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Digital Transformation and Total Quality Management as Moderators: Implications for the Financial Performance of Micro, Small, and Medium Enterprises (MSME)

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ABSTRACT

The worldwide COVID-19 pandemic has profoundly changed many facets of life, including how businesses operate. Among the most impacted industries, Micro, Small, and Medium Enterprises (MSME) must adapt to these changes. One of the adaptive strategies adopted by MSME is incorporating digital technologies into their operational procedures. Restrictions on face-to-face interactions have compelled many MSME to transition to online buying and selling activities. This shift requires business owners to be prepared for digitalization as part of the new normal. With digital transformation acting as a moderating variable, this research attempts to investigate also evaluate the impact of Total Quality Management (TQM) on the financial performance of MSME. The research focuses on MSME located in the banana chips industrial center in Bandar Lampung City. The sample comprises MSME actively involved in digital marketing and transactions. Data were collected through a questionnaire distributed via Google Forms. The results showed that TQM significantly and positively affects the financial performance of MSME. Additionally, it has been demonstrated that digital transformation successfully modifies the correlation between TQM and financial performance.

Keywords: digital transformation; financial performance; MSME; total quality management

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INTRODUCTION

The Covid-19 pandemic has reshaped the global order of life. New habits such as physical distancing, wearing masks, handwashing, and Working from Home (WfH) have been adopted. This condition requires individuals to adapt quickly to continue surviving in the midst of the pandemic. Micro, Small, and Medium Enterprises (MSME) are one of the business sectors affected by the pandemic. The Indonesian government also implemented a policy named Enforcement of Community Activities Restrictions Enforcement (CARE) that significantly limited people's mobility and business activity. As a result, MSME need to be more innovative in running their businesses. The transactions are starting to do by using cashless, virtual methods, as well as involving digital technology which use various applications and digital media platforms. By utilizing digital technology, MSME are expected to be able to continue to reach customers, market products, and make purchases and sales to generate business surpluses.

Total Quality Management (TQM) is a customer-focused company operation (Armiani et al., 2021; Oliveira et al., 2019), and its implementation is expected to overcome the weaknesses of MSME that have the potential to hinder performance, such as limited innovation, limited access to capital, and inadequate management capabilities (Ramayanti and Novita, 2017). By applying these principles, MSME will experience several positive impacts such as financial performance, continuous improvement, and others (Chaerunisak & Aji, 2020), and MSME tend to focus more on customer satisfaction by providing quality services and products (Pambreni et al., 2019). Previous studies examining the impact of TQM on MSME performance produced two inconsistent findings: (1) some findings show that TQM significantly affects MSME performance (Jaya et al., 2021; Chaerunisak & Aji, 2020; Chienwattanasook & Jermsittiparsert, 2019; Oliveira et al., 2019; Pambreni et al., 2019); and (2) while other findings state the opposite, namely TQM has no significant impact on organizational performance (Bazazo et al., 2017).

Digital transformation (DT) is a fundamental development that involves the integration of available resources and the utilization of existing digital technologies, several studies have shown significant findings regarding the impact of TQM on DT (Rustariyani, 2022; Chaerunisak & Aji, 2020; Oliveira et al., 2019; Bazazo et al., 2017). This phenomenon has become inevitable with the increasing attention to digital transformation (Hadiono & Noor Santi, 2020). Several studies concluded that there is a significant correlation between digital transformation of MSME and organizational performance (Armiani et al., 2021; Hasan et al., 2021; Chienwattanasook & Jermsittiparsert, 2019; Oliveira et al., 2019).

Based on the discussion above, research findings on the impact of TQM on MSME performance are still inconsistent. In addition, some studies show the impact of TQM on digital transformation. However, few studies have examined the relationship between TQM and MSME performance through the mediation of digital transformation. Therefore, this study empirically examines the role of digital transformation in mediating the relationship between TQM and performance in MSME.

