, as well as a doctor who intervenes to advise workers on the use of machines.

## • Increase in market share

This is the primary objective for MIC, which allows it better visibility on a global scale thanks to the production of good quality products.

### 2.1.2 Activities of the different departments

### 2.1.2.1 Activities of the purchasing department

This department ensures the placing of orders and monitors the quality of the services purchased. The main objective of the purchasing function is to provide the raw materials necessary for production at the best quality/cost/deadline ratio, but it also ensures the purchase of all the factory's needs.

The purchasing department is considered as "a cost center": it is up to the purchasing manager to put negotiated agreements with its suppliers and this by setting rules (delivery times, quality, payment method) and to bring together the effects that result from it so that the purchasing department becomes "a profit center"

A purchasing manager selects products according to priority, and the choice of suppliers is made according to the quality of the products, their price and the delivery time.

□ MIC's purchases are divided into two types:

Local purchases: are made with Tunisian suppliers.

Foreign purchases: are made with European or Asian suppliers.

Communication with suppliers is done by OUTLOOK messaging or by telephone.

The purchasing department includes logistics activities:

☐ Ensure the smooth running of the supply chain and ensure coordination between the different links in the chain.

 $\Box$  Ensure receipt of the right raw materials, at the right time and in the right quantity.

□ Guarantee compliance with customer-specific procedures.

□ Guarantee compliance with delivery times

□ Ensure functional relations with the various departments and with suppliers.

□ Organize transport: choose the mode of transport, select the carrier according to well-defined criteria to optimize transport costs.

□ Manage anomalies / malfunctions, and monitor complaints.

□ Solve material delivery problems (non-compliant deliveries)

☐ In practice, it is mainly dedicated to the management of the flow of goods. The purpose of logistics is to complete the routing of products from the place of delivery in the exporting country to the importer's warehouse in the importing country, it is a question of organizing the routing of goods in the best economic conditions and the best deadlines.

### 2.1.2.2 Activities of the planning department

It deals with detailed work planning for the company, this concerns the successive production operations that meet customer requirements.

Main tasks: this department has a dual role; it deals with launch operations and export operations. Its purpose is to establish the rules for processing and monitoring orders:

- A detailed preliminary study.
- Planning
- Control
- Launch of the order.

Established operations:

- Reception of orders.
- Creation of manufacturing orders.

## 2.1.2.3 Activities relating to the quality department:

Quality is the basic concept in the product implementation process. In this perspective, the establishment of a quality department in the MIC company is a prerequisite for ensuring the desired quality.

This department ensures that the quality of the products complies with the standards and requirements imposed by the customer and manages the production of non-compliant products.

The tasks of a quality department consist of:

- $\Box$  Evaluating the quality system
- □ Taking corrective and preventive measures.
- □ Setting up and monitoring the necessary indicators.
- □ Ensuring that the quality system regulations are applied.
- $\Box$  Ensuring that the quality meets the standards.
- □ Maintaining the quality system.

## • Products offered:

The WIC MIC group company offers a wide range of jeans products for women / men / children: pants, shirts, skirts, vests, etc.

## 2.1.3 WIC-MIC Company Process

Purchasing process description :

## Management process

Management: The "Management" sub-process is managed by the Deputy

Director. The purpose of this sub-process is to transmit to the purchasing process the logistics strategy (push flows, pull flows, tight flows, etc.), to transmit the commercial and overall performance objectives in conjunction with general and commercial management.

### Key Account

The purpose of this sub-process is to transmit to the purchasing process the research and development strategy with material quality.

### • Quality

The purpose of this sub-process is to transmit to the purchasing process the Quality, Safety and Environment Management strategy.

These are mainly normative requirements related to ISO 9001 (quality management), ISO 14001 (environmental management), ISO 45001 (Occupational health and safety management). These requirements are often supplemented by regulatory and CSR-related requirements (supply distance, ethical issues, choice of suppliers certified on eco-design, fair trade, etc.).

## • Implementation process

## • Needs management

This sub-process aims to collect needs and define their supply criteria.

These criteria can be defined in the form of specifications that will then be validated by the various interested parties.

### • Inventory management

This sub-process will consult the stocks in relation to the previously defined needs, it will assign the quantity to be ordered and then validate the purchase request. It will also be responsible for negotiating a delivery schedule.

## • Supplier selection

This sub-process will select suppliers in accordance with the various requirements (commercial, technical and Quality, Safety, environmental requirements) provided that the diggers are not imposed by customers. It will therefore ensure that the list of suppliers remains up to date. At the end of the purchasing process, it will be responsible for evaluating the suppliers.

## Carrier Selection

This sub-process will select carriers taking into account the input data from supplier selection and management sub-processes.

It is responsible for organizing transport, monitoring carriers, and transmitting carrier complaints.

## • Processing of goods

This sub-process will begin when the purchase order is transmitted to the digger until the product is delivered.

## • Updating data

This sub-process will be responsible for updating data in the company's ERP (purchase price, list of suppliers, updating supplier specifications, etc.).

### Support Process

They contribute to the smooth running of the purchasing process (invoicing suppliers, checking goods upon receipt, reporting information in the event of non-conformities upon delivery, etc.). To close the continuous improvement loop, the purchasing process transmits to the management processes all the output data from the process (supplier evaluation, complaints from the various sub-processes, malfunctions encountered, etc.) in order to allow the management processes to question their operations and, if necessary, adapt their strategies.

### 2.1.4 Logistics costs

Logistics costs are the financial cost associated with transporting a good from its place of manufacture to the point of sale such as transport, transit, storage, freight, etc.

### 2.1.4.1 Transport

The cost of transport is a very sensitive parameter for the company that directly affects the price of the product, the more the transport costs are well optimized by the company, the more the price of these products is well controlled

To optimize transport costs, one can act on one of the following factors

- $\Box$  Choice of carrier
- □ The incoterm used
- □ Negotiation of rates and conditions

To succeed in exporting, it is essential to develop a good transport strategy. It is therefore essential that the exporter knows and understands the different modes of transport with their advantages and disadvantages, to choose the one that will best meet his needs and those of his customer. Indeed, delivering a product to a foreign country can be a highly complex task.

Delivery time plays a major role in choosing a mode of transport (air rather than sea, rail rather than road), depending on the customer's needs, the characteristics of the product and the conditions of the sales contract. Generally, it is the customer who will determine when he wishes to receive the goods.

Generally, international transport of goods is mainly carried out by sea or air.

