


Enhancing Sustainable Supply Chain Performance through Total Quality Management: The Role of Organisational Culture


Isaac Opoku-Fofie

Department of Procurement and Supply, Takoradi Technical University, P. O. Box 256, Takoradi, Ghana
isaac.opoku-fofie@ttu.edu.gh

 0009-0009-9378-277X


John Amoah

Department of Marketing and Entrepreneurial Studies, Takoradi Technical University, Takoradi, Ghana
john.amoah@ttu.edu.gh

 0000-0002-3558-2077


David Asante

Department of Procurement and Supply, Takoradi Technical University, P. O. Box 256, Takoradi, Ghana
david.asante@ttu.edu.gh

 0000-0002-3377-0859

Kofi Kwarteng

Department of Marketing and Entrepreneurial Studies, Takoradi Technical University, Takoradi, Ghana
kofi.kwarteng@ttu.edu.gh

 0009-0006-7606-5777

ABSTRACT

Research background: Manufacturing SMEs in emerging markets face increasing pressure to improve supply chain sustainability while maintaining cost efficiency and product quality. Total Quality Management (TQM) practices are frequently proposed as a means of strengthening sustainable supply chain performance (SSCP), yet evidence on which specific practices matter most—and under what organizational conditions—remains mixed. In particular, the role of quality culture as a contextual enabler of SSCP has received limited empirical attention in sub-Saharan African manufacturing settings.

Purpose of the article: This paper examines the effects of TQM practices and quality culture on sustainable supply chain performance (SSCP) in manufacturing SMEs in Ghana. It also tests whether quality culture moderates the relationships between specific TQM practices and SSCP.

Methods: The study adopts a quantitative research design using survey data from 400 senior managers in manufacturing SMEs in Ghana. Structural equation modelling (SEM) is employed to estimate the relationships among TQM practices, quality culture, and SSCP, and to assess the moderating effects of quality culture on selected TQM–SSCP linkages.

Findings & Value added: The results show that TQM practices—excluding quality assessment—have significant positive effects on SSCP. Quality culture is also positively associated with SSCP and moderates the effects of strategic planning, supplier quality management, and information analysis on SSCP. The study extends the literature by providing evidence on the joint and conditional roles of TQM practices and quality culture in shaping SSCP in an emerging-market context. The findings offer actionable implications for policymakers and managers, indicating that SSCP improvements are more likely when TQM implementation is complemented by deliberate efforts to cultivate a strong quality-oriented culture across supplier networks.

RECEIVED: March 29 ◉ **ACCEPTED:** May 31 ◉ **PUBLISHED ONLINE:** June 30

KEYWORDS: Total Quality Management, Quality Culture, Sustainable Supply Chain Performance, Small and Medium Scale Enterprises

JEL CLASSIFICATION: L23, M14, Q56

CITATION: Opoku-Fofie, I., Amoah, J., Asante, D. & Kwarteng, K. (2026). Enhancing Sustainable Supply Chain Performance through Total Quality Management: The Role of Organisational Culture. *Journal of Business Sectors*, 4(1), 78–90. <https://doi.org/10.62222/VCHC1345>

INTRODUCTION

Environmental degradation and the preservation of natural resources have become major concerns for manufacturing industries in developed countries (Khan et al., 2021). However, these issues are often overlooked in developing countries where environmental business strategies are lacking, despite increasing customer demand for environmental awareness (Yasir et al., 2020). Consequently, as customers place greater importance on environmental issues, there is growing pressure on manufacturing firms to implement total quality management (TQM) practices (Hassan & Jaaron, 2021; Albloushi et al., 2023). Total Quality Management (TQM) has emerged as a pivotal approach for enhancing organisational performance and competitiveness across various industries. The philosophy of TQM emphasises continuous improvement, customer focus, and employee involvement, aiming to optimise processes and deliver superior-quality products and services. In recent years, the concept of sustainability has gained significant attention in the business world, with companies increasingly recognising the importance of integrating environmental, social, and economic considerations into their operations. Despite the growing interest in both TQM and sustainability, there is a noticeable gap in the literature regarding the specific influence of TQM practices on sustainable supply chain performance. While prior research (Hassis et al., 2023; Shaikh et al., 2023; Mittal et al., 2023; Hassan and Jaaron, 2023) has explored the impact of TQM on various aspects of organizational performance, such as quality, cost, and customer satisfaction, limited attention has been paid to its effects on sustainable supply chain. Again, despite the growth of literature on the performance implication of TQM practices, most of these studies (Basu et al. 2016; Basu et al. 2020, Anil & Satish, 2019; Yas et al., 2021; Agyabeng-Mensah et al., 2021) considered TQM as a unidimensional construct without discussing the dimensions and their influence on performance. Even though others (Ali AlShehail et al., 2022; Sahoo & Yadav, 2020; Sharma & Modgil, 2020; Puthanveetil et al., 2021) have also looked at the various dimensions of TQM, little attention has been paid to information and analysis, supplier quality management, benchmarking, quality assurance and strategic planning, which are crucial sources of sustainability and quality management for firms (Ali AlShehail et al., 2022; Sharma & Modgil, 2020; Al-Rawi et al., 2021). Additionally, Kebede Adem & Viridi (2020) pointed out the limited studies on the performance implications of TQM among SMEs in developing African economies like Ghana. Asserting the relevance of TQM in emerging economies as a strategic approach in the current dynamic market. In this light, there have been increasing calls for the need to further explore the context of a specific country regarding the performance outcomes of TQM practices in resource-constrained environments like sub-Saharan Africa (Shafiq et al., 2019; Jasti et al., 2022). Understanding this relationship is crucial, as supply chains play a critical role

in driving sustainability, particularly among Small and medium-sized enterprises (SMEs).

Small and medium-sized enterprises (SMEs) play a vital role in driving economic growth, innovation, and employment globally. However, SMEs face notable challenges in integrating sustainability into their supply chain (SC) operations, partly due to resource constraints and the complex balance between profitability, ethics, and environmental impact. While research shows sustainability in SC management can confer strategic advantages, limited guidance exists on effective implementation strategies for SMEs. Moreover, the synergy between sustainability and total quality management (TQM) in the SME context remains underexplored, despite quality management's purported benefits (Peprah et al., 2025). This paper examines how total quality management practices (TQMP) influence sustainable supply chain performance (SSCP) in the context of SMEs. Furthermore, the role of quality culture as a potential moderator in the relationship between TQM practices and sustainable supply chain performance remains underexplored. Quality culture refers to the shared values, beliefs, and norms within an organisation that promote a commitment to quality and continuous improvement. It is plausible that organisations with a strong quality culture may experience greater benefits from TQM practices in terms of enhancing their sustainable supply chain performance. By examining the moderating role of quality culture, this study aims to provide a more nuanced understanding of how TQM practices influence sustainable supply chain performance. This research will contribute to bridging the gap in the literature and provide valuable insights for both academics and practitioners seeking to enhance sustainability practices in supply chain management. The outcome of this study makes a useful contribution to supply chain and quality management literature. First, this study is the first to empirically validate how TQM practices can be used to improve sustainable supply chain performance. Second, the study offers useful insights into how RBV maintains its explanatory power in an emerging area of supply chain management. Thirdly, we expand upon RBV by demonstrating the varying conditions of quality culture under which the effect of TQM practices on sustainable supply chain performance amplifies. The remaining parts of the paper are organised as follows: A literature review is provided in Section 2; Section 3 provides the methodology and data analysis presented and discussed in Section 4. The last section presents a conclusion, limitations, and suggestions for further study.

