

The Mediating Role of Innovation Capability in the Effect of Total Quality Management (TQM) on the Business Performance of Micro, Small, and Medium Enterprises (MSMEs) in the Food and Beverage Sector in Cimahi City

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Abstract

Competition in the food and beverage sector is becoming increasingly intense, requiring Micro, Small, and Medium Enterprises (MSMEs) in Cimahi to maintain the quality of their products and services and to continue innovating in order to improve their business performance. This study aims to evaluate the impact of Total Quality Management (TQM) on MSME business performance, with innovation capacity serving as a mediating variable for MSMEs in the food and beverage sector in Cimahi City.

The research approach applied in this study is a quantitative method with a descriptive and verifiable focus. The sample consisted of 94 respondents working in the food and beverage SME sector in Cimahi, with data collected via a questionnaire using a 1–5 Likert scale and using stratified random sampling. Data analysis was conducted using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) technique supported by SmartPLS software version 4.1.1.8.

The results of the study indicate that Total Quality Management has a positive and significant impact on business performance and innovation capability. Furthermore, innovation capability also exerts a significant positive influence on business performance and acts as a partial mediator in the relationship between Total Quality Management and business performance. The research model demonstrates a strong fit, as evidenced by a satisfactory Goodness of Fit value. Nevertheless, future researchers are encouraged to focus on enhancing innovative capacity so that companies can improve their business performance and sustainably remain competitive in the market

INTRODUCTION

The Micro, Small, and Medium Enterprises (MSME) sector has shown significant growth, becoming a vital backbone of the local economy, as observed in the city of Cimahi. According to data from the West Java Central Statistics Agency (BPS), the total number of MSMEs across West Java increased by 380,013 units, rising from 6,645,485 units in 2022 to 7,025,498 units in 2023. This encouraging development is also clearly evident in the city of Cimahi, where the number of MSMEs surged from 57,666 to 86,635 during the same period (see Table 1 for full details).

Table 1 Data on MSMEs in West Java (2022–2023)

No	City/Region	2022 (business unit)	2023 (business unit)	No	City/Region	2022 (business unit)	2023 (business unit)
1	Tasik City	37.125	138.703	15	Kota Bogor	123.873	131.538
2	Subang	86.437	258.457	16	Kota Sukabumi	57.319	60.865
3	Bandung	224.956	537.801	17	Cianjur	362.138	381.810
4	Indramayu	136.029	290.833	18	Majalengka	243.397	238.762

No	City/ Region	2022 (business unit)	2023 (business unit)	No	City/ Region	2022 (business unit)	2023 (business unit)
5	Depok City	125.078	247.207	19	Karawang	371.510	355.623
6	Garut	200.304	394.496	20	Bekasi City	334.902	309.116
7	Bandung City	331.226	523.584	21	Sukabumi	537.676	409.407
8	Cimahi City	57.666	86.635	22	Sumedang	269.618	176.898
9	Bekasi	273.887	351.720	23	West Bandung	385.646	237.919
10	Ciamis	166.591	212.635	24	Purwakarta	291.105	132.816
11	Tasikmalaya	224.887	286.300	25	Banjar City	130.621	39.422
12	Bogor	506.465	570.943	26	Kuningan	493.076	144.445
13	Pangandaran	81.587	91.785	27	Cirebon City	232.803	61.234
14	Cirebon	359.563	354.544				
TOTAL						6.645.485	7.025.498

Source: West Java Provincial Statistics Agency (2025)

The data shows an increase of 380,013 MSMEs in West Java during the 2022–2023 period. However, this increase in the number of business owners has not been accompanied by stable business performance. These signs are evident in the trends in MSME assets and sales volume in Cimahi City from 2019 to 2023, as shown in Figure 1.