Maritime transport	Rail transport		
River transport	Postal transport		
Air transport (cargo)	Road transport		

Table 1 : Transport mode

Source: Composed by the Author

Each mode of transport has advantages and disadvantages:

Mode of transport	The advantages	The disadvantages		
	- Advantageous freight	- Long delays		
Maritime transport	rates	- Some lines do not		
	- The least expensive	transport containers		
(Any movement of goods or	- Best suited for heavy	- More expensive insurance		
persons by ship on routes	and bulky transport	and packaging		
carried out partially or	- Many geographical			

Table 2: Advantages and Disadvantages of each transport mode

entirely at sea)	areas served		
	- Speed		High prices for sending
Air transport	- Safety for the goods		dense or low-value
	(horizontal handling)		goods
(Air transport is the	- Regularity and reliability	-	Prohibited for certain
economic sector that	nat of transport		dangerous products
includes all air transport - Inexpensive packaging		-	Unsuitable for bulky
activities, air transport of	- Lower financial and		products.
goods has experienced very	storage costs		
strong growth in recent	(Adapted to supply		
years thanks to the	management methods		
enlargement of aircraft	calculated according to the		
baggage compartments) needs of the company over			
	a short period)		

Source : Composed by the author

# 2.1.4.2 Transport in the company (WIC MIC)

MIC has chosen to concentrate on its core business, and to use a logistics service provider (LSP) to handle the transport of both imported and exported products, in coordination with the company's own transport function.

In fact, the company uses several LSP's for both national and international transport. This includes

- Transport of raw materials (accessories, fabrics, supplies) in the case of imports.

- Transport of finished products (pants, shirts, skirts) for export.

# 2.1.4.3 The Incoterm 2020

Incoterms are unique terms generally reduced to acronyms that are interpreted in the same way throughout the world. They are used to distribute risks between the importer and the exporter as well as the cost related to a goods delivery operation. They do not represent a transfer of ownership.

Incoterms 2020 are classified into different categories based on the level of responsibility and risk involved in the transaction. The currently accepted Incoterms 2020 edition include 11 terms, which are grouped into two categories:

Incoterms 2020 for any mode of transport: These Incoterms 2020 can be used for any mode of transport, including road, rail, air, and sea transport. They are:

EXW (Ex Works) FCA (Free Carrier) CPT (Carriage Paid To) CIP (Carriage and Insurance Paid To) DAP (Delivered at Place) DPU (Delivered at Place Unloaded) DDP (Delivered Duty Paid)

Incoterms 2020 for sea and inland waterway transport: These terms are specifically designed for use in transport by sea and inland waterway. They are:

FAS (Free Alongside Ship)FOB (Free on Board)CFR (Cost and Freight)CIF (Cost, Insurance, and Freight)

Incoterms 2020 have specific meanings and defines the obligations and responsibilities of the buyer and seller in relation to the delivery of goods. For example, under EXW, the seller is responsible for making the goods available at their premises, while under CIF, the seller is responsible for arranging and paying for the transport and insurance of the goods to the port of destination.

Figure 7: Incoterm 2020



Source: WINGMAN FREIGHT EXPRESS

### 2.1.4.4 Freight

Each mode of transport has its own pricing system. The main carrier always calculates the freight rate to its advantage (weight or volume).

Air freight, as defined by the OACI, refers to goods transported for remuneration, with the exception of mail (which is subject to a monopoly under the provisions of the Universal Postal Union).

In air freight, packages are generally grouped and transported in special containers installed in the aircraft's storage area.

The taxable weight is equal to the maximum between the gross weight of the goods in tons and the volume in m3 divided by 6.

If the air carrier were to calculate freight costs on the basis of weight alone, he could find himself with very light goods whose volume would occupy the entire hold.

Sea freight is the most important mode of transport for importing or shipping goods internationally. It involves transporting goods by sea over long distances. These goods are packaged in standardized containers to avoid any handling from the point of departure to the final destination.

To the basic sea freight cost can be added permanent adjustments (port dues, quay dues, etc.) and cyclical adjustments such as:

- BAF: compensates for changes in the price of a barrel of oil

- CAF: Corrects for changes in the currency in which freight is invoiced.

Road freight: this is a mode of land transport that uses roads to move goods. There are 2 types of road freight:

- International road freight: goods are imported or exported between Tunisia and other countries using trailers (sheeted or covered).
- The trailer may be intended for a single customer, or for several customers in the case of a groupage trailer.

• National road freight: is the movement of cargo ranging from small boxes and pallets to large/heavy parcels.

## 2.2 DMA (Define, Measure, Analyze)

The DMAIC technique is now used to systematically address the logistics cost issues identified in the first part of this study. This methodical, data-driven approach ensures a deep understanding of the problem and opens the door to practical solutions. The Define phase begins the analysis and includes precisely defining the problem, establishing clear objectives, and determining the study parameters relevant to the WIC MIC logistics operations.

### 2.2.1 Identification of causes

In this part, we have chosen to use specific tools that can help us identify the root causes that lead to various problems.

Starting first with the "5why" method

The 5 Whys?

The 5 Whys, is a problem-solving tool that allows us to identify the root causes of a dysfunction within a company. By successively asking ourselves five questions starting with "Why" (Why is our turnover falling?), the manager is able to identify the main cause of the problem.

Thanks to these five questions, developed in a relevant manner, the manager is able to point out the root cause of the failure and thus make the appropriate decisions.

The principle is to start from the observed effect - in this case the problem (or the effect) - and go back to the root cause by a succession of Why?" questions.

Figure 8: 5 why's method



### Source: Medium Press

The designers of this method believe that by deepening the search for causes by asking questions 5 times, we are able to identify the roots of the malfunction. Too few iterations and the real cause is not found. Too many repetitions this time generate the risk of getting lost in unmanageable details. In practice, this number of 5 is not absolute. Depending on the problem, more or less iterations will be needed to arrive at an understanding of the original causes.

However, some prerequisites must be respected: identifying and analyzing possible causes requires a good knowledge of the problem environment. It is unthinkable to embark on such an analysis if the person(s) in charge of resolving the malfunction are not sufficiently competent in the field in question.

Case study: Development of the 5 why's in the WIC MIC:

Figure 9: Development of the 5 why's in the WIC MIC



Source: Composed by the author

#### 2.2.2 Ishikawa diagram (Measure)

The Ishikawa diagram, also known as the cause-and-effect diagram or fishbone diagram, is a key tool in problem-solving for companies experiencing operational problems. This method, developed by Kaoru Ishikawa, is very effective for finding the roots of problems, and it is one of those things that every business should consider in order to get things running quickly and efficiently.

For companies like WIC MIC, the Ishikawa diagram is priceless, considering the context of the Measure phase of the DMAIC methodology. The tool helps in the identification of all the potential causes-either direct or indirect-which result in the problem being observed. For example, if inefficiency or increased cost of logistics occurs in WIC MIC, the Ishikawa diagram will answer the crucial question: Why is this happening?

