How Does Quality Lead to Sustainability? Unveiling the Mediating Role of Organizational Learning in Green Performance

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Abstract—This study examines how Total Quality Management (TQM) practices contribute to sustainability by exploring the mediating role of Organizational Learning (OL) in enhancing Corporate Green Performance (CGP). Data were collected from 150 manufacturing companies in Indonesia through structured questionnaires and analyzed using Structural Equation Modeling (SEM). The findings demonstrate that TQM significantly influences CGP, with OL acting as a key mediator in this relationship. Specifically, TQM practices such as leadership commitment, customer focus, and continuous improvement foster a learning environment that drives sustainable practices, improving environmental performance outcomes. The study highlights the importance of integrating TQM and OL for achieving sustainability, offering a theoretical framework that connects quality management practices to green performance through enhanced learning capabilities. The results suggest that organizations investing in OL, such as knowledge-sharing platforms and employee training programs, are better positioned to implement effective green initiatives. This research contributes to the growing body of literature on the intersection of quality management and sustainability, providing actionable insights for organizations aiming to enhance both operational efficiency and environmental responsibility. Future studies are encouraged to explore longitudinal impacts and extend the research across different industries and regions for broader generalizability.

Keyword — TQM, Organizational Learning, Corporate Green Performance

1. INTRODUCTION

In the context of modern business practices, organizations are increasingly adopting sustainability strategies to meet the growing demands for environmental responsibility. Sustainability in business involves a range of initiatives aimed at reducing environmental impacts while maintaining economic profitability. One key element driving sustainability in organizations is Total Quality Management (TQM), a management philosophy that focuses on continuous improvement, customer satisfaction, and process efficiency. TQM practices can lead to enhanced operational performance, reduced waste, and improved environmental outcomes, making it an essential tool for promoting sustainability in various industries (Zairi, 2002)

The link between TQM and sustainability has become a growing area of research in recent years, as businesses aim to integrate green practices into their operations. The role of Organizational Learning (OL) has also been recognized as a critical factor in this integration. OL, which refers to an organization's capacity to acquire, share, and apply knowledge to improve its practices, plays a significant role in translating TQM initiatives into tangible sustainability outcomes. Organizations that foster a strong culture of learning are better positioned to innovate and implement sustainable practices that align with both economic and environmental goals (Pratiwi & Fanani, 2019)

Despite the increasing recognition of TQM's potential to enhance sustainability, there is limited research examining the specific role of OL in mediating this relationship. Previous studies have explored the direct impact of TQM on Corporate Green Performance (CGP), but few have addressed how OL influences the effectiveness of TQM in driving environmental performance. For instance, prior studies (Gomes & Wojahn, 2017) focus on the direct link between TQM and CGP but overlook the crucial mediating role of organizational learning in facilitating this relationship. Understanding this link is essential, as it can help businesses leverage TQM and OL to achieve both quality improvements and sustainability goals more effectively.

The research gap identified in the literature forms the foundation of this study, which aims to investigate how OL mediates the relationship between TQM and CGP. The current study expands on previous research by incorporating OL as a key factor that enhances the translation of TQM practices into improved green performance. This novel approach offers valuable insights for both scholars and practitioners in the fields of quality management and sustainability.

In exploring the relationship between TQM and sustainability, it is important to consider the theoretical frameworks that underpin these concepts. TQM is grounded in principles such as continuous improvement, customer satisfaction, and employee involvement, all of which are critical for achieving operational excellence. According to Magd & Karyamsetty (2020), TQM is an ongoing process that focuses on quality in all aspects of an organization, including its environmental impact. TQM's emphasis on process optimization and waste reduction aligns with sustainability goals, particularly in industries that rely heavily on resource-intensive production processes.

Sustainability, on the other hand, is generally defined as the capacity to meet present needs without compromising the ability of future generations to meet their own needs (Brundtland, 1987). In the context of corporate performance, sustainability encompasses environmental, social, and economic dimensions, with companies increasingly seeking to integrate these three aspects into their operations. Green performance, or Corporate Green Performance (CGP), refers to the environmental outcomes achieved by organizations through sustainable practices, such as waste reduction, energy efficiency, and product innovation (Abbas, 2020)

Organizational Learning (OL) has emerged as a key concept in linking TQM with sustainability. OL is the process by which organizations develop and enhance their knowledge base, improve decision-making, and adapt to changing environments. In the context of TQM, OL enables organizations to learn from their experiences, share knowledge across teams, and apply lessons learned to improve both quality and sustainability outcomes. Studies such as those by Zgrzywa Ziemak & Walecka Jankowska (2021) emphasize that OL is critical in enabling organizations to foster a culture of continuous improvement, which is essential for both achieving quality and driving sustainable innovation.