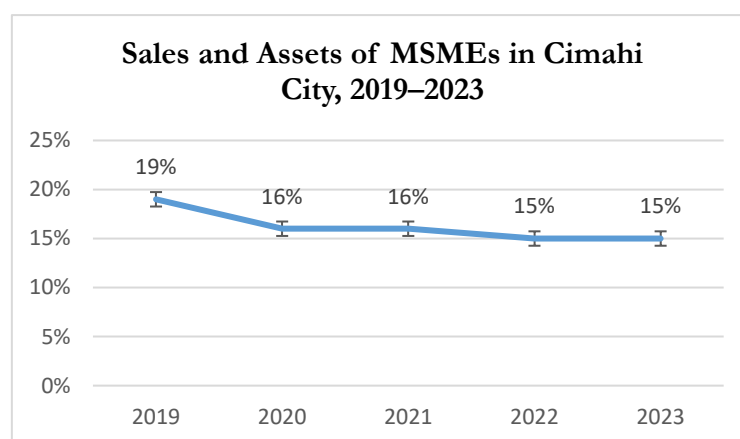


Figure 1 Sales and Assets of MSMEs in Cimahi City, 2019–2023

Source: West Java Provincial Statistics Agency (2025)

Although the number of MSMEs continues to grow, this situation indicates that their business performance has not yet reached its optimal level. This picture reveals limitations in the quality of management, operational efficiency, and the ability of business owners to innovate. Therefore, a comprehensive strategy is needed to improve business performance sustainably, particularly in the food and beverage (F&B) sector, which is rapidly changing yet high-risk due to intense competition.

Previous research (Ludiya & Kurniawan, 2020; Kurniawan et al., 2019; Ratnamurni & Yun, 2020; Ratnamurni & Irawan, 2018) confirms that entrepreneurial ability, management efficiency, and the use of technology significantly influence the performance of MSMEs in Cimahi. Nevertheless, operational issues such as supply chain efficiency, the utilization of information technology, and the implementation of Total Quality Management remain major obstacles.

Total Quality Management (TQM) serves as a strategic approach to reviewing and enhancing the overall quality of business management, where innovation capabilities can strengthen this relationship. However, the literature identifies a research gap: several studies

(Anifowose et al., 2022; Budiman et al., 2022; Munawar et al., 2022; Mulyana et al., 2024) identify innovation as a mediator between TQM and business performance, while other studies (Gerald et al., 2020; Vaillant & Lafuente, 2019; AlTaweel & Al-Hawary, 2021) yield differing findings.

The selection of Cimahi City as the study location was based on the rapid growth of F&B sector MSMEs in this area, as well as the ease of access to the location, which facilitates smooth data collection. Based on existing research gaps and phenomena, this study aims to examine the extent to which the implementation of TQM influences the business performance of F&B MSMEs in Cimahi City, with innovation capability serving as a mediator.

Theoretical reviews and empirical evidence from previous studies indicate a relationship between Total Quality Management (TQM), innovation capacity, and business performance. Based on this relationship, a conceptual model was designed to illustrate the direction of the relationships among the variables, serving as the basis for testing the research hypotheses. The conceptual model of this study is shown in Figure 2.

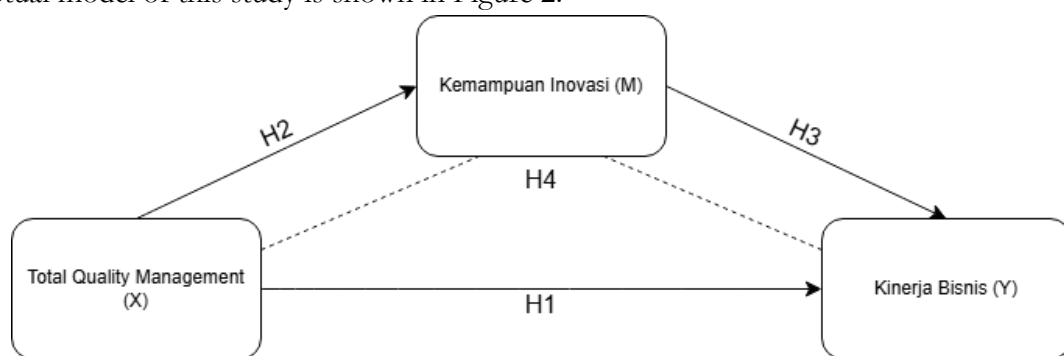


Figure 2 Conceptual Model

METHODS

This study employs a quantitative approach using descriptive and verifiable methods to analyze the effect of Total Quality Management (TQM) on business performance, with innovation capacity as a mediating variable, among MSMEs in the food and beverage sector in Cimahi City. The study population consists of all food and beverage MSME operators registered in Cimahi City. The sample was selected using purposive sampling, with the criteria being MSME operators who have been in business for at least one year and are actively conducting operational activities. The sample size for this study was 94 respondents.

