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## The Role of Product Innovation in Enhancing the Competitiveness of Fish Processing SMEs in the IKM Center of Tarakan

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**Abstract:** This research is titled "The Role of Product Innovation in Enhancing the Competitiveness of Fish Processing SMEs in the IKM Center of Tarakan." The objective of this study is to analyze the impact of product innovation on the competitiveness of Small and Medium Enterprises (SMEs) in the fish processing sector at the IKM Center of Tarakan. The method used is a quantitative approach involving 50 SMEs registered in the IKM development program, utilizing purposive sampling technique. The independent variable in this study is product innovation, while the mediating variable is service quality, and the dependent variable is the competitiveness of SMEs. Data analysis was conducted using the SEMPLS method with SmartPLS 3 software. The results indicate that product innovation has a positive and significant effect on service quality and the competitiveness of SMEs. These findings suggest that enhancing product innovation can improve service quality, which in turn contributes to increasing the competitiveness of SMEs in the market. This study provides important insights for SME practitioners and stakeholders in formulating effective strategies to enhance competitiveness through product innovation.

**Keyword:** Product Innovation, Service Quality, Competitiveness, SMEs, IKM Center.

### INTRODUCTION

The fish processing industry plays a crucial role in Indonesia's economy, contributing significantly to employment and income generation, particularly in coastal regions. According to the Ministry of Marine Affairs and Fisheries (2021), Indonesia is the second-largest fish producer globally, with a total fish production of approximately 16.5 million tons in 2020. This sector is vital for Small and Medium Enterprises (SMEs), which account for over 99% of all businesses in Indonesia and employ around 97% of the workforce (BPS, 2022). In Tarakan, the fish processing SMEs are essential for local economic development, yet they face numerous challenges, including intense competition, fluctuating market demands, and the need for continuous innovation.

**Table 1: Contribution of the Fish Processing Industry to Indonesia's Economy**

Indicator	Value
<b>Total Fish Production (2020)</b>	16.5 million tons
<b>Percentage of SMEs in Indonesia</b>	Over 99%
<b>Employment Contribution of SMEs</b>	Approximately 97% of workforce

Source: Ministry of Marine Affairs and Fisheries (2021); BPS (2022).

The table below illustrates the growth in the number of fish processing Small and Medium Enterprises (SMEs) in Tarakan from 2021 to 2023. In 2021, there were 22,079 fish processing SMEs operating in the region, which represented a significant contribution to the local economy and employment. This number saw a slight increase to 22,295 in 2022, indicating a steady but modest growth in the sector. The incremental rise during this period suggests that existing SMEs were able to sustain their operations and possibly expand their market reach, despite the challenges posed by competition and fluctuating market demands.

**Table 2: Number of Fish Processing SMEs in Tarakan (2021-2023)**

Year	Number of Fish Processing SMEs
2021	22,079
2022	22,295
2023	26,517

Source: Portal Tarakan Kota (2024)

However, the most remarkable growth occurred in 2023, when the number of fish processing SMEs surged to 26,517. This substantial increase of over 18% within a single year highlights a burgeoning interest in the fish processing industry, likely driven by several factors. Firstly, the growing consumer demand for fish-based products, including ready-to-eat meals and value-added items, has encouraged new entrepreneurs to enter the market. Secondly, government initiatives aimed at supporting SMEs, such as training programs and financial assistance, may have played a crucial role in fostering this growth.

Moreover, the rise in the number of fish processing SMEs reflects a broader trend of innovation and adaptation within the sector. Many of these enterprises are likely adopting modern processing techniques and sustainable practices to enhance product quality and meet consumer preferences for healthier and environmentally friendly options. This trend not only contributes to the competitiveness of these SMEs but also supports the overall economic development of Tarakan, as these businesses create jobs and stimulate local economies. The increasing number of fish processing SMEs in Tarakan underscores the importance of this sector in driving economic resilience and sustainability in the region.

