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RESEARCH ARTICLE

Analysis of The Influence of Soft And Hard QM Practices on Business Sustainability And Competitive Advantage of SMEs: An Organizational Culture Mediation Approach

Yuni Siswanti[1], Yoga Religia[2] and Muafi Muafi[3,*]

[1,2] Management, Universitas Pembangunan Nasional "Veteran" Yogyakarta

[3] Management, Universitas Islam Indonesia*

*** Corresponding author:** Muafi Muafi, muafi@uii.ac.id

ABSTRACT

This study investigates how Soft and Hard Quality Management (QM) practices influence business sustainability and competitive advantage among creative manufacturing SMEs, with organizational culture as a mediating variable. Using a quantitative approach, data were collected through structured questionnaires from 210 SMEs engaged in creative manufacturing linked to tourism in Yogyakarta and Central Java. Structural Equation Modeling with Partial Least Squares (SEM-PLS) was applied to analyze the relationships between constructs. The results reveal that both Soft and Hard QM significantly enhance business sustainability, with Soft QM having a stronger impact. Organizational culture also mediates the relationship between QM practices and business sustainability. Furthermore, sustainable business performance positively affects competitive advantage. The model confirms that an integrated approach to QM, which combines technical systems and behavioral values, produces better strategic outcomes. The findings encourage SMEs to balance technical improvements with internal cultural development. Government and support institutions should design interventions that address both system implementation and value-based capacity building.

Keywords: Soft QM; Hard QM; Organizational Culture; Business Sustainability; Competitive Advantage

1. Introduction

Indonesia currently occupies a strategic position as one of the ten largest contributors to the global manufacturing sector, as well as being the only representative from the ASEAN region [1]. Latest data indicates that Indonesia's manufacturing sector contributes 1.4% of total global manufacturing production. However, various current performance indicators, including the Industrial Confidence Index (ICI) in August 2024, suggest that the national manufacturing industry faces serious challenges. Global economic pressures and market uncertainties have also impacted the declining competitiveness of Indonesian manufacturing products, both in terms of quality and quantity [2, 3].

The impact of this slowdown is particularly felt by Small, and Medium Enterprises (SMEs) in the creative manufacturing sector, especially those operating as supporters of the tourism industry in the Special

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Region of Yogyakarta and Central Java. In fact, creative SMEs have long been recognized as one of the important pillars of the national economy. This condition raises an urgent need to identify strategies that can help creative manufacturing SMEs survive and thrive amid increasingly complex market dynamics.

In this context, the implementation of Soft and Hard QM emerges as a promising approach. Various previous studies [4, 5] show that proper implementation of QM can help SMEs consistently improve the quality of their products and business processes. Interestingly, the effectiveness of QM is not only limited to operational aspects, but also contributes significantly to the achievement of business sustainability in three key dimensions: economic, social, and environmental [4, 6-8]. However, the implementation of QM among SMEs often faces serious obstacles.

Research by Khalil and Muneenam [9] and Wang [10] demonstrates that the successful implementation of Quality Management (QM) practices is highly dependent on their alignment with existing organizational culture. These findings suggest that QM cannot be applied as a standardized, one-size-fits-all approach, particularly in the context of small and medium-sized enterprises (SMEs). Instead, QM practices must be adapted to the specific organizational characteristics, values, and operational realities of each firm. For creative manufacturing SMEs, where flexibility, creativity, and informal structures often dominate, the compatibility between technical QM systems and organizational culture becomes even more critical.

This study integrates two main theoretical frameworks. First, the Triple Bottom Line concept introduced by Elkington and Rowlands [11], which emphasizes the importance of balance between environmental, economic, and social aspects in achieving business sustainability [12, 13]. Second, the Resource-Based View (RBV) theory asserts that sustainable competitive advantage can be achieved through the utilization of internal resources that are VRIN (valuable, rare, inimitable, and non-substitutable) [14, 15]. The integration of these two perspectives is relevant because many SMEs still do not fully understand the concept of sustainability, especially in the context of environmental balance [16, 17]. However, the unresolved research gap lies in the lack of understanding of how specifically the Soft and Hard QM dimensions interact with organizational culture to create sustainable competitive advantage in the context of creative manufacturing SMEs, which constitutes the originality of this study. In fact, the right QM approach can help SMEs develop their internal resources into core competencies that are difficult for competitors to imitate.

TQM as part of QM has been proven effective in improving organizational competitiveness [4, 18]. Interestingly, TQM implementation not only focuses on reducing operational failures, but also encourages the creation of a culture of continuous improvement [19, 20]. However, previous studies tend to highlight the Hard QM aspects (technical, methods, procedures) and pay less attention to the Soft QM dimensions that focus on organizational behavior and HR development [21]. In fact, some studies have even found contradictory results regarding the effect of Hard QM on organizational performance [5, 22].

This study makes an important contribution to the development of science and business practice by integrating the Soft and Hard Quality Management dimensions in a comprehensive analytical framework. So far, most studies have only highlighted one of the dimensions, thus not providing a complete understanding of the effectiveness of QM implementation. This study also emphasizes the role of organizational culture as a mediating variable in the relationship between QM practices and business sustainability. This aspect of organizational culture is often overlooked, even though it has an important role in determining the success of QM. In addition, the focus on creative manufacturing SMEs in the tourism sector is unique, given that this sector has different characteristics and challenges as well as a strategic role in the national economy. The findings of this study are expected to serve as an empirical basis in formulating strategies to improve SME competitiveness amidst current industry challenges.