This diagram maps the causes in a tree-like structure, with branches, much like the skeleton of a fish. It then groups these causes into categories and priorities so that the company can focus on the most influential factors touching the problem. The use of this visual presentation enhances communication and collaboration among team members through the provision of a clear, all-inclusive overview of the problem and its root causes.

The Ishikawa diagram should be used in the Measure phase of the DMAIC process to ensure that any collection and analysis of data are both complete and focused. The result is a basis from which critical areas for improvement can be determined, setting the ground for effective solutions in subsequent phases. It is an important tool to help WIC MIC diagnose and resolve its logistics challenges efficiently.

The causes of a problem can be grouped into five categories, the 5 Ms:

- Method: The production process of the product or service. Research and development.
- Material: The materials used to produce the good.
- Environment: The competitive context, the state of the market.

- Material: The machines, the computer equipment and the software. All the equipment used to add value to the basic material.
- Workforce: The employees and all the human interventions (HR).

It is entirely possible to create new categories of causes depending on the problem observed and the objectives of the company. A "sixth M", for Financial Means, can be added in order to give particular importance to this aspect which is normally included in Material. The main thing is to adapt the branches according to the context of the company, its objectives and its problem.

## Figure 10: Ishikawa cause and effect diagram



Source: Tech Quality Pedia

The methodology for constructing an Ishikawa diagram can be divided into four main steps:

## **1. Identify the effect**

This is a relatively easy step, because the problem is generally perceptible to the entrepreneur. This effect can take an infinite number of forms: drop in turnover, drop in production, less motivation among employees, etc.

## 2. List of the causes

By brainstorming with experts or employees, the manager lists all the causes that have a more or less direct impact on the observed effect. These causes must then be categorized within each "M".

### 3. Identify the causes on which the company can act

For each of the causes (for each "M"), the company must ask itself the necessary questions to find the origin of this cause. For example, for the Method cause, it could be a lack of innovation. If this is the case, we must then ask ourselves why this lack is present (financial means, lack of ideas, etc.) and continue to dig until we find the origin.

## 4. Prioritize the causes

For each branch, each cause identified, a weight must be assigned. This weight makes it possible to prioritize the causes, with priority given to the cause that has the greatest influence on the observed effect.

This classification of causes guides the company in the actions it must take as a priority to resolve the problem.

At the end of these four steps, it is up to the manager to find the actions to take to resolve the problem encountered by his company. WIC MIC case study:



Source: Composed by the author

## 2.2.3 Analyze

After defining the problem and measuring its size, the next step within the DMAIC scope is to explain the root causes and impacts of WIC MIC's cost optimization attempts. Therefore, the analysis will be based on various strategic tools: SWOT, PESTEL, and Porter's Five Forces Analysis. These frameworks will not only highlight the opportunities and risks associated with WIC MIC, but will also reveal the key elements that influence its operational and logistical effectiveness.

The SWOT analysis examines WIC MIC's internal strengths and weaknesses as well as external opportunities and threats, providing valuable insights into the company's current situation. This assessment lays the foundation for a more in-depth analysis using other tools to fully address the cost optimization challenge.

### 2.2.3.1 SWOT analysis

SWOT analysis is a business strategy tool invented by a group of Harvard professors: Guth, Christensen, Learned and Andrews, designed to identify a company's strategic options. It allows you to define objectives based on internal factors (strengths/weaknesses) and external factors (opportunities/threats) to have a strategic vision and implement the most interesting corrections for the organization.

### Strengths

The first element of the SWOT matrix to study is the strengths. The approach consists of identifying and then evaluating the strengths that the company has to develop its business. Indeed, the strengths identify what the company does particularly well. We are talking here about characteristics and functionalities that represent added value to better meet customer demands.

### Weaknesses

After working on the company's strengths, it is necessary to criticize to identify what the company's weaknesses are. These can be constraints (financial, geographical, technical, regulatory, etc.), or organizational difficulties (logistical problems, training, recruitment of qualified personnel, etc.).

### **Opportunities**

Opportunities represent external elements that can contribute to the development of the business. An opportunity represents an identified development possibility, but which has not been implemented.

In summary, in a SWOT, opportunities cover everything that can be achieved to develop a project, boost commercial activity, improve sales. This includes all the steps to develop the business, grow the company or achieve the company's objectives.

## Threats

The last element to identify to carry out the SWOT analysis is the Threats that weigh on the company. Namely: anything that brings a risk to the development of the company.

This represents a fairly broad field of investigation that can include quite diverse factors as well as anything that could compromise the future of the company.

Figure 12: SWOT ANALYSIS



Source: Composed by the author

The SWOT analysis explores WIC MIC's internal strengths and weaknesses alongside external opportunities and threats, providing valuable insights into the company's current situation. Following this, a PESTEL analysis will be conducted to examine the broader external factors influencing WIC MIC's operations and cost optimization efforts.

#### 2.2.3.2 Pestel analysis

The PESTEL analysis is a strategic tool that enables the company to analyze elements that may impact its activity and development. PESTEL is an acronym representing six types of factors that form a framework for analyzing the external environment: Political, Economic, Sociocultural, Technological, Environmental, and Legal

The PESTEL analysis is a comprehensive framework used to assess the external environment in which a company operates. By examining six key factors—Political, Economic, Sociocultural, Technological, Environmental, and Legal—this tool enables organizations to identify and analyze the broader macroeconomic and societal influences that may affect their strategic decisions, operations, and growth potential. For WIC MIC, conducting a PESTEL analysis is essential to understand the external forces that could impact its cost optimization efforts and overall business performance. This analysis will provide valuable insights into how political decisions, economic trends, social changes, technological advancements, environmental regulations, and legal frameworks shape the company's competitive landscape and influence its ability to adapt to market demands.

Factor	Description	Impact Note	Туре
Politique	Political stability directly impacts export operations; there is a risk of goods being blocked or even lost during a political crisis in a country.	5	Threat
Economic	Price variability, inflation, impacts on the prices of different export operations such as samples	4	Threat
Sociocultural	Social instability in a country can negatively impact export operations (strikes, riots, etc.)	4	Threat

Table 3: Pestel Analysis

Technological	Innovations and technological development lead to improvement in product quality and finish.	3	Opportunity
Environmental	The climate can negatively impact the export operation due to bad weather which implies additional charges to pay.	3	Threat
Legal	The customs legislation of the countries can impact the export operation with the increase of fees and customs duties, which will generate additional costs.	3	Threat

Source: Composed by the Author

The Porter's Five Forces model would complete the analysis and provide more profound insight into the competitive forces acting upon the industry where WIC MIC is involved. An in-depth look at its five parameters: bargaining power of buyers, bargaining power of suppliers, the threat of new entrants, threat of substitute products, and intensity of rivalry, this analysis provides a review of the changes that may be seen in market dynamics, hence in competitive pressures on WIC MIC for cost optimization strategies and as a whole, in business management.

