website. :
http://openjournal.unpam.ac.id/index.php/JIIM

DOI : 10.32493/jiim.v3i2.54151

Ilmiah Ilmu Manajemen
Magister

ISSN (*print*) : 2829-6648 & ISSN (*online*) : 2830-0548

Vol. 3 • No. 2 • 2024
Pege (*Hal.*) 92-102 :

ISSN (*online*) : 2830-0548
ISSN (*print*) : 2829-6648

Integration of Green Leadership and Production & Operations Management for Operational Sustainability

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Abstrak

Penelitian ini bertujuan mengkaji integrasi konsep green leadership dalam praktik manajemen produksi dan operasi dengan fokus pada keberlanjutan operasional perusahaan. Melalui metode tinjauan literatur sistematis, studi ini menganalisis berbagai temuan empiris dan teori terkini terkait peran green leadership dalam mendorong inovasi hijau serta peningkatan efisiensi dan efektivitas operasional yang ramah lingkungan. Hasil kajian menunjukkan bahwa green leadership bukan sekadar gaya kepemimpinan, melainkan pendekatan strategis yang menggabungkan kepedulian lingkungan dengan pengelolaan sumber daya manusia dan proses produksi yang berkelanjutan. Penerapan green leadership mendorong terciptanya budaya organisasi hijau yang menginspirasi partisipasi aktif anggota tim, meningkatkan kesadaran lingkungan, dan memperkuat komitmen perusahaan terhadap praktik operasional yang berkelanjutan. Integrasi ini terbukti mampu meningkatkan performa produksi sekaligus meminimalkan dampak negatif terhadap lingkungan dan sosial. Studi ini memberikan kontribusi penting bagi pengembangan kerangka konseptual yang menghubungkan manajemen produksi dan operasi dengan prinsip green leadership sebagai landasan untuk keberlanjutan jangka panjang. Temuan ini membuka peluang bagi penelitian lanjutan yang mendalami faktor-faktor pendukung dan hambatan dalam implementasi green leadership di berbagai konteks industri.

Kata Kunci

Green leadership, keberlanjutan operasional, inovasi hijau, budaya organisasi hijau.

Jurnal Ilmiah Ilmu Manajemen Magister
ISSN (*print*) : 2829-6648 & ISSN (*online*) : 2830-0548

Abstract

This study aims to examine the integration of green leadership concepts within production and operations management practices, focusing on corporate operational sustainability. Utilizing a systematic literature review method, the study analyzes empirical findings and recent theories on the role of green leadership in driving green innovation as well as enhancing environmentally friendly operational efficiency and effectiveness. The review reveals that green leadership is more than a leadership style; it is a strategic approach combining environmental concern with sustainable human resource management and production processes. The implementation of green leadership fosters a green organizational culture that encourages active team participation, raises environmental awareness, and strengthens corporate commitment to sustainable operational practices. This integration has been proven to improve production performance while minimizing environmental and social impacts. The study contributes significantly to developing a conceptual framework linking production and operations management with green leadership principles as a foundation for long-term sustainability. These findings also open opportunities for further research exploring supporting factors and barriers in implementing green leadership across diverse industrial contexts.

Keywords

Green leadership, operational sustainability, green innovation, green organizational culture.

Introduction

Production and operations management (POM) plays a pivotal role in ensuring the smooth and efficient functioning of business activities, with the primary goal of maximizing the efficiency and effectiveness of production and operational processes within an organization. This field addresses various operational challenges, from resource allocation and process optimization to supply chain management and product design. However, in the face of rapid

ISSN (*print*) : 2829-6648 & ISSN (*online*) : 2830-0548

industrial development, these operations also bring about significant environmental and social challenges, particularly as mass production continues to strain natural resources and contribute to environmental degradation. According to the World Economic Forum (2023), global industrial production accounts for over 30% of global greenhouse gas emissions, underscoring the need for organizations to rethink their operational models and adopt sustainable practices.

As a result, operational sustainability has emerged as a critical focus within POM. This requires organizations to balance not only the traditional economic factors such as cost, quality, and time but also the environmental and social dimensions of their operations. Environmental sustainability, in particular, has garnered attention as companies strive to minimize their carbon footprint, reduce waste, and adopt renewable energy sources. Social sustainability, on the other hand, emphasizes ethical practices, fair labor standards, and positive community engagement, which are all essential for long-term success and stakeholder satisfaction.

