Jurnal Ilmu Manajemen Retail (JIMAT)
Published by: Manajemen Retail Fakultas Ekonomi UMMI
e-ISSN: 2746-1475
DOI: https://doi.org/10.37150/jimat.v6.i1.3603
Volume: 6 Nomor: 1 (Maret: 2025) hal: 60-76

Mediating Factors Influencing the Adoption of Green Technology by SMEs for Sustainable Performance: A Systematic Literature Review

Agus Sobar
Universitas Linggabuana PGRI Sukabumi
e-mail: agussobar2@gmail.com
Corresponding author: agussobar2@gmail.com

Informasi Artikel:
Terima: 10-02-2025
Revisi: 25-02-2025
Disetujui: 20-03-2025

ABSTRAK

Tujuan penelitian ini adalah untuk memberikan pemahaman yang komprehensif mengenai konteks dan landasan teori yang digunakan dalam adopsi teknologi hijau oleh UMKM dalam menghasilkan kinerja berkelanjutan. Penelitian ini menggunakan metode tinjauan sistematis PRISMA dengan menganalisis 40 artikel empiris mengenai factor mediasi adopsi teknologi hijau oleh UMKM dalam menghasilkan kinerja berkelanjutan, dari tahun 2017 hingga 2024 serta berasal dari berbagai negara. Dari setiap teori yang diterapkan, disajikan juga deskripsi singkat dan rekomendasi untuk agenda penelitian di masa mendatang. Terlepas dari luasnya hasil penelitian sebelumnya, tinjauan ini menunjukkan bahwa sebagian besar penelitian menyelidiki kinerja berkelanjutan dengan factor mediasi adopsi teknologi hijau. Selanjutnya teori-teori yang digunakan seperti Resource-Based View (RBV), Technology Acceptance Model (TAM), Innovation Theory, dan Sustainability Theory. Kontribusi penelitian ini membantu pengambil kebijakan dalam merancang regulasi dan insentif yang mendorong adopsi teknologi hijau oleh UMKM. sedangkan bagi UMKM, temuan ini memberikan panduan praktis tentang bagaimana meningkatkan kapabilitas inovasi hijau dan memanfaatkan teknologi hijau untuk mencapai kinerja berkelanjutan.

Kata Kunci: *Adopsi Teknologi Hijau, Kinerja Berkelanjutan, Keberlanjutan Financial, Keberlanjutan Lingkungan, UMKM*

ABSTRACT

This research aims to elucidate the background and theoretical framework underlying the adoption of green technology by MSMEs to achieve sustainable performance. This study employs the PRISMA systematic review methodology to analyze 40 empirical publications regarding the mediating factors influencing green technology adoption by MSMEs in achieving sustainable performance, spanning from 2017 to 2024 and encompassing diverse nations. A concise summary and recommendations for future research goals are provided for each applicable theory. This study indicates that, despite extensive prior research, the majority of studies examine sustainable performance through factors that mediate the adoption of green technologies. Additionally, the employed theories include the Resource-Based View (RBV), Technology Acceptance Model (TAM), Innovation Theory, and Sustainability Theory. This research aids policymakers in formulating policies and incentives that promote the use of green technology by MSMEs. For MSMEs, these findings offer pragmatic direction on

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enhancing green innovation capabilities and leveraging green technology to attain sustainable performance.
Keywords: Adoption of Eco-Friendly Technology, Sustainable Performance, Financial Viability, Environmental Sustainability, SMEs

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) constitute the foundation of numerous economies, particularly in developing nations (Sadeghi et al., 2023). Their impact on employment generation, innovation, and poverty reduction is substantial (Anjaningrum et al., 2024). Nevertheless, the operational sustainability of MSMEs frequently encounters significant obstacles, particularly in addressing progressively rigorous environmental requirements (Rojas-Ospina et al., 2024). Amid the progression towards a more sustainable global economy, numerous MSMEs confront the necessity of reconciling their commercial objectives with environmental and social accountability (Ougier et al., 2024).

Green technology has emerged as a pivotal solution for firms striving for enhanced sustainability (Somohano-Rodríguez & Madrid-Guijarro, 2022). The technique emphasizes the reduction of carbon emissions, enhanced waste management efficiency, and the utilization of renewable resources (Hasani et al., 2023). The implementation of green technology by MSMEs can yield advantages in operational efficiency and in cultivating an eco-friendly reputation that contemporary consumers anticipate (Hussain et al., 2020; Qalati et al., 2022). Nonetheless, some MSMEs remain reluctant to embrace this technology owing to insufficient comprehension and constrained resources.

A primary challenge encountered by MSMEs in the adoption of green technology is the scarcity of financial and technical resources (Adomako & Ahsan, 2022; Orden-Cruz et al., 2024). The absence of awareness and comprehension regarding the direct impact of green technology on corporate performance constitutes a barrier. Although numerous studies indicate the potential advantages of adopting green technology, this process does not inherently yield favorable outcomes, particularly in the absence of facilitating elements such as technological expertise, managerial competencies, and suitable policy support (Subhani et al., 2023; Yousaf et al., 2021; Zamani, 2022).

The sustainable performance of MSMEs relies not only on the implementation of green technology but also on several other aspects that influence the connection between this implementation and long-term performance outcomes (Chourasiya et al., 2024; Ngo, 2023; Wang et al., 2024) Factors may encompass management competencies, organizational innovation, and external assistance, including governmental legislation and access to technical resources (Jing et al., 2023; Konopik et al., 2022; Lutfi et al., 2024). A comprehensive study of these mediating elements is crucial to elucidate why the adoption of green technology may be successful in certain MSMEs while proving less effective in others (Tariq et al., 2024).

Managerial qualities are frequently seen as a crucial mediating aspect in the application of green technology (Wang et al., 2024). Micro, Small, and Medium Enterprises possessing expertise in technology and sustainability are more inclined to successfully incorporate green innovation into their operational strategies (Gutiérrez-Broncano et al., 2024; Tariq et al., 2024). They can enhance decision-making on resource allocation, workforce training, and the establishment of collaborative networks to facilitate the green transformation process (Audretsch

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et al., 2023; Liu et al., 2023). In the absence of these competencies, the implementation of green technology may fail to yield the anticipated advantages.