The data used were primary data obtained through the distribution of questionnaires using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The Total Quality Management (TQM) variable was measured based on indicators of leadership, customer focus, human resource management, strategic planning, process management, and information and analysis. The Innovation Capability variable was measured through product, process, and organizational innovation capabilities, while the Business Performance variable was measured based on indicators of sales growth, profitability, customer satisfaction, and operational performance.

Data analysis was conducted using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) approach with the assistance of SmartPLS software version 4.1.1.8. The analysis stages included evaluation of the outer model through tests of convergent validity, discriminant validity, and construct reliability, as well as evaluation of the inner model through tests of the coefficient of determination (R^2), effect size (f^2), and Variance Inflation Factor (VIF). Hypothesis testing was performed using the bootstrapping technique by examining path coefficients, t-statistics, and p-values to determine the direct effects and mediating effects among the study variables.

RESULTS AND DISCUSSION

Respondent Characteristics

The respondents in this study consisted of 94 owners of micro, small, and medium-sized enterprises (MSMEs) located in the city of Cimahi. The respondents represented a variety of demographic characteristics, including gender and age.

Table 2 Respondent Characteristics

Description	Qty	Percentage
Gender		
Male	20	21,3%
Female	74	78,7%
Age		
<25 Years Old	49	52,1%
25-35 Years Old	39	41,5%
>35 Years Old	6	6,4%
Length of Time in Business		
<1 Years	26	27,7%
2-3 Years	50	53,2%
4-6 Years	15	16%
>6 Years	3	3,2%
Average Range of Monthly Income		
<Rp. 25.000.000	64	68,1%
Rp. 25.000.000-Rp. 208.000.000	27	28,7%
>Rp. 208.000.000	3	3,2%
Having a Digital Platform		
Yes	76	80,9%
No	18	19,1%

There were 94 MSME owners in Cimahi City who participated as respondents in this study. As shown in Table 2, the majority of respondents were women (78.7%) and young entrepreneurs under the age of 25 (52.1%). The majority of respondents run micro and small-scale businesses, as evidenced by the fact that most of their businesses are 2–3 years old (53.2%) and generate monthly revenues of less than Rp25,000,000 (68.1%). The adoption of technology in this region is also growing rapidly, as shown by the fact that 80.9% of MSME owners have

adopted digital platforms to support their business activities.

Descriptive Analysis

The descriptive analysis conducted shows that Total Quality Management (TQM), Innovation Capacity, and Business Performance fall into the high category. This indicates that the majority of MSME entrepreneurs have adopted the fundamentals of quality management, possess adequate innovation capacity, and are capable of achieving relatively good business results.

Table 3 Results of the Descriptive Analysis

Variable	Mean	Categories
Total Quality Management	3,727	High
Innovation Capability	3,667	High
Business Performance	3,649	High

Based on Table 3, a high score for the Total Quality Management (TQM) variable indicates that MSME operators have made efforts to apply Total Quality Management principles in their business activities. Furthermore, a high score for Innovation Capacity indicates that business operators can develop products or business processes in line with market demands. Meanwhile, a high score for Business Performance shows that MSMEs are generally able to maintain and improve their business performance. Nevertheless, there are still several aspects that can be further improved through more consistent application of TQM and strengthened innovation.

Inferential Analysis

Inferential testing is used to draw conclusions about a population based on sample data, in order to determine whether the research results can be generalized to a broader population. The analysis in this study was conducted using SmartPLS version 4 with a Partial Least Squares-Structural Equation Modeling (PLS-SEM) approach to test the causal relationships among variables in the model. The latent variable model analyzed is shown in Figure 3.