In this regard, green leadership has gained significant recognition as a key strategic concept that facilitates the integration of sustainability into organizational practices. Green leadership is characterized by a leadership approach that prioritizes environmental values, fosters innovation for sustainability, and drives environmentally friendly decision-making at all levels of an organization. Leaders who embrace green leadership not only promote sustainability but also inspire teams to adopt green practices that reduce operational waste, enhance resource efficiency, and contribute to the broader goal of environmental conservation. Research by Yang (2024) has highlighted that organizations with strong green leadership frameworks exhibit higher levels of employee engagement and environmental innovation, which in turn leads to improved performance in terms of both profitability and ecological impact. Similarly, Khan et al. (2023) found that green leadership is positively correlated with better operational performance, reduced emissions, and more responsible waste management strategies.

Despite the growing recognition of green leadership, its integration into POM has not been systematically explored in the literature. While there is substantial research on green practices within individual areas of operations, such as green supply chain management (SCM) and eco-friendly product design, the intersection between green leadership and POM remains underdeveloped. Several studies have pointed out the need for a more comprehensive conceptual framework that links these two areas. For instance, Sharma and Gupta (2022) argue that while sustainability initiatives are often implemented in silos within organizations, the integration of green leadership could help streamline these efforts and lead to more holistic, impactful sustainability strategies across production and operations.

This gap in research presents a unique opportunity for academic inquiry and practical application. Therefore, this study seeks to conduct a systematic literature review that explores the integration of green leadership into POM, with the goal of identifying the mechanisms, challenges, and opportunities involved in this integration. Through this review, the research aims to contribute to the development of both theoretical frameworks and practical guidelines for achieving long-term operational sustainability. By examining existing literature, this research will also identify the drivers of successful integration and offer insights on how organizations can better incorporate green leadership into their POM practices for operational effectiveness.

The novelty of this research lies in its focus on bridging the gap between green leadership and POM, providing a strong, integrated framework that can guide organizations in their pursuit of operational sustainability. While there are isolated studies on green leadership and POM, this research aims to offer a comprehensive view, synthesizing knowledge from both

ISSN (*print*) : 2829-6648 & ISSN (*online*) : 2830-0548

fields to create a unified approach to sustainable operations. Furthermore, this research will explore emerging trends, such as the role of digital technologies in promoting green leadership within POM, and offer new perspectives on how the digital transformation of operations can further advance sustainability goals.

Through this systematic review, the study will contribute to the body of knowledge by addressing a pressing need in both academia and practice for a cohesive framework that links green leadership to operational sustainability, ultimately driving better decision-making and long-term sustainable performance in production and operations management.

Literature Review

Production and Operations Management (POM) in the Sustainability Context

Production and operations management (POM) is the core foundation in conducting business processes focused on optimizing resource management to produce goods and services efficiently and effectively. With growing global awareness of environmental issues, the sustainability concept has increasingly been integrated into POM practices. According to Heizer, Render, and Munson (2019), sustainability in POM involves not only waste and emission reduction but also the development of resource-efficient production processes, green supply chain management, and promoting an organizational culture that supports environmentally friendly practices. Applying sustainability principles in operations helps companies meet environmental regulations, enhance corporate image, and improve competitiveness in the global market.

The concept of sustainability has gained prominence in recent decades, prompting organizations to rethink their traditional approaches to Production and Operations Management (POM). POM involves the design, control, and management of production processes, with the objective of delivering products and services efficiently while maintaining quality. Traditionally focused on optimizing economic factors like cost and time, POM is increasingly required to integrate environmental and social dimensions to ensure long-term viability (Sarkis, 2019). This shift reflects the growing recognition that industrial operations must reduce their negative environmental impact while also contributing to social well-being (Elkington, 1997). This literature review explores the integration of sustainability into POM, examining key themes such as green production practices, sustainable supply chain management, and the role of technology in advancing sustainability.

Green Leadership as a Sustainable Leadership Approach

Green leadership is a contemporary leadership approach integrating environmental and sustainability principles into leadership style. It goes beyond mere concern for green issues by encompassing the ability to inspire, motivate, and direct organizations toward achieving long-term sustainability goals (Yang, 2024). Khan et al. (2023) explain that green leadership creates an organizational environment that supports green innovation and sustainable human resource management. The role of green leadership is crucial in building a green

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organizational culture emphasizing social and environmental responsibility, enabling operational decisions that minimize negative environmental impacts.

Green production is a significant aspect of sustainability within POM, referring to the process of producing goods with minimal environmental impact. According to Geng and Doberstein (2008), green production involves strategies such as reducing energy consumption, minimizing waste, and using renewable resources. Research by Gunasekaran et al. (2015) suggests that the adoption of green production practices leads to better environmental outcomes and often improves financial performance in the long term, as companies can reduce costs associated with energy consumption and waste management. Moreover, green production practices enhance organizational reputation, which in turn can lead to increased customer loyalty and market share (Porter & Kramer, 2006).

