Formosa Journal of Multidisciplinary Research (FJMR)
Vol. 4, No. 4, 2025: 1939-1954

# Systematic Literature Review: The Effect of Quality Cost on Defective and Damaged Products in the Manufacturing Industry

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A R T I C L E I N F O
*Keywords:* Quality Cost, Defective Products, Damaged Products, Manufacturing Industry, Systematic Literature Review (SLR)

*Received : 15, March*
*Revised : 29, March*
*Accepted: 26, April*



A B S T R A C T
This study aims to examine the impact of Quality Cost on defective and damaged products in the manufacturing industry using a Systematic Literature Review (SLR) approach. Twelve scientific articles from 2013 to 2024 were analyzed, focusing on prevention, appraisal, and failure costs. The findings show that higher prevention and appraisal costs effectively reduce product defects, while high external failure costs indicate poor quality control. The study highlights the importance of implementing Total Quality Management (TQM) to improve efficiency and competitiveness. These insights offer practical recommendations for better quality cost management to enhance profitability and customer satisfaction in the manufacturing sector.

DOI: https://doi.org/10.55927/fjmr.v4i4.169
ISSN-E: 2829-8896
https://npaformosapublisher.org/index.php/fjmr

## INTRODUCTION

In the era of global trade pThe business world competition is getting tighterWhichemphasize product and service quality to beimportant aspects that are determiningthe success of a company. Companies that are able to create products with high quality and efficient costs will be more competitive andable to compete more superiorly in the global market. One of the important concepts in quality management is quality cost, which reflects all expenses incurred by the company to prevent, detect, andmresolving service or product issues Nomeet the established quality standards.

Business continuity is closely related to the impact of customer satisfaction. Customer satisfaction is a priority for companies to maintain business performance and existence.in the middlesociety for the products produced. The increasingly complex and dynamic needs and expectations of customers are a challenge for manufacturers to further improve ideal performance (Luh & Pancawati, 2022). In addition, challenges such as defective products and damaged products often arise in the production process.i the company thatnegatively impact operational efficiency and corporate image.

Defective products are products that do not meet the given quality standards, but in terms of economic standards, can be repaired to become superior products. While damaged products can be interpreted as goods that do not meet quality standards in the production process, both technically and economically. This product cannot be repaired to achieve the desired quality standards, because the cost of repair tends to be higher than the selling value of the product after repair (Terang et al., 2023a). Both of these things are major challenges in the industry, especially the manufacturing industry, because they can reduce production efficiency, increase operational costs, and reduce customer satisfaction. Therefore, manufacturing companies need to implement effective quality management strategies to minimize defective and damaged products.

One of the important concepts in quality management is quality cost. This cost reflects all expenses incurred by the company to prevent, detect, and handle products or services that do not meet quality standards. Good quality cost management can help companies reduce the level of defective and damaged products, increase production efficiency, and increase customer satisfaction.

Although the concept of quality cost has long been recognized as a strategic approach to improving quality and production efficiency, its total implementation in the production industry remains a challenge in the manufacturing industry. Many companies do not optimally allocate and manage quality cost components in a structured manner, which means that there are many defective and damaged products. This problem not only affects the company's financial aspects, but also affects its reputation, customer loyalty, and business continuity. Therefore, it is important to formulate important questions about all quality cost factors including prevention costs, appraisal costs, internal loss costs, and external failure costs that can reduce the number of failed products.

This study is based on the need to fill several gaps that still exist in previous scientific studies. First, many studies only discuss some components of quality costs without looking at the overall relationship in the Cost of Quality model. Second, the scope of the study tends to be limited, both in terms of location, industrial scale, and measurement methods, so that the results are difficult to generalize. Third, the analytical approach used is generally descriptive or simple quantitative, not many have used comprehensive methods such as Systematic Literature Review (SLR). Fourth, the relationship between quality management theories such as Total Quality Management (TQM) and quality cost management in the context of reducing defective and damaged products is still rarely studied in depth.

Therefore, through the Systematic Literature Review (SLR) approach,This research not only aims to answer the question of how much influence quality costs have on defective and failed products., but also aims to explore various leading practices and important findings from previous studies that can be a strategic basis for quality management in the manufacturing sector. This research is expected to provide significant contributions, both theoretically and practically, for companies in their efforts to improve operational efficiency, product quality, and competitiveness in the global market through optimal quality cost management. In addition, this research also plays a role in identifying how much influence Quality Cost has on the emergence of defective and damaged products in the manufacturing industry.