# **2.2.3.3 Porter's Five Forces**

Porter's five forces model is a tool that allows you to effectively analyze the competition in a market by performing a strategic analysis, and is based on five relevant axes that allow each company to conduct a structural analysis. The purpose of these five forces is to clearly define the opportunities and threats that weigh on any company.

## • Intensity of competition

MIC has a low competitive intensity. There is only one competing company in Tunisia "DEMCO" which offers the same level of service

# • Bargaining power of suppliers

MIC's bargaining power with suppliers is low because most suppliers are required by customers, on the other hand it has a strong bargaining power with logistics providers given their large numbers

# • The bargaining power of customers

Thanks to its respect for deadlines and its quality of service, MIC is in a strong position which allows it to have a strong bargaining power

## • The threat of incoming products

No new companies on a national scale which offer a similar service, on the other hand there are new companies on an international scale (Morocco - Algeria).

### 2.2.3.4 Control system

Managing a company is not just about using a dashboard and key decision-making indicators. The management system encompasses the organization set up to maximize performance and create value.

Consequently, the management and monitoring system is part of different objectives, namely the use of strategy at the operational level in order to acquire strategic management, but also to ensure that the actions carried out make it possible to achieve the objectives set, which leads to an understanding of the actions in order to continually improve.

Despite all these advantages of the management and monitoring system, the company WIC MIC has not favored it, which is why this system is totally absent.

### 2.2.3.5 Information out of the system

Employees belonging to the company WIC MIC found difficulties in monitoring the status of orders, they were forced to follow each detail alone by returning each time to the mailbox. Certainly, this habit takes a lot of time and a lot of effort by the user.

These difficulties thus show the lack of invoice attachments which caused a loss of documentation.

Consequently, the reduction of the potential of this information system led to a total absence of details of expenses such as the quotation of transport, freight, customs clearance.

### 2.2.3.6 Forwarding costs

The forwarding costs correspond to all the costs necessary to be able to send us the item by the supplier. They are added to the purchase price of the item. We mainly find the transport costs but also the customs fees etc...

Indeed, the CORONA pandemic, the war between Russia and Ukraine has impacted several dimensions in the world, particularly in Tunisia.

The WIC MIC Company suffers from an abnormal increase in approach costs because of these global difficulties.

Following a mutual agreement with the WIC MIC team, we decided to study more this disagreeable situation which concerns the abnormal increase in approach costs

To properly acquire this approach, we must begin with an empirical study which determines the execution of interviews with the services concerned.

## 2.2.3.7 Interview

Who?	Purchasing department – Export department
Who is affected by the problem?	– purchasing manager – export manager,
	sales department, IT department, customs
	formalities department.
What	Abnormal increase in approach costs, lack
What's the problem?	of traceability, absence of a piloting system.
Where	MIC Direction
Where did the problem occur?	WIC Direction.
When	For years.
When did the problem occur?	
How	Through interviews and the results of the
In what way? In what circumstances?	evaluation grids.
Why	Control approach costs, reduce approach
What are the objectives?	costs, to introduce a more effective and
	efficient information system that better
	meets the needs of workers.

Table 4: WIC MIC interview

Source: Composed by the author

#### **2.2.3.8 Documentary analysis**

During the internship, we conducted a qualitative and quantitative analysis of documents (received emails, curve studies, percentages...), which confirmed our interviews with WIC MIC employees and managers as follows:

- The document is an email sent by the FEDEX company (an airline specialized in international freight) to the transport manager, Ms. Basma. In fact, this email explains the increase in shipping rates due to global situations such as the COVID-19 pandemic and the Russian-Ukrainian war (Annex 1)

- Record the amount of the monthly fuel surcharge for the Martian months so that you can apologize to FedEx when you ask for a price revision. The WIC MIC did not accept the offer proposal due to the delay of the offer (Annex 2)

- The document shows a huge price difference for the same weight. This explains the non-relative price increase in the three years from 2018 to 2021 (Annex 3).



Figure 13: Graph shows 3 phases in relation to the annual duration

Source: Chemorbis 2013

In a first phase, from 2016 to 2020 the constancy of the composite did not exceed \$2,000, in a second phase the value of the composite marks a sudden increase that reaches the peak of \$10,000 in 2021, for finally, a third phase, this value of the composite decreases slightly in 2021 towards \$6,000.

## 2.2.3.9 Process analysis : import/export

In order to continue our diagnostic process, we had the chance to visit the import and export departments at WIC to learn more about, understand and discuss their processes.

If incoterm EX WORKS:

According to the EXWORKS incoterms, the MIC company is only responsible for the packaging of goods and everything else is at the customer's expense.

The order is ready The export department checks the order with the production department

Contact customer to confirm order preparation

Preparation of the invoice by the finance department to send it to the customer

Collection of the goods by the customer's carrier

Inform the customer of the removal of goods

### If FOB:

In the FOB incoterm, the MIC company is responsible for the packaging of goods, transport packaging and loading onto the pre-transport means. It is also responsible for loading onto the main means of transport.

Check that the order is ready

The export department checks the order with the production department

Contact customer to inform them that the goods are ready

Contact the carrier for pre-routing to make a reservation

Packaging of goods

Ship the goods to the port

If CIF: In the CIF incoterm, the MIC company is responsible for the packaging of goods, transport packaging and loading on the pre-transport means. It is also responsible for loading on the main means of transport and is also responsible for the main transport costs and its insurance. The order is ready

export service checks the status of the order with the production

service

Customer contact for order confirmation

Emballage de la commande

Transport packaging

Contact the pre-transport carrier and

The main way to make a reservation

Settle customs formalities through the company's freight forwarder

Send a notice of arrival status + packing list + invoice to the customer

### - Si DAP

The order is ready

The export department checks the status of the order with the production department Customer contact for order confirmation Packaging the order Transport packaging Contact the carrier of the pre-transport of the main means and post transport to make a reservation

Settle customs formalities through the company's freight forwarder

Send a notice of arrival status<sup>+</sup> + packing list + invoice to the customer

In summary, the Define, Measure, and Analyze steps of the DMAIC methodology provide a solid foundation for understanding the challenges and opportunities that WIC MIC faces in its pursuit of cost optimization. The Define phase provides a clear framework for identifying key issues, setting goals, and outlining the scope of the analysis. This allows us to clearly align the project with the company's strategic goals, thereby focusing on the most critical issues. In the Measure phase, we collect and analyze data to ensure that we can quantify the issues and assess their impact on WIC MIC's operations. This reliable key data is a prerequisite for making well-informed decisions in subsequent phases.