Innovation is a crucial factor that facilitates the connection between the adoption of green technology and sustainable performance (Greco et al., 2021; Nair et al., 2019; Rhee & Stephens, 2020). Innovative MSMEs are more adept at customizing green technology to align with their market requirements and attributes. Moreover, advancements in products, processes, and business models can enhance operational efficiency and provide new market opportunities, hence fostering long-term sustainability (Alshuaibi et al., 2024; Prajapati et al., 2024). In the absence of appropriate innovation, green technology may fail to be optimized within the framework of MSMEs.

Government policies and regulations significantly influence the adoption of green technology by MSMEs (Mallett et al., 2019; Utaminingsih et al., 2020). Subsidy schemes, fiscal incentives, and educational training might alleviate the financial and knowledge burdens encountered by MSMEs (Chugunov et al., 2020). In nations with robust policy assistance, MSMEs are more inclined to successfully embrace green technology and attain enhanced sustainable performance (Menne et al., 2022). This policy support serves as a mediating factor that enhances the beneficial effect of green technology on corporate performance.

The implementation of green technology can positively influence economic, social, and environmental sustainability ((Hussain et al., 2020; Oduro, 2024; Singh et al., 2022; Varriale et al., 2024). This technique can enhance cost efficiency and create new business prospects (Pilav – Velic et al., 2024). The implementation of green technology can enhance the quality of life for employees and nearby communities by fostering a healthier work environment and promoting more social responsibility (Alqershi et al., 2020). From an ecological standpoint, green technology evidently aids in diminishing carbon emissions and enhancing resource management (Qalati et al., 2022).

Prior research has examined numerous factors influencing the adoption of green technology by firms; however, investigations into the impact of mediating factors within the setting of MSMEs remain few. Numerous studies emphasize the significance of managerial capabilities, innovation, and policy support; however, few have systematically examined how these elements mediate the relationship between green technology adoption and sustainable performance (Merín-Rodrigáñez et al., 2024; Rumanti et al., 2023; Wang et al., 2024). This study seeks to address this gap by emphasizing the significance of mediating elements, including management competencies, innovation, and government policies, in enhancing the effectiveness of green technology adoption in MSMEs.

METHOD

This study employed the Systematic Literature Review (SLR) methodology by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standards (Oduro, 2024). PRISMA offers a systematic framework for the identification, selection, assessment, and analysis of pertinent papers. The phases of this methodology are delineated in detail as follows:

Sources of Data and Search Parameters (Identification)

The data for this study was sourced from the Scopus database, a prominent and esteemed repository of scholarly journals. Scopus was selected because to its extensive range of papers that have undergone a peer-review process from reputable publications, particularly in the domains

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of management, business, and sustainability. Initially, article searches concentrated on journals from the Q1 to Q4 quartiles to guarantee the inclusion of research with diverse quality levels. Search keywords comprise a mix of terms:

"green technology" OR "sustainable technology" AND "SME performance" OR "sustainable performance" OR "sustainability" AND "mediating factors" OR "mediation".

From the initial search, 528 articles were found that were relevant to these keywords and criteria.

Evaluation Procedure

Following the acquisition of 528 articles from the preliminary search, a multi-stage screening process was implemented, specifically 1) a review based on the journal's discipline, categorizing articles across various scientific domains, and subsequently refining the selection to concentrate on the field pertinent to this research topic. In this instance, only papers from the three primary domains are preserved: Business, Management, and Accounting: 145 articles; Social Sciences: 67 articles; and Economics, Econometrics, and Finance: 66 articles. Following field filtration, the quantity of pertinent articles was diminished to 238. 2) Screening predicated on free access Open open-access journal articles are chosen to provide data transparency and complete accessibility to the examined publications. Open-access articles are deemed significant due to their facilitation of additional backtesting and transparency in research endeavors. Out of the remaining 238 papers, merely 88 originated from open-access publications and were incorporated into the subsequent phase.

Stage of Relevant Article Selection (Eligibility)

Following the first screening by field and open access methods, a comprehensive evaluation of the abstract and content of the article was performed to ascertain its relevance to the research issue, specifically the adoption of green technology and the sustainable performance of MSMEs with mediating factors. At this juncture, publications that are not directly pertinent to the topic's focus are eliminated, such as those addressing green technology without reference to MSMEs or lacking mediating variables. As a result of this examination, 48 irrelevant articles were discarded, leaving 40 articles that aligned with the theme and were suitable for analysis in the subsequent step.

Conclusive Selection (Incorporated)

The final phase of the selection procedure involves identifying articles that are pertinent to the research emphasis, specifically the adoption of green technology and the sustainable performance of MSMEs with mediating factors, resulting in the identification of just 40 relevant publications. Following the final adjustment, a total of 40 papers were chosen for further analysis, encompassing the following information: (1) author, (2) year of publication, (3) nation, (4) analysis approach, (5) type of product, and (6) theoretical framework.