## LITERATURE REVIEW

After the researcher conducted several journals related to research which functioned as a theoretical framework with the following explanation:

1. *Cost of Quality*

Quality costs include all expenses incurred by the company to ensure that the products or services produced are in accordance with the established quality standards. In general, these costs are divided into four main categories, namely: prevention costs, inspection or evaluation costs, internal failure costs, and external failure costs.(Berry & Bhaskara, 2019). Prevention and appraisal costs are a form of initial investment to ensure quality, while failure costs arise due to non-conformity to standards. Several studies have stated that increasing the allocation of prevention and appraisal costs can reduce the level of defective or damaged products.(Hadijah et al., 2019). On the other hand, high external failure costs indicate weak quality control at the end of the production process.

2. *Defective Products and Damaged Products*

Defective products are goods that do not meet quality standards but still have the opportunity to be repaired, while damaged products are goods that cannot be repaired or whose repair value exceeds their selling value (Terang et al., 2023b). Both have a negative impact on operational effectiveness and can reduce the company's reputation.

Research conducted by Safitri et al. (2021) and Kountul et al. (2024) shows a significant relationship between proper quality cost management and a decrease in the number of defective products. Efficient quality cost management

can encourage process improvements from the start, thereby reducing the need to repair or discard products that do not meet standards.

3. *Total Quality Management (TQM)*

TQM is a management strategy that focuses on improving overall quality in every aspect of the organization, involving all elements of the company. This concept prioritizes continuous improvement, customer satisfaction, and decision making based on data (Luh & Pancawati, 2022).

Various studies in the literature review show that the implementation of TQM contributes greatly to streamlining quality costs and reducing failure rates in the production process (Puspita Waty Sudibyo & Ratna Dewi, 2019). TQM also encourages the implementation of preventive actions from the beginning of the production process and forms a quality culture in the company environment.

4. *Previous Research Findings*

Research by (Suryanata, n.d.) at PTPN XI showed that increasing prevention and appraisal costs correlated with decreasing defective product rates, although the relationship was weak. Meanwhile, research by (Hadijah et al., 2019) And (Ulfah & Hastuti, 2018) shows that simultaneously, quality costs have a significant influence on reducing defective products in manufacturing companies.

In general, the results of the literature review show consistency that structured and strategic quality cost management can be an effective tool to reduce the number of failed products and increase the company's operational efficiency.

***Theoretical Basis***

In an effort to reduce the number of defective and damaged products in the manufacturing industry, a comprehensive theoretical understanding of the concept of quality cost is needed. Several theories underlie the relationship between quality spending and production output, which are the main foundations of this study.

1. *Cost of Quality Theory*

According to(Lores & Siregar, 2019), explains that quality costs are costs incurred to prevent, detect, and correct poor quality, as well as opportunity costs due to lost production time and sales. These costs arise not only when fixing defects, but also in the process of ensuring good products from the start. Quality costs are categorized into:

a. Prevention costs, namely expenses incurred to avoid the occurrence of defective products.
b. Appraisal costs, namely costs used to check and test product quality.
c. Internal failure cost, namely the cost resulting from the discovery of a defective product before the product is sent to the customer.
d. External failure costs, namely costs that arise when a defective product is discovered after it is received by the customer.

In his article entitled "Cost of Quality, Productivity and Product Quality: A Literature Review," Lores also explained that quality costs are also positively

correlated with product quality, such as improving product quality, reducing failure costs, and increasing customer satisfaction. This shows that quality costs are not a burden, but rather an important strategic investment to improve productivity, product quality, and company profits. Prevention and appraisal costs play a central role, while failure costs should be minimized.

2. *Total Quality Management (TQM) Theory*

According to (Lastiawan & Aprilyanti, 2021), TQM is a comprehensive management approach that focuses on continuous quality improvement throughout an organization's processes, involving all employees and emphasizing customer satisfaction. By implementing TQM effectively, companies can reduce failure costs (such as defective/rejected products) and improve quality directly by reducing the need for re-inspection and repair, thus reducing appraisal costs and internal failure costs. In addition, continuous operator training and skill improvement are investments in prevention costs, which have been proven to reduce overall failure costs.