2. Theoretical basis and hypothesis development

2.1. Theoretical framework

This study is grounded in three complementary theoretical perspectives: the Resource-Based View (RBV), Total Quality Management (TQM), and the Triple Bottom Line (TBL) framework, which together explain how Quality Management (QM) practices contribute to business sustainability and competitive advantage among SMEs. The Resource-Based View (RBV) argues that sustainable competitive advantage is derived from internal resources and capabilities that are valuable, rare, inimitable, and non-substitutable [14, 23, 24]. In the SME context, managerial practices, organizational routines, and cultural values constitute strategic internal resources. Soft and Hard QM practices can be viewed as firm-specific capabilities that enhance process efficiency, employee involvement, and learning, thereby strengthening business sustainability and competitiveness.

The TQM perspective emphasizes quality as a holistic management philosophy that integrates technical systems (Hard QM), such as procedures and process control, with behavioral and human-oriented practices (Soft QM), including leadership commitment and employee involvement. Prior studies show that TQM improves organizational performance and competitiveness while fostering a culture of continuous improvement [4, 18]. However, the literature has tended to emphasize Hard QM over Soft QM, leading to inconsistent findings regarding performance outcomes and highlighting the need for a more balanced approach.

The Triple Bottom Line (TBL) framework complements RBV and TQM by framing business sustainability as the balanced achievement of economic, environmental, and social objectives [11]. For creative manufacturing SMEs, integrating QM practices with sustainability principles supports efficient resource use, quality improvement, and long-term value creation. In this study, organizational culture is positioned as a mediating mechanism that translates QM practices into sustainable business performance and competitive advantage.

2.2. Quality management practices in creative manufacturing SMEs

Quality Management has become a key strategy for small and medium enterprises to improve product quality, operational efficiency, and business sustainability. QM practices consist of two main dimensions, namely Hard Quality Management and Soft Quality Management. Hard QM refers to the use of structured systems and technical procedures such as process standardization, quality certification, and statistical control [18]. *Soft QM*, in contrast, focuses on behavioral and cultural aspects, including leadership commitment, employee involvement, teamwork, and continuous learning [20].

Integrating both dimensions is essential for creative manufacturing SMEs, where innovation and flexibility coexist with the need for consistent quality. However, research shows that SMEs often face barriers such as limited capital, insufficient technical knowledge, and weak quality-oriented culture [2, 4]. Consequently, an integrated understanding of how QM practices interact with organizational culture and business sustainability becomes vital [25].

2.3. Hard quality management and business sustainability

Hard QM encompasses structured activities such as process control, documentation, and continuous improvement, which directly enhance efficiency and minimize waste [26]. These practices contribute to business sustainability by improving economic and environmental performance through cost savings and waste reduction [13, 17, 27]. While Hard QM provides operational consistency, some scholars argue that

excessive standardization can reduce flexibility, especially in small firms, which indicates the need for balance with softer practices [8].

H1. Hard QM practices positively influence the business sustainability of creative manufacturing SMEs.

2.4. Soft quality management and business sustainability

Soft QM focuses on people development, employee engagement, and customer orientation. These practices play a role in building a culture of continuous improvement and innovation, which is critical for business sustainability [6, 17, 20, 21, 28]. Soft QM also supports the social aspects of sustainability through strengthening relationships with stakeholders and implementing ethical work practices [9]. However, scholars note that the benefits of Soft QM may take longer to materialize, and require strong leadership support to ensure consistency across teams [6].

H2. Soft QM practices positively influence the business sustainability of creative manufacturing SMEs.

2.5. QM practices and organizational culture

Organizational culture refers to the shared values, beliefs, and behaviors that shape how members act within an organization [29]. In the context of QM, culture functions as the social infrastructure that enables technical systems to work effectively. Hard QM establishes a culture of discipline and accountability, while Soft QM encourages a culture of collaboration and learning [10, 29, 30]. A quality-oriented culture encourages all members of the organization to carry out QM principles consistently [31].

H3. Hard QM practices positively influence the organizational culture of creative manufacturing SMEs.

H4. Soft QM practices have a positive effect on the organizational culture of creative manufacturing SMEs.

2.6. Organizational culture and business sustainability

An organizational culture that emphasizes innovation, quality, and sustainability has a direct impact on SMEs' business performance in economic, social, and environmental aspects. Such cultures encourage the implementation of environmentally friendly processes, social engagement, and cost efficiency [9, 11, 17, 32]. Organizations with a strong culture have been shown to have better resilience and adaptability in the face of market dynamics [29, 33, 34].

H5. Organizational culture has a positive effect on the business sustainability of creative manufacturing SMEs.

2.7. The mediating role of organizational culture

Organizational culture acts as a link between QM practices and business sustainability. Soft QM that emphasizes employee engagement and leadership will be more effective when supported by a culture that aligns with these values [35, 36]. Similarly, Hard QM that emphasizes standardization and control will be more accepted when framed within an organizational culture that supports continuous improvement [5, 29, 33].