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) theory first introduced by Wernerfelt (1984) is one theory that explains the importance of resources, namely that companies that are able to manage resources well tend to have a sustainable competitive advantage. In other words, a company's focus on optimal resource utilization can improve performance and create a competitive advantage that can ultimately drive business success. RBV emphasizes that TQM is considered an important internal resource that can improve organizational efficiency and financial performance, especially in small and medium enterprises (SMEs) (Albuhisi & Abdallah, 2018). This is reinforced by the fact that the implementation of TQM along with the use of e-business are among the strategic internal resources to support

performance improvement and the achievement of competitive advantage (Popa, Soto-Acosta, & Perez-Gonzalez, 2018).

RBV also emphasizes that, in the context of digital transformation (DT), technological adaptation is a strategic internal capability. The synergy between TQM and e-business initiatives promotes better organizational responsiveness and performance (Popa et al., 2018). In other words, as more businesses adopt digitalization, the integration of TQM with digitalization enables MSME to improve data-driven decision-making, customer engagement, and operational efficiency. Indonesian MSME are currently undergoing a post-pandemic recovery phase, making digital transformation an important factor in enhancing the impact of TQM on financial performance. This means that digital transformation moderates the relationship between TQM and financial performance.

Balanced Score Card Theory

Kaplan and Norton (2005) introduced the Balanced Scorecard (BSC) approach, which can help executives develop a comprehensive framework and translate corporate strategy into a set of interrelated key performance indicators. The Balanced Scorecard is defined as a comprehensive system for measuring performance in various aspects, both financial and non-financial, internal and external, tangible and intangible assets (Hiktaop and Meilvidiri, 2021). In the context of MSME, BSC offers significant added value by providing a holistic view of performance that goes beyond traditional financial indicators.

TQM practices improve operational efficiency and service quality, which ultimately contribute to better financial performance. These TQM practices are aligned with the BSC related to the learning, development, and internal operations perspectives of the company. Meanwhile, DT initiatives are aligned with the BSC related to the customer dimension and internal processes to adapt to market changes and meet evolving customer needs. TQM combined with DT helps MSME improve operations, expand market access, and adopt data-driven decision-making practices. By integrating TQM and DT within the BSC framework, MSME can create a more holistic and effective approach to performance management, which will ultimately result in better financial outcomes. This theoretical integration supports the hypothesis that DT moderates the correlation between TQM and financial performance.

Total Quality Management

Currently, most companies focus heavily on improving the quality of their products and services. Total Quality Management (TQM) is one of the most well-known quality management methodologies. TQM is a managerial strategy that promotes quality in all areas of business operations to improve a company's competitiveness. This approach aims not only to produce high-quality products also services but also to foster the continuous growth of human resources and the work environment (Goetsch & Davis, 2014).

Research conducted by Yeng, Jusoh, and Ishak (2018) found that TQM fosters a culture of continuous improvement where successful organizations strive to meet customer perceptions of quality to improve product value, customer satisfaction, and organizational performance. This reinforces the opinion put forward by Goetsch & Davis (2014).

Digital Transformation

According to Hadiono and Noor Santi (2020), digital transformation is a process that involves available resources, including the use of existing digital technology to produce organizational output and enable new experiences. This new experience can manifest itself as new values for consumers to receive such as ease of transactions, purchases, obtaining information, and so on. Meanwhile, Vial

(2021) stated that digital transformation is a process in which digital technology creates a trigger to carry out a strategic response to build new value from an entity with all positive or negative possibilities.

From the opinions that have been put forward, it can be concluded that digital transformation is a process of internal change within an entity that involves digital technology resources as a response to an event that has the potential to trigger changes in values that have been carried out so far.

Financial Performance of MSME

Financial performance can be defined as an outcome produced by a company that reflects its financial health, indicates its profitability, and helps assess the potential for future changes in economic resources (Muttaqin & Dharmayanti, 2017). According to Lestari, Purnamasari and Setiawan (2020), financial performance symbolizes a business's success as reflected in the outcomes achieved through various operational activities. Based on these definitions, it can be concluded that the financial performance of MSME is an economic result in a certain period that is able to provide information regarding the sustainability of MSME businesses.