The Analyze phase is important in determining the root causes that determine the effectiveness of WIC MIC's operations. By using strategic tools such as SWOT, PESTEL, and Porter's Five Forces, we identified the key strengths and weaknesses, opportunities and threats, and competitive forces that WIC MIC faces in the industry. These insights not only provide us with a deeper understanding of the company's current situation, but also reveal the key drivers that need to be addressed to optimize costs. Thanks to this comprehensive analysis, WIC MIC is now better able to move forward to the next phase of the DMAIC process. This phase develops and implements actionable solutions that can significantly improve cost efficiency and overall business performance.

## **3. IMPROVE AND CONTROL**

The previous section detailed the Define, Measure, and Analyze phases of the DMAIC methodology to identify and measure the root causes of WIC MIC cost inefficiencies. Armed with this information, they can move to the critical Improve and Control phases to effectively implement solutions and sustain profits.

In the Improve phase, innovative strategies to solve these problems are developed and implemented. Leveraging data-driven insights and industry best practices, they make concrete recommendations to eliminate waste, optimize processes, and reduce costs.

Thus, the Control phase focuses on establishing a reliable performance monitoring system, sustaining improvements to avoid setbacks, and preventing problems from recurring. With proper management and regular performance reviews, WIC MIC can maintain its competitive advantage and continue on its path to operational excellence.

### 3.1 Improve

Based on the in-depth analysis in the previous phase, we proposed a series of targeted improvement initiatives to address the identified root causes and optimize WIC MIC operations. These recommendations, along with a detailed action plan, will help the company significantly reduce costs and improve efficiency.

### 3.1.1 Recommendation

Based mainly on the causes and root causes as well as the diagnostic approach, the acquisition of interviews, the analysis of import and export processes and after having resolved the problems using the DMAIC mathematical method, but also the use of useful tools like QQOQCP, the 5 whys and the ISHIKAWA diagram, the following solutions were recommended:

- Integration of approach costs on the DIVALTO ERP

- Install a monitoring and management system for approach costs

- Review the approach costs management process

- Create a function responsible, Creation of new positions responsible for the detail of invoices (FA)

- Recruitment
- Assign employees who do not have a lot of workload to detail invoices
- Standardize the process
- Formalize personnel to properly control the process
- Development of a dashboard
- Development of specifications

## **3.1.2** Development of the action plan

		D 11	17	<b>G</b> ( )	<b>F</b> 1
Axe	Actions	Responsable	Key	Start	End
			Person	Date	Date
Information	- Implement	IT Development	Owners	August	-
system	functions to	Manager		2024	
	measure and				
	detail approach				
	costs on				
	DIVALTO				
Steering system	-Monitor	. Technical R	CEO	Shortly	Infinity
	approach costs				
	which entails				
	regular				

Table 5: WIC MIC action plan
	monitoring				
	- Create a				
	dashboard				
Formalization of	Provide training	HR.Responsable	CEO	Regular	One
personal data	to employees			ly	month a
					year
Recruitment	Create	HR Responsable	CEO	As	-
	recruitment			needed	
	strategies after				
	analyzing the				
	need for WIC				
	MIC				
Standardize the	Organize tasks to	HR Responsable	CEO	Daily	-
process	have stability in				
	daily operations				
Development of	Modify the	Project Manager	CEO	Every	-
specifications	existing			year	
	specifications				
	each period to				
	respond to the				
	development of				
	the project				
Review the	Involve new	R.purchasing	CEO	August	Two
management	current	manager		2024	times
process	management				per year
	processes				

Source: Composed by the author

After proposing some areas of recommendations with the aim of developing our action plan, we took into consideration the most urgent and priority area of recommendation, which is the integration of a DIVALTO information system.

#### **3.1.3** Integration process

#### **Creation of functional specifications**

A functional specifications document is a document that shows in a detailed and organized manner the determinations, the services to be delivered, the constraints of a product (although it can also be a service, a process, an intellectual service, software or an information system.)

The functional specifications document allows framing the project; however, it is noted at the last phase of the project launch, at the time of its validation.

It allows to quickly assess any gaps between the proposed solutions and the real need, facilitating the analysis and comparison between the different proposals.

It establishes a structured and competitive dialogue between the integrator and the IT development manager, because it clearly states a question and requires an appropriate response.

Organize framing workshops with the integrator

The framing aims to define the work to be implemented. It is also a step that sets the course. Framing a project is a key step carried out before the project. It is a phase that is often underestimated.

Indeed, the key points of the framing can be summarized as follows. First, the precise determination of the project objectives in terms of expected results or objectives to be achieved, deadlines, costs and quality. Thus, specifying the scope of the project in terms of products, functionalities, technology, etc. subsequently, identifying the related means to be implemented to succeed in the project. But also, the realization of a focus on change management and the means

ofcommunicationtobeimplemented.- Setting up (integration)

Betting up (integration)

- Test script preparation

Test preparation while confirming the test scenario associated with a requirement and a use case. Not to mention adding a test script to a test scenario. In order to acquire the resolution of a work item.

- Test execution

- Service training

The realization of regular training of services within the company is quite important for its internal evolution, which is why its acquisition can gradually develop the adaptation of employees to DIVALTO and its functions, the maintenance of any detail of the system and the know-how with DIVALTO which can mark an organizational revolution that can only advance with WIC MIC and its framework.

### 3.2 Control

To ensure the sustainability of the implemented improvements and prevent any regression, a robust control system is essential. This section outlines the control plan, which includes a detailed timeline and key performance indicators (KPIs) to monitor progress. By regularly reviewing and adjusting the plan, WIC MIC can maintain its operational excellence and continue to reap the benefits of the cost optimization initiatives.

### 3.2.1 Progress in September

Axe	Actions	Responsable	Key	Control	Pourcentage
			Person	Date	D'avancement
Information	- Implement	IT Development	Owners	1st	25%
system	functions to	Manager		September	
	measure and				
	detail approach				
	costs on				
	DIVALTO				
Steering system	-Monitor	. Technical R	CEO	1st	60%
	approach costs			september	
	which entails				
	regular				
	monitoring				

*Table 6: WIC MIC September action plan* 

	-Create a				
	dashboard				
Formalization of	Provide training	HR.Responsable	CEO	1st	30%
personal data	to employees			september	
	~		97.0		
Recruitment	Create	HR Responsable	CEO	1st	0%
	recruitment			september	
	strategies after				
	analyzing the				
	need for WIC				
	MIC				
Standardize the	Organize tasks to	HR Responsable	CEO	15th	20%
process	have stability in			september	
	daily operations				
Development of	Modify the	Project Manager	CEO	15th	0%
specifications	existing			september	
	specifications				
	each period to				
	respond to the				
	development of				
	the project				
Review the	- Involv enew	R.purchasing	CEO	15	10%
management	current	manager		september	
process	management				
	processes				

Source: Composed by the author

As at 60% progress, major milestones have been achieved in setting up the steering system. It will deliver the understanding of cost drivers and make decisions that are informed where such decisions may allow massive cost reductions.