H6. Organizational culture mediates the positive influence of Soft QM on business sustainability.

H7. Organizational culture mediates the positive influence of Hard QM on business sustainability.

2.8. Business Sustainability and Competitive Advantage

Business sustainability refers to an organization’s capacity to balance economic performance, environmental responsibility, and social well-being over time [28, 37]. SMEs that implement sustainability strategies are able to establish differentiation in the market and gain customer trust. Sustainability provides advantages in terms of cost efficiency, brand reputation, and adaptation to regulations [6, 28, 37]. Thus, business

sustainability is not only a defense tool, but also a driver of long-term competitive advantage. The study from Bari, Chimhundu [38] also states that the sustainable dynamic capabilities lead to sustainable competitive advantage. However, scholars caution that sustainability metrics remain context-dependent, as economic indicators often dominate in SMEs, while social and environmental impacts are less formalized [6, 39].

H8. Business sustainability has a positive effect on the competitive advantage of creative manufacturing SMEs.

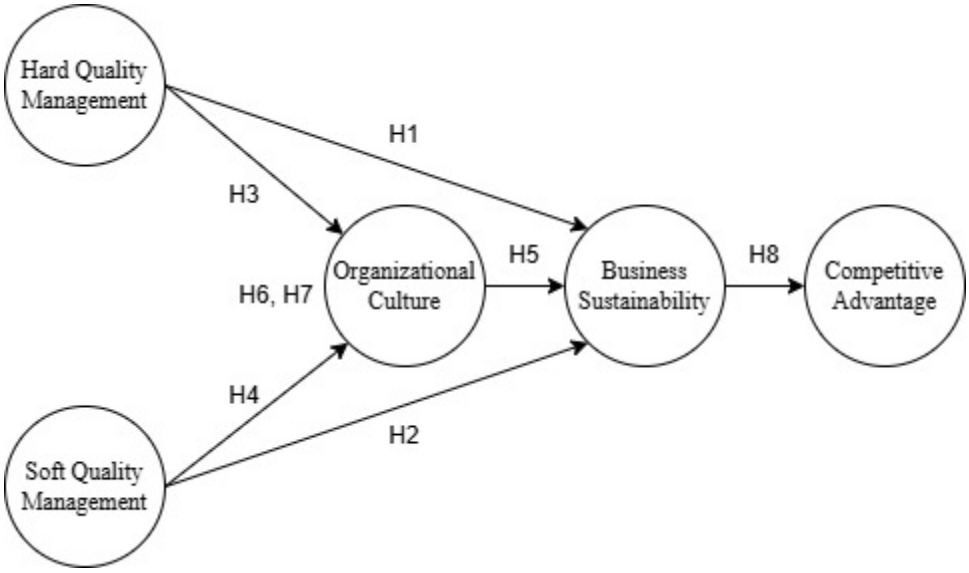


Figure 1. Hypothesis Framework

3. Research methods

This study aims to analyze the causal relationship between Soft and Hard Quality Management practices, organizational culture, business sustainability, and competitive advantage in creative manufacturing SMEs and tourism actors in the Special Region of Yogyakarta and Central Java Province. This study uses a quantitative approach with survey method as the main technique in data collection. The research design is cross-sectional because the data is collected only once at a certain time. This approach is considered appropriate for testing direct and indirect effects between variables, as well as for generalizing empirical findings based on a previously formulated theoretical framework [40].

The population in this study is all SMEs in the creative manufacturing sector that are part of the tourism ecosystem in the two selected provinces. The sample was purposively selected based on the criteria: (1) SMEs with a net income of at least IDR 3,000,000 per month, (2) have been operating for at least five years, and (3) have at least two permanent employees. Research respondents consisted of owners or key managers who understand the business processes of their SMEs. The target sample was set at 250 respondents, spread across areas with the highest concentration of SMEs. The selection of these locations was done based on the mapping of regional clusters that have great potential in the development of tourism-based creative industries.

Data collection was conducted through the distribution of structured questionnaires that were structured on a five-point Likert scale. To enrich the data and deepen the context, interviews were also conducted with key actors who are considered to understand the dynamics of QM implementation in the field. The research instrument was developed by adapting validated indicators from previous studies to suit the context of creative manufacturing SMEs. Soft Quality Management (QM) items were adapted from Zeng, Zhang [18], Sciarelli, Gheith [20], which cover aspects of people management, supplier collaboration, and stakeholder

engagement. Hard QM items were adapted from the same sources, emphasizing process management, information quality, continuous improvement, and program design. Organizational culture items were adapted from Khalil and Muneenam [9], which focus on teamwork, constructive feedback, empowerment, and leader suppport. Business sustainability was measured through three dimensions, namely economic, environmental, and social performance, which are adapted from Khan, Razzaq [25], Muafi and Sugarindra [37]. Competitive advantage followed Correia, Dias [35], emphasizing innovation, quality, price, delivery dependability, and time to market. All items were reviewed by three academic experts and two SME practitioners to ensure face validity and contextual relevance. Minor wording adjustments were made to reflect the terminology and practices of SMEs. Construct reliability, convergent, and discriminant validity were further confirmed using SEM-PLS analysis. The complete list of questionnaire items is presented in Appendix A.