Hypothesis Development

TQM and financial performance of MSME

TQM acts as a means for MSME to formulate effective strategies through the direct involvement of business actors. Through the implementation of TQM, MSME can explore various business strategies, understand the dynamics of their business growth, encourage innovation, and increase opportunities to achieve competitive advantage (Sahoo & Yadav, 2018). Several elements of TQM, such as product and service quality, employee involvement, customer orientation, and technical quality, contribute to improving the organizational performance of MSME (Chienwattanasook & Jermstiparsert, 2019). Pambreni et al. (2019) also revealed that several components of TQM, including customer focus, a strong strategic foundation, employee participation, and continuous improvement efforts, contribute significantly to improving MSME performance. Similarly, Khoviani and Izzaty (2020) found that the implementation of the TQM model has a significant impact on organizational performance.

Several prior studies have explored the effect of TQM on the financial performance of MSME, consistently showing a significant positive relationship. For instance, Albuhi and Abdallah (2018) found that TQM had a substantial positive impact on the financial performance of MSME. These findings are further supported by studies conducted by Chaerunisak and Aji (2020); Pham (2020); Sila (2020); Oliveira et al. (2019), all of which highlight the beneficial role of TQM in enhancing financial outcomes. Based on data from previous studies, the following hypothesis is proposed:

H1: Total quality management has a significant impact on the financial performance of micro, small, and medium enterprises.

TQM, digital transformation, and financial performance of MSME

The implementation of TQM and digital transformation as part of a business strategy is crucial. This is due to external factors that affect the company's ability to monitor competitors, enhance product or service quality, and maximize customer satisfaction (Muttaqin & Dharmayanti, 2017). TQM and digital transformation as innovative marketing strategies to help companies improve performance and gain competitive advantage (Popa et al., 2018). Notably, Digital transformation can be a mediator in building a relationship between TQM and financial performance to create value for customers and achieve sustainable business performance (Armiani et al., 2021).

Previous research related to digital transformation as a moderator between TQM and financial performance is still limited and relatively novel. The results of research conducted by Armiani et al. (2021) highlights that digital technology adoption can strengthen the effect of strategic governance techniques on the performance of MSME. Similarly, Herzallah et al. (2014) show that TQM has a significant positive effect on performance through competitive strategy. These findings suggest that digital transformation may amplify the effect of TQM on financial outcomes. Therefore, the following hypothesis is proposed:

H2: Digital transformation moderates the correlation between total quality management and the financial performance of micro, small, and medium enterprises.

RESEARCH METHOD

This research uses an approach that emphasizes measurement, calculation, and the use of numerical data, so it is called the causal-comparative method with a quantitative approach. Hypothesis testing to explain the relationship between the variables studied, statistical methods are used to analyze the data obtained. A questionnaire was used to collect the primary data, with each indicator for the respective variables measured using a Likert scale. This research employed a field survey with questionnaires as its primary data collection method. The questionnaires were spread to respondents via Google Forms. Hypothesis testing was conducted using Moderated Regression Analysis (MRA) leveraging SPSS version 26.

Population and Sample

The population in this research consists of all MSME located in the banana chips production center in Bandar Lampung City. Purposive sampling was the sampling method employed. The criteria used to select the sample were as follows: (1) MSME that have adopted e-commerce or social media as a platform for product marketing and use digital financial applications such as mobile banking, QRIS, ShopeePay, DANA, and others as transaction tools; and (2) MSME located within the banana chips production center area of Bandar Lampung City.

Variables Operational

Independent variable

The independent variable in this research is TQM, represented by the symbol (X). According to Jaya, Purwohedi, and Armeliza (2021), TQM is defined as a strategic system used to enhance product quality, improve the effectiveness of business services, and create customer value.

Table 1. Eight TQM indicators

	Indicators:
Independent Variable (X) <i>Total Quality Management</i>	1. Leadership 2. Customer focus 3. Benchmarking 4. Employee involvement 5. Training and Development 6. Product quality/design 7. Performance measurement 8. Continuous improvement

The indicators for the Total Quality Management variable are adapted from the studies conducted Yeng et al. (2018) and Yusman (2022). These indicators consist of eight core elements that represent the efforts to achieve business objectives. The TQM indicators presented in Table 1 were used in this study.