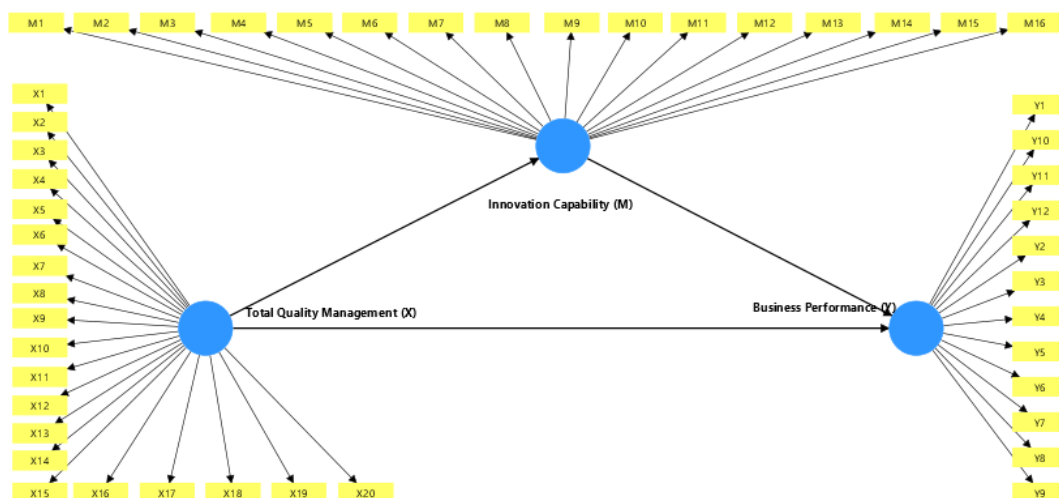


Figure 3 Latent variable model in research

Evaluation of the Measurement Model (Outer Model)

Testing the outer model aims to confirm the validity and reliability of the indicators in measuring latent variables through three main tests: Convergent Validity, Discriminant Validity, and Construct Reliability.

Convergent Validity

The evaluation of convergent validity is conducted by examining the outer loading and AVE parameters. According to the guidelines by Hair et al. (2021), good convergent validity is demonstrated by an outer loading greater than 0.70 at the indicator level and an AVE above 0.5 at the construct level.

Table 4 Results of the Outer Loading Test for Convergent Validity

Variable	Indicators	Outer Loading Range	AVE	Description
Total Quality Management (X)	20 (X1–X20)	0,751 – 0,883	0,670	Valid
Innovation Capability (M)	16 (M1–M16)	0,725 – 0,867	0,623	Valid
Business Performance (Y)	12 (Y1–Y12)	0,783 – 0,886	0,703	Valid

In the initial stage of the evaluation, 48 indicators were found to be valid because they met the minimum factor loading threshold of 0.70, so none were excluded from the model. The convergent validity criteria were also met by all three variables, with AVE scores above 0.5; Business Performance achieved the highest score (0.703), followed by Total Quality Management (0.670) and Innovation Capability (0.623) (Fornell & Larcker, 1981; Hair et al., 2021).

Discriminant Validity

Discriminant validity was tested by analyzing the Fornell-Larcker criteria, which involve comparing the square root of the AVE to the interconstruct correlations and measuring the Heterotrait-Monotrait Ratio (HTMT).

Table 5 Fornell-Larcker Criterion (Intra-construct Correlation and $\sqrt{\text{AVE}}$)

Variable	Innovation Capability (M)	Business Performance (Y)	Total Quality Management (X)
Innovation Capability (M)	0,790		
Business Performance (Y)	0,692	0,839	
Total Quality Management (X)	0,646	0,624	0,819

Table 6 Results of the Heterotrait-Monotrait Ratio (HTMT) Test

Inter-Construct Relationships	HTMT	Description
Business Performance (Y) <-> Innovation Capability (M)	0,713	Valid
Total Quality Management (X) <-> Innovation Capability (M)	0,653	Valid
Total Quality Management (X) <-> Business Performance (Y)	0,637	Valid

The average $\sqrt{AVE}$ for each construct is greater than its correlation with other constructs, and all HTMT values are below the 0.90 threshold (Hair et al., 2021). These two criteria ensure that all three constructs possess sufficient discriminant validity.