The sampling technique used was purposive sampling targeting 250 SMEs selected based on strict criteria from the population framework of creative manufacturing SMEs within the tourism ecosystem of the Special Region of Yogyakarta and Central Java Province, chosen for their regional cluster concentration and potential. Data collection was conducted via direct distribution through field visits and local business association networks, which was supported by a personal approach to introduce the research team, resulting in a high response rate of 84% with a total of 210 completed questionnaires ready for analysis. The high response rate in this study not only minimizes potential non-response bias but also enables further statistical examination to ensure that the findings are not significantly influenced by common method variance, which is a general consideration in questionnaire-based research designs.

The collected data were then analyzed using the Structural Equation Modeling method based on SEM-PLS with the help of SmartPLS software version 4.0. The SEM-PLS method was chosen because it has the advantage of analyzing complex structural models, even with moderate sample sizes and non-normal data distributions. The analysis was carried out in stages, starting with testing the validity and reliability of indicators (including outer loading, composite reliability, and average variance extracted/AVE), then continuing with testing the structural model (inner model), including testing the relationship between constructs and mediation tests using bootstrapping techniques. This research is expected to make an empirical contribution to understanding how the integration of quality management practices and organizational culture can encourage sustainability and competitive advantage of SMEs in a more systemic and sustainable manner.

4. Results and discussion

4.1. Respondent profile analysis

This study involved 210 respondents who are SME actors in the creative manufacturing sector operating in the tourism ecosystem in the Special Region of Yogyakarta and Central Java. Based on Table 1, it is known that the distribution of gender shows that the majority of respondents are women (57%), while men account for 43% of the total respondents. This composition reflects the growing role of women in the small and medium-sized enterprise sector, particularly in creativity- and tourism-based industries. In terms of age, most respondents are in the middle to older productive age range, namely 49–66 years (45%), followed by the 28–48 age group (33%) and the younger 18–28 age group (22%). This indicates that the majority of SME operators have considerable experience in running their businesses.

Table 1. Respondents Characteristics

Characteristic	Respondent	Frequency	Percentage (%)
Gender	Men	90	43
	Woman	120	57
Year of Birth	1943 – 1960	65	31
	1961 – 1981	90	43
	1982 - 2001	55	26
Age	18 - 28 years	46	22
	28 - 48 years	69	33
	49 - 66 years	95	45
Position	Owner	78	37
	Manager	75	36
	Owner and Manager	57	27
Education	Junior high school	59	28
	High school	73	35
	Bachelor's degrees	39	19
	Master's degrees	39	19
Number of Employees	2 – 6 people	36	17
	7 – 10 people	90	43
	More than 10 people	84	40
Turnover per Year (Million)	< 107.6	64	31
	107.6 – 205.2	35	17
	205.2 – 302.8	42	20
	302.8 – 400.4	27	13
	400.4 - 498	42	20
Region of Origin	Bantul	59	28
	Klaten	151	72

Note: *N=210 respondent*

Based on year of birth, the oldest group (1943–1960) still dominates (31%), followed by the 1961–1981 generation (43%) and the younger 1982–2001 generation (26%). In terms of job roles, there is a fairly even distribution between owners (37%), managers (36%), and those who serve as both owners and managers (27%). In terms of education, most respondents have a secondary education background, namely high school (35%) and junior high school (28%), while respondents with higher education (bachelor's and master's degrees) each account for 19%. This indicates there is still significant room for improvement in managerial and strategic capacity through science-based business training and mentoring interventions. Most SMEs have between 7 and 10 employees (43%) and annual turnover below Rp107.6 million (31%), indicating that the scale of their businesses is still relatively small. Geographically, respondents were predominantly from Klaten Regency (72%), with the remainder from Bantul Regency (28%). This finding reflects the distinctive characteristics of creative SMEs that are micro-scale and locally based, yet possess strategic potential to be driven toward competitive advantage and business sustainability.

4.2. Analysis of measurement models evaluation

Evaluation of the reflective measurement model was carried out to test the validity and reliability of the constructs used in this study. The test includes the outer loading value, composite reliability (CR), and average variance extracted (AVE) of each construct. The analysis results show that all indicators have an outer loading value above 0.7, which indicates that each indicator is able to represent its construct consistently. The composite reliability value of all constructs is also above the 0.7 threshold, which indicates high internal consistency. The business sustainability construct has a CR value of 0.966, organizational culture of 0.965, and competitive advantage of 0.946, indicating excellent reliability. Meanwhile, the constructs of soft quality management and hard quality management also showed strong CR values of 0.913 and 0.881, respectively. In terms of convergent validity, all constructs have an AVE value above 0.5. This indicates that the proportion of indicator variance that can be explained by the construct is higher than the variance caused by measurement error. The organizational culture construct has the highest AVE of 0.821, followed by competitive advantage (0.778) and business sustainability (0.724), all of which show adequate explanatory power of the indicators.

Overall, these results indicate that all constructs used in the study meet the required validity and reliability criteria. Thus, the measurement model is suitable for use in the next stage of structural analysis using the SEM-PLS approach. See Table 2.