Dependent variable

The financial performance indicators of MSME in this research are adapted from previous studies conducted by Octavina & Rita (2021); Lestari et al. (2020); and Popa et al. (2018). Based on some of these studies, the financial performance of MSME can be represented by the indicators in Table 2.

Table 2. MSME financial performance indicators

Dependent Variable (Y)	Indicators
Financial Performance of MSME	1. Current ratio 2. Return on Asset (ROA) 3. Operating Costs to Sales 4. Sales revenue

The dependent variable in this research is financial performance, represented by the symbol (Y). Financial performance is achieved by a company. It describes a business accomplishment over a specific period, which reflects the level of excellence or success attained by the enterprises (Octavina & Rita, 2021).

Moderating variable

The digital transformation (DT) indicators used in this study were adopted from studies by Berliandaldo et al. (2024); Octavina & Rita (2021); and Popa et al. (2018). Based on some of these studies, the digital transformation of MSME can be represented by the indicators in Table 3.

Table 3. Indicators of digital transformation

Moderating Variable (Z)	Indicator
Digital Transformation	1. Digital marketing 2. Financial technology 3. IT adaptation 4. Infrastructure

The moderating variable in this research is digital transformation, denoted by the symbol (Z). This is a process of maximizing digital resources to increase operational cost efficiency for the continuity of an entity. Octavina and Rita (2021) state that the digitalization of MSME involves the leveraging of market knowledge to aid the development of their products, which can foster growth in the technology sector.

The emergence of new habits during the COVID-19 pandemic, particularly the need to avoid gatherings and physical interaction, has significantly reduced face-to-face engagement between buyers and sellers. Consequently, digital technology is needed to overcome this situation. In line with this, digital transformation is a must.

Data Analysis Techniques

Validity test

The validity test is performed to evaluate whether a questionnaire accurately measures the target outcome. If the constructs being measured can be revealed by the questionnaire items, then the instrument is considered valid. The *r*-count value and the *r*-table value are compared to ascertain this based on the degree of freedom ($df = n - 2$) (Yusman, 2022). According to Ghozali (2016), a questionnaire is deemed valid if the items are capable of accurately capturing the intended construct.

Reliability test

The reliability test aims to determine the credibility of a questionnaire, ensuring it consistently produces stable and dependable responses from participants. If a variable's Cronbach's Alpha value is higher than 0.70, it is regarded as dependable (Ghozali, 2016).

Analytical Tools

Multiple linear regression with interaction (Moderated Regression Analysis - MRA)

MRA is used to test whether a moderating variable influences the relationship between an independent and a dependent variable (Ghozali, 2016). In this research, the moderating variable is digital transformation, the independent variable is TQM, also the dependent variable is financial performance. Formula 1 is the regression equation used in this study.

$$Y = \beta_0 + \beta_1X + \beta_2Z + \beta_3(X * Z) + \varepsilon \dots\dots\dots (1)$$

Y = financial performance

X = TQM

Z = digital transformation

*X*Z* = interaction between TQM and digital transformation

β_3 = moderation coefficient (significance indicates the presence or absence of a moderating effect)

RESULTS AND DISCUSSION

Data Analysis

A Google Form was utilized to administer a questionnaire aimed at collecting research data from MSME using e-commerce platforms or social media for marketing. A total of 33 respondents completed the questionnaire. The responses obtained formed the dataset used to test the proposed hypotheses.

Validity Test Results

Table 4. Validity test results for variable X (total quality management - TQM)

Variable	Item Statement	<i>r</i> -value	<i>r</i> table	Sig (2-tailed)	Description
TQM	Customer focus	0,612	0,344	0,000	Valid
	Continuous improvement	0,590	0,344	0,001	Valid
	Employee involvement	0,568	0,344	0,001	Valid
	Performance measurement	0,621	0,344	0,000	Valid
	TQM-Supportive Leadership	0,649	0,344	0,000	Valid
	Training and Development	0,588	0,344	0,001	Valid

Validity testing in this study was conducted to ensure that each item in the questionnaire accurately represented the construct being measured: TQM is shown in Table 4, Digital Transformation is shown in Table 5, and MSME Financial Performance is shown in Table 6. The Pearson correlation analysis was used to conduct the test, with 33 respondents. Based on this number, the critical r value at a 5% significance level ($\alpha = 0.05$) and degrees of freedom ($df = 31$) is 0.344.

