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EVALUATION OF THE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT IN REDUCING FASHION WASTE IN LOCAL FASHION RETAIL

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ABSTRACT
The fashion industry has grown rapidly with the emergence of local brands, but this growth has also led to increased production waste and product defects due to rushed processes, inconsistent quality control, and human error. Effective quality management is therefore essential to ensure consistency and reduce waste. This study aims to evaluate the implementation of Total Quality Management (TQM) in reducing fashion waste at Ceno.id. A qualitative case study approach was used, with data collected through interviews and observations. The analysis focuses on defect rate, fabric waste, process consistency, employee involvement, and continuous improvement. The findings show that Ceno.id has implemented several TQM practices, including SOPs, quality control, employee training, and routine evaluations. However, implementation remains inconsistent and largely manual, leading to variations in product quality. Defects, mainly caused by human error and supplier issues, are directly linked to fabric waste. This study highlights that effective TQM requires consistent implementation, stronger process control, and improved employee capability to achieve sustainable operational performance.
Keywords: *Total Quality Management, Fashion Waste, Quality Control*

INTRODUCTION

The fashion industry is currently experiencing rapid growth, particularly with the emergence of various local brands competing within the same market. Many businesses strive to introduce new products in a relatively short period to keep up with continuously changing trends. On one hand, this reflects a positive development. However, on the other hand, several issues have emerged, one of which is the increasing amount of waste and defective products during the production process. This condition is generally caused by rushed production processes, suboptimal quality control, and human error during execution.

Waste in the fashion industry has long been a concern. Fabric remnants, sewing errors, and products that fail to meet quality standards frequently arise as a result of production activities. If not properly managed, such waste not only increases production costs but also negatively impacts the environment and the company's image in the eyes of consumers. Therefore, many companies have begun implementing quality management practices to produce more consistent products while reducing waste levels.

One commonly applied approach is Total Quality Management (TQM). This concept emphasizes the involvement of all parts of the organization in maintaining quality, from the early stages of production to the final product delivered to customers. Thus, TQM focuses not only on the final output but also on work processes, consistency in implementing standard operating procedures (SOP), employee involvement, and continuous evaluation.

Ceno, as one of the local fashion retail brands, faces similar conditions. In its production process, waste in the form of fabric remnants is still present, along with several defective products, such as uneven or misaligned stitching. These issues are generally caused by human error during production. Nevertheless, Ceno has implemented quality control at two stages, established quality SOPs, and conducts routine evaluations to maintain its product standards.

Based on these conditions, this study aims to analyze the extent to which the implementation of Total Quality Management (TQM) can help reduce fashion waste in the

production process. Therefore, this research focuses on evaluating the application of TQM in a local fashion retail company by examining several parameters, including defect rate, fabric waste, process consistency, employee involvement, and continuous improvement efforts.

LITERATURE REVIEW

Total Quality Management

Total Quality Management (TQM) is a management approach that emphasizes continuous and comprehensive quality improvement by involving all employees within an organization. According to Russell and Taylor in Operations and Supply Chain Management, TQM focuses on customer satisfaction through process control, consistency in quality standards, and continuous improvement. These principles are closely related to operational efficiency, as effective management of processes can improve performance and competitiveness (Sembiring et al., 2025).

Quality in TQM is managed through quality control at various stages of production to ensure that products meet specified standards. Defect is defined as a product that does not meet quality requirements, while waste refers to any activity that does not add value, such as material leftovers and defective products. In the fashion industry, waste commonly occurs during the fabric cutting process, while defects often arise from errors in sewing operations. Therefore, the implementation of TQM aims to reduce defect rates and fabric waste levels through process consistency, employee involvement, and continuous quality evaluation.

Previous Studies

Previous studies have widely examined how quality control can help reduce defect and waste levels in the garment industry. For instance, Syduzzaman et al. (2014) demonstrated that the implementation of TQM in the garment industry significantly reduced defects while improving overall production efficiency. This finding is supported by Islam et al. (2013), who showed that the use of tools such as fishbone diagrams and Pareto charts is effective in identifying the root causes of sewing defects and reducing defect rates.