This study aims to investigate the mediating role of Organizational Learning in the relationship between Total Quality Management and Corporate Green Performance. Specifically, the study will address the following research questions:

1. How do TQM practices influence Corporate Green Performance in manufacturing companies?
2. What role does Organizational Learning play in mediating the relationship between TQM and Corporate Green Performance?
3. How can manufacturing companies leverage TQM and Organizational Learning to enhance their sustainability efforts?

By answering these questions, the study will contribute to a deeper understanding of how quality management practices can be effectively integrated with sustainability strategies, particularly through the role of organizational learning. The results will provide valuable insights for both academic research and practical application in the field of sustainable manufacturing.

2. METHODOLOGY RESEARCH

Berisi This study adopts a **quantitative research design**, employing a cross-sectional survey method to investigate the relationship between Total Quality Management (TQM), corporate green performance, and the mediating role of organizational learning capability (OLC). The quantitative approach is widely recognized for capturing measurable impacts of management practices (Bloomfield & Fisher, 2019), allowing for structured analysis of these relationships. A cross-sectional design was chosen for its efficiency in collecting data from a wide range of respondents within a limited timeframe (Lohr, 2021)

The study utilizes **Structural Equation Modeling (SEM)** as the primary analytical method. SEM is appropriate for this research as it enables the simultaneous examination of multiple relationships among variables, including direct, indirect, and mediating effects (Sholihin & Ratmono, 2021). The research framework was developed based on insights from previous studies (García-Alcaraz et al., 2021), with TQM as the independent variable, corporate green performance as the dependent

variable, and OLC as the mediating variable.

The choice of the manufacturing sector in Indonesia was guided by its significant environmental impact (Suhendah & Brigita, 2021) and the increasing adoption of sustainable practices within the industry. The use of validated scales for TQM, OLC, and corporate green performance ensures the reliability and validity of the measurements (Khalil & Muneenam, 2021)

The participants of this study consist of **managers and supervisors** from various manufacturing companies in Indonesia, particularly those involved in quality management, operations, and sustainability initiatives. Inclusion criteria include companies that have implemented TQM practices for at least three years and participants with a minimum of three years of experience in their respective roles (Zairi, 2002). Exclusion criteria include companies that do not prioritize sustainability or lack formal TQM implementation.

A total of **150 respondents** were targeted, representing diverse industries within the manufacturing sector, such as plastics, automotive, and consumer goods (Halim et al., 2022). The sample size was determined using purposive sampling to ensure the inclusion of respondents with relevant expertise (Sekaran & Bougie, 2016). The demographic profile of the participants, including their job roles, years of experience, and industry type, was recorded to provide context to the analysis.

Data were collected using a **structured questionnaire** administered through online platforms and face-to-face interactions. The questionnaire consisted of **five-point Likert-scale items** to capture participants' perceptions of each variable. Prior to distribution, the questionnaire was pretested with a pilot group of 15 respondents to ensure clarity, relevance, and reliability (Creswell, 2014). Minor revisions were made based on the pilot feedback.

The data collection process spanned two months, ensuring sufficient time for participant recruitment and follow-ups to maximize response rates. Ethical considerations were adhered to throughout the process, including informed consent, confidentiality, and voluntary participation. Data were anonymized to protect participant identities. The data were analyzed using **Structural Equation Modeling (SEM)** with AMOS software. SEM was selected for its capability to examine complex relationships among multiple variables simultaneously, including direct, indirect, and mediating effects (Dash & Paul, 2021). The analysis followed a two-step process:

1. **Measurement Model Validation**: Confirmatory Factor Analysis (CFA) was conducted to assess the reliability and validity of the constructs, including composite reliability (CR), average variance extracted (AVE), and factor loadings (Hair et al., 2019)
2. **Structural Model Analysis**: Path analysis was performed to test the hypothesized relationships among TQM, OLC, and corporate green performance. The mediating effect of OLC was evaluated using the **bootstrapping method**, which provides robust estimates of indirect effects (Purwanto, 2021)

Descriptive statistics were computed to summarize participant demographics and key variable distributions. Additional diagnostics, such as multicollinearity checks and model fit indices (e.g., CFI, RMSEA, and TLI), were used to ensure the robustness of the model. The findings from the analysis provided empirical evidence for the hypothesized relationships, offering insights into how TQM practices and learning capabilities contribute to sustainability outcomes.