THEORETICAL BACKGROUND

Resource-Based View Theory

We align with the perspective that the Resource-Based View (RBV) offers a valuable framework for elucidating the impact of Total Quality Management (TQM) on organisational performance. The fundamental premise posits that TQM facilitates performance enhancement by fostering the development of distinct assets, fostering intricate

social connections, rooted in the organisational history and ethos, and engendering tacit knowledge. These attributes align with the prerequisites outlined in the RBV literature for attaining sustained competitive advantage (Barney, 1991). RBV suggests that a firm's sustainable competitive advantage is derived from its unique and valuable resources and capabilities. In the context of TQM and sustainable supply chain performance, TQM practices can be seen as valuable resources and capabilities that contribute to a firm's competitive advantage. TQM practices such as continuous improvement, employee involvement, supplier partnerships, and customer focus can enhance operational efficiency, product quality, and innovation in the supply chain, leading to improved sustainability performance. According to RBV, firms that effectively implement TQM practices develop unique capabilities that are difficult for competitors to imitate. These capabilities can include a culture of quality and sustainability, efficient processes, and strong relationships with suppliers and customers. As a result, firms can achieve sustainable supply chain performance by leveraging TQM practices to develop these unique capabilities, which in turn create value for the firm and its stakeholders. In essence, the RBV suggests that TQM practices can contribute to sustainable supply chain performance by developing unique capabilities that enhance operational efficiency, product quality, and innovation in the supply chain. These capabilities, in turn, can lead to a sustainable competitive advantage for the firm. As shown in Figure 1, the paper further argues that under varying conditions of quality culture, the effect of TQM practices on sustainable supply chain performance varies such that a firm with a strong quality culture can enhance the effectiveness of TQM practices. When employees at all levels of the organisation embrace quality as a core value, they are more likely to fully engage in TQM initiatives, leading to better implementation and outcomes. Thus, quality culture can also facilitate the integration of sustainability principles into TQM. A quality-focused culture is more likely to value long-term sustainability over short-term gains, leading to the adoption of sustainable practices within TQM frameworks. A strong quality culture can amplify the positive impact of TQM on sustainability by ensuring that TQM practices are consistently applied and aligned with sustainability goals.

Total Quality Management and Sustainable Supply Chain Performance

In today's interconnected and environmentally conscious world, total quality management (TQM) extends to sustainable supply chain management (Saragih et al., 2020). TQM encompasses an integrated management philosophy centered on embedding quality principles like customer focus, continuous improvement, data-driven solutions, and cross-functional engagement to optimise performance. Research indicates implementing such strategies can enhance operational outcomes in quality, efficiency, and adaptability, which are core dimensions of a sustainable supply chain (Rajeev et al., 2017). However, few empirical investigations evaluate linkages between

specific TQM practices (TQMP) and sustainable supply chain performance (SSCP) (Ahmad, 2022; Zhou et al., 2022; Olugu & Wong, 2022). The subsequent sections discuss the various TQM practices and how they affect sustainable supply chain performance.

Information and data analytics

Information and data analytics focused on monitoring customer preferences (Olugu & Wong, 2022), supply capacities (Sisay, 2021), product and process quality metrics (Gligor, 2019), and sustainability indicators can enhance evidence-based decision-making, predictive capabilities, and adaptive responses. Analysis of real-time data on operational energy consumption, emissions levels, and waste metrics allows tailored optimisation solutions balancing profitability, planet, and people-centred objectives (Olugu & Wong, 2022). Studies reveal analytical use of data analytics enhances sustainability-related forecasting, accelerates responsiveness, and provides transparency - boosting triple bottom-line performance. Based on this evidence, this paper hypothesises:

H1a. Information and Data Analytics has a significant positive influence on sustainable supply chain performance

Supplier Quality Management

Strategic suppliers constitute pivotal stakeholders with substantial implications for environmental and social sustainability across supply networks. Joint quality management initiatives like supplier audits, collaboration on waste reduction and closed-loop processes, as well as capacity-building programs focused on enhancing energy efficiencies, have cascading sustainability impacts (Thanki et al., 2016). Supplier diversification boosts adaptability while localising streamlines carbon footprints - both crucial for resilience (Gligor, 2019; Olugu & Wong, 2022). Higher levels of supplier quality management and engagement correlate with improved SSCP markers (Sisay, 2021). Thus, this paper hypothesises:

H1b. Supplier quality management has a significant positive influence on sustainable supply chain performance

Benchmarking

Benchmarking sustainability initiatives both within and between supply chains provides crucial visibility on strengths, improvement areas, and knowledge transfer opportunities to progress economic, environmental, and social responsibility objectives. Internal benchmarking of operational emissions, waste metrics, and resource consumption, coupled with analysis of optimisation solutions, drives quantifiable progress on key eco-efficiency and social responsibility goals. Formal external benchmarking against recognised sustainability leaders also accelerates advancement (Wang et al., 2012). Therefore, this paper hypothesises:

H1c. Benchmarking has a significant positive influence on sustainable supply chain performance

Quality Assurance

While quality assurance programs traditionally focused predominantly on supply chain cost or reliability objectives, contemporary integration of sustainability considerations across assurance protocols now allows holistic, proactive life cycle assessment of products and processes against combined "triple bottom line" parameters (Thanki et al., 2016). Implementations reveal augmented quality assurance processes incorporating sustainability impact reviews, which help identify eco-efficiency advancement opportunities through predictive analytics while boosting brand reputation via ethical sourcing and social auditing (Rauer & Kaufmann, 2015). Based on these linkages, this paper hypothesises:

H1d. Quality Assurance has a significant positive influence on sustainable supply chain performance

Strategic Planning

While implementing TQM methods focused on enhancing informational, supplier, benchmarking, and assurance capabilities can directly strengthen SSCP, research indicates that an overarching strategic orientation amplifies TQM success (Sisay et al., 2021). Formal strategic planning integrating sustainable development objectives provides vision, resource prioritisation, and cross-functional focus to scale TQM initiatives from isolated projects to coordinated transformation. Studies demonstrate strategic planning boosts TQM effectiveness for sustainability gains by delineating pathways aligning stakeholder motivations, directing trade-off decisions, and preventing unintended negative consequences amidst disruptions (Yasir et al., 2020). Therefore, in conjunction with the four hypothesised direct TQMP effects, this paper proposes:

H1e. Strategic planning has a positive and significant effect on sustainable supply chain performance

The Moderating Role of Quality Culture

While formal strategic planning integrating sustainable development objectives provides vision, resource prioritisation, and cross-functional focus to scale TQM initiatives for sustainability gains, its effectiveness depends significantly on having a supportive quality culture. From an institutional theory perspective, a strong quality culture promoting shared assumptions and motivations shapes the sense-making, acceptance, and internalisation required for new strategic sustainability initiatives (Tari et al., 2023). A resource-based view also suggests that these cultural resources act as inimitable social complexities driving meaningful execution of diffused strategies (Barney, 1991). Without this cultural alignment, strategic planning efforts may face participation barriers, a lack of readiness for change, and challenges in cascading implementation needed to achieve supply chain sustainability objectives (Yas et al., 2020).