Even though formalization of personal data has been realized at 30%, more steps need to be taken to finalize the training and implementation relating to data protection. This should be taken into consideration as an important step in compliance to keep the integrity of data.

Information system initiatives advanced to 25% of progress. A good start but much work yet to come for these systems to be fully implemented and for recruitment processes to be managed in an efficient way.

Standardization of processes has moved forward by 20%, while specifications development still lies at 0%. These are, therefore, the areas that need immediate attention to ensure there is operational efficiency and no delays and cost overruns in any implementation.

The action plan has had a good start but much work is still required to realize its full potential. With attention to detail on tasks that high-in-the-priority list, resourcing right, and continual improvement, then WIC MIC will be able to realize the cost optimization that it has set out to achieve.

## 3.2.2 Progress in October

Axe	Actions	Responsable	Key	Control	Pourcentage
			Person	Date	D'avancement
Information	- Implement	IT Development	Owners	3th October	50%
system	functions to	Manager			
	measure and				
	detail approach				
	costs on				
	DIVALTO				

Table 7: WIC MIC October action plan

Steering system	-Monitor	. Technical R	CEO	3th October	60%
	approach costs				
	which entails				
	regular				
	monitoring				
	-Create a				
	dashboard				
Formalization of	Provide training	HR.Responsable	CEO	15th	70%
personal data	to employees			October	
Recruitment	Create	HR Responsable	CEO	15th	0%
Recruitment	roomitmont	The responsable	CLO	October	070
	stratagias after			Octobel	
	analyzing the				
	need for WIC				
	MIC				
Standardiza the	Organiza taska ta	UD Deepensehle	CEO	15th	250/
Standardize the	been stability in	HK Kesponsable	CEU	15th	55%
process	nave stability in			October	
	daily operations				
Development of	Modify the	Project Manager	CEO	15th	20%
specifications	existing			October	
	specifications				
	each period to				
	respond to the				
	development of				
	the project				
Review the	- Involv enew	R.purchasing	CEO	15th	10%
management	current	manager		October	
process	management				
	processes				

Source: composed by the author

The Action Plan continues to make progress, particularly in the areas of formalization of personal data and governance systems, which have achieved 70% and 60% progress, respectively.

These advances are critical to ensuring data security and enabling data-driven decision making.

While the information system has made significant improvements, reaching 50% progress, further efforts are needed to fully implement the system and realize its benefits.

Similarly, the recruitment program requires more attention as it has also made progress in process standardization, reaching 35% completion.

However, the development of specifications is still lagging behind, with progress reaching only 10%. This area requires immediate attention to avoid possible delays and cost overruns. Overall, the Action Plan has shown positive momentum, but there is still room for improvement in some areas.

## 3.2.3 Progress in November

Axe	Actions	Responsable	Key	Control	Pourcentage	
			Person	Date	D'avancement	
Information	- Implement	IT Development	Owners	1st	75%	
system	functions to	Manager		November		
	measure and					
	detail approach					
	costs on					
	DIVALTO					
Steering system	-Monitor	. Technical R	CEO	1st	75%	
	approach costs			November		
	which entails					
	regular					
	monitoring					
	-Create a					
	dashboard					

Table 8: WIC MIC November action plan

Formalization of	Provide training	HR.Responsable	CEO	1st	70%
personal data	to employees			November	
Recruitment	Create	HR Responsable	CEO	1st	0%
	recruitment			Novemeber	
	strategies after				
	analyzing the				
	need for WIC				
	MIC				
Standardize the	Organize tasks to	HR Responsable	CEO	15th	50%
process	have stability in			November	
	daily operations				
Development of	Modify the	Project Manager	CEO	15th	50%
specifications	existing			November	
	specifications				
	each period to				
	respond to the				
	development of				
	the project				
Review the	- Involv enew	R.purchasing	CEO	15th	40%
management	current	manager		November	
process	management				
	processes				

Source: Composed by the author

The Action Plan continues to make significant progress, particularly in the areas of information systems, governance systems, and formalization of personal data, all of which have achieved 75% completion. These advances are critical to enabling data-driven decision making, ensuring data security, and streamlining operations. While hiring initiatives remain at 0%, significant progress has been made in standardizing processes and reviewing management processes, reaching 50% and 50%, respectively. These efforts will help improve efficiency and

effectiveness. Progress has also been made in norm development, reaching 40% completion. However, this area still requires key focus to avoid delays and cost overruns.

Overall, the Action Plan shows strong momentum and is on track to achieve its goals. By focusing on key tasks, allocating adequate resources, and continually monitoring progress, WIC MIC enables the company to successfully implement the proposed strategy and achieve the expected cost savings.

# 3.2.4 Progress in December

Axe	Actions	Responsable	Key	Control	Pourcentage
			Person	Date	D'avancement
Information	- Implement	IT Development	Owners	2 <sup>nd</sup>	75%
system	functions to	Manager		December	
	measure and				
	detail approach				
	costs on				
	DIVALTO				
Steering system	-Monitor	. Technical R	CEO	2 <sup>nd</sup>	75%
	approach costs			December	
	which entails				
	regular				
	monitoring				
	-Create a				
	dashboard				
Formalization of	Provide training	HR.Responsable	CEO	2 <sup>nd</sup>	70%
personal data	to employees			December	
Recruitment	Create	HR Responsable	CEO	2 <sup>nd</sup>	10%
1.0010101010	recruitment	The new point of the		- December	
	strategies after			December	
	analyzing the				
	analyzing the				
	NIC				
0. 1 1			GEO		000/
Standardize the	Organize tasks to	HK Responsable	CEO	3rd	80%
process	have stability in			December	
	daily operations				

Table 9: WIC MIC December action plan

Development of	Modify the	Project Manager	CEO	3rd	50%
specifications	existing			December	
	specifications				
	each period to				
	respond to the				
	development of				
	the project				
Review the	- Involv enew	R.purchasing	CEO	3rd	90%
management	current	manager		December	
process	management				
	processes				

Source: Composed by the author

The Action Plan continues to make important progress, especially in achieving a 75% performance level in information systems, control systems, and formalization of personal data. These advances enable data-based, informed decisions, data security, and seamless integration of operations.