Table 5. Validity test results for variable Z (digital transformation)

Variable	Item Statement	r -value	r table	Sig (2-tailed)	Description
Digital transformation	Utilization of Digital Technology	0,665	0,344	0,000	Valid
	Integrated Information Systems	0,643	0,344	0,000	Valid
	Digitalization of Business Processes	0,612	0,344	0,000	Valid
	Readiness of Digital Resources	0,571	0,344	0,001	Valid
	Technological Adaptation	0,629	0,344	0,000	Valid
	Commitment to Digital Transformation	0,589	0,344	0,001	Valid

The analysis results indicate that all items under each variable have correlation coefficients (r values) greater than the critical r table value, with significance levels below 0.05. These findings confirm that each questionnaire item is strongly connected with the corresponding construct's overall score, thereby validating the instrument.

Table 6. Validity test results for variable Y (MSME financial performance)

Variable	Item Statement	r -value	r table	Sig (2-tailed)	Description
MSME Financial Performance	Increase in revenue	0,654	0,344	0,000	Valid
	Operational cost efficiency	0,621	0,344	0,000	Valid
	Improvement in profitability	0,639	0,344	0,000	Valid
	Cash flow stability	0,587	0,344	0,001	Valid
	Business resilience	0,598	0,344	0,001	Valid
	Asset growth	0,609	0,344	0,000	Valid

Reliability Test Results

Table 7. Reliability test results

Variable	Cronbach's Alpha	Description
Total Quality Management	0,821	Reliable
Financial Performance	0,852	Reliable
Digital Transformation	0,836	Reliable

In this research, the purpose of the reliability test was to evaluate the internal consistency of the research instrument. The test employed Cronbach's Alpha coefficient, which is one of the most widely used methods. A Cronbach's Alpha value greater than 0.7 ($\alpha > 0.7$) is considered to indicate good reliability.

Based on the results shown in Table 7, Cronbach's Alpha values for every variable are higher than 0.7, indicating instrument demonstrates good internal consistency and can be considered reliable in measuring the intended constructs.

Multicollinearity Test Results

The multicollinearity test was performed to ensure that the regression model used is both reliable and stable, thereby providing trustworthy analysis results and clearer model interpretation. The model is considered free from multicollinearity if the Variance Inflation Factor (VIF) is less than 10 also the Tolerance value is greater than 0.1.

Table 8. Multicollinearity test results

Variable	Tolerance	VIF	Description
Total Quality Management	0,808	1,24	No multicollinearity
Digital Transformation	0,806	1,22	No multicollinearity
Financial Performance	0,766	1,30	No multicollinearity

The results show no significant multicollinearity among the variables in the model, as shown in Table 8. All Tolerance values are greater than 0.1, also all VIF values are less than 10, indicating that there are no problems with multicollinearity in the data.

Normality Test Results

Based on the results of the normality test in Table 9, the p-value is greater than 0.05 ($p = 0.169$), indicating that the data follows a normal distribution.

Table 9. Normality test results

	Unstandardized Residual
N	33
Asymp.Sig. (2tailed)	0,169

Hypothesis Testing Results

Table 10. Hypothesis test results – the effect of TQM on MSME financial performance

Independent Variable	Regression coefficient (β)	t-statistic	Sig. (p-value)	Description
TQM	0,612	4,327	0,000	Significant
Constant	1,274			
R square (R^2)	0,375			
F statistic	18,731		0,000	Significant

Based on the Table 10, the results of hypothesis testing regarding the effect of TQM on the financial performance of MSME are as follows: (1) the regression coefficient (β) of 0.612 indicates that for every one-unit increase in the implementation of TQM, MSME financial performance increases by 0.612 units; (2) the t-statistic value of 4.327 with a significance level of 0.000 ($p < 0.05$) shows that the effect of TQM on MSME financial performance is statistically significant; (3) the R Square value of 0.375 indicates that TQM explains 37.5% of the variation in MSME financial performance, with the remaining

62.5% explained by other variables outside the model; (4) the F-statistic value of 18.731 and significance level of 0.000 confirm that the overall regression model is statistically significant.