H2a1. Quality Culture moderates the relationship between Strategic Planning and Sustainable Supply Chain Performance

Well-coordinated quality assurance systems through auditing, standardisation, process control, and worker engagement foster consistent defect prevention, which enhances sustainability from reduced waste, accuracy, and process stability (Moktadir et al., 2018). However, moving beyond basic compliance to maximising quality-based performance advantages depends on supportive norms and values. The resource-based view recognises these socially complex cultural resources as inimitable sources of competitive advantage over other management systems, as assumptions, interpretations, and goals shape how quality assurance is enacted (Barney, 1991). The institutional theory also explains how unified, committed assumptions drive assurance system stability and perceived legitimacy. Empirically, a strong quality culture cultivates worker internalisation moving from extrinsic audits toward self-reinforcing commitment to quality in sustainable production (Barney, 1991).

H2a2. Quality Culture moderates the relationship between Quality Assurance and Sustainable Supply Chain Performance

As management practices diffuse rapidly, benchmarking leading organisations enables continuous evolution and competitiveness through smarter resource utilisation with sustainability implications (Singh, 2024; Tari et al., 2019). However, learning and implementation efficacy from benchmarking varies based on an organisation's cultural readiness (Tari et al., 2019). The institutional theory highlights how cultural-cognitive institutions like shared visions and motivations shape sense-making, acceptance, and internalisation of new externally acquired practices (Tari et al., 2019). The resource-based view also suggests organisational cultures are valuable, inimitable social resources enhancing execution and derived meaning from benchmarked innovations (Barney, 1991). Empirical evidence indicates that a common purpose and willingness to change strengthen benchmarking for sustainability in municipalities (Tari et al., 2019), while quality culture boosts global benchmarking effectiveness in Portuguese firms (Barney, 1991).

H2a3. Quality Culture moderates the relationship between Benchmarking on Sustainable Supply Chain Performance

Product and service quality increasingly results from extensive supply chain coordination rather than single firms (Shafiq et al., 2019). Supplier quality management through integration, training, auditing, and collaboration has well-established performance benefits (Moktadir et al., 2018; Shafiq et al., 2019). Still, the efficacy of these external integration efforts depends critically on internal cultural readiness across supply chain stages. Institutional theory explains how common understandings facilitate the diffusion of quality practices like supplier management across firm boundaries (Scott, 1987; Shafiq et al., 2019). The resource-based perspective suggests these cultural resources enhance meaningful, impactful integration by making it smoother and more valuable (Barney, 1991; Naor et al., 2008). Empirically, a multi-country

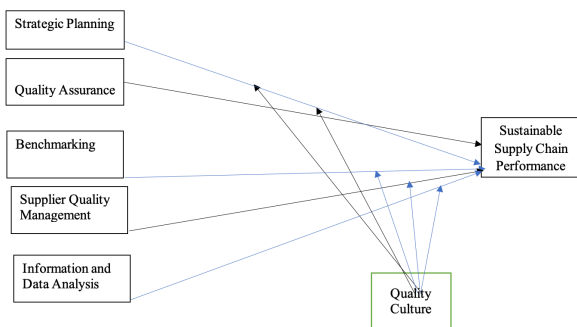
study confirmed that quality culture strengthens international supplier quality transfer and performance (Shafiq et al., 2019). Thus, internal shared quality commitments maximise supply chain-wide sustainability progress from supplier management initiatives.

H2a4. Quality Culture moderates the relationship between Supplier Quality Management and Sustainable Supply Chain Performance

Information and data analytics reflecting quality metrics provide evidence-based decision-making for continuous improvement and prevention-based sustainability thinking (Moktadir et al., 2018; Sinkovics et al., 2020). However, maximising these informational capabilities depends on a complementary quality culture (Sinkovics et al., 2020). The resource-based view suggests that leveraging advanced information systems requires human capital quality orientation, driving effective usage and decision relevance (Barney, 1991). The institutional theory also emphasises how shared members' interpretations shape perceived value and the adoption of new approaches such as analytics (Scott, 1987). Sinkovics et al. (2020) confirmed that information systems have a greater sustainability-supply-chain impact when complemented by quality cultures that reinforce responsibility, learning, and transparency. Thus, a strong quality culture providing a collective commitment to improvement can amplify the sustainability benefits derived from informational and analytical capabilities.

H2a5. Quality Culture moderates the relationship between Information and Data Analysis on Sustainable Supply Chain Performance

Figure 1: Conceptual framework



Source: own research

RESEARCH OBJECTIVE, METHODOLOGY AND DATA

Instrument Development

For this study, the construct for TQM is operationalised multi-dimensional scale. The scale comprises 23 items across strategic planning (5 items), quality assurance (3 items), benchmarking (5 items), supplier quality management (3 items), and information analysis (5 items). Each practice item is measured on a 5-point Likert scale (1 = no implementation; 5 = complete implementation). We operationalised SSCP in the study using (6 items) adopted from Bag et al. (2020). The items were measured on a 5-point Likert scale (1 = Strongly disagree; 5 =

Strongly agree). We also measure quality culture using 7 items. The scale is administered on a 5-point scale (1 = strongly disagree, 5 = strongly agree). A similar operationalisation has been adopted in past studies (Jum'a et al., 2023). All the measures were pretested with senior managers with experience in the manufacturing sector and adequate knowledge of SC management. The measures are piloted to validate their applicability for real business contexts. The measurement items are adapted based on feedback to enhance validity and readability.

Sample selection and data collection

The unit of analysis of the study is manufacturing SMEs in Ghana. While total quality management (TQM) adoption is increasing, there remains a gap in understanding how TQM and supportive QC affect SSCP for manufacturers in Ghana. Assessing this can help determine if TQM provides economic and sustainability benefits amidst resource constraints. The sampling frame for the survey is manufacturing SMEs in Ghana. The participants comprised 450 middle and senior-level managers working in selected manufacturing SMEs. The selection of participants is based on their medium to high level of competency in steering TQM practices and SC management initiatives. Second, they are selected through a decision-making role in the firm-level deployment of TQM and SC management initiatives. This purposive sampling strategy can be justified as different organisations possess company-specific production systems in light of TQM practices in varying proportions that may impact SC performance individually and in tandem. SC management scholars widely adopt this sampling strategy to minimise sample selection biases and ensure knowledgeable respondents' selection. The data collection process lasts for three months (November - January 2023). After follow-up, responses were received from 415 companies across Ghana. All incomplete responses are removed during data preparation, and the remaining 400 responses (88.88% response rate) are used for the data analysis. Table 1 presents the description of the sample. Regarding respondents' positions, 47.25% are senior managers, and the remaining are mid-level managers. The majority of the participating firms are operating in the food manufacturing sector (26.0%).