3. RESULT AND DISCUSSION

Results

The results of the study provide a comprehensive analysis of the relationships among Total Quality Management (TQM), Organizational Learning Capability (OLC), and Corporate Green Performance (CGP). By employing Structural Equation Modeling (SEM), the study was able to simultaneously evaluate both the direct and indirect effects of TQM on CGP, as well as the mediating role of OLC. SEM is a robust statistical technique that allows for the exploration of complex relationships between multiple variables, making it ideal for understanding the intricate connections between these key constructs. The use of SEM enables a more nuanced understanding of how TQM practices not only directly influence CGP but also do so indirectly by

enhancing an organization's learning capabilities.

In this analysis, the study evaluated the direct paths from TQM to OLC and CGP, revealing strong positive relationships. TQM was found to significantly enhance organizational learning, suggesting that practices such as continuous improvement, employee involvement, and process standardization help organizations develop better internal knowledge and adaptive learning capabilities. These capabilities, in turn, were shown to have a positive effect on CGP, highlighting the role of OLC in supporting sustainability initiatives.

Furthermore, SEM allowed for the identification of indirect effects, demonstrating that OLC mediates the relationship between TQM and CGP. This finding is crucial as it suggests that the impact of TQM on corporate green performance is not solely through direct improvements in operational processes or quality measures. Instead, TQM fosters an organizational culture that emphasizes learning and innovation, which is instrumental in driving sustainable practices.

The ability to simultaneously examine these direct and indirect relationships provides a more holistic understanding of how TQM influences corporate sustainability. By modeling these complex interactions, the study offers valuable insights into the mechanisms through which TQM contributes to both improved quality management and enhanced environmental performance, underlining the importance of fostering an organizational learning culture to amplify the impact of TQM on sustainability outcomes.

Table 1, descriptive statistics

Variable	Mean	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
TQM	4.21	0.87	0.89	0.67
OLC	4.15	0.85	0.88	0.65
Corporate Green Performance	4.08	0.89	0.91	0.72

The reliability scores exceeded the threshold of 0.7, indicating internal consistency of the measurement scales (Hair et al., 2019)

The structural model's evaluation was based on various fit indices, and the results indicated an excellent fit between the proposed model and the data. Specifically, the Comparative Fit Index (CFI) was 0.96, which is considered a strong indicator of model fit, as values above 0.90 generally suggest good fit. Similarly, the Tucker-Lewis Index (TLI) was 0.94, which also supports the goodness of fit, as values above 0.90 indicate an adequate fit. The Root Mean Square Error of Approximation (RMSEA) was 0.05, which is well within the acceptable range of less than 0.08, suggesting a close approximation of the model to the observed data. Additionally, the ratio of Chi-square to degrees of freedom (Chi-square/df) was 2.10, which is below the threshold of 3.0, indicating a well-fitting model. These indices collectively confirm that the structural model adequately represents the relationships between the constructs and is a reliable basis for drawing conclusions in the study.

Table 2. path coefficients and significance levels

Path	Standardized Coefficient	p-value	Status
TQM → OLC	0.62	<0.001	Supported
OLC → Corporate Green Performance	0.55	<0.001	Supported
TQM → Corporate Green Performance	0.37	<0.01	Supported
TQM → OLC → CGP (Indirect Effect)	0.34	<0.01	Supported

The analysis of the standardized path coefficients and significance levels, as shown in Table 2, provides valuable insights into the relationships between the study's key constructs. First, the path from Total Quality Management (TQM) to Organizational Learning Capability (OLC) is significant, with a standardized coefficient of 0.62 and a p-value less than 0.001. This strong positive relationship indicates that effective TQM practices significantly enhance an organization's learning capability, confirming that TQM is a key driver in fostering a culture of organizational learning.