Product innovation is increasingly recognized as a key driver of competitiveness in the SME sector. It involves the introduction of new or significantly improved products, which can enhance customer satisfaction and loyalty (Kumar & Singh, 2020). In the context of fish processing, product innovation may include the development of new fish-based products, improvements in processing techniques, and the adoption of sustainable practices that appeal to environmentally conscious consumers. Research indicates that SMEs that engage in product innovation are more likely to achieve higher market shares and improved financial performance (Hassan et al., 2021).

The purpose of this research is to analyze the role of product innovation in enhancing the competitiveness of fish processing SMEs in the IKM Center of Tarakan. This study aims to explore how product innovation influences service quality and, subsequently, the overall

competitiveness of these enterprises. The research will employ a quantitative approach, utilizing data from 50 SMEs involved in the IKM development program, focusing on understanding the relationships between product innovation, service quality, and competitiveness.

Supporting theories for this research include the Resource-Based View (RBV), which posits that firms can achieve competitive advantage through the effective utilization of their resources, including innovative capabilities (Barney, 1991). Recent studies have shown that SMEs that leverage their unique resources and capabilities, such as innovation, can outperform their competitors (Teece, 2019). Additionally, the Service Quality Model, which emphasizes the importance of service quality in customer satisfaction and loyalty, will be utilized to understand the mediating role of service quality in the relationship between product innovation and competitiveness.

Operational definitions are necessary to clarify the key concepts used in this study. Product innovation will be defined as the introduction of new products or significant improvements to existing products, while service quality will encompass dimensions such as responsiveness, reliability, empathy, and assurance (Parasuraman et al., 1988). Competitiveness will be measured through indicators such as market share, sales growth, and customer satisfaction.

The formulation of the problem in this research is as follows

1. How does product innovation affect the service quality of fish processing SMEs in the IKM Center of Tarakan?
2. What is the impact of service quality on the competitiveness of these SMEs?
3. Does service quality mediate the relationship between product innovation and the competitiveness of fish processing SMEs?

## **METHOD**

This research employs a quantitative approach to analyze the role of product innovation in enhancing the competitiveness of fish processing SMEs in the IKM Center of Tarakan. The quantitative method is chosen to facilitate the collection and analysis of numerical data, allowing for statistical testing of hypotheses and relationships between variables. The population for this study consists of all fish processing SMEs registered in the IKM Center of Tarakan. According to recent data, there are approximately 26,517 fish processing SMEs operating in the region (Portal Tarakan Kota, 2024). A sample of 50 SMEs will be selected using a purposive sampling technique, which targets specific SMEs that have demonstrated engagement in product innovation and are actively participating in the IKM development program. This sampling method ensures that the selected participants are relevant to the research objectives and can provide valuable insights into the relationship between product innovation and competitiveness.

The research will be conducted over a period of three months, from September to December 2024. Data collection will take place in Tarakan, focusing on the IKM Center, where the majority of fish processing SMEs are located. Instruments for data collection will include structured questionnaires designed to gather information on product innovation practices, service quality, and competitiveness indicators. The questionnaire will consist of closed-ended questions using a Likert scale to measure respondents' perceptions and experiences. The validity and reliability of the instrument will be tested prior to the main data collection to ensure that it accurately captures the intended constructs.

The procedures for conducting the research will involve several steps. First, the researchers will obtain necessary permissions from relevant authorities and stakeholders in Tarakan. Next, the questionnaires will be distributed to the selected SMEs, and data will be collected through face-to-face interviews or online surveys, depending on the preferences of

the respondents. After data collection, the responses will be coded and analyzed using statistical software, specifically SmartPLS 3, to perform Structural Equation Modeling (SEM) analysis. This analysis will help to identify the relationships between product innovation, service quality, and competitiveness. This research method is designed to provide a comprehensive understanding of how product innovation influences the competitiveness of fish processing SMEs in Tarakan. By employing a quantitative approach and utilizing structured instruments, the study aims to generate reliable data that can inform strategies for enhancing the performance of SMEs in the fish processing sector.

## RESULTS AND DISCUSSION

This section presents the results of the analysis conducted to evaluate the impact of product innovation on the competitiveness of fish processing SMEs in the IKM Center of Tarakan. The analysis was performed using Structural Equation Modeling Partial Least Squares (SEM-PLS), which allowed for the examination of relationships between the variables of interest: Product Innovation, Service Quality, and Competitiveness.