So, the implementation of TQM has a positive impact on reducing total quality costs through error prevention, process improvement, and continuous quality control. This also increases the efficiency of production costs and the company's competitiveness.

3. *Quality Theory as Investment*

According to Philip B. Crosby in his famous book "Quality is Free" (1979), Quality is Free or "Quality is Free", it does not mean that there is no cost at all, but that the cost of maintaining quality is smaller than the cost of poor quality (Editor and Editor). So, if the company consistently invests in quality from the start, total operational costs can actually decrease and profits increase. He also emphasized that quality is not a burden or additional cost, but an investment that provides a return. The main idea is that the cost of preventing errors is much smaller than the cost of fixing them after they occur. Of the four categories of quality costs, Cosby argues that investing in prevention and appraisal costs, companies can reduce internal and external failures, which are often more expensive. The conclusion is that by managing quality proactively it is not a waste, but a smart strategy to increase efficiency, reduce waste, strengthen reputation, and ultimately increase company profits. Therefore, quality is a form of long-term investment.

4. *Customer Satisfaction Theory and Operational Efficiency*

According to (Meisheilla Aditya & Syam, 2018) The implementation of quality costs can increase the efficiency of production costs, although its influence is still relatively small. This is because quality costs are only a small part of the total production costs and the company has not implemented a special calculation of quality costs, but is still mixed in production costs. In addition, quality costs play a role in controlling the production process, producing higher quality products, and reducing losses due to defective products, so that there is no need for additional costs for repairs. Where as we know that defective or damaged products can reduce customer satisfaction levels and have a negative impact on

loyalty and the company's image. Therefore, controlling quality costs also contributes to achieving operational efficiency and increasing the company's competitiveness in the market. So, reducing the number of defective and damaged products is not only related to cost savings, but also increasing customer satisfaction and trust.

## METHODOLOGY

In the article entitled "Systematic Literature Review: The Effect of Quality Cost on Defective Products and Damaged Products in the Manufacturing Industry", the Systematic Literature Review (SLR) approach is used. This method is a research technique carried out by collecting and reviewing various literature or previous studies in order to draw conclusions from a particular topic (Triandini et al., nd 2019). The purpose of using the SLR method is to analyze, identify, review, evaluate, and interpret a topic in order to formulate research questions. SLR is often used in compiling research agendas, as part of writing a dissertation or thesis, and completing research grant proposals. This method is carried out through structured stages and aims to compile a summary and analyze research results from previously determined literature.

In this article, the author will formulate critical questions related to the topic or title. Where later the author will formulate questions related to the topic discussed, namely whether Quality Cost consisting of prevention costs, appraisal costs, internal and external failure costs have an effect on reducing the level of defective products and damaged products in the manufacturing industry. After the questions are formulated, the next stage is to search for literature from trusted sources, such as Websites, Google Scholar, or Scopus. In addition, the author must pay attention to the keywords used in the literature search, namely they must be specific and relevant. This search aims to collect articles and journals that discuss the relationship between quality costs and reducing defective products and damaged products.

Next, the authors filtered the literature by setting inclusion and exclusion criteria so that only the most relevant and high-quality studies were used. Studies that met the inclusion criteria, for example, had to focus on the manufacturing industry and discuss the impact of Quality Cost directly on product defects. Meanwhile, studies that only discussed the service sector or quality cost in general without mentioning defective products could be excluded. After the literature was collected and selected, the authors then compared and identified patterns and relationships. Are increased prevention and appraisal costs able to significantly reduce internal and external failure costs? Are there any studies that prove that early investment is more effective than bearing losses due to defective products?

The result of this article is the presentation of answers to critical questions regarding the topic discussed. In addition, this article also presents a discussion and conclusion that summarizes important findings from the analyzed literature. With this SLR approach, the article not only provides a deeper understanding of the influence of quality costs in reducing defective and damaged products, but also offers practical recommendations for the manufacturing industry in managing quality costs to improve efficiency and competitiveness.

## RESEARCH RESULT

After conducting a search for scientific articles by searching for literature from trusted sources, such as Websites, Google Scholar, or Scopus, 10 articles were found that met the research criteria published between 2013 and 2024, namely as follows.

