Article

Crafting Excellence Total Quality Management (TQM) Unleashed in Fahmi Cookies

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Abstract: This study explores the application of Total Quality Management (TQM) through Six Sigma techniques to enhance product quality in the Fahmi Cookies peanut cake business, addressing the challenge of maintaining competitiveness through continuous quality improvement. Despite extensive research on Six Sigma in large-scale industries, its application in small-scale culinary businesses remains underexplored. The study analyzed production data from October to December 2022, covering 16,805 peanut cakes with 290 defective products, yielding a Six Sigma performance level of 3.7 and a defect rate of 17,257 Defects Per Million Opportunities (DPMO). Common defects included irregular shapes, hard textures, lumpy dough, and uneven coloring. The findings demonstrate the effectiveness of Six Sigma in reducing defects, enhancing operational efficiency, and improving customer satisfaction in small-scale food enterprises, contributing practical insights into quality management for local culinary businesses.

Keywords: Total Quality Management (TQM), Product quality, Six sigma

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1. Introduction

In today's fast-evolving business landscape, the number of emerging enterprises continues to grow, leading to fierce competition among businesses. To survive and thrive in such a competitive environment, business owners must constantly adopt strategies that align with their goals and ensure sustainability. One of the most effective ways to stay ahead is by prioritizing product quality. As Kotler (2018) states, product quality encompasses the overall characteristics of a product or service, enabling it to meet or exceed consumer expectations. Customers often judge product quality based on the materials used, the production process, and the final result.

Enhancing product quality is not only key to satisfying customers but also critical to boosting profitability, strengthening competitiveness, and securing a sustainable market position. A proven approach to achieving these goals is through the implementation of Total Quality Management (TQM). When applied effectively, TQM fosters a culture of quality, minimizes associated costs, and ensures the production of superior goods (Haryani et al., 2015). Research also demonstrates that TQM significantly improves operational performance, customer satisfaction, and product quality, giving businesses a competitive advantage and ensuring long-term success (Sutrisno, 2019).

The Fahmi Cookies peanut cake business in Jember serves as a case in point. Jember, a city celebrated for its wide array of pastry souvenirs, is fondly referred to as the "City of Small Gifts." Despite this reputation, Fahmi Cookies has faced fluctuating sales over the past three years. Sales

data indicates inconsistencies, with declines in 2021 compared to 2020 and further drops in early 2023. For instance, sales in February 2020 were recorded at a scale of 2.5, rose to 4 in 2021, but dropped to 3 in 2023. A similar pattern was observed in April, where sales fell from a scale of 4.5 in 2020 to 2.8 in 2021 before rebounding to 5 in 2023. Such instability raises important questions about the factors impacting product quality and production processes.

To address these challenges, this study explores the use of the TQM framework with an emphasis on Six Sigma techniques. Six Sigma is a data-driven methodology designed to reduce defects and enhance operational efficiency. By identifying and addressing the root causes of inconsistencies, this approach can help small businesses like Fahmi Cookies stabilize their product quality and drive sustainable sales growth. Previous studies have largely focused on the application of TQM principles across various sectors. For instance, Murni (2018) examined TQM in a government setting, highlighting key principles such as customer focus, quality obsession, and employee empowerment. Pratama (2022) explored the implementation of TQM in the hospitality industry, emphasizing the importance of regular evaluations and performance reports. Meanwhile, Pabendon (2023) reviewed studies showcasing TQM's positive impact on cost efficiency in food production.

However, a notable research gap exists. Few studies delve into how TQM tools, such as Six Sigma, can be utilized to enhance product quality, particularly in small-scale food businesses. This study aims to address this gap by applying TQM and Six Sigma to the Fahmi Cookies business. Through this approach, it seeks to offer practical insights and actionable recommendations for small enterprises aiming to achieve consistent quality, competitive advantage, and long-term sustainability.

2. Materials and Methods

This study focuses on a peanut cake business, Fahmi Cookies, located at Jln. Moch. Sroedji, Tegal Waru Mayang, Klayu Hamlet, Tegal Waru Village, Mayang District, Jember Regency. The research involves three key informants who represent different aspects of the business operations. The first informant is the business owner, who possesses comprehensive knowledge about the business and bears the primary responsibility for decision-making. The second informant is from the marketing department, which oversees product distribution and ensures the products meet consumer expectations. Lastly, the third informant is from the production department, which handles the manufacturing process and monitors product quality, including identifying any defective items before packaging.