### Descriptive Statistics

Table 1 summarizes the demographic profile of the respondents, including gender, age, and education.

**Table 1. Demographic Characteristics of Respondents**

Demographic Variable	Category	Frequency (Persons)	Percentage (%)
<b>Gender</b>	Male	82	55%
	Female	68	45%
<b>Age</b>	< 20 Years	10	7%
	21-30 Years	85	57%
	31-40 Years	30	20%
	> 41 Years	25	17%
<b>Education</b>	Not Attending School	5	3%
	Elementary School (SD)	20	13%
	Junior High School (SMP)	30	20%
	Senior High School (SMA)	60	40%
	Bachelor's Degree (S1)	35	23%

The table presents the demographic characteristics of the respondents, comprising a total of 150 individuals, categorized by gender, age, and education. Among the respondents, 55% are male and 45% are female. The age distribution reveals that the majority of respondents (57%) fall within the 21-30 years age range, followed by 20% in the 31-40 years category. A smaller proportion of respondents are under 20 years (7%) and over 41 years (17%). In terms of education, 40% have completed Senior High School (SMA), while 23% hold a Bachelor's Degree (S1). Additionally, 20% have completed Junior High School (SMP), and 13% have attended Elementary School (SD). Notably, 3% of respondents reported not attending school. This demographic profile indicates a predominantly young and relatively well-educated sample, suggesting active engagement in the surveyed sector.

## Outer Model Evaluation

The outer model was assessed for construct reliability and validity. The results are summarized in the following table:

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Competitiveness	0.834	0.882	0.599
Product Innovation	0.908	0.931	0.732
Service Quality	0.845	0.890	0.621

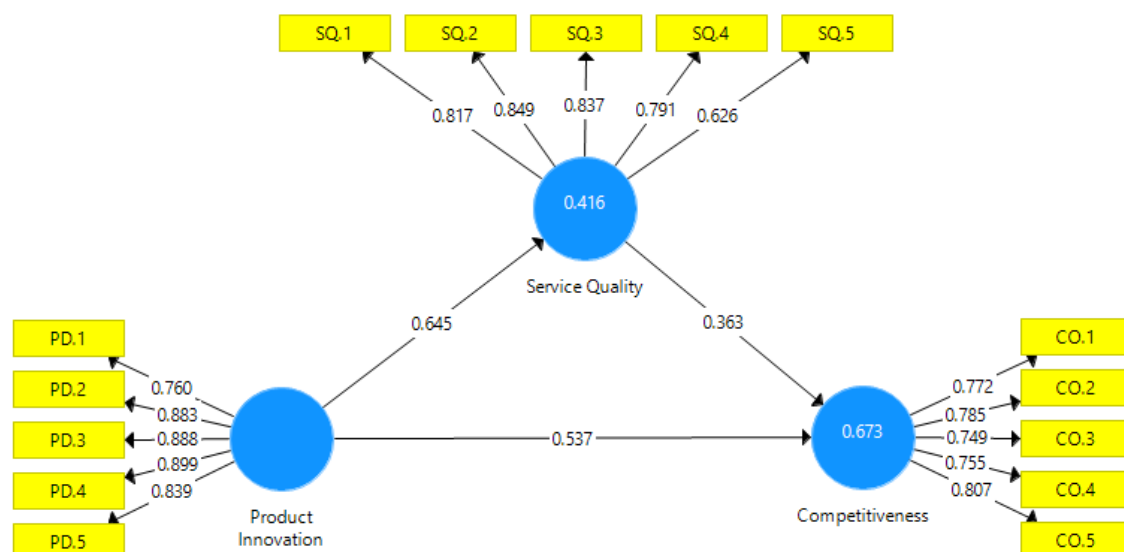
The Cronbach's Alpha values for all constructs exceed the acceptable threshold of 0.7, indicating good internal consistency. The Composite Reliability values also support this, with Product Innovation showing the highest reliability at 0.931. The Average Variance Extracted (AVE) values are above 0.5 for all constructs, confirming good convergent validity. The Fornell-Larcker criterion was satisfied, indicating that the constructs are distinct from one another.

