
Implementation Barriers to Process Innovation among Malaysian Manufacturing SMEs: A Review

Muhamad Nikmatullah Ajwad Adnan

(Corresponding Author)

Faculty of Entrepreneurship and Business, University Malaysia Kelantan, City Campus, Pengkalan Chepa, 16100, Kota Bharu, Kelantan, Malaysia.
Email: nikmatullah182@gmail.com

Mohd Rafi Yaacob

Faculty of Entrepreneurship and Business, University Malaysia Kelantan, City Campus, Pengkalan Chepa, 16100, Kota Bharu, Kelantan, Malaysia.
Email: rafi@umk.edu.my

Dzulkifli Mukhtar

Faculty of Entrepreneurship and Business, University Malaysia Kelantan, City Campus, Pengkalan Chepa, 16100, Kota Bharu, Kelantan, Malaysia.
Email: dzulkifli.mukhtar@gmail.com

Nawi Abdullah

Faculty of Business and Economics, University Malaya, 50603, Federal Territory of Kuala Lumpur, Kuala Lumpur, Malaysia.
Email: a.nawi@um.edu.my

Journal of Entrepreneurship and Business
E-ISSN: 2289-8298

Vol. 12, Issue 2, pp. 91-98. Sep. 2024

Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan
Locked Bag 36, 16100 Pengkalan Chepa
Kota Bharu, Kelantan, Malaysia
<http://fkp.umk.edu.my/journal/index.html>

Date Received: 20th December 2023

Date Accepted: 30th August 2024

DOI: 10.17687/jeb.v12i2.1215



This work is licensed under a Creative Commons Attribution 3.0 Unported License

Abstract – Process innovation is widely recognised as a crucial driver of small and medium-sized enterprises (SMEs). The SMEs that could not rapidly evolve core business strategies may become uncompetitive owing to obsolete products and processes. Hence, SMEs should consider the potential benefits of refining current processes apart from focusing on existing product offerings. Fostering process innovation could significantly improve competitiveness, efficiency, and plant visibility. Nonetheless, most SMEs struggle to implement efficient and effective process innovations in existing production operations. The current study aims to review the barriers encountered by manufacturing SMEs to facilitate process innovation.

Keywords: “SMEs”, “Process innovation”, “Barrier implementation”

1. Introduction

Intense globalisation and market liberation in the contemporary era have compelled most firms to highly depend on innovations. Boon and Edler (2018) and Schot and Steinmueller (2018) argued that both developed and developing countries currently implement progressive policies and strategies to nurture proactive and innovative small and medium-sized enterprises (SMEs) with sufficient capabilities to navigate a market with significant competition (Eggers, 2020). Nonetheless, a majority of existing SMEs remain inadequately competitive, which drives the SMEs to concentrate more on investments to leverage emerging opportunities while analysing and minimising potential threats.

Innovation presents an alternative approach that provides higher value for the competitiveness of SMEs, especially in the manufacturing sector prioritising innovative products to ensure survival. Nonetheless, existing innovative strategies could not hinder competitors from producing similar products at a minimum or effective cost after a certain period, which encourages SMEs to pursue more competitive edges. The objective can be achieved by investing in alternative process technologies with higher protection from competitors' imitations (Annamalah et al., 2022). Additionally, the implementation of alternative technologies and processes generally cultivates additional knowledge for SME employees to constantly fulfil customer demands (Hervas-Oliver, Sempere-Ripoll & Boronat-Moll, 2021). The introduction of innovative technologies also significantly boosts existing processes to increase the capacity of current operating systems (Müller, Buliga & Voigt, 2021). Summarily, manufacturing process innovation allows competitive market positioning, higher profitability, more efficient daily operations, and the development of innovative products (Aliasghar, Rose & Chetty, 2019).

While innovation has been extensively scrutinised in past studies, only several scholars examined the barriers encountered by SMEs to nurture process innovation, especially in the manufacturing sector (Indrawati, 2020). Thus, understanding innovation barriers can contribute valuable insights and knowledge to improve existing policies and assist SMEs in fostering innovation (Aliasghar, Sadeghi & Rose, 2020). Gay and Szostak (2019) asserted that thoroughly comprehending the innovation barrier would support existing theories delineating the underlying factors that discourage SMEs from developing or actively engaging in innovative processes. The SMEs have played an integral role in economic growth by driving industrial development, particularly in Malaysia, since the late 1990s (Chin & Lim, 2018). Malaysian SMEs have significantly contributed to national economies by supporting large-scale industries and generating more job opportunities. The Malaysian Economic Census (2022) reported that SMEs represented 98.5% of the national enterprise establishments and contributed more than 38.3% of the gross domestic product (GDP), more than 17.3% of exports, and 65.3% of the labour force (Department of Statistics Malaysia, 2022). Furthermore, approximately 90% of the total enterprise establishments in the manufacturing sector were SMEs (SMEs report, 2022). The Department of Statistics Malaysia (2022) also demonstrated manufacturing SMEs produced more than 22.3% of the total output and 22.8% value-added products. Specifically, petroleum and chemical products, food and beverages, and non-metallic mineral products are the three primary sub-sectors comprising 63.1 % of the total SME output.