Data collection was conducted using a combination of observation, interviews, and documentation techniques, allowing a comprehensive understanding of the business operations. The data analysis followed a structured process involving data reduction, data presentation, comparative analysis, and drawing conclusions. This aligns with the approach suggested by Fitria (2020) and Saleh et al. (2022), where qualitative methodologies provide nuanced insights into business processes.

The Six Sigma method's application in this context is expected to enhance the operational efficiency of Fahmi Cookies by systematically identifying and addressing defects in its production and distribution processes, as highlighted by the principles of DMAIC. Such an approach not only improves product quality but also strengthens the overall customer experience, aligning with findings from related studies on operational improvements in SMEs (Fitria, 2020; Saleh et al., 2022).

3. Results

Measurement Stage Analysis: Control Chart and Six Sigma Assessment

In the Measure phase of the Six Sigma process, we begin by evaluating the quality of Fahmi Cookies' peanut cake production using two critical measurement stages: the Control Chart (P-Chart)

and the Six Sigma level measurement. These methods help to identify variation in the production process and assess whether improvements are needed.

Table 1. Fahmi Cookies Peanut Cake Product Sample Report October – December 2023

No.	Types of Nut Cakes	Total Production			Defective Products			Recorded Product Percentage (%)		
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
1.	Old School Peanut Cake	1,500	1,650	2,000	27	31	42	1.8	1.88	2.1
2.	Peanut Cake	1,500	1,655	2,000	15	28	17	1	1.7	0.85
3.	Monde Milk Cookies	750	750	1,250	8	15	6	1.1	2	0.5
4.	Crescent Nut Cake	650	650	650	12	15	17	1.8	2,3	2.6
5.	Snow Princess	500	500	800	16	19	22	3,2	3.8	2.8

Source: Processed data, 2023

From table above the Fahmi Cookies production data from October to December 2023 reveals important insights into the company's product quality and manufacturing processes. The report shows that as production volumes increased across various product lines, some of the defect rates also rose. For example, the Old School Peanut Cake and Snow Princess had defect percentages that fluctuated, showing slight increases towards the end of the period. While products like Peanut Cake saw a decrease in defective percentages, others like Crescent Nut Cake and Monde Milk Cookies experienced slight increases in defects, suggesting potential areas of improvement. The fluctuation in defective products highlights the need for continuous monitoring to ensure quality remains consistent, particularly as demand and production grow.

This data is crucial for Fahmi Cookies in understanding the effectiveness of their production processes and ensuring product quality meets customer expectations. By utilizing Six Sigma tools such as P-Chart analysis, the company can track defects and make data-driven decisions to reduce production errors. Maintaining low defect rates is essential for enhancing customer satisfaction and ensuring the business can scale without sacrificing quality. These findings are in line with quality management practices that emphasize process optimization and customer-

Table 2. DPMO Conversion Results into Six Sigma

No	Name Product	Total Production			Note Products			DPU			DPMO			Six Sigma		
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
1.	Old School Peanut C	1,500	1,650	2,000	27	31	42	0.018	0.019	0.021	18000	18788	2100(	3.70	3.60	3.60
2.	Peanut Cake	1,500	1,650	2,000	15	28	17	0.01	0.017	0.009	10000	16918	8500	3.90	3.70	3.90
3.	Monde Milk Cookies	750	750	1250	8	15	6	0.011	0.02	0.005	10667	20000	4800	3.90	3.60	4.10
4.	Crescent Nut Cake	650	650	650	12	15	17	0.018	0.023	0.026	18462	23077	2615(	3.60	3.50	3.50
5.	Snow Princess	500	500	800	16	19	22	0.032	0.038	0.028	32000	38000	2750(	3.40	3.30	3.50

Source: processed data, 2024

From above , In analyzing the DPMO (Defects Per Million Opportunities) and Six Sigma results for Fahmi Cookies from October to December 2023, we observe significant insights into the company's quality management and process improvement efforts. The data indicates a generally consistent performance across the different products, with some variations in defect rates as production volumes increased. For example, the Old School Peanut Cake and Snow Princess products displayed slight increases in DPMO values during the period, leading to relatively stable Six Sigma scores around 3.6 to 3.7. This suggests that while the production process for these products was largely under control, occasional defects still impacted the overall product quality, highlighting

potential areas for improvement in defect reduction strategies.