Table 1: Sample Profile

| Variable | Categories | N | % |
|----------|---------------------------|-----|------------|
| Position | Senior managers | 189 | 47.25 |
| | Middle managers | 211 | 52.75 |
| | Others | 82 | 20.5 |
| Industry | Food | 104 | 26.0 |
| | Electrical and Electronic | 82 | 20.5 |
| | Textiles | 65 | 16.25 |
| | Wood, Leather, and Paper | 66 | 16.5 |
| | Oil | 63 | 15.75 |
| | Others | 20 | 5.0 |
| | Total | | 400 |

Source: own research

RESULTS

Evaluation of Common Method Bias, Nonresponse Bias, and Multicollinearity

Using the VIF, this study evaluated the possible problems of multicollinearity and common method bias (CMB). Accordingly, multicollinearity and common method bias are not issues in the research if the VIF value is less than 3.0 (Hair et al., 2021; Kock, 2015). The results show that all of the VIF values (which range from 1.45 to 2.26 for the constructs) are less than 3.0. As a result, it is confirmed that the model is free of CMB and multicollinearity issues. The most popular technique for the CMB test, Harman's single-factor test approach, was also used to further assess CMB. According to the findings of the exploratory factor analysis using the 1-factor extraction criteria, 46.187 (<50%) of the total variance was extracted. The accepted upper threshold of 50% is used in recent studies by Xu et al. (2022) to determine that CMB is not problematic in the model. As a result, based on the total variance extracted results, this model does not support the possibility of CMB. Crucially, to reach the rigour of some research, CMB is a field of interest to the general public. As such, prevention is more important than inspection and repair. In this regard, before gathering data, this study implemented procedural measures to reduce the possibility of CMB. These tactics make sure that there is no systematic bias and that respondents have a higher chance of answering the questions accurately. First and foremost, the cover sheet must clearly state the goal of the research as well as provide instructions for survey respondents. Crucially, the coversheet also stresses that we ask respondents to refer to official reports and other pertinent documents of the firms when answering the questionnaire, rather than basing their responses solely on their personal experiences, to ensure the objectivity of the data to be collected for research and implications purposes.

According to Hair et al. (2021), giving respondents a coversheet with instructions on the attached questionnaire is the easiest approach to improve response accuracy. Podsakoff et al. (2012) state that respondents are more inclined to provide accurate answers when they are aware of the information provided in their responses and how it will help them enhance their business performance and competitive advantage. Additionally, making an effort to create a brief survey and reducing superfluous and overlapping measures will motivate respondents to provide more accurate answers. Second, to prevent respondents from being uncertain about how to respond to a particular question, the survey questions are written as clearly as possible in a language that they are fluent in (in this case, their native tongue). Terms like "sometimes," "occasionally," "somehow," and "somewhat" are excluded from the questions (Podsakoff et al., 2012). To determine whether nonresponse bias is an issue in this study, a t-test methodology was utilised. There is no discernible difference between the response waves, according to the t-statistic results. Nonresponse bias is therefore not an

issue with the data. Nonresponse bias is one of those issues that can be addressed before data collection, much like the CMB problem. As a result, many techniques were employed to reduce nonresponse. To reduce the number of non-responses, it is crucial to provide follow-ups and reminders in addition to clearly stating the study's purpose and providing instructions, questions, and simple language and procedures.

Evaluation of the measurement model

The following procedures were used to conduct an assessment of the measurement model. The reliability of the scale was first assessed using correlation and Cronbach's alpha coefficients. According to Hair et al. (2021), the results show that all scales are dependable because the correlation coefficients are greater than 0.3 and the Cronbach's alpha values are greater than 0.7. Then, using factor loading and AVE (Hair et al., 2021) and the Fornell–Larcker criterion (Fornell and Larcker, 1981), convergent and discriminant validity were evaluated, respectively. Convergent validity was confirmed because all factor loadings and AVE are greater than 0.5, according to the results. Furthermore, the square root of AVE is shown by the Fornell–Larcker criterion to be greater than their correlations, suggesting that discriminant validity was supported. The scales' convergent and reliable validity conclusions are shown in Table 2, and the discriminant validity conclusion is shown using the Fornell–Larcker criterion in Table 3. Based on the recommendations of Wetzels et al., (2009) for GoF and Byrne (2001) and Arbuckle (2006) for the remaining critical indices, such as RMSEA (root mean squared error of approximation), TLI (Tucker and Lewis index), CFI (Comparative Fit Index), and CMIN/df, the goodness of fit (GoF) was assessed using the pertinent indices. In particular, the outcomes were as follows: a large fit is indicated by a GoF of 0.59 > 0.36 (Wetzels et al., 2009); a good fit is indicated by an RMSEA of 0.041 < 0.08, a TLI of 0.979, a CFI of 0.983, and a CMIN/df of 1.264 < 3 (Byrne, 2001; Arbuckle, 2006). Thus, it can be said that the suggested model fits the data well. The confirmatory factor analysis (CFA) that shows the reported results is shown in Figure 2.

Table 2: Factor Loadings, CA, CR, and AVE

| Const ructs | Items | Loadi ngs | CA | CR | AVE |
|--------------------|-------|-----------|-------|-------|-------|
| Strategic Planning | SP5 | 0.740 | 0.877 | 0.877 | 0.588 |
| | SP4 | 0.750 | | | |
| | SP3 | 0.780 | | | |
| | SP2 | 0.790 | | | |
| | SP1 | 0.774 | | | |
| Quality Assuran ce | QA4 | 0.839 | 0.892 | 0.893 | 0.676 |
| | QA3 | 0.819 | | | |
| | QA2 | 0.865 | | | |
| | QA1 | 0.763 | | | |
| | B3 | 0.838 | | | |

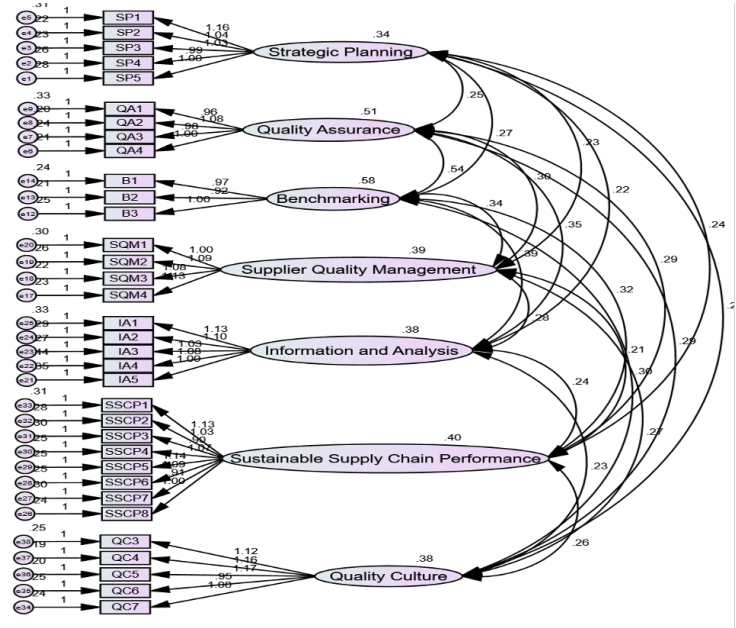
| | | | | | |
|--|-------|-------|-------|-------|-------|
| Benchm arking | B2 | 0.835 | 0.873 | 0.874 | 0.698 |
| | B1 | 0.833 | | | |
| Supplier Quality Manage ment | SQM4 | 0.827 | 0.875 | 0.876 | 0.637 |
| | SQM3 | 0.818 | | | |
| | SQM2 | 0.798 | | | |
| | SQM1 | 0.748 | | | |
| Informati on and Analysis | IA5 | 0.724 | 0.868 | 0.869 | 0.57 |
| | IA4 | 0.713 | | | |
| | IA3 | 0.775 | | | |
| | IA2 | 0.786 | | | |
| | IA1 | 0.773 | | | |
| Sustaina ble Supply Chain Perform ance | SSCP8 | 0.789 | 0.925 | 0.926 | 0.609 |
| | SSCP7 | 0.726 | | | |
| | SSCP6 | 0.809 | | | |
| | SSCP5 | 0.823 | | | |
| | SSCP4 | 0.806 | | | |
| | SSCP3 | 0.720 | | | |
| | SSCP2 | 0.776 | | | |
| | SSCP1 | 0.789 | | | |
| Quality Culture | QC7 | 0.787 | 0.907 | 0.908 | 0.663 |
| | QC6 | 0.761 | | | |
| | QC5 | 0.850 | | | |
| | QC4 | 0.854 | | | |
| | QC3 | 0.810 | | | |