### *1. Damaged Product*

| Journal | Objective | Population and Sample | Data Collection Method | Advantages and Disadvantages | Discussion Results |
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| "Cost Effectiveness of Quality in Order to Reduce Damaged Products at PT. Perkebunan Nusantara XI PG. Redjosarie" ((Intia Puspita Waty Sudibyo and Farida Ratna Dewi, 2019) | Identifying the types of quality costs, conditions and causes of damaged products, and analyzing factors that influence the effectiveness of quality costs to reduce product damage. | Population: All products of PT. PN XI PG. Redjosarie (2012–2016). Sample: Quantitative and qualitative data of quality costs and damaged products. | Data were obtained through direct interviews (primary data) and company cost reports (secondary data) during the period 2012-2016. The analysis was conducted descriptively by utilizing cause-effect diagrams to identify factors causing damaged products. | **Advantages:** The research presents an in-depth analysis with primary and secondary data, as well as a structured methodology through a descriptive approach and cause-effect diagrams. **Disadvantages:** Limited to one company so it is less general, and quality costs are not separated from production costs, making it difficult to measure its effectiveness. | Research shows that prevention and appraisal costs have a significant effect on defective products. Although quality costs fluctuate (2012–2016), defective products remain high, indicating that effectiveness is not optimal. TQM is recommended for improvement. |
| "Cost of Quality and Product Damage Level (Empirical Study at PT. Indokom Citra Persada" (Yunike Berry & Reza Trie Bhaskar, 2019) | To determine the effect of prevention costs, appraisal costs, internal failure costs, and external failure costs on the level of product damage at PT. Indokom | Population: all quality cost reports at PT. Indokom Citra Persada. Sample: quality cost data for the last three years. | Interviews, observations, and documentation of quality cost reports. Data were analyzed using multiple linear regression accompanied by classical assumption tests (normality, multicollinearity, | **Advantages:** Powerful statistical methods, clear COQ framework, real data, complete results. **Disadvantages:** Validity tests are not explained, indicators are not detailed, without managerial recommendations and study comparisons. | The study shows that prevention, appraisal, and external failure costs have a significant effect on reducing defective products, while internal failure costs do not. This finding is in line with the principles of TQM and Crosby's theory that quality costs are investments. It is recommended |

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| | Citra Persada. | | heteroscedasticity, autocorrelation). | | that companies increase cost allocations early in the process for prevention and appraisal, and reduce external failure costs that are expensive and damaging to reputation, by focusing on quality control upstream in production. |
| "The Effect of Quality Costs on Damaged Products (Case Study on Sari Rasa Lombok Cake Shop)" (Yunita Putri, Akram, & Widia Astuti, 2022) | This study aims to analyze the effect of prevention, appraisal, internal and external failure costs on damaged products at Sari Rasa Lombok Cake Shop. | **Population :** Sari Rasa Lombok Cake Shop quality cost report 2019–2021. **Sample:** Monthly time series data, quantitative (nominal costs and defective products) and qualitative (interviews and quality control documentation). | Type of research: Quantitative associative. Data collection techniques: Observation, documentation, interviews. Data analysis: Descriptive statistics, classical assumption tests (normality, heteroscedasticity, multicollinearity, autocorrelation), and multiple linear regression. | **Advantages:** Actual data from MSMEs with a 3-year period, provides a representative picture and stable trends. **Disadvantages:** Only involves quality cost variables, without considering other factors that influence defective products (such as materials, training, human resources, production equipment). | Simultaneous tests show that overall, quality costs (X1–X4) have a significant effect on defective products. |
| "The Effect of Quality Costs on Minimizing Damaged Products in Home Industry Products for Making | This study aims to analyze the effect of prevention and assessment costs on minimizing damaged products in the | **Population :**All data on peanut crackers products from the Minanti home industry. **Sample:**Taken by purposive sampling, based on | The data collection method for the research was through documentation such as financial reports and direct interviews with the production department | **Advantages:** The use of actual financial data from micro-enterprises and a combination of documentation and interview methods increases the validity of the data. **Disadvantages:** Limited data | The results of the study showed a significant simultaneous influence between prevention and assessment costs on damaged products (F test). Partially, both had a significant effect (t test). Regression showed that increasing |