In contrast, other products like Peanut Cake and Monde Milk Cookies showed impressive results, particularly in December, with DPMO figures decreasing significantly for Peanut Cake, reaching a DPMO of 8,500 and achieving a Six Sigma score of 3.9. Monde Milk Cookies also performed well, with Six Sigma score of 4.1 in December, reflecting a notable improvement in quality control. The variations in DPMO and Six Sigma levels across products are a clear indicator of the effectiveness of Fahmi Cookies' Total Quality Management (TQM) efforts. This variability underscores the need for ongoing monitoring and targeted interventions to address product-specific challenges while continuing to foster a culture of quality (Juran & Godfrey, 1999; Kubiak & Benbow, 2009; Pete & Holpp, 2022).

By maintaining a strong focus on quality management principles such as Six Sigma, Fahmi Cookies can further optimize their processes, reduce defects, and ensure product excellence across all product lines. These efforts will be essential in supporting the company's long-term growth and ensuring that customer satisfaction remains a top priority.

4. Discussion

The application of Six Sigma methodology at Fahmi Cookies, through the DMAIC (Define, Measure, Analyze, Improve, and Control) framework, reveals both strengths and areas for improvement in their peanut cake production process. This study's findings indicate a high level of awareness regarding production defects, with the company's sigma level at 3.7. This level of Six Sigma suggests a need for improvement, as the ideal is a level of 6 (3.4 defects per million opportunities). The data from October to December 2022 shows a consistent defect rate, with 290 defective peanut cakes out of 16,805 produced, translating to a DPMO of 17,257. The major defects identified include imperfect shape, uneven color, hard texture, and lumpy dough.

In the Define phase, the identification of key production problems such as uneven cake shapes and hard textures lays the groundwork for targeted interventions. The Measure phase provides quantitative insights, with control charts and Six Sigma metrics revealing defect trends and their impact on overall production quality. By calculating the DPU (Defects Per Unit) and DPMO (Defects Per Million Opportunities), Fahmi Cookies established the root cause for these production issues. For instance, the high DPMO values suggest the existence of inefficiencies, likely linked to inconsistent raw materials or flawed production techniques.

The Analyze phase, utilizing Pareto and cause-and-effect diagrams, helped pinpoint the most common defects, thereby guiding the company to focus on addressing the imperfections that had the greatest impact. The Improve phase outlined specific actions, including machine maintenance, ingredient standardization, and employee incentives, to improve product quality. By standardizing processes and enhancing operational focus, these steps can significantly reduce defect rates in future production cycles.

Finally, in the Control phase, Fahmi Cookies aims to institutionalize these improvements, ensuring that both employees and machines work according to optimized processes. The proposal for regular equipment checks and the reinforcement of standard operating procedures (SOPs) will help maintain consistency and prevent recurrence of defects, contributing to a continuous quality improvement culture.

5. Conclusion

The research reveals that Fahmi Cookies is at an intermediate level of quality management, with a Six Sigma value of 3.7. While the company has taken initial steps to address production defects, there remains a significant opportunity for improvement. The analysis points to several key issues: imperfect cake shapes, uneven color, hard textures, and lumpy dough, with the shape being the most frequent problem.

By focusing on the most critical defects as identified in the Pareto analysis (46% of defects being shape-related), Fahmi Cookies can streamline its efforts to target these specific areas. The implementation of corrective actions, such as machine maintenance, ingredient adjustments, and improved employee training, will likely lead to a reduction in defects, thereby improving overall product quality.

The control mechanisms, including regular checks and standardized procedures, will play a crucial role in maintaining improvements and ensuring sustainability. With these efforts, Fahmi Cookies is on a path to significantly improving its quality, minimizing production waste, and enhancing customer satisfaction, ultimately leading to increased profitability and competitiveness in the market.

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