Note: CA = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted. Source: own research

Structural Model

We employ a combination of SPSS AMOS 26 and Hayes' Process 4.2 macro for SPSS to estimate the structural model and test the moderated effects. Table 4 presents the estimates obtained using the moderated regression model. The model accurately accounts for 52.0% of the variance in SSCP. The F-statistics also confirm the model's significance. The results in Table 4 show that total quality management practices (strategic planning, benchmarking, supplier quality management, and information and analysis) all have a positive direct effect on SSCP ($\beta = .242, p < 0.01$; $\beta = .262, p < 0.01$; $\beta = .214, p < 0.01$; $\beta = .174, p < 0.01$) confirming H1a, H1c, H1d and H1e,

Figure 2: Confirmatory Factor Analysis



suggesting that a unit increase in total quality management comprising of strategic planning, benchmarking, supplier quality management and information and analysis is associated with increase in SSCP. However, quality assessment is not significantly related to SSCP ($\beta = .064, p > 0.05$), which does not support H1b. Quality culture is also significantly and positively related to SSCP ($\beta = .293, p < 0.01$), providing support for H2, indicating that firms with higher levels of quality culture tend to experience greater levels of SSCP. In terms of moderation analysis, strategic planning combine, supplier quality management and information and analysis combine with quality culture (interaction effect) affect SSCP ($\beta = .125, p < 0.05$; $\beta = .095, p < 0.05$; $\beta = .0840, p < 0.05$) confirming H3a, H3d and H3e, whereas quality assessment and benchmarking all combine with quality culture do not affect SSCP ($\beta = .034, p > 0.05$; $\beta = .069, p > 0.05$) which do not support H3b and H3c.

DISCUSSION

This paper examines how total quality management practices (TQMP) influence sustainable supply chain performance (SSCP) in the context of SMEs and the moderating role of quality culture. The results reveal that

Table 3: The Fornell-Larcker criterion

| Constructs | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Strategic Planning | 0.867 | | | | | | |
| Quality Assurance | 0.605*** | 0.822 | | | | | |
| Benchmarking | 0.605*** | .604*** | 0.835 | | | | |
| Supplier Quality Management | 0.626*** | 0.672*** | 0.724*** | 0.898 | | | |
| Information and Analysis | 0.604*** | 0.803*** | 0.823*** | 0.718*** | 0.855 | | |
| Sustainable Supply Chain Performance | 0.660*** | 0.641*** | 0.665*** | 0.520*** | 0.618*** | 0.881 | |
| Quality Culture | 0.690*** | 0.662*** | 0.643*** | 0.707*** | 0.601*** | 0.650*** | 0.864 |

Note: Bold diagonal elements are the square roots of the AVE statistics for discriminant validity by the Fornell-Larcker criterion; below the diagonal elements are the correlations between the constructs. Source: own research

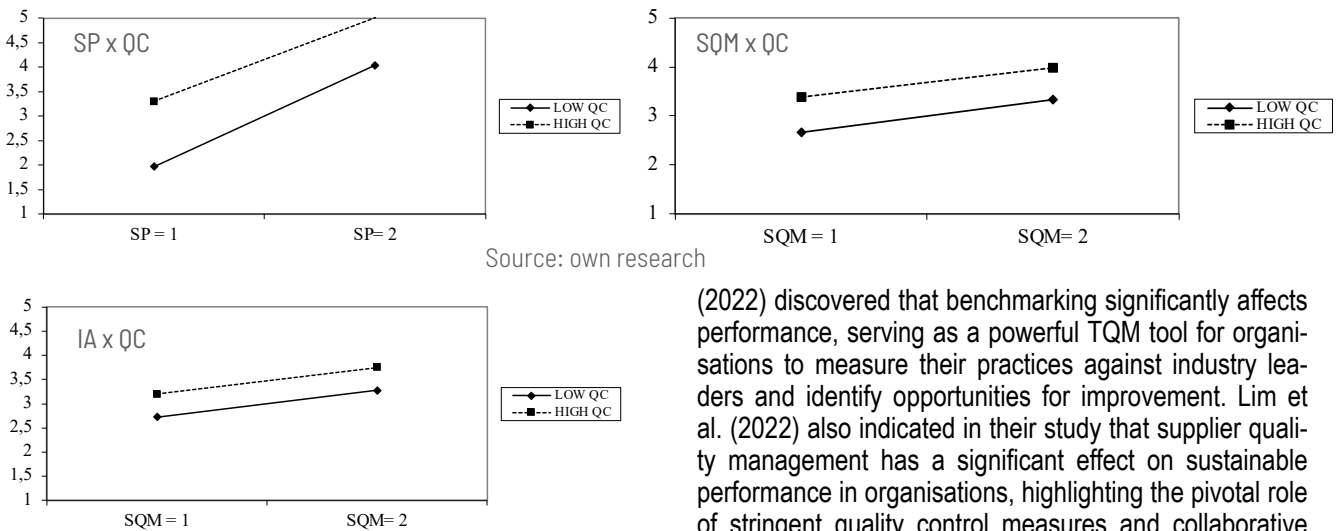
Table 4: Structural Model

| Dependent Variables | | | | | | |
|----------------------------|-----------|-----------|-----------|-----------|------------|-----------|
| Sustainable SC Performance | | | | | | |
| | Mod. 1 | Mod. 2 | Mod. 3 | Mod. 4 | Mod. 5 | Mod. 6 |
| Main Effect | | | | | | |
| IA | .174*** | .170*** | .175*** | .172*** | .174*** | 0.022 |
| SQM | .214*** | .231*** | .206*** | .206*** | 0.233 | .220*** |
| BEN | .262*** | .262*** | .262*** | .527** | .262*** | .267*** |
| QA | 0.064 | 0.052 | 0.198 | 0.07 | 0.064 | 0.06 |
| SP | .242*** | .739*** | .237*** | .231*** | .243*** | .249*** |
| QC | .293*** | .809*** | .418** | .564*** | 0.276 | 0.145 |
| Interaction Effect | | | | | | |
| SP | | .125** | | | | |
| QA | | | 0.034 | | | |
| BEN | | | | 0.069 | | |
| SQM | | | | | .095** | |
| IA | | | | | | .0840* |
| Model Summary | | | | | | |
| R-squared | 0.52 | 0.5264 | 0.5203 | 0.5219 | 0.5196 | 0.5205 |
| F-test | 70.832*** | 62.251*** | 60.734*** | 61.137*** | 60.5607*** | 60.792*** |

Note(s): SP: Strategic Planning, QA: Quality Assessment, BEN: Benchmarking, SQM: Supplier Quality Management, IA: Information and Analysis, QC: Quality Culture, SSCP: Sustainable Supply Chain Performance. *** p<.01, ** p<.05, * p<.1

Source: own research

Figure 3: Interaction Graphs



Source: own research

four TQM practices, which are strategic planning, benchmarking, supplier quality management, and information and analysis, have a significant impact on sustainable SC performance. Nevertheless, quality assessment does not significantly impact sustainable SC performance. The findings that strategic planning has a significant effect on sustainability SC performance are supported by Thaher & Jaaron (2022), Dwikat et al. (2022), and Tarigan & Siagian (2021), who concluded that the existence of strategic planning is vital in improving the sustainable performance of firms. Additionally, a study by da Costa et al.