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| Peanut Crackers ” (Rina Milyati Yuniastuti, 2021) | Minanti peanut peyek home industry in Bandar Lampung (2018–2019). | location and availability of financial reports (cash, debt, assets, sales, net income) from 2018–2019. | to dig up additional information that was not contained in the written report. | coverage (only 2 years), so the results are difficult to generalize. One small industry as a sample, less representative for the home industry sector in general. | prevention and assessment costs reduced damaged products. However, $R^2$ = 11.8%, indicating that the contribution of quality costs to reducing damaged products is still small, with other factors influencing. |
| “The Effect of Quality Costs on Damaged Products at CV. Ake Abadi” (Vrigel Vasya Alfarezi, 2023) | The purpose of this study is to determine how much influence the cost of quality—consisting of prevention costs and appraisal costs—has on the number of defective products in the manufacturing company CV. Ake Abadi. | **Population :**Production activities and cost recording at CV. Ake Abadi during the research period. **Sample:**12-month data (January–December) 2012, in the form of the number of defective products and quality costs each month. | The study used primary data (interviews, observations) and secondary data (company archive documentation, literature). Data analysis was carried out using qualitative descriptive methods, simple linear regression (SPSS), and classical assumption tests (normality, autocorrelation, heteroscedasticity). | **Advantages:** Real data from active manufacturing companies, application of complete statistical tests (t-test, regression, classical assumptions). **Disadvantages:** The amount of data is limited (only 12 months) and focuses only on prevention and appraisal costs, without covering internal and external failure costs. | The results showed that the number of defective products was relatively stable, while the quality costs fluctuated. The regression analysis produced a significance value of 0.508 (> 0.05), indicating no significant influence between quality costs and the number of defective products. The correlation coefficient (R) showed a weak relationship, and $R^2$ was only 4.5%, meaning that the variation of defective products was mostly influenced by other factors such as pests and employee errors. |

## 2. *Defective Product*

| Journal | Objective | Population and Sample | Data Collection Method | Advantages and Disadvantages | Discussion Results |
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| "Quality Cost Analysis to Reduce Defective Products at Jati Jaya Kendari Furniture Store" ((Ika Maya Sari, Muntu Abdullah, Friday, 2023) | Knowing the use of quality costs incurred to reduce defective products at the Jati Raya Furniture Store. | The population in this study is all quality-related costs incurred by Toko Meubel Jati Raya Kendari during 2018 and 2019. The sample was taken from quality cost data and defective product reports that occurred during the period. | Data types: Quantitative and qualitative. Data collection method: **a. Interview (Primary Data):** Q&A with management and employees regarding defective products and their causes. **b. Documentation (Secondary Data):** Studying documents and archives related to product design and defect reports. Method of analysis: Descriptive. | **Advantages:** A multidimensional approach with interviews and document analysis provides a comprehensive understanding of quality management at Toko Meubel Jati Raya. Detailed data allows for in-depth analysis of quality cost trends from year to year. **Disadvantages:** It does not consider external factors that can affect quality costs and defective products. And it does not explore the relationship between quality costs and other variables such as customer satisfaction or profits. | The study showed that increasing quality costs at Toko Meubel Jati Raya reduced defective products. Although prevention costs increased, internal failure costs remained high, indicating the need for HR supervision and training. These findings emphasize the importance of quality control and performance appraisal systems for competitive advantage and customer satisfaction. |
| "Analysis of the Influence of Quality Costs on Defective Products (Case Study at PT. XYZ Aspal 2018-2020)" | This study aims to determine and analyze the effect of quality costs on defective products at PT. XYZ Aspal using a mixed method with | **Population:** Products produced by PT. XYZ Asphalt. **Sample:** AGF (Asbuton Granular Filler) product with the largest production volume | This research uses a mixed method: **Quantitative:** Data collection through financial and statistical analysis with multiple linear regression using SPSS, based on financial | **Advantages:** Mixed methods provide a clearer picture of the impact of quality costs. Quantitative methods provide strong numerical data, while qualitative methods add depth to contextual understanding and managerial | The results of the study indicate that prevention and appraisal costs reduce defective products, while internal failure costs have no significant effect. Effective quality cost management, especially prevention costs, can reduce product defects and repair costs, and improve |