Process standardization is also well advanced, reaching 80% completion. This is an important milestone that will go a long way toward improving efficiency and reducing costs. Specification development has reached 90% completion. This is an important milestone that will

ensure smooth execution of future projects.

Although recruitment activities are currently at 10%, there is still a need to focus on attracting and hiring qualified talent. Priority must be given to reviewing administrative processes that are 50% complete to identify opportunities for improvement.

Overall, the Action Plan has strong momentum and is on track to achieve its stated goals. WIC MIC will successfully implement the proposed strategies to achieve the expected cost savings by focusing on key tasks, providing appropriate resources, and conducting ongoing monitoring.

	Information	Steering	Personal		Process	Management	
Month	System	System	Data	Recruitment	Standardization	Review	Specifications
September	25%	60%	30%	0%	20%	10%	0%
October	50%	60%	70%	0%	35%	20%	10%
November	75%	75%	70%	0%	50%	50%	40%
December	75%	75%	70%	10%	80%	50%	90%

*Table 10: Action plan progress* 

Source: composed by the author

The WIC MIC action plan has made good progress over the last four months. Major areas like information systems, and control systems have leaped from 25% to 75%, and 60% to 88%, respectively. This exhibits a major concentration toward analytic-oriented operational effectiveness.

70% of the personal data is normalized; however, the adoption rate was 0% for the first three months and then increased to only 10% for the last area. This is immediately required if the adoption has to be on time since operational bottlenecks should be avoided.

There is a much better level of process standardization with completion rates improving from 20% to 80%, translating to increased efficiency and reduced costs for the organization. Specification development has also been approximately 90% complete, one of the most critical aspects of executing this project.

Only 50% of management processes have been reviewed. All in all, the action plan has made encouraging progress. However, focused efforts in certain areas are still needed to maintain the momentum and achieve the expected cost optimization goals.

Figure 14: Action plan Progress



Source: Composed by the author

### **CONCLUSIONS AND RECOMMENDATIONS**

This section presents the key conclusions drawn from the research, addressing the objectives outlined in the introduction. Each conclusion is linked to a specific research objective, followed by corresponding recommendations for improving cost management and operational efficiency at WIC MIC.

- Conclusion: Analysis of Current Cost Management Practices at WIC MIC The first objective was to analyze the current cost management practices at WIC MIC. The study revealed that WIC MIC's cost management practices are relatively traditional and largely reactive. The company primarily relies on historical data and manual oversight, which limits its ability to identify emerging inefficiencies in real-time. Additionally, the lack of integrated systems for tracking and optimizing costs across departments hampers the company's ability to implement cost-saving measures effectively. Recommendation: It is recommended that WIC MIC adopt a more proactive approach to cost management by implementing an integrated cost-tracking system. This system should provide real-time data on production costs, allowing for more informed decision-making and early identification of inefficiencies. Additionally, establishing a centralized cost management team could help ensure consistency and oversight across all departments.

- Conclusion: Evaluation of Existing Production Processes and Identification of Inefficiencies The second objective was to evaluate the existing production processes at WIC MIC and identify inefficiencies. The study highlighted several operational inefficiencies that contribute to higher production costs, including excessive downtime, improper allocation of resources, and significant waste in the manufacturing process. These inefficiencies result in unnecessary costs that could be reduced through better management practices and process optimization. Recommendation: To address these inefficiencies, it is recommended that WIC MIC implement Lean management principles. Specifically, practices such as value stream mapping, 5S, and Kaizen should be introduced to streamline production processes, reduce downtime, and eliminate waste.

Regular training for staff on Lean techniques will ensure that these practices are consistently applied across the production line.

- Conclusion: Assessment of the Impact of External Factors on Production Costs The third objective was to assess the impact of external factors, such as raw material price fluctuations, on production costs. The research found that raw material prices significantly influence WIC MIC's cost structure, with price volatility often leading to unpredictable cost increases. This impact is exacerbated by the company's reliance on a limited number of suppliers and the lack of hedging strategies to mitigate these risks. Recommendation: To minimize the impact of raw material price fluctuations, WIC MIC should consider diversifying its supplier base and negotiating longer-term contracts to secure more stable pricing. Additionally, implementing a financial hedging strategy could help the company protect itself against sudden price increases. WIC MIC should also explore the possibility of developing relationships with sustainable suppliers to mitigate cost variability.

- Conclusion: Proposing Strategies for Improving Operational Efficiency and Cost Management The fourth objective was to propose strategies for improving operational efficiency and cost management. The analysis revealed that WIC MIC could significantly improve its operational efficiency by optimizing resource allocation, improving labor productivity, and introducing automated systems to support production. The company also lacks a comprehensive strategy for managing overhead costs, such as energy consumption and maintenance. Recommendation: WIC MIC should develop and implement a comprehensive resource allocation strategy that focuses on optimizing labor, machinery, and materials. Automation solutions such as robotic process automation (RPA) and machine learning could be introduced to improve efficiency and reduce reliance on manual labor. Additionally, WIC MIC should focus on energy-efficient practices and invest in energy-saving technologies to reduce operational overhead costs.

- Conclusion: Evaluation of Advanced Management Tools and Technologies for Cost Reduction The fifth objective was to evaluate the potential of advanced management tools and technologies, such as Lean management, Six Sigma, and digital solutions, to reduce production costs. The research found that WIC MIC could benefit greatly from adopting these advanced tools. Lean and Six Sigma methodologies, in particular, can help eliminate waste, streamline production processes, and improve overall quality. Additionally, digital tools such as data analytics and enterprise resource planning (ERP) systems could provide better insights into operational performance and enable more precise cost forecasting. Recommendation: It is recommended that WIC MIC invest in adopting Lean and Six Sigma methodologies as part of its continuous improvement efforts. Additionally, the company should explore the implementation of advanced digital tools, including ERP and data analytics platforms, to gain deeper insights into operational performance. These tools will help WIC MIC optimize its cost structure, improve forecasting, and make data-driven decisions.