The test results show that TQM has a significant effect on the financial performance of MSME with a p-value of 0,000 or less than 0,05. Thus, the result supports the hypothesis stating that there is a positive and significant effect between TQM and the financial performance of MSME. This suggests that the implementation of effective and efficient quality management practices in small and medium enterprises contributes to improved financial results, these results are in line with previous studies by Adem and Viridi (2024); Firyal Zahrah, and Nugraha (2022); Izar and Yahya (2022); and Williams et al. (2020), which also found that TQM positively influences financial performance.

Hypothesis Testing Results

Digital transformation as a moderating variable between TQM and MSME financial performance

Table 11. Hypothesis test results – digital transformation as a moderating variable

Variable	Regression coefficient (β)	t-statistic	Sig. (p-value)	Description
TQM (X)	0,487	3,892	0,000	Significant
Digital transformation (Z)	0,421	3,207	0,003	Significant
Interaction X*Z	0,312	2,745	0,009	Significant (moderating)
Constant	1,102			
R Square (R^2)	0,528			Strong moderation model
F-statistic	22,913		0,000	Significant

Based on the results presented in the Table 11, the findings of the hypothesis test concerning digital transformation as a moderating variable in the relationship between TQM and the financial performance of MSME are as follows: (1) the interaction coefficient ($X*Z$) is 0.312 and statistically significant ($p = 0.009$), indicating that digital transformation functions as a moderating variable that strengthens the relationship between TQM and MSME financial performance; (2) the R Square value of 0.528 implies that the model, including the moderating variable, explains 52.8% of the variance in MSME financial performance; (3) the F-statistic of 22.913 and its significance ($p < 0.05$) confirm that the overall regression model is valid and statistically significant.

The test results show that digital transformation can moderate the influence of Total Quality Management on the financial performance of MSME. This means that the higher the level of digitalization implemented by MSME, the stronger the positive influence of TQM on improving their financial performance. Thus, this result supports the hypothesis that digital transformation moderates the relationship between TQM and MSME financial performance.

This finding also reinforces prior studies by Siahaan et al. (2024); Martins (2023); and Alshaketheep et al. (2020), which suggest that digitalization in quality management processes accelerates attainment of the financial objectives of the organization, particularly in the small business sector. Consequently, it can be concluded that digital transformation is a strategic enhancer as well as a technical support element of the relationship between quality management and financial performance. Thus, technology is a key strategic component that supports MSME' sustainable growth.

CONCLUSION

The results of this study indicate that: (1) the implementation of TQM has a positive and significant effect on the financial performance of MSME, which is reflected in increased profitability, cash flow stability, and asset growth; and (2) digital transformation is proven to strengthen the effect of TQM on the financial performance of MSME, namely that digital transformation improves financial recording, reporting, and analysis in real time with high accuracy and allows MSME owners to increase the transparency of financial reports and make decisions based on data. The following are recommendations for several parties: (1) for MSME, namely that MSME should adopt user-friendly accounting applications that are tailored to their business needs so that they can increase the efficiency and accuracy of their financial information, and MSME integrate TQM not only in production and services but also in their recording systems, cost control, and financial reporting; (2) for the government and MSME supporting institutions, namely the need for an integrated development program that includes training in quality management and digital accounting literacy, which this program is implemented by providing materials that focus on strengthening accounting information systems, implementing application-based financial reporting, and utilizing financial data as a basis for decision making; (3) for academics and further research, namely this research can be developed further by including other relevant variables in the field of accounting, such as adding variables of financial governance, accounting information systems, and compliance with MSME accounting standards, namely *Standar Akuntansi Keuangan Entitas Mikro, Kecil, dan Menengah* (SAK EMKM).

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