In the context of sustainable manufacturing, many organizations are shifting towards cleaner technologies and resource-efficient processes. A study by Kuo et al. (2010) found that the implementation of clean production technologies not only decreases operational costs but also results in a reduction in hazardous waste generation, which is critical for ensuring environmental sustainability. Additionally, innovations in product design, such as remanufacturing and recycling, help extend product life cycles and further contribute to sustainability goals (Zhu et al., 2013).

Integration of Green Leadership with POM for Operational Sustainability

The integration between green leadership and production and operations management is essential to combine production efficiency and environmental preservation simultaneously. Studies by Juniarti (2024) and Yang (2024) emphasize that green leadership provides a strategic framework supporting POM practices oriented toward efficiency and environmental friendliness through sustainable innovation and increased active employee participation. This approach creates synergy that improves operational performance while preserving natural resources. Furthermore, this integration strengthens organizational competencies in responding to environmental regulations and increasingly stringent market demands for sustainable products and processes.

Sustainable supply chain management (SSCM) has become a critical area within POM, as organizations realize that sustainability efforts must extend beyond internal operations to the entire supply chain (Seuring & Müller, 2008). SSCM involves integrating environmental and social considerations into supply chain activities, such as sourcing raw materials, production, and distribution. According to Carter and Rogers (2008), an effective SSCM approach aligns business operations with sustainable practices while enhancing supply chain resilience and reducing risks related to environmental regulations and consumer preferences.

Recent studies emphasize the role of suppliers in ensuring sustainability across the supply chain. A key element of sustainable supply chains is the selection of suppliers who adhere to environmental and social sustainability practices (Hsu et al., 2016). For instance, practices such as green procurement and the evaluation of suppliers based on their environmental performance are gaining traction. Furthermore, firms that engage in collaborative initiatives with suppliers to improve sustainability performance tend to experience long-term benefits, such as improved innovation and market competitiveness (Sarkis et al., 2011).

Previous Studies on Green Leadership and POM

Jurnal Ilmiah Ilmu Manajemen Magister
ISSN (*print*) : 2829-6648 & ISSN (*online*) : 2830-0548

Various empirical studies show that implementing green leadership significantly contributes to improving operational performance and corporate sustainability. Khan et al. (2023) found that environmental knowledge management driven by green leadership enhances green production effectiveness and employee environmental awareness. Meanwhile, Yang (2024) identified a positive relationship between green transformational leadership and green innovation in manufacturing, which results in improved production performance and waste reduction. This sustainability framework is further reinforced by studies by Heizer et al. (2019), emphasizing the importance of sustainability in operations and supply chain management.

Conceptual Framework

Based on the literature review, it can be concluded that green leadership and production and operations management are not standalone entities but are interrelated and mutually reinforcing in shaping operational sustainability. Green leadership, as a leadership styleembedding environmental and social values within the organization, acts as a catalyst driving POM practices based on sustainability principles. This conceptual framework becomes a fundamental basis in this study to further explore the mechanisms and influence of green leadership integration on the success and sustainability of production and operations management.

Despite the increasing importance of sustainability in POM, many organizations face significant challenges when integrating sustainability practices into their operations. One of the major obstacles is the high initial cost of adopting green technologies and practices (Lee, 2008). The cost of investing in sustainable technologies such as renewable energy systems, waste management infrastructure, and green production processes can be prohibitive for small and medium-sized enterprises (SMEs). However, several studies suggest that these upfront investments pay off in the long term through cost savings, regulatory compliance, and improved brand value (Hart, 1995).

Another challenge lies in the lack of a standardized framework for integrating sustainability into POM. While various sustainability metrics and standards exist, such as ISO 14001 for environmental management and the Global Reporting Initiative (GRI), organizations often struggle to apply these frameworks consistently across their operations (Yang et al., 2021). As noted by Gunasekaran et al. (2015), firms may lack the knowledge or expertise required to effectively implement and measure sustainability practices, leading to fragmented efforts that fail to achieve desired outcomes.

Research Methodology

Research Type

This research employs a systematic literature review method aimed at identifying, evaluating, and synthesizing previous research results concerning the integration of green leadership and production and operations management in the context of operational sustainability. This method is appropriate as it allows researchers to collect and analyze relevant scholarly literature comprehensively, producing deep understanding and a solid conceptual framework.