Next, the relationship between OLC and Corporate Green Performance (CGP) is also highly significant, with a standardized coefficient of 0.55 and a p-value below 0.001. This suggests that organizations with higher organizational learning capabilities are more likely to achieve improved corporate green performance, highlighting the crucial role of learning and knowledge-sharing processes in advancing sustainability goals.

Furthermore, the direct path from TQM to CGP reveals a moderate positive relationship, with a standardized coefficient of 0.37 and a p-value under 0.01. This supports the hypothesis that TQM practices directly contribute to better corporate green performance, underscoring the importance of quality management in achieving sustainable outcomes within organizations.

Finally, the indirect effect of TQM on CGP through OLC shows a standardized coefficient of 0.34, which is statistically significant at a p-value less than 0.01. This finding highlights the mediating role of OLC, suggesting that TQM's impact on corporate green performance is partly channeled through its influence on organizational learning. In sum, the results confirm that TQM positively influences both OLC and CGP, with OLC acting as a significant mediator in the relationship between TQM and CGP. These findings suggest that organizations aiming to improve sustainability should not only focus on TQM practices but also work on enhancing their organizational learning capabilities to fully leverage the benefits of TQM for sustainability.

The results indicate that TQM positively impacts both OLC and CGP, with OLC serving as a significant mediator in the relationship between TQM and CGP.

Discussion

Theoretical Contributions

This study significantly contributes to the theoretical understanding of how Total Quality Management (TQM) practices impact Corporate Green Performance (CGP) through the mediating role of Organizational Learning Capability (OLC). The findings align with previous research, such as Namada (2013), which highlighted that TQM practices, particularly those focused on leadership, customer orientation, and continuous improvement, enhance an organization’s ability to learn and adapt to changing environments. This study corroborates the theoretical notion that TQM, by fostering a culture of excellence, leads to greater organizational adaptability and efficiency, ultimately influencing sustainability efforts. In particular, the study affirms that TQM practices create an environment where knowledge is continuously generated, shared, and applied, which significantly contributes to enhancing CGP.

Furthermore, this study builds on the work of Morioka et al. (2016), who established the positive

influence of TQM on organizational sustainability performance. However, the current research extends this literature by introducing and empirically validating OLC as a crucial mediating variable. By demonstrating that OLC plays an instrumental role in facilitating the transition from quality management to sustainable practices, this study provides a deeper understanding of the mechanisms through which TQM drives sustainability. It emphasizes the importance of organizational learning in effectively implementing green practices and achieving long-term sustainability goals. This contribution is particularly valuable as it bridges the gap between quality management and environmental performance, providing a more holistic view of organizational development and sustainability.

Practical Implications

The practical implications of this research are substantial for manufacturing firms seeking to enhance their sustainability performance. The study underscores that managers should prioritize strengthening TQM practices to create an organizational environment that encourages learning and continuous improvement. For instance, implementing knowledge-sharing platforms, fostering a culture of collaboration, and introducing targeted training programs can significantly enhance OLC. These initiatives not only build the organizational learning capacity but also drive improvements in CGP. By fostering organizational learning, firms can better integrate sustainable practices into their operations, leading to enhanced environmental performance.

In the context of Indonesian manufacturers, the findings are particularly relevant, given the growing pressure to adopt sustainable practices driven by both regulatory requirements and market demands Allan et al. (2020). Indonesian manufacturing companies are increasingly facing stringent environmental regulations and are expected to adopt more sustainable practices. This study highlights that enhancing TQM practices, particularly through organizational learning, can provide a competitive advantage in meeting these requirements. Managers should view organizational learning not just as an internal process for improving knowledge, but as a critical factor for achieving sustainability, which is becoming a key differentiator in the global market.

Comparison with Previous Studies

While previous studies, such as those by Hamdan & Alheet (2021), have explored the direct relationship between TQM and CGP, this research adds significant value by demonstrating the mediating role of OLC. This extension of the literature addresses a critical gap by providing a nuanced understanding of how organizational learning capabilities facilitate the operationalization of green initiatives within the context of TQM. Most prior research has focused primarily on the direct effects of TQM on green performance, without considering the underlying processes that mediate this relationship. By identifying OLC as a mediator, this study contributes new insights into how manufacturing companies can better operationalize sustainability through the enhancement of organizational learning, which in turn strengthens the impact of TQM on CGP. This finding highlights the importance of fostering not only high-quality management practices but also a learning culture that supports the adoption of sustainable practices.