Table 2. Reflective Measurement Model

Construct	Items	Loadings (>0.7)	CA (> 0.7)	CR (> 0.7)	AVE (>0.5)
Business Sustainability [25, 37]	KB1: Overall business performance	0.826	0.962	0.966	0.724
	KB2: Financial performance	0.805			
	KB3: Service performance	0.786			
	KL1: Regular evaluation of environmental performance	0.861			
	KL2: Awareness of environmental impact reduction	0.9			
	KL3: Appreciation for environmentally friendly practices	0.808			
	KL4: Compensation for environmental contribution	0.859			
	KS1: Responsibility to stakeholders	0.836			
	KS2: Compliance with policies and laws	0.863			
	KS3: Community role in social welfare	0.902			
	KS4: Social responsibility to the environment	0.902			
Competitive Advantage [35]	CA1: Competitive price without compromising quality	0.939	0.929	0.946	0.778
	CA2: Prioritization on product quality	0.809			
	CA3: Reliability in product development	0.895			
	CA4: Innovation for customer satisfaction	0.886			
	CA5: Timeliness in fulfilling the market	0.876			
Hard Quality Management [18, 20]	HQ1: Quality of operational information	0.801	0.819	0.881	0.649
	HQ2: Management process effectiveness	0.845			
	HQ3: Culture of continuous improvement	0.742			
	HQ4: Program design based on measurable plans	0.83			

Construct	Items	Loadings (>0.7)	CA (> 0.7)	CR (> 0.7)	AVE (>0.5)
Organizational Culture [9]	OC1: Work and function as a team	0.904	0.957	0.965	0.821
	OC2: Acceptance of critical feedback	0.909			
	OC3: Delegation of responsibility by leaders	0.884			
	OC4: Critical feedback from leaders to members	0.91			
	OC5: Leadership efficiency and productivity	0.932			
	OC6: Leader's suggestions for member performance	0.898			
Soft Quality Management [18, 20]	SQ1: Integrated management system	0.821	0.881	0.913	0.678
	SQ2: HR as the main asset	0.753			
	SQ3: Employee involvement in improvement	0.856			
	SQ4: Procurement cooperation	0.787			
	SQ5: Stakeholder feedback	0.893			

Table 2. (*Continued*)

Source: *table prepared by the authors from software SmartPLS 4.0.*

The discriminant validity test is carried out with the Fornell and Larcker approach to ensure that each construct in the model is unique and does not overlap conceptually with other constructs. Table 3 shows that the square root AVE (√AVE) value for each construct is higher than the correlation between other constructs in the same column. For example, the √AVE value for the business sustainability construct is 0.851, higher than its correlation with other constructs such as competitive advantage (0.277) and soft quality management (0.509). Similar results are also seen in the constructs of organizational culture and hard quality management. These findings indicate that all constructs in the model have good discriminant validity and can be distinguished empirically, so the model is feasible to proceed to the structural analysis stage.

Table 3. Discriminant Validity Using Fornell-Larcker Criterion

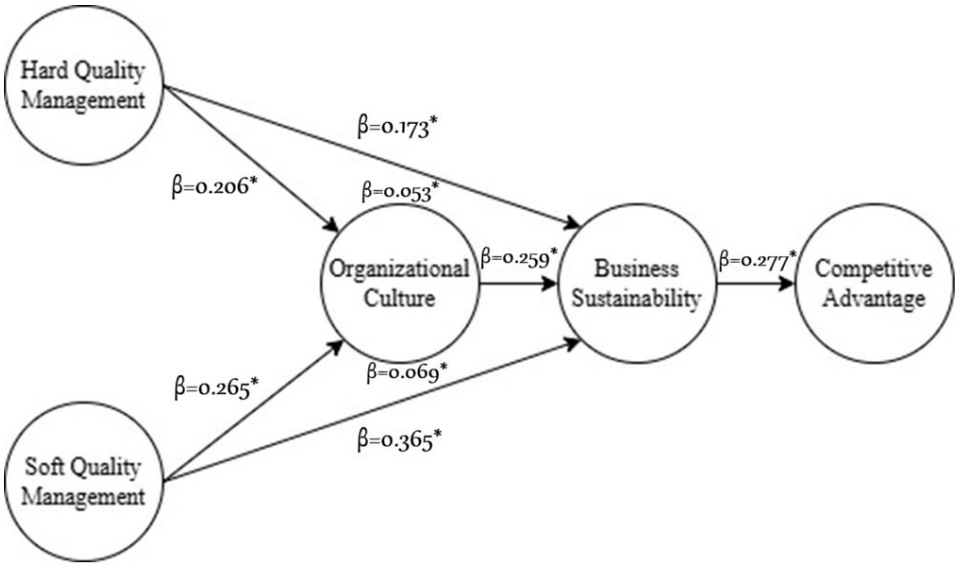
Construct	1	2	3	4	5
1. Business Sustainability	0.851				
2. Competitive Advantage	0.277	0.882			
3. Hard Quality Management	0.371	0.34	0.806		
4. Organizational Culture	0.431	0.319	0.294	0.906	
5. Soft Quality Management	0.509	0.311	0.333	0.334	0.823