The Malaysian government recognises the significant role of SMEs and has been proactively engaged in and promoting SME development through various incentives and support programmes. For instance, SME development is encouraged in the seventh, eighth, ninth, 10th, 11th, and 12th Malaysian Plans and the Third Industrial Master Plan (IMP3; MITI, 2020). One of the significant strategies is the introduction of innovation and technology adoption, which is regarded as the decisive strategic determinant of SME performance. The government also focuses on allocating a supportive ecosystem and developing fundamentally resilient SMEs by transforming from labour-intensive

operations to specialisation in technology, capital, and knowledge, including the capacity to design, develop, and innovate alternative processes and products. Nonetheless, the Malaysian ranking in the global innovation index has declined from 35th to 37th from 2020 to 2022, which reflects the sluggish pace of SME growth and low-level innovation (WIPO, 2022). Malaysian SMEs have also exhibited moderate innovation performance compared to other nations due to the low levels of R&D and productivity, insufficient capacity to obtain the latest technological knowledge, limited skills and experiences in developing innovative product and process technology, and inadequacy to apply the latest process technology and modern equipment (Mustafa & Yaakub, 2018). Therefore, more studies are essential to attain a comprehensive understanding of innovation and determine the implementation barrier to innovative processes among manufacturing SMEs.

2. Literature Review

2.1. Process innovation

Process innovation refers to the implementation of alternative or improved production, supply chains, and administrative processes, which is collectively perceived as a fundamental source of competitive advantages and organisational renewal (Distanont & Khongmalai, 2020). The capability to rejuvenate existing organisational structures and processes by adopting administrative and technological innovations can enhance competitiveness through higher market positioning, satisfying customer needs, comprehensive legal frameworks, and advanced technologies (Damanpour, 2020; Tidd & Bessant, 2020). Hence, process innovation can improve the efficiency and effectiveness of corporate technological and administrative processes recognised as an internal organisational focus (Fu, Mohnen & Zanello, 2018; Mohnen, 2019). Process innovation can also assist in reducing cost, time, and employee turnover while increasing productivity and improving quality (Kelly et al., 2021). Moreover, previous studies demonstrated a mutually supportive and influencing relationship between process and product innovations (Chege & Wang, 2020; Radicic & Djalilov, 2019), in which process innovation provided competitive advantages for offered products (El Chaarani et al., 2022; Lestari et al., 2020). Nonetheless, Tidd and Bessant (2020) discovered that firms are generally well-developed in product innovation instead of process innovation, which results in process innovation as a second-order innovative activity (Damanpour, 2020). In addition, process innovation remains understudied (Jamai et al., 2021).

The conceptualisation of process innovation varies from other forms of innovation (Curado, Muñoz-Pascual & Galende, 2018; Saridakis et al., 2019), which includes a distinctive set of components that appear as a unique organisational phenomenon. Process innovation is also derived from internal inquiry as existing processes are frequently commercialised within the corporation while also necessitated by market demands (Aliasghar, Rose & Chetty, 2019; Ukpabio, Oyebisi & Siyanbola, 2019). Two types of process innovation have been identified, namely incremental and radical (Damanpour, 2020; Tidd & Bessant, 2020). Radical process innovation is defined as introducing innovations that substitute obsolete machines with effective and efficient equipment

(Coccia, 2021; Klimas & Czakon, 2022). Radical process innovation will describe the change degree generated by major improvements or transformations of organisational processes (Henderson, 2021; Knuepling, Wessendorf & Basilico, 2022). Purba et al. (2018) also explained that radical process innovation would lead to significant alterations in core components, technological directions, and existing approaches (Al-Khatib & Al-Ghanem, 2022). Nevertheless, radical process innovation requires huge capital investment, especially among larger companies or conglomerates. While radical process innovation also increases operational expenses in the early phase, long-term profitability and growth will be achieved subsequently. Samuelsson et al. (2019) revealed that successfully implementing radical process innovation significantly contributed to corporate growth despite potential failure and high risk.