Limitations and Future Research

Despite its contributions, this study has some limitations that should be addressed in future research. First, the use of a cross-sectional design restricts the ability to make causal inferences. While the relationships between TQM, OLC, and CGP are clearly supported, a longitudinal study would offer a deeper understanding of how these relationships evolve over time and provide more robust evidence of causality. By tracking changes in TQM practices, OLC, and CGP over a longer period, future studies could offer more precise insights into the dynamic interactions between these variables.

Second, the study's sample is limited to the Indonesian manufacturing sector, which may impact the generalizability of the findings to other regions and industries. While the Indonesian context offers valuable insights, future research could explore the applicability of these findings in different geographical and industrial contexts. By expanding the study to include firms from other countries or industries, researchers could validate whether the mediating role of OLC and the relationships between TQM and CGP hold universally or if contextual factors influence these dynamics. This would enrich the generalizability of the findings and help develop more universally applicable

strategies for enhancing sustainability.

Finally, future research could also investigate other potential mediators or moderators that could influence the relationship between TQM and CGP. Organizational culture, leadership styles, and technological innovation, for example, may also play significant roles in shaping how TQM practices influence green performance. Exploring these additional factors would offer a more comprehensive view of the drivers of sustainability in manufacturing companies.

4. CONCLUSION

In conclusion, this study provides valuable insights into the influence of Total Quality Management (TQM) practices on Corporate Green Performance (CGP) and the mediating role of Organizational Learning Capability (OLC) in manufacturing companies.

First, the results confirm that TQM practices positively influence CGP in manufacturing companies. TQM, through its focus on continuous improvement, quality control, and customer satisfaction, fosters sustainability by encouraging more efficient, eco-friendly practices. The direct relationship between TQM and CGP demonstrates that companies implementing TQM practices are likely to experience enhanced green performance, emphasizing the importance of quality management systems in achieving sustainable outcomes.

Second, Organizational Learning plays a significant mediating role in the relationship between TQM and CGP. The study found that TQM practices enhance an organization's learning capabilities, which in turn positively impacts CGP. This suggests that organizations with strong organizational learning cultures are better positioned to absorb and apply knowledge related to green practices, thereby improving their environmental performance. The findings highlight the importance of fostering a learning environment that enables the continuous development of sustainable practices within the organization.

Finally, manufacturing companies can leverage both TQM and Organizational Learning to enhance their sustainability efforts. By integrating TQM practices with a focus on organizational learning, companies can create a culture that not only drives quality improvements but also facilitates the adoption of green technologies, processes, and innovations. The combination of these practices can lead to more sustainable operations, lower environmental impact, and a stronger competitive advantage in the market. This study underscores the importance of TQM and Organizational Learning in driving long-term sustainability within manufacturing industries.

Recommendations

Based on the findings, the following recommendations are proposed:

1. **Enhance TQM Practices**: Organizations should strengthen their TQM initiatives by fostering leadership commitment, emphasizing customer-centric approaches, and creating a culture of continuous improvement. These practices are foundational for achieving sustainable outcomes.
2. **Invest in Organizational Learning**: Companies should prioritize building learning capabilities through training programs, knowledge-sharing platforms, and cross-functional collaboration. This will enable employees to effectively address sustainability challenges and innovate green solutions.
3. **Leverage TQM to Drive Green Performance**: Managers should align their TQM strategies with sustainability goals. For example, quality improvement initiatives can be directly linked to environmental performance metrics, such as waste reduction or energy efficiency.
4. **Adopt a Holistic Approach**: The integration of TQM and OLC should be part of a broader sustainability strategy. Companies should implement policies that encourage green innovation, promote environmental awareness, and comply with sustainability standards.
5. **Future Research Directions**: Researchers should explore longitudinal studies to understand the long-term effects of TQM and OLC on sustainability. Expanding the study to include diverse industries and geographic regions would also enhance the generalizability of the findings.

By implementing these recommendations, organizations can achieve a competitive advantage while contributing to environmental sustainability, aligning operational efficiency with long-term strategic goals.

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