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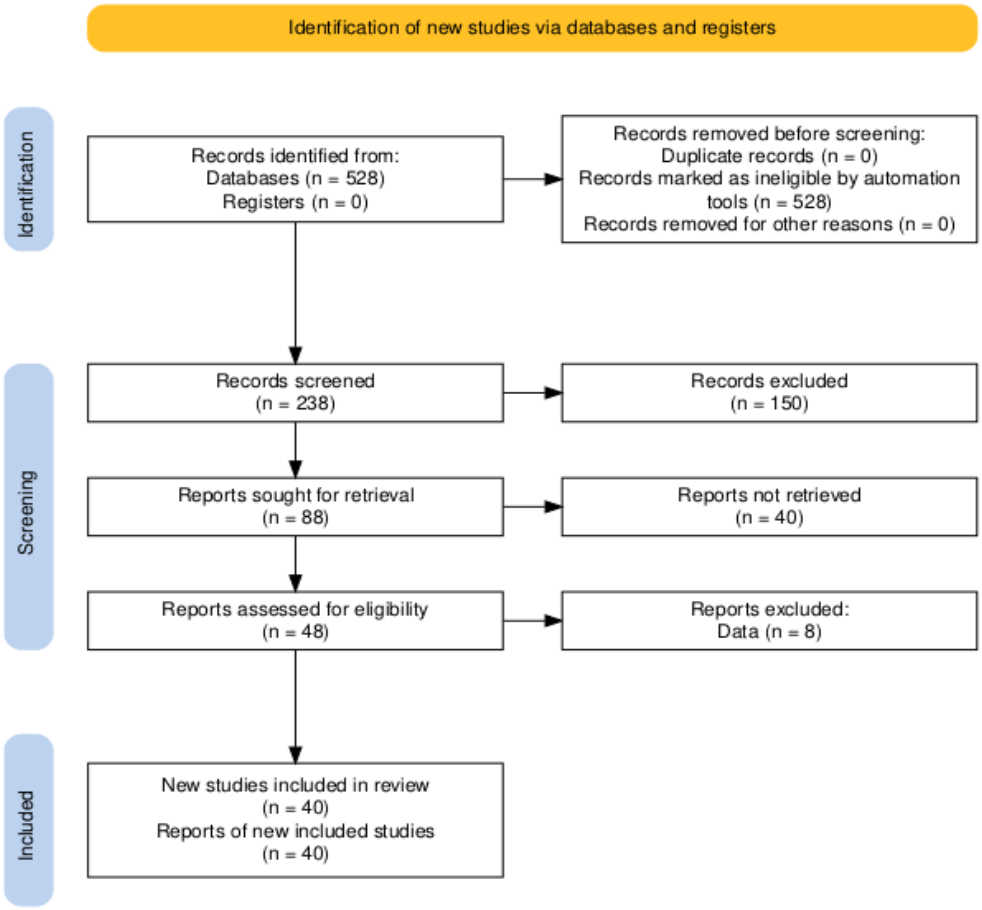

Figure 1. Prisma Diagram

RESULT

Descriptive analysis of research about mediating elements in the adoption of green technology by MSMEs to achieve sustainable performance. This mediation illustrates the intricacies of the green technology adoption process and demonstrates that effective implementation frequently relies on a confluence of several organizational, financial, and external factors. Among the 40 articles published from 2017 to 2024, the authors' countries are as follows: Spain (n=5), Malaysia (n=3), Vietnam (n=3), Poland (n=2), Sweden (n=1), Saudi Arabia (n=3), Thailand (n=1), Italy (n=2), Germany (n=2), United Kingdom (n=4), Indonesia (n=3), United States (n=2), China (n=3), Iran (n=1), Yemen (n=1), Oman (n=1), Ghana (n=2), and Bosnia and Herzegovina (n=1). The facilitation of green technology adoption by MSMEs in achieving sustainable performance is:

Managerial Capabilities

Managerial capabilities, encompassing the capacity of MSME leaders to oversee change, innovation, and emerging technologies, are a crucial factor that mediates the relationship between green technology adoption and sustainable performance (Hidayat-ur-Rehman & Alsolamy, 2023; Ngo, 2023; Nguyen et al., 2021; Tolstoy et al., 2022; Wang et al., 2024). Managers

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proficient in comprehending and applying green technologies effectively can enhance operational efficiency and expedite the integration of sustainable practices.

Organizational Innovation

Innovation, in terms of products, processes, or business models, serves as a crucial mediating component. Innovative MSMEs are more adept at effectively integrating green technology, leading to enhanced long-term performance in both financial and environmental sustainability (Abrokwah-Larbi, 2024; Anjaningrum et al., 2024; Hussain et al., 2020). Innovation enables organizations to address market difficulties and comply with sustainability standards.

Financial Resources and Capital Accessibility

Implementing green technology frequently necessitates a substantial upfront expenditure. The availability of financial resources and access to capital influence MSMEs' capacity to adopt and maintain green technology over time (Menne et al., 2022; Pascucci et al., 2022). MSMEs with improved access to capital will be more capable of absorbing the expenses associated with adopting green technology and capitalizing on the resultant business opportunities (Adela et al., 2024).

Ecological Cognizance and Understanding

Understanding environmental and sustainability issues influences the connection between the adoption of green technology and long-term performance (Bhatti et al., 2023; Chaithanapat et al., 2022). MSMEs that possess a heightened awareness of environmental sustainability and a comprehensive understanding of the advantages and ramifications of green technology are more inclined to successfully deploy this technology.

Sustainability-Focused Organizational Culture

A sustainability-oriented organizational culture is essential in facilitating the implementation of green technologies (Kusa et al., 2021). Micro, Small, and Medium Enterprises (MSMEs) that cultivate a culture emphasizing sustainability principles would more readily incorporate green technology into their strategies and operations, hence enhancing their sustainable performance (Anjaningrum et al., 2024; Sarfo et al., 2024).

Government Policy and Regulation Assistance

Government actions, like financial incentives, subsidies, or rules that promote the adoption of green technologies, also mediate this link (Adomako & Ahsan, 2022; Drobetz et al., 2024; Orden-Cruz et al., 2024). Facilitative policies can enhance MSMEs' access to green technology and enable them to capitalize on incentives to bolster their environmental and economic sustainability performance (Hussain et al., 2020; Le et al., 2023).

Network for Collaboration and Partnership

Collaborative networks with external entities, such as governments, academia, or corporate partners, can act as intermediaries in these connections (Hsieh et al., 2018; Zelenika & Pearce, 2014). Collaboration enables MSMEs to exchange information, resources, and technologies that facilitate the implementation of green technologies, hence enhancing their sustainable performance (Audretsch et al., 2023; Belitski & Mariani, 2023; Liu et al., 2023).

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Theoretical Frameworks and Models

This research employs many theoretical frameworks and conceptual models to elucidate the adoption of green technology by MSMEs for sustainable performance, including the Resource-Based View (RBV), Technology Acceptance Model (TAM), Innovation Theory, and Sustainability Theory:

Resource-Based View (RBV)

The Resource-Based View (RBV) is a fundamental theory in strategic management, positing that a firm's competitive advantage relies on its capacity to obtain and manage valuable, rare, inimitable, non-substitutable, or non-renewable resources (VRIN) (Adomako & Ahsan, 2022). The Resource-Based View (RBV) posits that an organization's enduring competitive advantage is contingent upon its internal resources, encompassing both tangible assets (such as physical assets and money) and intangible assets (including knowledge, innovation, corporate culture, and reputation). In the realm of MSMEs, the Resource-Based View (RBV) is frequently employed to evaluate how internal resources, including innovation, managerial competencies, and technological skills, enable firms to seize market opportunities and surmount external obstacles. Micro, Small, and Medium Enterprises (MSMEs) possessing advanced technological capabilities (rare and valuable resources) can more readily implement green technology and innovate, leading to a sustainable competitive advantage (Audretsch et al., 2023; Gutiérrez-Broncano et al., 2024).