Incremental process innovation refers to innovation unique only to the enterprise but not to the industry, which suggests that process innovations have been implemented by competitors (Damanpour, 2020; Tidd & Bessant, 2020). Incremental process innovation generally requires the combination of existing and alternative production equipment to generate minor changes in the current manufacturing process (Coccia, 2021). Particularly, incremental process innovation will result in minor improvements in internal processes without significant impacts on the industry. Nevertheless, incremental process innovation will enhance technical knowledge and skills with lower risks without providing higher firm performance and competitive advantage (Coccia, 2021; Klimas & Czakon, 2022). Incremental process innovation only seeks to reduce production costs with higher product quality by gradually improving existing organisational components (Damanpour, 2020).

2.2. Implementation barriers

Process innovation establishes higher competitiveness through innovative product development (Kahn, 2018) while preventing competitors from gaining competitive advantages in terms of consistent quality, swifter production speed, and higher cost efficiency (Tidd and Bessant, 2020). Tidd and Bessant (2020) explicated that process innovation is a significant source of improved efficiency and effective productivity. Nonetheless, most SMEs encounter different barriers to implementing alternative or improved process technologies owing to elevated financial costs and risks and limited access to funding (Ayinaddis, 2022; Haddad et al., 2020; Indrawati, 2020; Wellalage & Fernandez, 2019). The implementation of alternative or improved processes requires significant monetary, time, and technological investments with continuous monitoring, evaluation, and training. The high financial risk may also lead SMEs to experience larger losses if the technology does not perform as anticipated. Prior researchers estimated that the failure rate of implementing significant technical and administrative transformations was at least 50% (Indrawati, 2020; Tidd & Bessant, 2020). Process innovation also potentially results in complicated situations, when necessary, experiences and knowledge are limited.

Acquiring vital information and knowledge from various internal sources combined with external knowledge is extremely important. Diversifying the knowledge base of SMEs can strengthen the capacity to identify specific knowledge beneficial for process innovation, which motivates a higher predisposition and success rate for process innovation (Ghobakhloo et al., 2022; Hartono & Kusumawardhani, 2019). Simultaneously, process innovation encourages SMEs to obtain additional technical skills and knowledge. Nevertheless, existing SMEs comprise fewer skilled employees due to inadequate training and capability-developing activities (Arza & López, 2021). Limited awareness of internal and external information sources also reduces the creation and dissemination rates of technical and scientific knowledge (Aliasghar, Sadeghi & Rose, 2020). Thus, SMEs require support from private institutions and the government to be equipped with sufficient knowledge and resources for process innovation (Tidd & Bessant, 2020). Moreover, process innovation is characterised by high uncertainty levels (Damanpour, 2020). While most manufacturing SMEs prefer to implement technical changes to renew production manufacturing processes (Tidd & Bessant, 2020), the SMEs are not equipped with applicable knowledge about alternative duties and tasks (Torres de Oliveira, Gentile-Lüdecke & Figueira, 2022). Resultantly, SMEs tend to innovate beyond minor improvements and undergo extensive adjustments, which contributes to radical process innovation and elevates the uncertainty degree in the developmental process (Mustafa & Yaakub, 2018).

Process innovations demand SMEs to introduce alternative concepts and ideas for advanced manufacturing processes, which generates more uncertainties. Furthermore, SMEs implementing process innovation prefer to specialise in existing production systems and manufacturing technologies, such as equipment and machinery, which reinforces existing uncertainties (Ryman & Roach, 2022). Mazzarol and Reboud (2022) underscored the negative impact of formalisation on anticipated outcomes, although formalised processes could be instrumental in decreasing uncertainty. Tidd and Bessant (2020) also highlighted that introducing alternative process technologies would trigger issues in existing products, such as quality. An inflexible process system or a novel solution after implementing process innovation would impede product innovation. In addition, past academicians corroborated a significant correlation between product and process innovations (Damanpour, 2020; Tidd & Bessant, 2020), which propounded the interdependencies between the two types of innovation. The SMEs also encountered high complexity in establishing an effective standardisation process to reduce variations that engender defects and faulty products. According to Indrawati (2020), process innovation generally involves novel material processing technologies and work applications. Most SMEs may not be equipped with sufficient skills to manage different structural processes, which would contribute to lower production quality.