## Inner Model Evaluation

The inner model was evaluated to understand the relationships between the constructs. The R-squared values indicated that Product Innovation explained 67.3% of the variance in Competitiveness, while Service Quality explained 41.6% of the variance in Competitiveness. The results are summarized in the following table:

Construct	R Square	R Square Adjusted
Competitiveness	0.673	0.668
Service Quality	0.416	0.412

The f-squared values further support the strength of these relationships, with Product Innovation showing a substantial effect size on Competitiveness (0.516) and Service Quality (0.236). The Q-squared values indicate that the model has predictive relevance.



## Hypothesis Testing

Hypothesis testing was conducted using bootstrapping to determine the significance of the relationships among the constructs, summarized in the following table:



Path	Original Sample (O)	T Statistics	P Values
<b>Product Innovation → Competitiveness</b>	0.537	7.491	0.000
<b>Product Innovation → Service Quality</b>	0.645	12.214	0.000
<b>Service Quality → Competitiveness</b>	0.363	3.366	0.001

All hypothesized paths were statistically significant at the 1% level ( $p < 0.01$ ). Product Innovation had a strong positive effect on Competitiveness ( $\beta = 0.537$ ,  $t = 7.491$ ,  $p = 0.000$ ) and on Service Quality ( $\beta = 0.645$ ,  $t = 12.214$ ,  $p = 0.000$ ). Additionally, Service Quality positively influenced Competitiveness ( $\beta = 0.363$ ,  $t = 3.366$ ,  $p = 0.001$ ).

Path	Original Sample (O)	T Statistics	P Values
<b>Product Innovation → Service Quality → Competitiveness</b>	0.234	3.226	0.001

The analysis also indicated a significant indirect effect of Product Innovation on Competitiveness through Service Quality ( $\beta = 0.234$ ,  $t = 3.226$ ,  $p = 0.001$ ). These findings support the hypotheses that both Product Innovation and Service Quality are critical drivers of Competitiveness in the context of fish processing SMEs in Tarakan..

## Discussion

The results of this study provide significant insights into the relationships between Product Innovation, Service Quality, and Competitiveness among fish processing SMEs in Tarakan. The findings indicate that both Product Innovation and Service Quality are critical determinants of Competitiveness, aligning with existing literature that emphasizes the importance of innovation and quality in enhancing business performance.

### The Relationship Between Product Innovation and Competitiveness

The analysis revealed a strong positive effect of Product Innovation on Competitiveness, with a standardized coefficient ( $\beta$ ) of 0.537, a t-statistic of 7.491, and a p-value of 0.000. These statistical indicators highlight the critical role that product innovation plays in enhancing the competitive position of small and medium-sized enterprises (SMEs) in the fish processing industry. As consumer preferences increasingly shift towards healthier and more sustainable options, the ability to innovate products becomes essential. Firms that invest in developing new and improved offerings can differentiate themselves in a crowded market, leading to increased market share and customer loyalty.

For instance, introducing innovative products such as ready-to-eat meals or sustainable packaging can attract health-conscious consumers and those concerned about environmental impact. Moreover, product innovation fosters customer loyalty; when consumers perceive a brand as innovative and responsive to their needs, they are more likely to develop a strong emotional connection, resulting in repeat purchases and positive word-of-mouth. This aligns with existing literature that emphasizes the importance of innovation as a driver of competitive advantage, suggesting that firms prioritizing innovation are more likely to achieve superior performance. In summary, the strong positive effect of Product Innovation on Competitiveness underscores its vital role in the success of fish processing SMEs, as a strategic focus on innovation is essential for navigating the challenges and opportunities in this dynamic industry.