Data Sources and Selection Criteria

ISSN (*print*) : 2829-6648 & ISSN (*online*) : 2830-0548

The primary data sources for this research consist of reputable scientific journals and free-access e-books selected based on relevance to the topic and academic quality. The literature selection criteria include: (1) publications focusing on green leadership and production and operations management, (2) empirical and conceptual articles published within the last five years (2019-2024), (3) literature available in both Indonesian and English, and (4) documents fully accessible for transparency and data validity.

Data Collection Techniques

Data were collected through academic databases such as ScienceDirect, Google Scholar, and university digital libraries portals. Keywords used in the search included "green leadership," "production and operations management," "sustainability," and "green innovation." Abstracts and article contents were then screened to ensure alignment with the research focus.

Data Analysis Techniques

Data analysis was conducted qualitatively using descriptive and narrative synthesis approaches. Researchers grouped findings based on emergent main themes, namely the definition of green leadership, the role of green leadership in production and operations management, and the influence of their integration on operational sustainability. These analytical results were deepened for building the theoretical framework undergirding this research. The analysis emphasized continuity and interconnection among the reviewed literature.

Validity and Reliability

To ensure validity and reliability, selected literature came from trusted sources with good peer-review and indexing. The literature selection process was systematic, starting from identification, screening, to final selection based on predetermined criteria. Documentation of each step was preserved to guarantee transparency and reproducibility of the research.

Results and Discussion

Profile of Reviewed Literature

This systematic literature review is based on five primary and recent sources concerning green leadership and production and operations management. Selected literature comprises peer-reviewed journals and openly accessible academic books, aimed at gathering empirical and theoretical evidence highlighting green leadership's role in enhancing operational sustainability through innovation and resource management.

Role of Green Leadership in Enhancing Organizational Performance

Yang (2024) and Khan et al. (2023) indicate that green leadership significantly improves organizational performance by enhancing environmental literacy and knowledge sharing among employees. Yang (2024) reveals that green leadership can create competitive advantage through green innovation that supports production efficiency while reducing waste

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Factor	Impact	Reference
Green Leadership	+65% increase in knowledge sharing	Khan et al., 2023
Green Innovation in POM	-30% reduction in waste and energy	Juniarti, 2024
Operational Efficiency	+25% increase in productivity	Yang, 2024

and emissions.

Integration of Green Leadership in POM

Literature indicates that implementing green leadership strengthens sustainable POM practices. Heizer, Render, and Munson (2019) emphasize that visionary and strategic leadership is essential for building an organizational culture supportive of sustainability. Juniarti (2024) adds that green leadership facilitates cross-functional collaboration inside companies, accelerating green innovation, and significantly reducing raw material and energy consumption.

Impact of Implementation on Performance and Sustainability

Synthesis from reviewed sources shows that companies consistently implementing green leadership achieve higher operational efficiency and effectiveness, along with improved corporate image and market competitiveness. Khan et al. (2023) report companies integrating green leadership reduce carbon emissions by 20% and increase customer loyalty by 15%.

Challenges and Opportunities

Identified barriers include cultural resistance, insufficient understanding of green leadership, and resource constraints. However, significant opportunities arise from leveraging green technology and sustainable human resource training.

Conclusion and Recommendations

Conclusion

Based on this systematic literature review, several key points can be concluded concerning the integration of green leadership and production and operations management (POM) in operational sustainability context. Green leadership acts as a key driver transforming organizational culture toward sustainability through green innovation, enhanced environmental awareness, and more responsible resource management. Integrating green leadership into POM practices helps companies improve process efficiency, reduce waste and emissions, and simultaneously strengthen competitiveness and corporate image sustainably.

The literature demonstrates that green leadership implementation impacts not only operational performance improvement but also supports achieving long-term sustainability goals demanded globally. Despite challenges such as cultural resistance, resource limitations, and managerial knowledge gaps, opportunities especially through green technology utilization and continuous human resource training should be strategically leveraged.

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Recommendations

Based on the conclusions, several recommendations are proposed:

1. **Human Resource Capacity Development**: Companies should invest in training and educating employees at all levels, especially managerial, on green leadership and sustainability to internalize these concepts into daily operational practices.
2. **Transformational Leadership Approach**: Visionary and transformational leadership is needed to drive comprehensive organizational culture change embedding sustainability principles.
3. **Utilization of Green Technology**: Companies are encouraged to adopt environmentally friendly technologies in production and operations as strategic solutions to minimize environmental impacts and enhance efficiency.
4. **Further Research**: It is recommended to conduct more in-depth empirical studies on barriers and enablers of green leadership integration in specific industry contexts to provide more applicable policy recommendations.

By implementing these recommendations, the integration of green leadership and production and operations management will become more optimal and contribute significantly to effective and efficient operational sustainability.

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