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a paradigm designed to elucidate and forecast user acceptance of novel technology. TAM identifies two primary characteristics that affect technology adoption: Perceived Usefulness and Perceived Ease of Use (Hasani et al., 2023). The Technology Acceptance Model posits that an increased impression of usability and ease of technology correlates with a higher likelihood of user adoption (Alraja et al., 2020). Within the realm of MSMEs, TAM is frequently employed to evaluate the influence of technological factors on the adoption of novel technologies. This model examines how business owners' perceptions of the utility of digital technologies, including social media and privacy technologies, affect their adoption decisions, subsequently influencing their business success (Deku et al., 2024).

Theory of Innovation

Innovation Theory examines the impact of innovation in products, processes, and business models on the growth and success of MSMEs. Innovation is a critical determinant of the Company's competitive advantage and sustainability (Bhatti et al., 2023; Zhang, 2022). Innovation may manifest as incremental innovation (minor, ongoing enhancements) or radical innovation (significant alterations that disrupt the industry) (Nguyen et al., 2021). The capacity of a corporation to innovate is frequently influenced by its internal competencies and external circumstances (Oduro, 2024; Sarfo et al., 2024). In the realm of MSMEs, innovation theory examines how enterprises can cultivate competitive advantages via their innovation skills. MSMEs that can rapidly create products in response to market demand would enhance their competitiveness and expand their market share (Pilav – Velic et al., 2024; Tariq et al., 2024).

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Sustainability Theory

Sustainability Theory pertains to the notion of sustainability, highlighting the necessity of harmonizing economic, environmental, and social performance (Bhatti et al., 2023). This theory posits that corporations must evaluate the long-term consequences of their economic operations, considering not just profitability but also environmental and societal impacts (triple bottom line) (Oppon et al., 2024). Sustainability encompasses methods that promote the judicious use of resources, minimize waste, and foster long-term social well-being (Suryawan & Lee, 2024). Within the framework of MSMEs, Sustainability Theory assesses the impact of sustainability practices on the long-term performance of enterprises (Hidayat-ur-Rehman & Alsolamy, 2023). Micro, Small, and Medium Enterprises (MSMEs) that implement green technology and sustainable practices will achieve a competitive edge by enhancing their reputation, lowering operational expenses, and accessing new markets that prioritize sustainability (Hariyono & Narsa, 2024).

Deficiencies in Scholarly Work

Examination of literature deficiencies concerning theoretical, methodological, and contextual gaps, particularly on the use of green technology by MSMEs in achieving sustainable performance, based on a study of pertinent articles:

Theoretical Deficiencies

The theoretical gap pertains to the insufficient examination of the intricate mechanisms and connections between green technology adoption and sustainable performance in MSMEs. Significant deficiencies include the absence of thorough theoretical integration for the use of green technologies:

- Numerous articles, including those on the performance of servitized SMEs and the effects of sustainable procurement, packaging, and distribution, as well as the adoption of privacy-enhancing technologies and their impact on SMEs' performance, employ the innovation theory framework and the Technology Acceptance Model (TAM). However, they fail to explore in depth the acceptance of specific green technologies by MSMEs across diverse economic and cultural contexts (Bhatti et al., 2023; Hasani et al., 2023). A comprehensive examination of the integration of Resource-Based View (RBV) with Technology Acceptance Model (TAM) or sustainability theory is essential to comprehend the interaction between internal and external resources in the adoption of green technologies.
- Insufficient investigation of the long-term impacts of green technology implementation on MSMEs: A significant portion of the literature examines the direct influence of green technology adoption on innovation and sustainability outcomes, including eco-innovation and the sustainable performance of SMEs: a meta-analysis (Oduro, 2024). However, limited study exists regarding the long-term effects of this adoption, particularly concerning business transformation and the sustainability of small enterprises over extended durations.
- The functions of moderation and mediation have not been thoroughly investigated. Numerous publications address moderation, including transformational leadership in a

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SEM-ANN analysis to assess sustainable performance in SMEs, as well as mediation in eco-innovation and the performance of Servitized SMEs (Bhatti et al., 2023; Hidayat-ur-Rehman & Alsolamy, 2023; Oduro, 2024). Further investigation is required to examine additional variables that may mediate or moderate the relationship between the adoption of green technology and sustainable performance, including organizational culture, human resource development, and network capabilities.

Methodological Deficiencies

Methodologically, previous studies exhibit several weaknesses, notably the restricted diversity of research methods employed:

- For instance, numerous studies utilize quantitative approaches, including structural equation modeling (SEM) or meta-analysis, to examine the relationships among variables such as green technology adoption, innovation, and MSME performance (Hidayat-ur-Rehman & Alsolamy, 2023; Oduro, 2024). Nonetheless, comprehensive qualitative studies, such as interviews or case studies, remain underexplored, particularly those examining the motives, obstacles, and opinions of MSME owners concerning the use of green technology. Qualitative research can yield deeper insights into the context surrounding the acceptance and use of these technologies in the field.
- Insufficient utilization of longitudinal methodologies: Numerous studies mostly concentrate on cross-sectional data about digital marketing and the commercial success of small and medium-sized firms in emerging markets (Deku et al., 2024). To comprehend the influence of green technology on the sustainable performance of MSMEs, a longitudinal study is required that examines the evolution of company performance over many years. A longitudinal approach will elucidate the evolution of green technology adoption over time and its effect on the sustainability of MSMEs.
- Challenges in quantifying sustainability performance: Certain studies indicate that objectively measuring sustainability performance, such as in SMEs utilizing big data analytics, is challenging (Khan et al., 2024). There is a necessity for the advancement of more precise and reliable measurement instruments to evaluate the sustainable performance of MSMEs, particularly concerning environmental and social implications. Furthermore, it is essential to investigate new indicators pertinent to MSMEs about the implementation of green technology.