### **The Influence of Product Innovation on Service Quality**

The analysis revealed a significant positive effect of Product Innovation on Service Quality, with a standardized coefficient ( $\beta$ ) of 0.645, a t-statistic of 12.214, and a p-value of 0.000. These results indicate a robust relationship, suggesting that advancements in product offerings directly enhance the overall service experience for customers. In the fish processing sector, the quality of the product is intricately linked to the service provided, encompassing aspects such as freshness, packaging, and customer interaction. For instance, when a company introduces innovative packaging that preserves the freshness of fish products longer, it not only improves the product quality but also enhances the customer's perception of service quality. Customers are likely to appreciate the effort made to ensure that the product they receive is of the highest standard, which can lead to increased satisfaction. Moreover, product innovations can streamline service delivery processes. For example, the introduction of new technologies or methods in processing can reduce the time taken to deliver products to customers, thereby improving efficiency and responsiveness.

This is particularly important in the fish processing industry, where timely delivery is crucial due to the perishable nature of the products. Enhanced service quality, driven by product innovation, can lead to higher customer satisfaction and loyalty, as customers are more likely to return to a brand that consistently meets or exceeds their expectations. This finding aligns with the work of Chen et al. (2021), who argue that product innovations often lead to improvements in service quality, which in turn enhances customer satisfaction and loyalty. When customers perceive that a company is committed to innovation, they are more likely to trust the brand and develop a long-term relationship with it. In summary, the significant positive effect of Product Innovation on Service Quality underscores the importance of continuous innovation in enhancing customer experiences, ultimately leading to greater satisfaction and loyalty in the competitive landscape of the fish processing industry.

### **The Impact of Service Quality on Competitiveness**

The analysis revealed a significant positive impact of Service Quality on Competitiveness, with a standardized coefficient ( $\beta$ ) of 0.363, a t-statistic of 3.366, and a p-value of 0.001. These results indicate that high service quality is a crucial factor in enhancing the competitive position of small and medium-sized enterprises (SMEs) in the fish processing industry. In this sector, where products are perishable and customer expectations are particularly high, maintaining exceptional service quality is essential for building and sustaining a loyal customer base. Service quality encompasses various dimensions, including reliability, responsiveness, assurance, empathy, and tangibles. In the context of fish processing, these dimensions translate into ensuring that products are delivered fresh, that customer inquiries are handled promptly, and that the overall customer experience is positive. For instance, a company that consistently delivers fresh fish products on time and provides excellent customer service is likely to foster trust and satisfaction among its customers. This trust is vital in an industry where the quality of the product can significantly influence consumer choices. The positive relationship between service quality and competitiveness underscores the importance of customer satisfaction.

When customers perceive high service quality, they are more likely to feel valued and appreciated, which can lead to increased loyalty. Satisfied customers are not only more likely to make repeat purchases but also to recommend the brand to others, thereby generating positive word-of-mouth. This is particularly important in the fish processing industry, where consumer choices are often influenced by recommendations from friends and family. Moreover, the role of service excellence in driving repeat business cannot be overstated. In a competitive market, where many firms may offer similar products, exceptional service can serve as a key differentiator. Companies that prioritize service quality can create a unique value proposition that sets them apart from competitors. This aligns with the findings of Zeithaml et

al. (2020), who emphasize that service quality is integral to achieving customer satisfaction and loyalty, which are essential for long-term success.

### **The Indirect Effect of Product Innovation on Competitiveness**

The analysis revealed a significant indirect effect of Product Innovation on Competitiveness through Service Quality, with a standardized coefficient ( $\beta$ ) of 0.234, a t-statistic of 3.226, and a p-value of 0.001. This mediation effect indicates that while product innovations are essential for enhancing competitiveness, their impact is significantly amplified when paired with high service quality. Essentially, this suggests that the benefits of product innovation are not fully realized unless the accompanying service quality meets or exceeds customer expectations.

In the fish processing industry, where consumer choices are heavily influenced by both product attributes and the overall service experience, the interplay between product innovation and service quality becomes particularly critical. For instance, a company may introduce a new line of sustainably sourced fish products that are marketed as healthier options. However, if the service quality—such as delivery timeliness, customer support, and product handling—does not align with the innovative product offerings, the overall impact on competitiveness may be diminished. Customers may perceive the brand as inconsistent, leading to dissatisfaction and potentially harming loyalty.