In conclusion, this study has provided an in-depth analysis of WIC MIC's current cost management practices, identifying key inefficiencies and areas that can be optimized. Through the adoption of Lean management principles, the implementation of advanced digital tools, and the diversification of its supplier base, WIC MIC is well-positioned to reduce operational inefficiencies and enhance its cost structure. These steps, however, will require a committed effort from the company's leadership to ensure their successful integration into the organizational culture and processes. The findings of this research suggest that WIC MIC could significantly improve its competitive edge by leveraging modern management practices and technologies. Lean management, particularly through its focus on reducing waste and streamlining production, can have an immediate impact on operational costs. Similarly, the integration of digital tools, such as Enterprise Resource Planning (ERP) systems and data analytics, offers substantial potential for optimizing production efficiency, improving decision-making, and forecasting future costs more accurately. Furthermore, diversifying the supplier base would mitigate risks associated with raw material price volatility, thus providing greater stability in cost management. For future research, several avenues can be explored to expand the knowledge base in the area of cost optimization in the textile industry. One potential area for further study is the application of cutting-edge technologies, such as Artificial Intelligence (AI) and the Internet of Things (IoT), to further refine production processes and optimize resource allocation. AI could be particularly

useful in predictive maintenance, supply chain optimization, and demand forecasting, while IoT could enable real-time tracking of production lines and equipment, offering new opportunities for reducing downtime and improving efficiency. Moreover, as sustainability becomes an increasingly important aspect of business operations, future research could focus on the relationship between sustainability initiatives and cost management. Understanding how sustainable practices, such as the use of eco-friendly materials or energy-efficient technologies, impact production costs and long-term competitiveness is crucial for companies striving to remain competitive in a globalized market. It would be valuable to assess how these initiatives not only influence direct costs but also enhance a company's brand image and consumer loyalty, which can be significant factors in achieving sustained profitability. In conclusion, while the recommendations outlined in this study provide a clear path forward for WIC MIC, further exploration into the role of emerging technologies and sustainability practices will allow for a deeper understanding of the evolving dynamics within the textile industry. Future researchers should consider these areas to avoid limitations seen in this study and contribute to a more comprehensive framework for cost optimization in the sector. For practitioners, particularly managers and decision-makers in the textile industry, it is essential to stay abreast of technological advancements and sustainability trends that shape the industry's future, ensuring that cost management strategies remain relevant and effective.

#### **Challenges and Limitations**

While this research offers valuable insights into cost management practices at WIC MIC, several challenges and limitations need to be acknowledged. One of the primary challenges was the distance between the researcher, based in Lithuania, and WIC MIC, which is located in Tunisia. To overcome this barrier, the researcher spent one month in Tunisia during July to collect data and interact with key stakeholders. However, the subsequent control phase was conducted remotely, which limited the ability to gather real-time data and engage with staff as directly as initially planned. Another limitation was the restricted access to sensitive financial and operational data, as some information at WIC MIC was confidential. This limitation affected the comprehensiveness of the analysis, especially in terms of specific cost breakdowns and internal financial performance. Additionally, external factors such as global economic

conditions, fluctuations in raw material prices, and the complex dynamics of international supply chains introduced variables that are difficult to control and could potentially influence the findings. Finally, the study was confined to WIC MIC, meaning the conclusions may not fully capture the unique circumstances or challenges faced by other textile companies in different regions or market segments. Therefore, the findings may not be directly applicable to other businesses operating in the textile sector. These challenges and limitations highlight the need for further research to overcome these constraints, particularly through more direct involvement with companies in various geographical locations and industries.

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## ANNEXES

Annex 1

Email explains the increase in shipping rates due to global situations such as the COVID-19 pandemic and the Russian-Ukrainian war



Annex 2

Email explain the amount of the monthly fuel surcharge



Annex 3

Document shows a huge price difference for the same weight from 2018 to 2021



#### Abstract

Global manufacturing relies heavily on the textile industry for the clothing, furnishings, and household products it produces. However, this industry faces a great deal of cost inefficiency due to continual shifts in the market, such as spikes in the price of materials, labour costs, and increased demands for sustainability. Factors like the complex supply chain and constantly changing fashion trends lead to the need for flexibility in production. To illustrate, it is common that at any given time there are trends that result in a surge in demand but consumers are not willing to pay a high cost for the fabric or product. This research will examine some of the cost inefficiencies in the textile industry and evaluate strategies to improve efficiency and enhance competitiveness.

to understand why costs are inefficient and learn how the current cost cut practices are effectively applied. This study adopts both qualitative and quantitative approaches to conduct data analysis. In particular, a major case will focus on a fast-growing and leading textile company, so called WIC MIC. This company has made brave moves on cost management via procurement, production and supply chain management. Hence, its experience is expected to benefit other firms facing the same dilemma of how to better manage cost effectively.

The findings of the study provide useful guidelines for rationalising cost within textile sector, like the use of only latest technological inventions and adoption of best practices in management. It does also contribute to the general theory of rationalisation of cost within textile sector and present a model for companies wishing to maintain their competitiveness in a growing competitive market.

Keywords: Textile Industry, WIC MIC, Divalto infinity, Navision, Cost optimization, ERP systems ,5S system, Kanban, 6SIGMA, Just in time, JIT, Supply chain, Cost Management,Lean Manufacturing , Kaizen, Gemba, KPI, ERP, PDCA

#### Abstract

Pasaulin drabuži , bald ir nam apyvokos gamini gamyba labai priklauso nuo tekstil s pramon s. Ta iau ši pramon susiduria su dideliu s naud neefektyvumu d l nuolatini poky i rinkoje, pvz., medžiag kain šuoli , darbo s naud ir padid jusi tvarumo reikalavim . Tokie veiksniai kaip sud tinga tiekimo grandin ir nuolat kintan ios mados tendencijos lemia gamybos lankstumo poreik . Pavyzdžiui, prasta, kad bet kuriuo metu yra tendencij , d l kuri paklausa išauga, ta iau vartotojai nenori mok ti dideli išlaid už audin ar gamin . Šiame tyrime bus nagrin jami kai kurie tekstil s pramon s s naud neefektyvumo tr kumai ir vertinamos efektyvumo ir konkurencingumo didinimo strategijos.

suprasti, kod l išlaidos yra neefektyvios, ir sužinoti, kaip efektyviai taikoma dabartin išlaid mažinimo praktika. Šiame tyrime taikomi tiek kokybiniai, tiek kiekybiniai duomen analiz s metodai. Vis pirma, pagrindinis atvejis bus skirtas greitai augan iai ir pirmaujan iai tekstil s monei, vadinamai WIC MIC. Ši mon m si dr si žingsni valdydama s naudas pirkim , gamybos ir tiekimo grandin s valdymo srityje. Tod l tikimasi, kad jos patirtis bus naudinga kitoms mon ms, susidurian ioms su ta pa ia dilema, kaip geriau valdyti išlaidas.

Tyrimo išvados pateikia nauding gairi , kaip racionalizuoti išlaidas tekstil s sektoriuje, pavyzdžiui, naudoti tik naujausius technologinius išradimus ir perimti geriausi vadybos praktik . Tai taip pat prisideda prie bendrosios tekstil s sektoriaus s naud racionalizavimo teorijos ir pateikia model mon ms, norin ioms išlaikyti savo konkurencingum augan ioje konkurencin je rinkoje.