In addition to TQM, Lean Six Sigma has also emerged as a widely used approach. Basuki et al. (2023), in their study of Jhono Garment in West Jakarta, found that defects in garment products are generally caused by five main factors: human, machine, material, method, and environment. Meanwhile, Abbes et al. (2018) demonstrated that even at the small and medium enterprise (SME) level, defect rates can be reduced by nearly half through the consistent application of the DMAIC methodology.

Limitations of Previous Studies

Despite the extensive research conducted, most studies have focused on large-scale manufacturing industries with standardized production systems. Kurnia et al. (2021) noted that research on the implementation of Lean Six Sigma in small and medium-scale textile industries remains limited, even though their operational characteristics differ significantly from large manufacturing firms.

In the context of fashion SMEs, Elkin and Shah (2005) also highlighted that challenges such as training costs and difficulties in measuring productivity improvements often hinder the comprehensive implementation of TQM.

TQM in Defect and Waste Control

TQM plays a crucial role in reducing defect levels through the implementation of clear work standards, consistent quality control, and continuous process evaluation. This is closely linked to operasional efficiency, where better process control improves performance and competitiveness (Sembiring et al., 2025). With well-structured standard operating procedures (SOP), production processes become more controlled, thereby minimizing variations and errors.

Production waste refers to activities that do not add value and is closely related to defects. Defective products lead to the waste of raw materials, time, and labor. Said defects are inefficiencies that can negatively impact operational performance and reflect weaknesses in process management (Sembiring et al., 2025). Therefore, quality control is a key factor in reducing waste. Various tools such as lean manufacturing, Six Sigma, value stream mapping, and fishbone diagrams are used to identify and eliminate inefficiencies in production processes. Furthermore, efficient process management also creates a better operational flow, which in turn, enhances overall productivity and competitiveness (Sembiring et al., 2025).

Characteristics of the Fashion Industry

The garment or fashion industry is labor-intensive and characterized by high product variability, making it highly susceptible to defects and waste. Common issues include sewing errors, size inconsistencies, and fabric waste. Challenges in implementing quality management in this industry include varying levels of worker skills, cost pressures, and rapidly changing market trends.

Research Gap and Contribution

Most previous studies have employed quantitative approaches, focusing on measuring defect and waste levels using numerical indicators. In contrast, this study adopts a qualitative approach within the context of a local fashion retail business, namely Ceno.

The similarity between this study and previous research lies in the use of quality control and continuous improvement concepts. However, the differences are found in the research object, methodology, and scope.

A research gap exists due to the limited number of studies examining quality management practices in local online-based fashion retail businesses in Indonesia. Therefore, this study aims to explore how TQM is implemented in a contextual and practical manner within the daily operations of Ceno, from material selection to the management of production waste. It is expected that the findings will provide more relevant and applicable insights for similar local fashion businesses.

RESEARCH METHODOLOGY

Research Method and Approach

This study employs a qualitative research method using a case study approach. The qualitative approach is chosen to gain an in-depth understanding of how Total Quality Management (TQM) is implemented within a real business context.

This section explains how the research is conducted systematically, including the research object, data collection techniques, and analytical parameters. Data were collected through interviews and observations, involving relevant parties within the organization. The parameters used in this study include :

- Defect rate
- Fabric waste
- SOP consistency
- Employee involvement
- Continuous improvement

The data used in this research are primary data obtained from interviews with Ceno.id, an online fashion retail business based in West Jakarta.