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| (Monica Shahnaz Safitri, Choirul Anwar, Indah Muliasari, 2021) | quantitative and qualitative analysis. | during 2018–2020. | reports and production volume of PT. XYZ Aspal Qualitative: Interviews with middle management to obtain views on quality costs and their impact on defective products. | perspective. **Disadvantages:** Focuses only on three types of quality costs, without considering external failure costs. Does not include other external factors that can affect product quality, such as market trends or environmental factors. | company efficiency and profitability. |
| "Quality Cost Analysis to Reduce the Risk of Defective Products in Offering Bags at Pustaka Mulia Manado Bookstore" (Thezza Sthevany Helena Kountul, Natalia YT Gerungai, Syermi SE Mintalang, 2024) | This study aims to analyze the management of quality costs in reducing the risk of defective products in offering bag products produced by the Pustaka Mulia Manado Bookstore, as well as assessing the efficiency of the quality control system based on theoretical standards. | **Population:** All activities and production data of offering bags in 2022–2023 at Pustaka Mulia Bookstore Manado. **Sample:** Quality cost report (prevention, appraisal, internal & external failure) and defective product count data for the two years. | Descriptive qualitative approach. Data collection techniques: observation, direct interviews with management and production operators, and documentation of product cost and damage data. | **Advantages:** Relevant topics for local manufacturing SMEs, with a complete quality cost classification and data comparing two years. **Disadvantages:** There is no in-depth statistical analysis, comparison to external standards, or benchmarking with peer companies. | Quality costs increased from IDR 10,355,000 (2022) to IDR 11,302,500 (2023), with a decrease in defective products thanks to strengthening prevention and assessment costs. The largest costs are in machine maintenance and product inspection. Although effective, quality management efficiency is still low, with quality costs to sales exceeding the standard (6.75% in 2022 and 6.35% in 2023). This study suggests the need for an efficient cost control system, as well as a proportional preventive approach to optimize quality without burdening costs. |
| "Analysis of the Influence of | To find out the effect of increasing | Not mentioned quantitatively; the | Qualitative methods: observation, interviews, | **Advantages:** Using a variety of data | The increase in defective products has a negative impact on quality, |

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| Increasing the Quantity of Defective Products on Manufacturing Companies (Case Study of PT.X)" (Margareta and Abdul Hamid, 2021) | quantity of defective products on product quality in manufacturing companies (PT. X) and to contribute to minimizing product defects. | research was conducted directly at PT. X with respondents as primary and secondary data sources. | documentation, Focus Group Discussion (FGD). | collection methods. Direct field studies provide real and in-depth data. **Disadvantages:** No specific sample size was mentioned. No quantitative/statistical data analysis. | caused by human error, machine failure, and weak SOPs. It is necessary to improve supervision, workforce training, and quality evaluation. The company must improve the quality control system and SOPs. The results of this study can be used as a managerial reference for evaluating the production process and making decisions related to efficiency and quality improvement. The increase in defective products also increases internal failure costs, which are part of quality cost management. |
| "The Influence of Prevention Cost and Appraisal Cost on Defective Products (Case Study at PTP Nusantara XI Sugar Factory)" (Bayu Nugraha | This study aims to measure the extent to which quality costs, especially prevention costs and appraisal costs, influence the number of defective products in 16 sugar factories owned by PTP Nusantar | The population in this study were 16 sugar factories operated by PTP Nusantara XI. The sample used included all cost and defective product data at the 16 factories during the period 2007–2011, with a total of 80 | This research method uses a quantitative descriptive approach with case studies. Data collection techniques include literature studies and field studies, obtained through interviews and documentation. Data analysis is carried out descriptively and quantitativel | **Advantages:** Using real data over five years from a large state-owned company. Analyzing two components of quality costs (prevention and appraisal) simultaneously. **Disadvantages:** Does not include the cost of failure in the analysis. The low Adjusted R Square value (8.2%) indicates a weak relationship between the variables. And | The study showed that prevention costs had a significant effect on reducing defects, while appraisal costs had a lesser impact. Although the relationship found was weak (only 8.2%), a focus on prevention remains crucial to reducing defects, and further analysis is needed for more in-depth results. |