Contextual Deficiencies

The literature reveals contextual gaps on the adoption of green technology by MSMEs, highlighting the necessity for expanded research across diverse geographical, cultural, and industrial contexts:

- Limited regional scope: Much of the current study concentrates on certain developed or emerging market environments, such as the inquiry into whether Does Facebook Commerce Enhances SMEs Performance? A Structural Equation Analysis of Omani SMEs and The Impact of Entrepreneurial Orientation on SMEs' Performance in a Transitional Economy (Alraja et al., 2020; Ngo, 2023). The wider emerging market landscape, especially in Africa, Southeast Asia, and Latin America, remains inadequately covered. The

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dynamics of green technology uptake might vary significantly between nations with differing infrastructures or degrees of policy support.

- Restricted industry context: Numerous studies concentrate on particular industries, like manufacturing and the service industry, exemplified by the performance of Servitized SMEs (Bhatti et al., 2023). Nevertheless, the use of green technology in particular MSME industries, such as agricultural or tourism, remains underappreciated. These sectors possess distinct dynamics concerning resources, legislation, and environmental variables that may influence their capacity to efficiently use green technologies.
- Insufficient consideration of MSME-specific attributes: Numerous studies fail to differentiate outcomes according on MSME size, age, or growth phase. The SEM-ANN analysis investigating sustainable performance in SMEs and the perceived value of microfinance and SME performance fails to account for the distinct challenges that smaller MSMEs or those in nascent stages of development may encounter in adopting green technology, in contrast to larger or more established MSMEs (Hidayat-ur-Rehman & Alsolamy, 2023; Sarfo et al., 2024). An investigation concentrating on the dynamics across different stages of MSME growth will yield a more profound comprehension.

The deficiencies in the current literature regarding the adoption of green technologies by MSMEs in achieving sustainable performance indicate significant potential for further research, particularly in enhancing the theoretical framework, broadening methodological approaches, and extending the geographical and industrial contexts.

Future Research Agenda

The future research agenda on the use of green technology by MSMEs for sustainable performance should concentrate on various areas, including theoretical, methodological, and contextual deficiencies. Below are potential areas for future research focus:

Theory Development and Integration

Integration of the Resource-Based View (RBV) with Sustainability Theory and the Technology Acceptance Model (TAM): The future of study may concentrate on formulating a novel theoretical framework that integrates Resource-Based View (RBV), Sustainability Theory, and Technology Acceptance Model (TAM) within the realm of green technology adoption by Micro, Small, and Medium Enterprises (MSMEs). This paradigm examines how the constrained resources of MSMEs (capital, skills, and technology) might be leveraged to enhance the sustainable adoption of green technologies. The advancement of Green Innovation Theory: Prior research has inadequately emphasized the significance of green innovation, focusing instead on the influences of environmental regulations, global markets, and governmental incentives, particularly within the MSME sector.

An Enhanced Methodological Diversity

While the majority of the research employs a quantitative methodology, forthcoming studies should enhance the perspective by using a more profound qualitative approach. Qualitative studies, including interviews and case studies, can explore in greater depth the experiences, problems, and motives influencing the adoption of green technology by MSMEs across diverse sectors and nations. Furthermore, the application of big data and sophisticated

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analytics in business can evaluate the influence of green technology on the performance of MSMEs. The utilization of real-time data will yield more accurate and current insights into the behavior of MSMEs on the adoption of green technologies.

Examination of the Impact of Government Policies and Incentives

Future research should explore how government rules and policies, such as taxes, green subsidies, or incentive programs, can support the adoption of green technologies by MSMEs. This study will elucidate the role of governments in expediting green transformation within the MSME sector, particularly in emerging nations. The use of green technology frequently necessitates substantial investments, posing a challenge for MSMEs. Future research may investigate the role of financial institutions, including banks and investors, in facilitating suitable green financing for MSMEs.

Investigation of Organizational Competencies in Sustainable Technology

Considering the significance of internal capabilities for technology adoption, subsequent study may concentrate on how MSMEs cultivate green innovation capabilities, such as through training, collaboration, or partnerships with major enterprises and academic institutions. Moreover, subsequent research may investigate how collaborations with other entities, both locally and globally, can expedite the use of green technologies by MSMEs.

The Influence of Digitalization on the Integration of Green Technology

Digitalization progressively enhances the efficiency and sustainability of company operations. Future research may concentrate on the interplay between digital technology and green technology, as well as how digital transformation might expedite the adoption of sustainable business practices in MSMEs.

Assessment of the Social and Environmental Effects of Green Technology

The majority of the research concentrates solely on the economic implications of adopting green technology. Future research may investigate social implications, including the generation of green employment, effects on local communities, and the environmental consequences of green technology utilization by MSMEs.

CONCLUSION

A review of the literature concerning the use of green technology by MSMEs for sustainable performance indicates significant prospects for future study and practice development. Numerous analyzed publications indicate that the implementation of green technology significantly enhances innovative performance, operational efficiency, and the economic, social, and environmental sustainability of MSMEs. Nonetheless, there remain theoretical, methodological, and contextual deficiencies that require attention. There is a theoretical necessity to create a more comprehensive conceptual framework by merging the Resource-Based View (RBV), Technology Acceptance Model (TAM), Innovation Theory, and Sustainability Theory. This integration will elucidate the influence of internal resources, green innovation, and technological aspects on the adoption and sustainable performance of MSMEs across diverse contexts. Methodologically, several studies employ a quantitative technique utilizing cross-sectional data; hence, there is a must for additional longitudinal studies to

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DOI: https://doi.org/10.37150/jimat.v6.i1.3603
Volume: 6 Nomor: 1 (Maret: 2025) hal: 60-76

comprehend the long-term dynamics of green technology adoption. Furthermore, comprehensive qualitative research, including interviews and case studies, is essential to gain a deeper knowledge of the difficulties and motivations for green technology adoption among MSMEs. Most research predominantly examines developed nations, presenting a significant opportunity to investigate the dynamics of green technology uptake in MSMEs inside developing and impoverished countries. This research must also include the diverse industrial sectors and growth stages of MSMEs, as each environment presents distinct obstacles and opportunities in the use of green technology. Future research priorities encompass the formulation of more comprehensive theories, the implementation of diverse methodological approaches (both quantitative and qualitative), and the investigation of novel circumstances in developing nations. Research must also concentrate on the influence of governmental policies, partnerships with external stakeholders, and the social and environmental ramifications of green technologies. Digitalization and digital transformation are critical elements that should be examined in the implementation of green technology in MSMEs. The findings of this study can assist policymakers in formulating rules and incentives that promote the use of green technology by MSMEs. Financial institutions and ancillary organizations can significantly contribute by offering accessible green funding and technical assistance. These findings offer MSME stakeholders practical recommendations for enhancing green innovation capabilities and leveraging green technology to attain sustainable performance.