Construct Reliability

Construct reliability was evaluated by examining Cronbach's Alpha and composite reliability (CR) values, with both parameters required to be greater than 0.70 (Hair et al., 2021).

Table 7 Construct Reliability Test Results

Variable	Cronbach's Alpha	Composite Reliability	Description
Total Quality Management (X)	0,974	0,976	Reliable
Innovation Capability (M)	0,960	0,964	Reliable
Business Performance (Y)	0,961	0,966	Reliable

All construct variables showed Cronbach's Alpha and CR values above 0.70, with the highest value observed for Total Quality Management. These findings indicate that the research instrument has excellent internal consistency.

Model Fit Test

Model fit was tested by comparing the SmartPLS 4.1.1.8 output against applicable rule-of-thumb criteria.

Table 8 Model Fit Test Results

Parameter	Rule of Thumb	Parameter value	Description
SRMR	< 0,10 (ideal < 0,08)	0,069	Fit
Chi-square	χ^2 model < χ^2 tabel	2801,035 > 1256,9	Not Fit
NFI	Approaching 1	0,577	Poor Fit
GoF	0,10 (small); 0,25 (moderate); 0,36 (strong)	0,562	Fit and Strong

The SRMR value (0.069) is below the ideal threshold, and the GoF (0.562) indicates a very strong model fit according to the criteria of Tenenhaus et al. (2005). Although the Chi-square and NFI indicators suggest a poor fit a common occurrence in models with a large number of indicators and a specific sample size the SRMR and GoF indicators, which are more relevant in the context of PLS-SEM (Hair et al., 2021), confirm that the model as a whole is suitable for hypothesis testing.

Structural Model Evaluation (Inner Model)

Multicollinearity Test (Inner VIF)

Prior to hypothesis testing, we conducted a Variance Inflation Factor (VIF) test to identify multicollinearity among the predictor variables. A VIF value below 5.00 indicates that there are no multicollinearity issues of concern (Hair et al., 2022).

Table 9 Inner VIF Test Results

Inter-Construct Relationships	VIF
Innovation Capability (M) -> Business Performance (Y)	1,715
Total Quality Management (X) -> Innovation Capability (M)	1,000
Total Quality Management (X) -> Business Performance (Y)	1,715

All VIF values fall within the range of 1.000–1.715, well below the threshold of 5.00, indicating that the structural model is free of multicollinearity and ready for path coefficient testing.

Coefficient of Determination (R^2)

Table 10 R-Square (R^2) Test Results

Variable	R-Square	R-Square Adjusted
Innovation Capability (M)	0,417	0,410
Business Performance (Y)	0,532	0,522

The R^2 value for innovation capability is 0.417 (simple category, Chin, 1998), indicating that 41.7% of the variance is explained by Total Quality Management. The R^2 value for innovation capability is 0.532 (moderate-strong category), indicating that 53.2% of the variance is explained by Total Quality Management and innovation capability combined.

Effect Size (F^2)

Table 11 Effect Size Test Results (F^2)

Hubungan Antar-Variable	F^2	Category (Cohen, 1988)
Total Quality Management (X) -> Innovation Capability (M)	0,715	Besar
Total Quality Management (X) -> Business Performance (Y)	0,115	Kecil
Innovation Capability (M) -> Business Performance (Y)	0,307	Sedang

Total Quality Management has a significant effect on Innovation Capability ($f^2 = 0.715$), a moderate effect on Business Performance through Innovation Capability ($f^2 = 0.307$), but its direct effect on Business Performance is relatively small ($f^2 = 0.115$) compared to its contribution through Innovation Capability.

Hypothesis Testing

The significance of the relationship between latent variables was tested using the bootstrapping method (5,000 resamplings) with a significance level of 0.05. The results of the evaluation of direct and indirect effects are presented in Table 10.