(2022) discovered that benchmarking significantly affects performance, serving as a powerful TQM tool for organisations to measure their practices against industry leaders and identify opportunities for improvement. Lim et al. (2022) also indicated in their study that supplier quality management has a significant effect on sustainable performance in organisations, highlighting the pivotal role of stringent quality control measures and collaborative relationships with suppliers to foster long-term sustainability and operational excellence. Also, the significant positive relationship between information and analysis and sustainable SC performance is supported by Kamble et al. (2022) and Fu et al. (2022), whose findings showed that data-driven culture and information systems significantly affect sustainable SC performance in firms. However, the insignificant effect of quality assessment is interesting. While some studies emphasise the relevance of quality assessment in assuring product and service compliance, these findings imply that the influence of quality assessment may be less obvious in the context of

sustainable SC performance. This finding is consistent with the idea that various TQM components may have variable degrees of effect depending on the individual outcomes under consideration (Yas et al., 2021).

The study also found that quality culture positively affects sustainable supply chain performance, underscoring the importance of cultivating an organisational environment in which quality is deeply embedded and employees at all levels prioritise and continuously contribute to maintaining and improving quality standards. Such a sustained commitment to quality excellence enables firms to realise long-term benefits, including supply chain resilience, operational efficiency, and sustainable competitive advantage. These findings are consistent with Osei et al. (2023), who report that organisational culture positively influences sustainable supply chain performance. The study also shows that quality culture moderates the relationship between strategic planning, supplier quality management, information and analysis, and sustainable supply chain performance. This is further supported by the interaction plots (Figure 3), which indicate that these relationships are positive and stronger for firms with a high level of quality culture (i.e., one standard deviation above the mean) than for firms with a low level of quality culture (i.e., one standard deviation below the mean). Nguyen et al. (2018) similarly emphasise the relevance of a quality management culture for sustainable performance among Vietnamese firms. Jum'a et al. (2023) also find that firms with stronger quality cultures perform better in sustainable environments. By contrast, quality culture was not found to moderate the relationship between benchmarking and sustainability performance assessment (Luthra et al., 2021). One possible explanation is that sustainability-oriented strategic planning requires complex, cross-functional decision-making regarding vision, resource allocation, and trade-offs, and therefore demands strong commitment to be executed effectively (Yas et al., 2021).

Implications for theory

This study contributes to the Resource-Based View (RBV) by empirically demonstrating that Total Quality Management (TQM) practices can function as valuable resources and capabilities that enhance sustainable supply chain performance. Consistent with the RBV perspective, the results suggest that TQM practices—such as strategic planning, benchmarking, supplier quality management, and information and analysis—can support sustainable competitive advantage by developing firm-specific capabilities that are difficult for competitors to imitate. Furthermore, the study extends RBV arguments by introducing quality culture as a moderating condition that strengthens the positive effects of TQM practices on sustainable supply chain performance. The findings highlight the importance of building quality culture in SMEs: quality culture plays a significant moderating role in the TQM–performance relationship, which contrasts with the findings of Luay et al. (2023). Overall, the results indicate that a strong quality culture—where employees at all levels embrace quality as a core organisational value—faci-

litates effective implementation of TQM initiatives and supports the integration of sustainability principles into TQM frameworks. By examining this moderating mechanism, the study advances understanding of the conditions under which TQM practices are most effective in improving sustainable supply chain performance and clarifies how firms can leverage resources and capabilities to achieve superior sustainability outcomes.

Implications for practice

This study offers several managerial implications. First, the results provide empirical support for the strategic role of TQM implementation in enabling SMEs in emerging economies to pursue sustainable growth. Managers should recognise the importance of TQM practices—such as information and analysis, supplier quality management, benchmarking, quality assurance, and strategic planning—for enhancing sustainable supply chain performance and integrate them into overall business strategy to achieve long-term sustainability goals. Given the significant influence of TQM practices on sustainable supply chain performance, firms should allocate sufficient resources (time, budget, and expertise) to implement and maintain these practices effectively. Because TQM is a continuous improvement process, managers should foster a culture of continuous improvement to ensure that TQM practices are routinely reviewed and updated in response to evolving sustainability requirements.

Supplier quality management is particularly critical, as it can substantially shape sustainable supply chain performance. Managers should therefore collaborate closely with suppliers to ensure compliance with quality and sustainability standards and treat suppliers as strategic partners in achieving sustainability objectives. Benchmarking and quality assurance are essential for monitoring effectiveness; managers should develop relevant key performance indicators (KPIs) to evaluate the contribution of TQM practices to sustainable supply chain performance and use these insights to guide further improvement. TQM practices should also be aligned with sustainability objectives so that they contribute to broader environmental, social, and economic goals—for example, by incorporating sustainability criteria into supplier selection, product design, and operational management.

Given the moderating role of quality culture, managers should prioritise building and sustaining a strong quality-oriented culture within their organisations by promoting values and behaviours that emphasise quality, sustainability, and continuous improvement across all organisational levels. TQM practices—particularly information and analysis, supplier quality management, and strategic planning—should be aligned with the organisation's quality culture to maximise their impact. Finally, the moderating role of quality culture also highlights the value of partnering with suppliers whose values and practices are consistent with the focal firm's quality and sustainability orientation, supporting coherence and alignment throughout the supply chain.

CONCLUSION

Under the moderating influence of quality culture, this study examined the effects of TQM practices on sustainable supply chain performance. The findings indicate that, with the exception of quality assurance, all other TQM dimensions—strategic planning, benchmarking, supplier quality management, and information and analysis—support the achievement of sustainable supply chain performance. Quality culture also exerts a significant positive effect on sustainable supply chain performance. In addition, strategic planning, supplier quality management, and information and analysis interact with quality culture to influence sustainable supply chain performance, whereas quality assessment and benchmarking do not exhibit significant interaction effects with quality culture.

The study offers several contributions. First, it provides additional evidence that adopting TQM positively supports sustainable supply chain development, which is particularly relevant in the transition toward sustainable development. This is important for SMEs seeking to articulate a strategic, long-term development vision grounded in sustainable growth. Second, the study contributes to measurement and modelling work on TQM, quality culture, and sustainable supply chain performance in

manufacturing SMEs in emerging economies. The study is also distinctive in incorporating quality culture as a moderating variable in the TQM–sustainable supply chain performance model, thereby offering a more comprehensive account of how TQM increases the likelihood of achieving sustainable supply chain performance. Its focus on SMEs in a developing-market context further underscores the study's contribution and relevance.