REFERENCES

Abrokwah-Larbi, K. (2024). The impact of customer-focus on the performance of business organizations: evidence from SMEs in an emerging West African economy. *African Journal of Economic and Management Studies*, *15*(1), 31–59. https://doi.org/10.1108/AJEMS-04-2022-0167

Adela, V., Agyei, S. K., Frimpong, S., Awisome, D. B., Bossman, A., Abosompim, R. O., Benchie, J. K. O., & Ahmed, A. M. A. (2024). Bookkeeping practices and SME performance: The intervening role of owners' accounting skills. *Heliyon*, *10*(1). https://doi.org/10.1016/j.heliyon.2023.e23911

Adomako, S., & Ahsan, M. (2022). Entrepreneurial passion and SMEs' performance: Moderating effects of financial resource availability and resource flexibility. *Journal of Business Research*, *144*, 122–135. https://doi.org/10.1016/j.jbusres.2022.02.002

Alqershi, N., Mokhtar, S. S. M., & Abas, Z. Bin. (2020). Innovative CRM and performance of SMEs: The moderating role of relational capital. *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(4), 1–18. https://doi.org/10.3390/joitmc6040155

Alraja, M. N., Khan, S. F., Khashab, B., & Aldaas, R. (2020). Does Facebook Commerce Enhance SMEs Performance? A Structural Equation Analysis of Omani SMEs. *SAGE Open*, *10*(1). https://doi.org/10.1177/2158244019900186

Alshuaibi, M. S. I., Alhebri, A., Khan, S. N., & Sheikh, A. A. (2024). Big data analytics, GHRM practices, and green digital learning paving the way towards green innovation and sustainable firm performance. *Journal of Open Innovation: Technology, Market, and Complexity*, *10*(4), 100396. https://doi.org/10.1016/j.joitmc.2024.100396

Anjaningrum, W. D., Azizah, N., & Suryadi, N. (2024). Spurring SMEs' performance through business intelligence, organizational and network learning, customer value anticipation, and

innovation - Empirical evidence of the creative economy sector in East Java, Indonesia. *Heliyon*, *10*(7). https://doi.org/10.1016/j.heliyon.2024.e27998

Audretsch, D. B., Belitski, M., Caiazza, R., & Phan, P. (2023). Collaboration strategies and SME innovation performance. *Journal of Business Research*, *164*. https://doi.org/10.1016/j.jbusres.2023.114018

Belitski, M., & Mariani, M. (2023). The effect of knowledge collaboration on business model reconfiguration. *European Management Journal*, *41*(2), 223–235. https://doi.org/10.1016/j.emj.2022.02.006

Bhatti, S. H., Rashid, M., Arslan, A., Tarba, S., & Liu, Y. (2023). Servitized SMEs' performance and the influences of sustainable procurement, packaging, and distribution: The mediating role of eco-innovation. *Technovation*, *127*. https://doi.org/10.1016/j.technovation.2023.102831

Chaithanapat, P., Punnakitikashem, P., Khin Khin Oo, N. C., & Rakthin, S. (2022). Relationships among knowledge-oriented leadership, customer knowledge management, innovation quality and firm performance in SMEs. *Journal of Innovation and Knowledge*, *7*(1). https://doi.org/10.1016/j.jik.2022.100162

Chourasiya, R., Pandey, S., Malviya, R. K., & Pujara, A. A. (2024). Towards sustainable success: A framework for assessing performance of sustainable manufacturing adoption in Indian textile industry. *Sustainable Futures*, *7*. https://doi.org/10.1016/j.sftr.2024.100216

Chugunov, I., Makohon, V., Vatulov, A., & Markuts, Y. (2020). General government revenue in the system of fiscal regulation. *Investment Management and Financial Innovations*, *17*(1), 134–142. https://doi.org/10.21511/imfi.17(1).2020.12

Deku, W. A., Wang, J., & Preko, A. K. (2024). Digital marketing and small and medium-sized enterprises' business performance in emerging markets. *Asia Pacific Journal of Innovation and Entrepreneurship*, *18*(3), 251–269. https://doi.org/10.1108/apjie-07-2022-0069

Drobetz, W., El Ghoul, S., Guedhami, O., Hackmann, J. P., & Momtaz, P. P. (2024). Entrepreneurial finance and sustainability: Do institutional investors impact the ESG performance of SMEs? *Journal of Business Venturing Insights*, *22*, e00498. https://doi.org/10.1016/j.jbvi.2024.e00498

Greco, A., Eikelenboom, M., & Long, T. B. (2021). Innovating for sustainability through collaborative innovation contests. *Journal of Cleaner Production*, *311*. https://doi.org/10.1016/j.jclepro.2021.127628

Gutiérrez-Broncano, S., Linuesa-Langreo, J., Rubio-Andrés, M., & Sastre-Castillo, M. Á. (2024). Can hybrid strategy improve SME performance? The role of innovation and adaptive capacity. *European Journal of Innovation Management*, *27*(9), 173–197. https://doi.org/10.1108/EJIM-07-2023-0566

Hariyono, A., & Narsa, I. M. (2024). The value of intellectual capital in improving MSMEs' competitiveness, financial performance, and business sustainability. *Cogent Economics and Finance*, *12*(1). https://doi.org/10.1080/23322039.2024.2325834

Hasani, T., Rezania, D., Levallet, N., O'Reilly, N., & Mohammadi, M. (2023). Privacy enhancing technology adoption and its impact on SMEs' performance. *International Journal of Engineering Business Management*, *15*. https://doi.org/10.1177/18479790231172874