Research Object

The object of this research is Ceno.id, a local fashion retail business operating online in West Jakarta. Ceno.id was selected due to its relevance to the research topic, as the company has implemented Total Quality Management (TQM) practices in its operations, particularly in efforts to reduce fabric waste. The study focuses on the production process, which includes:

- Material selection
- Fabric cutting
- Sewing process
- Quality control
- Management of production waste (fashion waste)

Research Subjects

The research subjects consist of internal stakeholders of Ceno.id who are directly involved in production and quality control processes, including:

- Owner or management
- Production team
- Quality control team

Data Analysis Method

This study utilizes a qualitative data analysis approach to explore the implementation of TQM in Ceno.id. Data were collected through interviews and analyzed using concepts from Operations Management by Russell, particularly focusing on:

1. Quality Management – emphasizing quality control to minimize defects
2. Process Strategy and Process Analysis – focusing on production efficiency and consistency
3. Supply Chain and Operations Control – related to managing production flow and quality control
4. Continuous Improvement – as an effort to enhance quality on an ongoing basis

Data Analysis Procedures

The data analysis was conducted through the following stages:

1. **Data Reduction**
   Filtering and selecting relevant information obtained from interviews.
2. **Data Categorization**
   Grouping data based on theoretical frameworks and research objectives.
3. **Data Presentation**
   Presenting data in narrative form and summarizing it in tables.
4. **Data Interpretation**
   Interpreting findings by linking them to theoretical concepts from Russell, with a focus on:
   - ○ The effectiveness of production processes in minimizing waste
   - ○ The implementation of quality control in maintaining standards
   - ○ Identification of the causes of defects and waste from an operational perspective
   - ○ The role of SOP in ensuring process consistency
   - ○ Employee contributions to maintaining quality
   - ○ The implementation of continuous improvement in company operations
5. **Conclusion Drawing**
   Drawing conclusions based on the interpretation of findings in relation to the research objectives concerning TQM and the reduction of fashion waste.
6. **Research Readiness Summary**
   Based on the defined research object, clearly established quality management parameters, and preliminary interview results, this study is considered ready to proceed to further stages, including field observation, analysis, and discussion.

From the perspective of the research object, Ceno.id has been appropriately selected, as it possesses a clear operational structure and has implemented practices relevant to the research objectives.

In terms of data availability, the study is supported by primary data obtained from interviews with Ceno.id, including data collected over a six-month period, which provides a comprehensive representation of the actual production process and TQM implementation.

From a theoretical and analytical perspective, this research is grounded in well-established frameworks, including Operations Management by Russell (Operations Management and Supply Chain Management, 11th Edition) and the concept of Total Quality Management. Additionally, key analytical parameters—such as defect rate, fabric waste level, process consistency, employee involvement, and continuous improvement—have been clearly defined to facilitate the evaluation process.

RESULTS AND DISCUSSION

Production Process and Quality Control

Based on the observations, the production process at Ceno.id consists of several main stages, including material selection, fabric cutting, sewing, quality control, and packaging. This workflow indicates that the company has established a structured production system, although its implementation is not yet fully consistent across all stages.

Defects and Waste

Based on interview findings, several types of defects and waste were identified in the production process, as summarized in Table 1.

Table 1. Types of Defects and Was te at Ceno.id

Type of Issue	Description	Cause	Impact
Misaligned stitching	Stitching is uneven or not straight	Human error	Product does not meet quality standards
Incorrect sizing	Size differs from standard	Lack of accuracy	Product cannot be sold
Poor finishing	Final details are not properly completed	Insufficient attention to detail	Decreased product quality
Fabric waste	Remaining fabric scraps	Inefficient cutting process	Material waste
Rejected products	Defective products that cannot be repaired	Production errors	Financial loss

Key findings include:

- The main type of waste is fabric scraps, averaging approximately 100 meters per month.

- The most common defects include misaligned stitching, twisted seams, uneven stitching, and fabric defects from suppliers.
- The primary causes are human error (particularly among less experienced workers) and supplier-related defects.

Although the defect rate is relatively low (approximately 0.5%), there is still potential for further reduction through a more structured quality control system.

TQM Practices Implemented Quality Control Implementation

Ceno.id has implemented several elements of TQM, including:

- Written SOPs for product quality, such as stitching neatness, absence of loose threads, no stains, and product durability.
- Employee training and specific guidance regarding quality standards.
- Continuous improvement efforts, including weekly evaluations, formal monthly reviews, and the reuse of fabric waste into products such as scrunchies, mini pouches, and keychains as complimentary items.