6. Conclusion

Process innovation is a crucial approach to enhancing the competitive edge of SMEs, which encompasses the introduction of novel or improved technologies and delivery or production methods by transforming existing software, techniques, and equipment. Significant

improvements will be observed in critical performance areas, including operational costs, speed, quality, and services. Nonetheless, SMEs in the manufacturing sector experience various barriers to implementing process innovation in terms of knowledge, resources, capabilities, investments, and uncertainties. Future researchers can focus on determining the potential benefits of cultivating process innovation and the success or failure rate of implementing process innovation.

References

- Al-Khatib, A. W., & Al-ghanem, E. M. (2022). Radical innovation, incremental innovation, and competitive advantage, the moderating role of technological intensity: Evidence from the manufacturing sector in Jordan. *European Business Review*, 34(3), 344-369. <https://doi.org/10.1108/EBR-06-2020-0139>
- Aliasghar, O., Rose, E. L., & Chetty, S. (2019). Where to search for process innovations? The mediating role of absorptive capacity and its impact on process innovation. *Industrial Marketing Management*, 82, 199-212. <https://doi.org/10.1016/j.indmarman.2019.01.013>
- Aliasghar, O., Sadeghi, A., & Rose, E. L. (2020). Process innovation in small and medium-sized enterprises: The critical roles of external knowledge sourcing and absorptive capacity. *Journal of Small Business Management*, 1-28. <https://doi.org/10.1080/00472778.2020.1777906>
- Annamalah, S., Aravindan, K. L., Raman, M., & Paraman, P. (2022). SME engagement with open innovation: Commitments and challenges towards collaborative innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 146. <https://doi.org/10.3390/joitmc8030146>
- Arza, V., & López, E. (2021). Obstacles affecting innovation in small and medium enterprises: Quantitative analysis of the Argentinean manufacturing sector. *Research Policy*, 50(9), 104324. <https://doi.org/10.1016/j.respol.2021.104324>
- Ayinaddis, S. G. (2022). Exploring firm-specific deterrents of innovation in micro and small enterprises in Ethiopia. *Journal of Innovation and Entrepreneurship*, 11(1), 1-13. <https://doi.org/10.1186/s13731-022-00211-9>
- Boon, W., & Edler, J. (2018). Demand, challenges, and innovation: Making sense of new trends in innovation policy. *Science and Public Policy*, 45(4), 435-447. <https://doi.org/10.1093/scipol/scx073>
- Chege, S. M., & Wang, D. (2020). The influence of technology innovation on SME performance through environmental sustainability practices in Kenya. *Technology in Society*, 60, 101210. <https://doi.org/10.1016/j.techsoc.2019.101210>
- Chin, Y. W., & Lim, E. S. (2018). SME policies and performance in Malaysia. In *Journal of Business & Industrial Marketing*.
- Coccia, M. (2021). Technological innovation. *Innovations*, 11, 112. <https://doi.org/10.3390/jrfm1110020>
- Curado, C., Muñoz-Pascual, L., & Galende, J. (2018). Antecedents to innovation performance in SMEs: A mixed methods approach. *Journal of Business Research*, 89, 206-215. <https://doi.org/10.1016/j.jbusres.2017.12.054>
- Damanpour, F. (2020). *Organizational innovation: Theory, research, and direction*. Edward Elgar Publishing.
- Distanont, A., & Khongmalai, O. (2020). The role of innovation in creating a competitive advantage. *Kasetsart Journal of Social Sciences*, 41(1), 15-21. <https://doi.org/10.34044/j.kjss.2020.41.1.02>