Table 12 Hypothesis Testing Results (Bootstrapping)

Hypothesis	Path	Coefficient (O)	T-statistik	P-value
H1	Total Quality Management (X) -> Business Performance (Y)	0,303	3,501	0,000*
H2	Total Quality Management (X) -> Innovation Capability (M)	0,646	10,661	0,000*
H3	Innovation Capability (M) -> Business Performance (Y)	0,496	5,290	0,000*

Hypothesis	Path	Coefficient (O)	T-statistik	P-value
H4	<i>Total Quality Management (X) -> Innovation Capability (M) -> Business Performance (Y)</i> (mediasi)	0,320	4,842	0,000*

*Significant at $p < 0.05$. All path coefficients are positive with p-values < 0.05 , so H1, H2, H3, and H4 are accepted.

The Effect of Total Quality Management on Business Performance

The results of the bootstrapping analysis revealed a positive and significant effect of Total Quality Management on Business Performance ($\beta = 0.303$; $t = 3.501$; $p = 0.000$), thus H1 is considered statistically valid. These findings indicate that the implementation of TQM principles—such as a focus on product or service quality, continuous improvement, and an emphasis on customer satisfaction—directly contributes to improved business performance among MSMEs. These results align with research conducted by Sih Afsari Utami et al. (2024) in the culinary SME sector in Bogor, as well as by Anifowose et al. (2022), which demonstrated a positive relationship between TQM and the operational performance of SMEs.

The Effect of Total Quality Management on Innovation Capacity

This path indicates a positive and significant impact ($\beta = 0.646$; $t = 10.661$; $p = 0.000$), so H2 is also considered statistically valid and represents the path with the strongest impact within the model ($f^2 = 0.715$, classified as large). This illustrates that a quality culture implemented consistently—even on a small business scale—can encourage MSME operators to continue innovating in terms of products, processes, and services. These findings align with those reported by Mahmud et al. (2019) on MSMEs in Malaysia and Sih Afsari Utami et al. (2024) on culinary MSMEs in Indonesia.

The Effect of Innovation Capability on Business Performance

This path shows a positive and significant relationship ($\beta = 0.496$; $t = 5.290$; $p = 0.000$), statistically confirming H3. The ability of SMEs to innovate—whether in product development, marketing, or operational methods—is a key element in enhancing competitiveness and business performance, despite the resource constraints commonly faced by SMEs. These findings align with studies conducted by Mahmud et al. (2019) and Sih Afsari Utami et al. (2024).

The Mediating Role of Innovation Capability

The results of the indirect effects analysis indicate that Innovation Capability successfully mediates the relationship between Total Quality Management and Business Performance ($\beta = 0.320$; $t = 4.842$; $p = 0.000$); thus, H4 is accepted. Given that Total Quality Management also has a significant direct effect on Business Performance (H1), Innovation Capability functions as a partial mediator: MSMEs that consistently implement TQM tend to exhibit superior Innovation Capability, which ultimately optimally enhances business performance. This partial mediation pattern aligns with the findings of Marini et al. (2021) and Anifowose et al. (2022), and is consistent with the findings of Sih Afsari Utami et al. (2024) in the food SME sector.

CONCLUSION

This study reveals that the implementation of Total Quality Management (TQM) has a positive and significant impact on the business performance of MSMEs in the food and beverage sector in Cimahi City, both directly and through enhanced innovation capabilities. TQM has also been proven to be a key driver of business owners' innovation capabilities, which in turn contributes to improved business performance. Therefore, innovation capacity serves as a partial mediator in the relationship between TQM and business performance, indicating that consistency in the application of quality management will be more effective if supported by a strengthened culture of innovation. These findings expand our understanding of the mechanisms for improving MSME performance through collaboration between quality management and innovation.

This study has several limitations, namely that it focuses only on MSMEs in the food and beverage sector in Cimahi City, the cross-sectional nature of the data, and the reliance on only one mediating variable, which necessitates careful generalization of the results. Therefore, for future research, it is recommended to expand the scope to include other sectors or regions, use a longitudinal design, and include additional variables such as entrepreneurial orientation or digitalization. Meanwhile, SME operators are advised to continue strengthening the implementation of TQM while fostering innovation to enhance their competitiveness and business sustainability.

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