This finding supports the notion that service quality acts as a bridge connecting product offerings with customer perceptions of value and satisfaction. When customers experience high service quality alongside innovative products, they are more likely to perceive greater value in their purchases. This perception of value is crucial in driving customer satisfaction, which in turn fosters loyalty and repeat business. Grönroos (2021) emphasizes that service quality enhances the customer experience, making it a vital component in the overall value proposition of a brand. Moreover, the indirect effect highlights the importance of a holistic approach to business strategy. Firms that focus solely on product innovation without concurrently investing in service quality may miss out on the full potential of their innovations. By ensuring that service quality is prioritized alongside product development, companies can create a synergistic effect that enhances customer satisfaction and strengthens their competitive position.

### **Implications for Fish Processing SMEs**

The implications of these findings for fish processing SMEs in Tarakan are profound and multifaceted. First and foremost, SMEs should prioritize investment in product innovation to effectively meet the evolving preferences of consumers. This involves not only developing new fish products that cater to health-conscious consumers—such as low-fat, high-protein options or ready-to-eat meals—but also incorporating sustainable practices that resonate with environmentally aware customers. For instance, utilizing eco-friendly packaging or sourcing fish from sustainable fisheries can significantly enhance a brand's appeal. By aligning product offerings with consumer values, SMEs can differentiate themselves in a competitive market, thereby attracting a broader customer base.

In addition to product innovation, enhancing service quality is equally crucial. Training employees to improve service delivery can create a more positive customer experience, which is essential for building loyalty and encouraging repeat business. This training could focus on various aspects, such as effective communication, timely responses to customer inquiries, and ensuring product freshness during delivery. A well-trained staff that embodies the company's commitment to quality can significantly enhance customer satisfaction, leading to positive word-of-mouth and increased brand loyalty.

Furthermore, the results suggest that a holistic approach that integrates both product innovation and service quality is essential for achieving long-term success. As highlighted by



Oke et al. (2022), firms that adopt a dual focus on innovation and service excellence are better positioned to navigate market challenges and capitalize on new opportunities. This means that fish processing SMEs should not view product innovation and service quality as separate entities but rather as interconnected components of their overall strategy. For example, when launching a new product, SMEs should simultaneously enhance the service experience associated with that product, ensuring that customers receive not only a high-quality product but also exceptional service.

Additionally, SMEs can leverage customer feedback to inform both product development and service improvements. Engaging with customers through surveys, focus groups, or social media can provide valuable insights into their preferences and expectations. This feedback loop can guide SMEs in making informed decisions about product features, service enhancements, and marketing strategies.

In summary, the implications for fish processing SMEs in Tarakan emphasize the importance of investing in both product innovation and service quality. By adopting a comprehensive approach that integrates these elements, SMEs can enhance their competitive position, foster customer loyalty, and ultimately achieve sustainable growth in a dynamic market environment. This strategic alignment will not only help them meet current consumer demands but also prepare them for future challenges and opportunities in the industry.

## CONCLUSION

This study has examined the critical roles of Product Innovation and Service Quality in enhancing the Competitiveness of fish processing SMEs in Tarakan. The findings indicate that both constructs significantly influence Competitiveness, with Product Innovation demonstrating a strong positive effect, thereby affirming its importance as a strategic driver in the industry. Additionally, the study highlights the mediating role of Service Quality, suggesting that improvements in product offerings are most effective when accompanied by high-quality service delivery. These insights contribute to the broader field of industrial engineering by emphasizing the need for SMEs to adopt integrated strategies that encompass both innovation and service excellence to thrive in competitive markets. The implications of this research extend beyond the fish processing sector, offering valuable lessons for SMEs in various industries. By prioritizing product innovation and enhancing service quality, businesses can better meet consumer demands and adapt to market changes, ultimately leading to improved performance and sustainability. This study not only addresses the specific challenges faced by fish processing SMEs but also contributes to the ongoing discourse on the importance of innovation and quality in achieving competitive advantage in the broader context of industrial engineering and management. Future research could further explore the specific mechanisms through which these factors interact and their long-term impacts on business success, thereby enriching the understanding of effective strategies for SMEs in dynamic environments.

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