Hidayat-ur-Rehman, I., & Alsolamy, M. (2023). A SEM-ANN analysis to examine sustainable performance in SMEs: The moderating role of transformational leadership. *Journal of Open Innovation: Technology, Market, and Complexity*, *9*(4). https://doi.org/10.1016/j.joitmc.2023.100166

Hsieh, W. L., Ganotakis, P., Kafouros, M., & Wang, C. (2018). Foreign and Domestic Collaboration, Product Innovation Novelty, and Firm Growth. *Journal of Product Innovation Management*, *35*(4), 652–672. https://doi.org/10.1111/jpim.12435

Hussain, A., Shahzad, A., & Hassan, R. (2020). Organizational and environmental factors with the mediating role of e-commerce and SME performance. *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(4), 1–21. https://doi.org/10.3390/joitmc6040196

Jing, H., Zhang, Y., & Ma, J. (2023). Influence of digital ambidextrous capabilities on SMEs' transformation performance: The mediating effect of business model innovation. *Heliyon*, *9*(11). https://doi.org/10.1016/j.heliyon.2023.e21020

Khan, S. A. R., Tahir, M. S., & Sheikh, A. A. (2024). Sustainable performance in SMEs using big data analytics for closed-loop supply chains and reverse omnichannel. *Heliyon*, *10*(16). https://doi.org/10.1016/j.heliyon.2024.e36237

Konopik, J., Jahn, C., Schuster, T., Hoßbach, N., & Pflaum, A. (2022). Mastering the digital transformation through organizational capabilities: A conceptual framework. *Digital Business*, *2*(2). https://doi.org/10.1016/j.digbus.2021.100019

Kusa, R., Duda, J., & Suder, M. (2021). Explaining SME performance with fsQCA: The role of entrepreneurial orientation, entrepreneur motivation, and opportunity perception. *Journal of Innovation and Knowledge*, *6*(4), 234–245. https://doi.org/10.1016/j.jik.2021.06.001

Le, D. V., Le, H. T. T., Pham, T. T., & Vo, L. Van. (2023). Innovation and SMEs performance: evidence from Vietnam. *Applied Economic Analysis*, *31*(92), 90–108. https://doi.org/10.1108/AEA-04-2022-0121

Liu, Z., Jiao, C., Zhang, Y., & Wang, J. (2023). Linking Supply Chain Collaboration, Collaborative Advantage, and Firm Performance in China: The Moderating Role of Government Subsidies. *Sustainability*, *15*(21), 15329. https://doi.org/10.3390/su152115329

Lutfi, A., Al-Hiyari, A., Elshaer, I. A., Alrawad, M., & Almaiah, M. A. (2024). Green environmental management system and environmental performance: Results from PLS-SEM and fsQCA. *Sustainable Futures*, *8*. https://doi.org/10.1016/j.sftr.2024.100276

Mallett, O., Wapshott, R., & Vorley, T. (2019). How Do Regulations Affect SMEs? A Review of the Qualitative Evidence and a Research Agenda. *International Journal of Management Reviews*, *21*(3), 294–316. https://doi.org/10.1111/ijmr.12191

Menne, F., Surya, B., Yusuf, M., Suriani, S., Ruslan, M., & Iskandar, I. (2022). Optimizing the Financial Performance of SMEs Based on Sharia Economy: Perspective of Economic Business Sustainability and Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(1). https://doi.org/10.3390/joitmc8010018

Merín-Rodrigáñez, J., Dasí, À., & Alegre, J. (2024). Digital transformation and firm performance in innovative SMEs: The mediating role of business model innovation. *Technovation*, *134*. https://doi.org/10.1016/j.technovation.2024.103027

Nair, J., Chellasamy, A., & Singh, B. N. B. (2019). Readiness factors for information technology adoption in SMEs: testing an exploratory model in an Indian context. *Journal of Asia Business Studies*, *13*(4), 694–718. https://doi.org/10.1108/JABS-09-2018-0254

Ngo, Q. H. (2023). The Impact of Entrepreneurial Orientation on SMEs' Performance in a Transitional Economy: The Mediating Role of Differentiation Advantages and Innovation Capability. *SAGE Open*, *13*(4). https://doi.org/10.1177/21582440231203035

Nguyen, P. V., Huynh, H. T. N., Lam, L. N. H., Le, T. B., & Nguyen, N. H. X. (2021). The impact of entrepreneurial leadership on SMEs' performance: the mediating effects of organizational factors. *Heliyon*, *7*(6). https://doi.org/10.1016/j.heliyon.2021.e07326

Oduro, S. (2024). Eco-innovation and SMEs' sustainable performance: a meta-analysis. In *European Journal of Innovation Management* (Vol. 27, Issue 9, pp. 248–279). Emerald Publishing. https://doi.org/10.1108/EJIM-11-2023-0961

Oppon, E., Koh, S. C. L., & Eufrasio, R. (2024). Sustainability performance of enhanced weathering across countries: A triple bottom line approach. *Energy Economics*, *136*. https://doi.org/10.1016/j.eneco.2024.107722

Orden-Cruz, C., Paule-Vianez, J., Sánchez-Escobedo, M. C., & Moutinho, V. (2024). EPU and SMEs' financial performance: Industry vs. service sector. *Journal of Open Innovation: Technology, Market, and Complexity*, *10*(3). https://doi.org/10.1016/j.joitmc.2024.100320

Ougier, S., Bach, P., Le Loc'h, F., Aubin, J., & Gascuel, D. (2024). When economy meets ecology, is it truly conflicted? A dashboard approach to assess the sustainability performance of European tropical tuna purse seine fisheries. *Science of the Total Environment*, *943*. https://doi.org/10.1016/j.scitotenv.2024.173842

Pascucci, F., Domenichelli, O., Peruffo, E., & Gregori, G. L. (2022). Family ownership and the export performance of SMEs: the moderating role of financial constraints and flexibility. *Journal of Small Business and Enterprise Development*, *29*(4), 602–626. https://doi.org/10.1108/JSBED-03-2021-0113

Pilav – Velic, A., Jahic, H., & Krndzija, L. (2024). Firm resilience as a moderating force for SMEs' innovation performance: Evidence from an emerging economy perspective. *Regional Science Policy and Practice*, *16*(8). https://doi.org/10.1016/j.rspp.2024.100033