Despite these theoretical and practical contributions, the study has limitations that create opportunities for future research. First, the focus on SMEs in Ghana may limit generalisability to other firm sizes and national contexts; future studies should replicate the analysis for larger enterprises and in other developing countries, particularly across sub-Saharan Africa. Second, TQM practices were operationalised using a specific set of constructs (strategic planning, benchmarking, supplier quality management, information and analysis, and quality assessment). Future research could incorporate additional TQM dimensions—such as agile manufacturing, operational performance, and customer satisfaction—to provide a more comprehensive understanding of how TQM contributes to sustainable supply chain performance.

Copyright © authors. Published by European Center for Economic & Social Research under the [Creative Commons Attribution \(CC BY 4.0\) license](#). Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors.



AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization, I.O.F and J.A; methodology, J.A.; software, K.K; validation, D.A., I.O.F., and K.K; formal analysis, J.A.; investigation, D.A and J.A; resources, I.O.F., D.A., and A.A; data curation, J.A.; writing—original draft preparation, I.O.F; writing—review and editing, D.A and K.K.; visualization, I.O.F; supervision, J.A; project administration, D.A. and I.O.F.; funding acquisition, K.K. All authors have read and agreed to the published version of the manuscript.

DATA AVAILABILITY STATEMENT

This submission has no linked research data sets. The following reason is given: The basic survey research and data will be available upon request.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

AI DISCLOSURE

The authors did not use artificial intelligence in preparing this article.

REFERENCES

1. Agyabeng-Mensah, Y., Afum, E., Agnikpe, C., Cai, J., Ahenkorah, E., & Dacosta, E. (2021). Exploring the mediating influences of total quality management and just-in-time between green supply chain practices and performance. *Journal of Manufacturing Technology Management*, 32(1), 156-175. <https://doi.org/10.1108/JMTM-03-2020-0086>
2. Ahmad, A. O., Fam, S. F., Chuan, Z. L., Wahjono, S. I., Nusa, N. M., & Hussein, S. A. (2022). Integration of TQM practices and ERP to enhance innovation culture and innovative work behavior. *Journal of Positive School Psychology*, 6(3), 4668-4676.

3. Albloushi, B., Alharmoodi, A., Jabeen, F., Mehmood, K., & Farouk, S. (2023). Total quality management practices and corporate sustainable development in manufacturing companies. *Management Research Review*, 46(1), 20-45. <https://doi.org/10.1108/MRR-03-2021-0194>
4. Ali AIShehail, O., Khan, M., & Ajmal, M. (2022). Total quality management and sustainability in the public service sector. *Benchmarking: An International Journal*, 29(2), 382-410. <https://doi.org/10.1108/BIJ-08-2020-0449>
5. Al-Rawi, N. H., Mohammad, M., & Ahmad, M. F. (2021). Relationship between Total Quality Management Practice and Organizational Performance. *International Journal of Integrated Engineering*, 13(2), 24-31. <https://doi.org/10.1108/TQM-08-2022-0258>
6. Anil, A. P., & Satish, K. P. (2019). An empirical investigation of the relationship between TQM practices, quality performance, and customer satisfaction level. *International Journal of Productivity and Quality Management*, 26(1), 96-117. <https://doi.org/10.1504/IJPM.2019.096976>
7. Arbuckle, T. E. (2006). Are there sex and gender differences in acute exposure to chemicals in the same setting? *Environmental Research*, 101(2), 195-204. <https://doi.org/10.1016/j.envres.2005.09.006>
8. Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120. <https://doi.org/10.1177/014920639101700108>
9. Basu, R., Bhola, P., & Das, M. C. (2020). A framework of quality management practices for Indian service SMEs. *Quality Management Journal*, 27(1), 62-75. <https://doi.org/10.1080/10686967.2020.1722047>
10. Basu, R., & Bhola, P. (2016). Impact of quality management practices on performance stimulating growth. *International Journal of Quality & Reliability Management*, 33(8), 1179-1201. <https://doi.org/10.1108/IJQRM-12-2014-0192>
11. Byrne, B. M. (2001). Structural equation modeling with AMOS, EQS, and LISREL. *International Journal of Testing*, 1(1), 55-86. https://doi.org/10.1207/S15327574IJT0101_4
12. Dwikat, S. Y., Arshad, D., & Mohd Shariff, M. N. (2022). The influence of systematic strategic planning. *Sustainability*, 14(20), 13388. <https://doi.org/10.3390/su142013388>
13. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. <https://doi.org/10.1177/002224378101800104>
14. Fu, P., Xue, W., Lei, B., Gui, X., & Cheng, L. (2022). Green total quality management and sustainable manufacturing performance. *Journal of Cleaner Production*, 266, 122279. <https://doi.org/10.1016/j.jclepro.2020.122279>
15. Gligor, D., Gligor, N., Holcomb, M., & Bozkurt, S. (2019). Distinguishing between the concepts of supply chain agility and resilience. *The International Journal of Logistics Management*, 30(2), 467-487. <https://doi.org/10.1108/IJLM-10-2017-0259>
16. Hair, J. F., Astrachan, C. B., Moisescu, O. I., Radomir, L., Sarstedt, M., Vaithilingam, S., & Ringle, C. M. (2021). Executing and interpreting applications of PLS-SEM. *Journal of Family Business Strategy*, 12(3), 100392. <https://doi.org/10.1016/j.jfbs.2021.100392>
17. Hassan, A. S., & Jaaron, A. A. (2021). Total quality management for enhancing organizational performance. *Journal of Cleaner Production*, 308, 127366. <https://doi.org/10.1016/j.jclepro.2021.127366>
18. Hassis, S. M., Othman, M. A., & Saleh, Y. (2023). The impact of total quality management on corporate sustainability. *The TQM Journal*, 35(8), 2572-2597. <https://doi.org/10.1108/TQM-11-2022-0347>
19. Jasti, N. V. K., Venkateswaran, V., Kota, S., & Sangwan, K. S. (2022). A literature review on total quality management in higher education. *The TQM Journal*, 34(5), 1298-1319. <https://doi.org/10.1108/TQM-04-2021-0125>
20. Jum'a, L., Alkalha, Z., Al Mandil, K., & Alaraj, M. (2023). Exploring the influence of lean manufacturing and total quality management practices on environmental sustainability. *International Journal of Lean Six Sigma*, 14(7), 1626-1654. <https://doi.org/10.1108/IJLSS-10-2022-0233>
21. Kamble, S. S., Gunasekaran, A., & Gawankar, S. A. (2020). Achieving sustainable performance in a data-driven agriculture supply chain. *International Journal of Production Economics*, 219, 179-194. <https://doi.org/10.1016/j.ijpe.2019.05.022>
22. Kebede Adem, M., & Virdi, S. S. (2021). The effect of TQM practices on operational performance. *The TQM Journal*, 33(2), 407-440. <https://doi.org/10.1108/TQM-03-2019-0076>
23. Khan, I., Hou, F., Le, H. P., & Ali, S. A. (2021). Do natural resources, urbanization, and value-adding manufacturing affect environmental quality? *Resources Policy*, 72, 102109. <https://doi.org/10.1016/j.resourpol.2021.102109>
24. Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1-10. <https://doi.org/10.4018/ijec.2015100101>
25. Lim, A. F., Lee, V. H., Foo, P. Y., Ooi, K. B., & Tan, G. H. (2022). Unfolding the impact of supply chain quality management practices on sustainability performance. *Supply Chain Management: An International Journal*, 27(5), 611-624. <https://doi.org/10.1108/SCM-09-2020-0476>
26. Mittal, S., Dhar, R. L., & Sindhvani, R. (2020). Modelling relationships between TQM and financial performance. *International Journal of Quality & Reliability Management*, 37(3), 392-409. <https://doi.org/10.1108/IJQRM-09-2018-0238>