However, the company has not yet implemented formal measurement systems such as control charts, Defects Per Million Opportunities (DPMO), or structured standards like ISO 9001. As a result, TQM is still applied as a localized practice rather than a fully formalized quality management system.

Employees also play a crucial role in maintaining product quality, particularly during production and quality control stages. However, differences in skill levels and understanding of quality standards lead to variations in product quality.

Discussion Analysis Based on Total Quality Management (TQM)

To evaluate the implementation of TQM at Ceno.id, an analysis was conducted based on several key aspects, as presented in Table 2.

Table 2. Analysis of TQM Implementation at Ceno.id

TQM Aspect	Condition at Ceno	Analysis
Quality Control	Conducted in two stages	Effective, but still manual
SOP	Available	Not consistently implemented
Employee Involvement	Employees are involved in production	Skill levels are not evenly distributed
Continuous Improvement	Regular evaluations exist	Still reactive rather than preventive

Based on Table 2, it can be concluded that Ceno.id has implemented several TQM principles. However, the implementation remains suboptimal and requires further strengthening, particularly in process consistency and human resource development.

Relationship Between Defects and Waste

From an Operations Management perspective, defects are directly related to waste. Products that fail to meet quality standards result in wasted materials, time, and labor. At

Ceno.id, defects contribute directly to increased fabric waste and product rejection. This indicates that improving production quality will significantly reduce waste levels.

Comparison with Previous Studies

The findings of this study are consistent with Syduzzaman et al. (2014), who found that TQM implementation significantly reduces defect levels. Similarly, Islam et al. (2013) emphasized the importance of identifying root causes of defects, which in this study were found to stem mainly from human factors and production processes.

However, unlike large-scale manufacturing industries, Ceno.id—as a small-scale fashion retail business—faces limitations in process standardization, employee training, and measurable quality control systems.

Role of SOP and Continuous Improvement

Although SOPs are already established at Ceno.id, they are not consistently implemented across all production processes. In addition, evaluations tend to be reactive, meaning they are conducted only after errors occur. In the TQM framework, continuous improvement should be preventive and ongoing. Therefore, improvements in evaluation and monitoring systems are necessary to ensure consistent product quality.

Key Insight

Based on the analysis, the main issue in Ceno.id's production process does not lie in the absence of a system, but rather in the inconsistency of implementing existing systems. This suggests that improving quality depends not only on having SOPs and quality control procedures, but also on consistent execution and active employee involvement in maintaining quality standards.

CONCLUSION AND MANAGERIAL IMPLICATIONS

Conclusion

Based on the findings and discussion, it can be concluded that the implementation of Total Quality Management (TQM) in the studied organization contributes positively to both organizational performance and employee performance. Key dimensions of TQM—such as quality leadership, employee involvement, continuous improvement, customer focus, training, and teamwork—have been shown to significantly influence productivity, reduce defect rates, and enhance customer satisfaction. Furthermore, TQM impacts not only technical aspects but also organizational culture by strengthening communication, cross-functional collaboration, and commitment to continuous improvement. However, the successful implementation of TQM does not occur automatically. It highly depends on top management commitment, consistency in applying quality processes, and the organization's ability to manage resistance to change at the operational level.

Managerial Implications

The findings of this study provide several important implications for managerial practice. First, top management must demonstrate a clear commitment to TQM by establishing well-defined quality policies, setting measurable quality targets, and allocating sufficient resources—such as time, workforce, and budget—for quality improvement initiatives.

Second, managers are encouraged to strengthen training and awareness of TQM across all levels of employees, ensuring that quality practices are understood as part of daily responsibilities rather than merely formal programs or temporary initiatives. Third, management should promote continuous improvement mechanisms, such as quality circles, internal audits, and regular management reviews, to ensure that TQM becomes embedded within the organizational culture.

From a practical perspective, managers can develop performance indicators related to TQM—such as defect rates, service cycle time, and customer satisfaction index—to monitor

the impact of TQM implementation over time and make necessary adjustments to policies and practices.

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