Source: *table prepared by the authors from software SmartPLS 4.0*

4.3. Analysis of structural model evaluation

Structural model analysis is conducted to test the relationship between constructs and confirm the hypotheses that have been formulated. Based on the results of data processing using SEM-PLS in Table 4, all hypotheses in the model are significant at the 95% confidence level ($t > 1.96$). Hard quality management practices have a positive effect on business sustainability ($\beta = 0.173$; $t = 2.372$), while soft quality management shows a stronger influence on business sustainability ($\beta = 0.365$; $t = 5.148$). Furthermore, hard quality management has a positive effect on organizational culture ($\beta = 0.206$; $t = 3.188$), as well as soft quality management, which has a significant effect on organizational culture ($\beta = 0.265$; $t = 4.043$). The organizational culture construct is also shown to have a positive effect on business sustainability ($\beta = 0.259$; t

= 3.871), which indicates the important role of organizational culture in supporting SME business sustainability. The mediation test shows that the indirect effect of soft quality management on business sustainability through organizational culture is significant (β = 0.069; t = 2.916), as well as the indirect effect of hard quality management on business sustainability (β = 0.053; t = 2.212). Finally, business sustainability has a positive effect on competitive advantage (β = 0.277; t = 6.215), indicating that achieving business sustainability is the foundation for creating competitive advantage.



Notes: ** Significant at level 0.05*

Figure 2. Measurement of Model

The R^2 value for the business sustainability construct is 0.741, indicating the high explanatory power of the model. The R^2 for organizational culture is 0.366, and for competitive advantage, it is 0.258. The Q^2 values for the three constructs are also above 0.26, indicating good predictive power of the model. Overall, these results support the strength of the conceptual model built and affirm all the relationship paths between the main variables in the study.

Table 4. Measurement of Structural Models

Hypothesis	Relations	β	t-value	Description
H1	Hard Quality Management → Business Sustainability	0.173	2.372*	Supported
H2	Soft Quality Management → Business Sustainability	0.365	5.148*	Supported
H3	Hard Quality Management → Organizational Culture	0.206	3.188*	Supported
H4	Soft Quality Management → Organizational Culture	0.265	4.043*	Supported
H5	Organizational Culture → Business Sustainability	0.259	3.871*	Supported
H6	Soft Quality Management → Organizational Culture → Business Sustainability	0.069	2.916*	Supported
H7	Hard Quality Management → Organizational Culture → Business Sustainability	0.053	2.212*	Supported
H8	Business Sustainability → Competitive Advantage	0.277	6.215*	Supported

Source: *table prepared by the authors from software SmartPLS 4.0.*

Notes: ** Significant at level 0.05; R^2 OC= 0.366; Q^2 OC= 0.364; R^2 BS= 0.741; Q^2 BS= 0.746; R^2 CA= 0.258; Q^2 CA= 0.260*

4.4. Discussion

This research strengthens previous theoretical arguments that quality management practices, both in the form of Hard QM and Soft QM, have a significant role in supporting the business sustainability of creative manufacturing SMEs. However, the difference in effect size between the two ($\beta = 0.365$ vs. $\beta = 0.173$) indicates that behavioral mechanisms may contribute roughly twice as much to sustainability outcomes as technical ones. In this context, Soft QM is shown to have a stronger impact on sustainability than Hard QM. This finding is in line with the views of Sciarelli, Gheith [20], García-Fernández, Claver-Cortés [21], who emphasize that behavioral aspects such as employee engagement and transformational leadership tend to be more effective in driving a culture of innovation and sustainability in small organizations. From a Total Quality Management (TQM) perspective, this result confirms that quality management functions most effectively when technical systems are supported by behavioral and cultural practices, reinforcing the holistic nature of TQM as both a managerial philosophy and an organizational value system. This stronger behavioral effect is somewhat unexpected, as SMEs are often assumed to rely more on procedural standardization than on cultural alignment; thus, it suggests that human-centric factors may compensate for limited formal systems. By prioritizing collaborative values and people development, SMEs are able to foster resilience in the face of market pressures.

The results of this research support the studies of Al Mansoob, Al Qubati [32], Chatterjee, Chaudhuri [39], which demonstrate a positive and significant relationship between organizational culture and organizational sustainability. Nevertheless, the moderate path coefficient from culture to sustainability ($\beta = 0.259$) implies that culture alone is not sufficient; it complements, rather than replaces, structured management practices. This finding aligns with the Resource-Based View (RBV), which posits that sustainable performance is derived from the combination of valuable internal resources rather than reliance on a single organizational factor. This research is relevant to the Dynamic Capabilities Theory (DCV Theory) [41], which states that a company's ability to build, integrate, and reconfigure internal and external competencies is necessary to face a rapidly changing environment [23, 41]. From a DCV perspective, Hard QM represents operational routines (ordinary capabilities), whereas Soft QM and culture reflect dynamic capabilities that enable reconfiguration. In the dynamic capabilities approach, organizations can develop both hard and soft capabilities to create new resources and revitalize their existing ones [24]. This research shows the influence of sustainable business on competitive advantage, thus supporting Bari, Chimhundu [38], which states that (1) sustainable dynamic capabilities lead to sustainable competitive advantage, (2) sustainable dynamic capabilities lead to corporate sustainability, and (3) corporate sustainability leads to sustainable dynamic capabilities.