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| Suryanata, 2013) | a XI, and to test whether increasing the allocation of quality costs can reduce the level of defective products as an indicator of production efficiency and quality improvement. | observation data. | y using linear regression with the help of SPSS software. | there is no multivariate test and classical regression assumption test which are important to ensure the validity of the model. | |

## DISCUSSION

Technological advances in the increasingly competitive business world in the era of global trade emphasize that product and service quality are the main factors determining the success of a company. Based on a literature review conducted by researchers, good quality cost management has a significant influence in reducing defective and damaged products in the manufacturing industry, thereby increasing the efficiency and profitability of the company. The study includes prevention costs, appraisal costs, internal failure costs, and external failure costs. There is a significant relationship between spending on prevention and appraisal costs and defective products. Increases in both components are related to reducing the level of nonconforming products, while failure costs are directly related to the level of defective products. In the journal article above, investment in prevention and appraisal costs can reduce defective and damaged products. These costs include efforts to improve the quality of processes and products, which will ultimately reduce the number of products that do not meet quality standards that have a direct impact on the operational efficiency and profitability of the company.

The application of TQM has been recommended as a way to improve quality cost control and reduce defective products. By focusing on quality costs, companies can create a more productive and efficient production environment.

In the journal article above recommends the implementation of TQM as a way to improve quality cost management and reduce defective and damaged products. TQM can help companies control quality costs and create more productive and efficient production. Reducing the number of defective and damaged products directly contributes to increased profitability. By reducing waste associated with defective and damaged products, businesses can allocate resources more optimally.

So it can be concluded that the influence of Quality Cost on defective and damaged products in the manufacturing industry is very important and positive. Effective quality cost management including prevention and appraisal costs, reduces the number of products that do not meet standards, improves operational efficiency, which contributes to the profitability of the company. Although there are some weaknesses related to the generalization of results and complex measurements in the production industry, quality costs are very important to improve the performance and competitiveness of the company by implementing a quality-controlled sustainable strategy to achieve the desired results.

The study of the effect of quality costs on defective products in the manufacturing industry has advantages, namely the use of complete and strong analysis methods, as well as the support of real data from companies that provide a clear picture of the relationship between the variables studied. This study also provides practical recommendations for companies to improve quality management by implementing TQM.(Simamora et al., 2024). However, on the other hand, this study cannot be generalized to all industries because it is based on one case company, and there are shortcomings in the separation of quality costs from production costs that make it difficult to evaluate cost effectiveness accurately. In addition, external factors that may affect the results of the study are not always considered, which may be related to product quality that can affect the relevance of the results of the discussion of the research findings..

## CONCLUSION

Through a systematic analysis of 10 relevant scientific articles, it was found that quality cost management has a significant influence in reducing the number of defective and damaged products in the manufacturing industry. The components of prevention and appraisal costs have been proven to be able to improve process quality from the beginning of production, thereby minimizing the risk of non-conforming products. On the other hand, the high cost of failure, especially at the external level, reflects the weakness of the internal quality control system which still needs serious attention. The implementation of Total Quality Management (TQM) is identified as an effective strategy to integrate all elements of quality costs as a whole. This strategy encourages companies to be proactive in preventing errors, rather than simply reacting to failures. Although there are variations in approaches and contexts in the articles reviewed, the findings show a consistent pattern: investment in quality management not only prevents losses, but also has a real impact on operational efficiency, profitability, and company sustainability.

Thus, structured and strategic quality cost management should be an integral part of a manufacturing company's quality management system. Focus on preventive and evaluative actions needs to be continuously improved to ensure production stability, customer satisfaction, and long-term competitiveness in a competitive market.

## RECOMMENDATION

This study has several limitations that need to be considered. First, the data used comes from previous studies with diverse industrial backgrounds, so the results cannot be fully generalized. Second, in some studies, quality costs are still mixed with production costs, so that the measurement of management effectiveness is less accurate. Third, most of the literature has not included external factors such as regulations, market conditions, technology, or workforce training that can actually directly affect product quality.

## ADVANCED RESEARCH

In addition, discussions on the application of the Total Quality Management (TQM) concept on a small industrial scale such as MSMEs are still very limited. Therefore, further research is needed with a more in-depth approach and broader coverage so that the results can be applied more relevantly in various industrial sectors.

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