Prajapati, C., Goswami, I., Kumar, V., Singh, A., Mahlawat, S., & Singh, S. (2024). Conceptualization and theorizing process of innovation metrics for green business practices. *Green Technologies and Sustainability*, *2*(3), 100110. https://doi.org/10.1016/j.grets.2024.100110

Qalati, S. A., Ostic, D., Sulaiman, M. A. B. A., Gopang, A. A., & Khan, A. (2022). Social Media and SMEs' Performance in Developing Countries: Effects of Technological-Organizational-Environmental Factors on the Adoption of Social Media. *SAGE Open*, *12*(2). https://doi.org/10.1177/21582440221094594

Rhee, M., & Stephens, A. R. A. E. (2020). INNOVATION-ORIENTATED TECHNOLOGY ASSIMILATION STRATEGY and Korean SMES' ENHANCING INNOVATION CAPABILITY, COMPETITIVE ADVANTAGE and FIRM PERFORMANCE. *International Journal of Innovation Management*, *24*(6). https://doi.org/10.1142/S1363919620500814

Rojas-Ospina, A., Zuñiga-Collazos, A., & Castillo-Palacio, M. (2024). Factors influencing environmental sustainability performance: A study applied to coffee crops in Colombia. *Journal of Open Innovation: Technology, Market, and Complexity*, *10*(3). https://doi.org/10.1016/j.joitmc.2024.100361

Rumanti, A. A., Rizana, A. F., & Achmad, F. (2023). Exploring the role of organizational creativity and open innovation in enhancing SMEs performance. *Journal of Open Innovation: Technology, Market, and Complexity*, *9*(2). https://doi.org/10.1016/j.joitmc.2023.100045

Sadeghi, A., Aliasghar, O., & Bouguerra, A. (2023). Unpacking the relationship between post-entry speed of internationalization and export performance of SMEs: A capability-building

perspective. *Journal of International Management*, *29*(1). https://doi.org/10.1016/j.intman.2022.100982

Sarfo, C., Zhang, J. A., O'Kane, C., & O'Kane, P. (2024). Perceived value of microfinance and SME performance: The role of exploratory innovation. *International Journal of Innovation Studies*, *8*(2), 172–185. https://doi.org/10.1016/j.ijis.2024.02.003

Singh, R., Chandrashekar, D., Subrahmanya Mungila Hillemane, B., Sukumar, A., & Jafari-Sadeghi, V. (2022). Network cooperation and economic performance of SMEs: Direct and mediating impacts of innovation and internationalisation. *Journal of Business Research*, *148*, 116–130. https://doi.org/10.1016/j.jbusres.2022.04.032

Somohano-Rodríguez, F. M., & Madrid-Guijarro, A. (2022). Do industry 4.0 technologies improve Cantabrian manufacturing smes performance? The role played by industry competition. *Technology in Society*, *70*. https://doi.org/10.1016/j.techsoc.2022.102019

Subhani, W., Abdul Latiff, A. S., & Wahab, S. A. (2023). Effort Expectancy, Task Technology Fit, and ERP Adoption Behavior; Moderating Effect of Trust in Technology: Evidence from SMEs of Pakistan. In *Pakistan Journal of Commerce and Social Sciences* (Vol. 2023, Issue 3).

Suryawan, I. W. K., & Lee, C.-H. (2024). Exploring citizens' cluster attitudes and importance-performance policy for adopting sustainable waste management practices. *Waste Management Bulletin*, *2*(3), 204–215. https://doi.org/10.1016/j.wmb.2024.07.011

Tariq, A., Sumbal, M. S. U. K., Dabić, M., Raziq, M. M., & Torkkeli, M. (2024). Interlinking networking capabilities, knowledge worker productivity, and digital innovation: a critical nexus for sustainable performance in small and medium enterprises. *Journal of Knowledge Management*, *28*(11), 179–198. https://doi.org/10.1108/JKM-09-2023-0788

Tolstoy, D., Nordman, E. R., & Vu, U. (2022). The indirect effect of online marketing capabilities on the international performance of e-commerce SMEs. *International Business Review*, *31*(3). https://doi.org/10.1016/j.ibusrev.2021.101946

Utaminingsih, A., Priyanto, S. H., Ihalauw, J. J. O. I., & Kusuma, L. (2020). Green Business Behaviour, Green Technologies, and Sustainability in SMEs. In *International Journal of Economics and Business Administration: Vol. VIII* (Issue 1).

Varriale, V., Cammarano, A., Michelino, F., & Caputo, M. (2024). Exploring the environmental, economic, and social implications of metaverse adoption in business and management. *European Management Journal*. https://doi.org/10.1016/j.emj.2024.09.007

Wang, G., Mansor, Z. D., & Leong, Y. C. (2024). Linking digital leadership and employee digital performance in SMEs in China: The chain-mediating role of high-involvement human resource management practice and employee dynamic capability. *Heliyon*, *10*(16). https://doi.org/10.1016/j.heliyon.2024.e36026

Yousaf, A., Mishra, A., & Gupta, A. (2021). 'From technology adoption to consumption': Effect of pre-adoption expectations from fitness applications on usage satisfaction, continual usage, and health satisfaction. *Journal of Retailing and Consumer Services*, *62*. https://doi.org/10.1016/j.jretconser.2021.102655

Zamani, S. Z. (2022). Small and Medium Enterprises (SMEs) facing an evolving technological era: a systematic literature review on the adoption of technologies in SMEs. *European Journal of Innovation Management*, *25*(6), 735–757. https://doi.org/10.1108/EJIM-07-2021-0360

Zelenika, I., & Pearce, J. M. (2014). Innovation through collaboration: scaling up solutions for sustainable development. *Development and Sustainability*, *16*(6). https://doi.org/10.1007/s10668

Jurnal Ilmu Manajemen Retail (JIMAT)
Published by: Manajemen Retail Fakultas Ekonomi UMMI
e-ISSN: 2746-1475
DOI: https://doi.org/10.37150/jimat.v6.i1.3603
Volume: 6 Nomor: 1 (Maret: 2025) hal: 60-76

Zhang, H. (2022). Does combining different types of innovation always improve SME performance? An analysis of innovation complementarity. *Journal of Innovation and Knowledge*, *7*(3). https://doi.org/10.1016/j.jik.2022.100192