Furthermore, organizational culture was found to play a significant mediating role in the relationship between QM practices and business sustainability. This supports the research results of Wang [10], Flynn, Schroeder [30], who stated that a conducive organizational culture is an important prerequisite for successful QM implementation. From an RBV standpoint, organizational culture functions as an intangible internal resource that enhances the value and effectiveness of QM practices, making them more difficult for competitors to imitate. In this study, values such as teamwork, openness to feedback, and leadership efficiency were shown to strengthen QM effectiveness. Interestingly, the mediation was partial rather than full, which suggests that culture amplifies, rather than substitutes, the direct influence of QM on sustainability. This finding becomes relevant when viewed from the profile of respondents, the majority of whom come from the middle and advanced productive age groups and have long business experience, so they are likely to have built an established and adaptive work culture. The low level of formal education is not a significant barrier, as field experience and collective practice seem to replace the function of formal training in shaping a strong quality culture.

The mediation test results in this study show that organizational culture acts as a partial mediation in the relationship between Quality Management practices (both Hard and Soft) and business sustainability. Partial mediation occurs because the direct effect of Hard QM and Soft QM on sustainability remains significant even though the indirect effect through organizational culture is also significant. This suggests that organizational culture is not only a channel of reinforcement but also acts as a leveraging mechanism that strengthens the effectiveness of QM implementation in the long run. This finding reinforces the idea of [29, 34, 36] that organizational values can bridge the gap between the management system and the internal context of the organization, especially in SMEs that have simple managerial structures and close social relationships. Thus, the mediation of organizational culture serves as a strategic element that smooths the transition from a technical quality management approach towards achieving the strategic goal of business sustainability.

The main uniqueness of this research lies in the strength of the structural model that was successfully built, where all constructs show high validity and reliability as well as consistently significant inter-variable relationships. All hypotheses proposed were confirmed, including the mediating role of organizational culture, which has often been ignored in the context of SMEs. The model provides a comprehensive picture that the integration of technical (Hard QM) and behavioral (Soft QM) aspects not only directly impacts business sustainability but also works synergistically through the formation of a strong organizational culture. This theoretical integration extends TQM and RBV by empirically linking internal quality practices to sustainability-driven competitive advantage, consistent with the long-term orientation advocated by the TBL framework. This extends the findings of Flynn, Schroeder [30], Yu and Choi [31] by providing empirical evidence that in the context of creative manufacturing SMEs, a holistic quality management approach—which incorporates organizational systems, processes, and values—is more effective than a partial approach. This success shows that local SMEs are able to strategically respond to sustainability challenges when quality practices are designed in accordance with internal cultural characteristics and collective leadership support.

While the structural model demonstrates strong validity and all hypothesized relationships are supported, this consistent pattern warrants critical reflection. The comprehensive confirmation of hypotheses could be influenced by methodological factors, such as common method variance due to single-informant data, suggesting the model's explanatory power should be interpreted with caution. Furthermore, the finding that a holistic QM approach is more effective may be particularly salient within the specific context of creative manufacturing SMEs, where close social relationships and adaptable cultures are prevalent. Future research employing longitudinal or multi-method designs would be valuable to corroborate these findings and establish stronger causal inferences beyond the current cross-sectional evidence.

4.4.1. Theoretical implications

This research makes an important theoretical contribution to the development of TQM and RBV. The finding that both Hard and Soft Quality Management have a positive impact on business sustainability strengthens the TQM theory as proposed by Zeng, Zhang [18], Flynn, Schroeder [27], that systematic implementation of quality systems can improve organizational efficiency and competitiveness. However, this study also adds that the effectiveness of such practices becomes much more optimal when integrated with organizational culture, as suggested by [10, 31]. That is, this study not only supports the existing TQM theory, but also extends it by explaining the importance of behavioral variables and internal organizational values in shaping sustainability outcomes.

This finding also provides reinforcement to the Resource-Based View perspective [14, 15], which emphasizes the importance of internal resources that are VRIN. In this context, an organizational culture that supports innovation and collective engagement can be positioned as a strategic resource that is difficult for competitors to replicate. With the inclusion of organizational culture as a mediating variable, this study offers a new theoretical contribution that the success of a quality management strategy is not solely determined by a systemic approach, but also depends heavily on its conformity with the internal context of the organization-an idea that is also in line with the findings of Rahman and Bullock [5], Hilman, Ali [36].

Regarding the generalizability of these findings beyond the current research context, the demonstrated mediation mechanism through organizational culture suggests potential applicability across various small-scale manufacturing sectors characterized by strong social networks and artisan traditions. The stronger influence of Soft QM may be particularly relevant for labor-intensive industries where human capital development is crucial, though the specific balance between soft and hard QM elements would likely vary depending on technological intensity and market demands. The structural relationships identified in this study provide a theoretical framework that could be tested in similar emerging economy contexts where informal institutions and relational dynamics significantly influence business operations. However, the model's transferability to large-scale manufacturing or highly standardized service industries may be limited due to fundamental differences in organizational structure and management systems.