27. Muktadir, M. A., Rahman, T., Rahman, M. H., Ali, S. M., & Paul, S. K. (2018). Drivers to sustainable manufacturing practices and circular economy. *Journal of Cleaner Production*, 174, 1366-1380. <https://doi.org/10.1016/j.jclepro.2017.11.063>
28. Nguyen, M. H., Phan, A. C., & Matsui, Y. (2018). Contribution of quality management practices to sustainability performance of Vietnamese firms. *Sustainability*, 10(2), 375. <https://doi.org/10.3390/su10020375>
29. Olugu, E. U., Wong, K. Y., Chung Ee, J. Y., & Mammedov, Y. D. (2022). Incorporating sustainability and maintenance for performance assessment of offshore oil and gas platforms. *Sustainability*, 14(2), 807. <https://doi.org/10.3390/su14020807>
30. Osei, M. B., Papadopoulos, T., Acquaye, A., & Stamati, T. (2023). Improving sustainable supply chain performance through organizational culture. *Journal of Purchasing and Supply Management*, 29(2), 100821. <https://doi.org/10.1016/j.pursup.2023.100821>
31. Peprah, J. A., Amoah, J., Kwarteng, K., Jibril, A. B., & Sharif, T. (2025). Artificial intelligence and additive manufacturing for resilient supply chain in Africa. *Future Business Journal*, 11(1), 54. <https://doi.org/10.1186/s43093-025-00436-5>
32. Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research. *Annual Review of Psychology*, 63, 539-569. <https://doi.org/10.1146/annurev-psych-120710-100452>
33. Puthanveetil, B. A., Vijayan, S., Raj, A., & MaP, S. (2021). TQM implementation practices and performance outcome of Indian hospitals. *The TQM Journal*, 33(6), 1325-1346. <https://doi.org/10.1108/TQM-07-2020-0155>
34. Rajeev, A., Pati, R. K., Padhi, S. S., & Govindan, K. (2017). Evolution of sustainability in supply chain management. *Journal of Cleaner Production*, 162, 299-314. <https://doi.org/10.1016/j.jclepro.2017.05.026>
35. Rauer, J., & Kaufmann, L. (2015). Mitigating external barriers to implementing green supply chain management. *Journal of Supply Chain Management*, 51(2), 65-88. <https://doi.org/10.1111/jscm.12063>
36. Sahoo, S., & Yadav, S. (2020). Influences of TPM and TQM practices on performance. *Procedia Manufacturing*, 43, 728-735. <https://doi.org/10.1016/j.promfg.2020.02.109>
37. Saragih, S., Jonnergård, K., & Alänge, S. (2020). Exploring inter-organizational quality practices in public-private innovation partnerships. *Total Quality Management & Business Excellence*, 31(3-4), 377-392. <https://doi.org/10.1080/14783363.2018.1426454>
38. Shafiq, M., Lasrado, F., & Hafeez, K. (2019). The effect of TQM on organizational performance. *Total Quality Management & Business Excellence*, 30(1-2), 31-52. <https://doi.org/10.1080/14783363.2017.1303881>
39. Shaikh, S. S., Huaming, S., & Ameer, M. S. (2024). Synergistic effect of TQM-SCM initiatives in organizational performance. *Nankai Business Review International*, 15(2), 207-223. <https://doi.org/10.1108/NBRI-06-2022-0078>
40. Sharma, S., & Modgil, S. (2020). TQM, SCM, and operational performance. *Business Process Management Journal*, 26(1), 331-370. <https://doi.org/10.1108/BPMJ-07-2018-0191>
41. Singh, R. K. (2024). Impact of leadership, TQM and supply chain capabilities on sustainable supply chain performance. *The TQM Journal*. <https://doi.org/10.1108/TQM-09-2023-0298>
42. Sinkovics, N., Sinkovics, R. R., & Archie-Acheampong, J. (2021). Small-and medium-sized enterprises and sustainable development. *Journal of International Business Policy*, 4(1), 80-101. <https://doi.org/10.1057/s42214-020-00075-5>
43. Sisay, G., Gitima, G., Mersha, M., & Alemu, W. G. (2021). Assessment of land use land cover dynamics and its drivers in Bechet Watershed. *Remote Sensing Applications: Society and Environment*, 24, 100648. <https://doi.org/10.1016/j.rsase.2021.100648>
44. Tari, J. J., Claver-Cortés, E., & García-Fernández, M. (2023). How quality management can enhance performance? *Production Planning & Control*, 34(7), 587-603. <https://doi.org/10.1080/09537287.2021.1983064>
45. Tarigan, Z., & Siagian, H. (2021). The effects of strategic planning, purchasing strategy, and strategic partnership on operational performance. *Uncertain Supply Chain Management*, 9(2), 363-372. <https://doi.org/10.5267/j.uscm.2021.2.006>
46. Thaier, Y. A., & Jaaron, A. A. (2022). The impact of sustainability strategic planning and management on organizational sustainable performance. *Journal of Environmental Management*, 305, 114381. <https://doi.org/10.1016/j.jenvman.2021.114381>
47. Thanki, S., Govindan, K., & Thakkar, J. (2016). An investigation on lean-green implementation practices in Indian SMEs. *Journal of Cleaner Production*, 135, 284-298. <https://doi.org/10.1016/j.jclepro.2016.06.105>
48. Wang, C. H., Chen, K. Y., & Chen, S. C. (2012). Total quality management, market orientation, and hotel performance. *International Journal of Hospitality Management*, 31(1), 119-129. <https://doi.org/10.1016/j.ijhm.2011.04.004>
49. Wetzels, M., Odekerken-Schröder, G., & Van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models. *MIS Quarterly*, 33(1), 177-195. <https://doi.org/10.2307/20650284>
50. Xu, J., Du, H. S., Shen, K. N., & Zhang, D. (2022). How gamification drives consumer citizenship behavior. *International Journal of Information Management*, 64, 102477. <https://doi.org/10.1016/j.ijinfomgt.2021.102477>
51. Yas, H., Alsaud, A., Almaghrabi, H., Almaghrabi, A., & Othman, B. (2021). The effects of TQM practices on performance of organizations. *Management Science Letters*, 11(2), 503-510. <https://doi.org/10.5267/j.msl.2020.9.035>

52. Yasir, M., Majid, A., & Qudratullah, H. (2020). Promoting environmental performance in manufacturing industry through environmental orientation and green business strategies. *Journal of Cleaner Production*, 275, 123003. <https://doi.org/10.1016/j.jclepro.2020.123003>
53. Zhou, X., Zhu, Q., & Xu, Z. (2022). The mediating role of supply chain quality management for traceability and performance improvement. *International Journal of Production Economics*, 254, 108630. <https://doi.org/10.1016/j.ijpe.2022.108630>