Furthermore, this research fills a gap in the literature that has been lacking in exploring TQM integration in the context of tourism-based creative manufacturing SMEs. By extending the application of TQM and RBV theories to unique sectors and regions such as SMEs in Yogyakarta and Central Java, this research opens space for theoretical replication in the informal sector and local business communities. This local context strengthens the external relevance of the findings while enriching the theoretical building that has been more tested on the scale of large and multinational organizations [4, 20]. Therefore, this research not only confirms the relevance of existing theories, but also provides an empirical basis for the development of new conceptual models that are more responsive to local dynamics and values.

4.4.2. Practical implications

The findings of this study provide strong practical implications for creative manufacturing SMEs, especially in the context of tourism-based business development in regions such as Yogyakarta and Central Java. The integration of Soft and Hard Quality Management practices is proven to not only have a direct impact on business sustainability but is also strengthened by an organizational culture that supports the values of collaboration, openness, and efficiency. Therefore, SME owners and managers should not only focus on technical aspects such as process standardization and quality control [18], but also actively build an organizational culture that encourages employee engagement, acceptance of critical feedback, and participative leadership [10, 31, 34].

For immediate implementation, SME owners should establish structured feedback mechanisms through monthly "innovation circles" where employees can propose process improvements with guaranteed managerial responses, while simultaneously implementing "cross-training programs" to enhance teamwork through role rotation among artisans. To strengthen both Soft and Hard QM practices, businesses should adopt simple digital checklists using free applications like Google Forms for real-time quality control across key production stages, complemented by quarterly "culture audits" using simplified 5-item surveys to measure and discuss teamwork and leadership effectiveness. These practical interventions should be supported by training and mentoring programs from SME assistance agencies or local governments that balance technical skills with soft skills development, specifically designed through creative cluster-based

approaches that address the demographic and social characteristics revealed in this study, thereby overcoming common adoption barriers related to limited human resources and organizational culture preparedness [2, 4].

Finally, to support long-term competitiveness, SMEs should begin to view sustainability not as an administrative obligation but as a core business strategy. Sustainability strategies have been shown to have a positive impact on competitive advantage [14, 37], both in terms of cost efficiency, product reputation, and regulatory adaptability. Therefore, SMEs need to adopt sustainability principles that align with their corporate culture and quality management practices. At the policy level, local governments should develop a "Sustainable Creative SME Certification" program that provides tax incentives and preferential procurement opportunities for businesses demonstrating integrated QM practices and sustainability performance, following the framework validated in this study. For educational institutions, vocational curricula should be redesigned to include integrated quality management modules that combine technical skills in production process control with soft skills in team-based problem solving and sustainable leadership, creating industry-ready graduates who can drive both operational excellence and cultural transformation in creative SMEs [20, 21]. This comprehensive approach will not only increase their chances of survival in a competitive market but also strengthen their position in a tourism supply chain that increasingly demands social and environmental accountability.

4.4.3. Research limitations

The findings of this study make an important contribution to the development of quality management theory and practice in the SME sector. However, there are some limitations that need to be considered as a basis for further research. The cross-sectional approach used provides a snapshot of the relationship between variables at one particular time, so it has not captured the long-term dynamics of the Quality Management implementation process and the role of organizational culture in promoting sustainability. Longitudinal studies will be very useful to observe the changes and stability of the influence of these variables over time. The regional focus on creative manufacturing SMEs in Yogyakarta and Central Java is also an advantage as well as a limitation, as the distinctive social and cultural characteristics in these regions may not necessarily reflect the conditions of SMEs in other regions or sectors. In addition, the model does not include additional contextual variables such as leadership style, competitive pressures, or level of digitalization, which could potentially enrich the understanding of the determinants of sustainability and competitive advantage. Future research could expand this conceptual model to be more adaptive to the complexity of the evolving business world.

5. Conclusion

This study aims to analyze the influence of Soft and Hard Quality Management practices on business sustainability and competitive advantage of creative manufacturing SMEs, considering the role of organizational culture as a mediating variable. Based on the analysis results, it was found that both Soft and Hard QM have a significant influence on business sustainability, with Soft QM showing a stronger influence. In addition, organizational culture was shown to play an important mediating role in strengthening the impact of both approaches on sustainability. Business sustainability also contributes positively to the achievement of competitive advantage, suggesting that sustainability strategies can be an important foundation for SMEs' long-term competitiveness.

The findings strengthen and extend TQM and RBV theories by showing that the success of quality management is not only determined by technical systems and procedures but also by the strength of internal

organizational values. By integrating organizational culture as a mediator, this study offers a theoretical framework that is more contextual and appropriate to the characteristics of SMEs, particularly in the tourism-based creative manufacturing sector. Practically, the results of this study provide guidance for SMEs and policymakers to balance structural and behavioral approaches in quality improvement strategies and business sustainability

Author contributions

Conceptualization, Y.S. and Y.R.; methodology, Y.S.; software, Y.R.; validation, Y.S., Y.R., and M.M.; formal analysis, Y.R.; investigation, Y.S.; resources, M.M.; data curation, Y.R.; writing—original draft preparation, Y.S. and Y.R.; writing—review and editing, M.M.; visualization, Y.R.; supervision, M.M.; project administration, Y.S.; funding acquisition, M.M. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest

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