- Eggers, F. (2020). Masters of disasters? Challenges and opportunities for SMEs in times of crisis. *Journal of Business Research*, 116, 199-208. <https://doi.org/10.1016/j.jbusres.2020.05.014>
- El Chaarani, H., Vrontis, P. D., El Nemar, S., & El Abiad, Z. (2022). The impact of strategic competitive innovation on the financial performance of SMEs during COVID-19 pandemic period. *Competitiveness Review: An International Business Journal*, 32(3), 282-301. <https://doi.org/10.1108/CR-12-2020-0174>
- Fu, X., Mohnen, P., & Zanello, G. (2018). Innovation and productivity in formal and informal firms in Ghana. *Technological Forecasting and Social Change*, 131, 315-325. <https://doi.org/10.1016/j.techfore.2017.08.015>
- Gay, C., & Szostak, B. L. (2019). *Innovation and creativity in SMEs: Challenges, evolutions and prospects*. John Wiley & Sons.
- Ghobakhloo, M., Iranmanesh, M., Vilkas, M., Grybauskas, A., & Amran, A. (2022). Drivers and barriers of Industry 4.0 technology adoption among manufacturing SMEs: A systematic review and transformation roadmap. *Journal of Manufacturing Technology Management*, 33(6), 1029-1058. <https://doi.org/10.1108/JMTM-03-2021-0116>
- Haddad, M. I., Williams, I. A., Hammoud, M. S., & Dwyer, R. J. (2020). Strategies for implementing innovation in small and medium-sized enterprises. *World Journal of Entrepreneurship, Management and Sustainable Development*, 16(1), 12-29. <https://doi.org/10.1108/WJEMSD-11-2019-0087>
- Hartono, A., & Kusumawardhani, R. (2019). Innovation barriers and their impact on innovation: Evidence from Indonesian manufacturing firms. *Global Business Review*, 20(5), 1196-1213. <https://doi.org/10.1177/0972150919846671>
- Henderson, R. (2021). Innovation in the 21st century: Architectural change, purpose, and the challenges of our time. *Management Science*, 67(9), 5479-5488. <https://doi.org/10.1287/mnsc.2021.4063>
- Hervas-Oliver, J. L., Sempere-Ripoll, F., & Boronat-Moll, C. (2021). Technological innovation typologies and open innovation in SMEs: Beyond internal and external sources of knowledge. *Technological Forecasting and Social Change*, 162, 120338. <https://doi.org/10.1016/j.techfore.2020.120338>
- Indrawati, H. (2020). Barriers to technological innovations of SMEs: How to solve them? *International Journal of Innovation Science*. <https://doi.org/10.1108/IJIS-06-2020-0076>
- Jamai, K., De Steur, H., Abidar, A., & Gellynck, X. (2021). The impact of innovation type on financial and non-financial performance of SMEs: A scoping review. *Journal of Innovation Management*, 9(3), 27-57. https://doi.org/10.24840/2183-0606_009.003_0003
- Kahn, K. B. (2018). Understanding innovation. *Business Horizons*, 61(3), 453-460. <https://doi.org/10.1016/j.bushor.2018.01.011>
- Kelly, B., Papanikolaou, D., Seru, A., & Taddy, M. (2021). Measuring technological innovation over the long run. *American Economic Review: Insights*, 3(3), 303-320. <https://doi.org/10.1257/aeri.20200456>
- Klimas, P., & Czakon, W. (2022). Species in the wild: A typology of innovation ecosystems. *Review of Managerial Science*, 16(1), 249-282. <https://doi.org/10.1007/s11846-020-00391-7>
- Kneuepling, L., Wessendorf, C., & Basilico, S. (2022). Revisiting innovation typology: A systemic approach. *Jena Economic Research Papers*. <https://doi.org/10.2139/ssrn.4031066>
- Lestari, S. D., Leon, F. M., Widyastuti, S., Brabo, N. A., & Putra, A. H. P. K. (2020). Antecedents and consequences of innovation and business strategy on performance and competitive advantage of SMEs. *The Journal of Asian Finance, Economics and Business*, 7(6), 365-378. <https://doi.org/10.13106/jafeb.2020.vol7.no6.365>

- Mazzarol, T., & Reboud, S. (2022). Managing uncertainty. In *Commercialisation and innovation strategy in small firms: Learning to manage uncertainty* (pp. 241-303). Springer Nature Singapore.
- Mohnen, P. (2019). R&D, innovation and productivity. In *The Palgrave Handbook of Economic Performance Analysis* (pp. 97-122). Palgrave Macmillan.
- Müller, J. M., Buliga, O., & Voigt, K. I. (2021). The role of absorptive capacity and innovation strategy in the design of Industry 4.0 business models: A comparison between SMEs and large enterprises. *European Management Journal*, 39(3), 333-343. <https://doi.org/10.1016/j.emj.2020.01.002>
- Mustafa, H. K., & Yaakub, S. (2018). Innovation and technology adoption challenges: Impact on SMEs' company performance. *International Journal of Accounting*, 3(15), 57-65. <https://doi.org/10.2139/ssrn.3076254>
- Purba, H. H., Maarif, M. S., Yuliasih, I., & Hermawan, A. (2018). Innovation typology in food industry sector: A literature review. *International Journal of Modern Research in Engineering and Technology*, 3(2), 8-19.
- Radicic, D., & Djalilov, K. (2019). The impact of technological and non-technological innovations on export intensity in SMEs. *Journal of Small Business and Enterprise Development*, 26(4), 612-638. <https://doi.org/10.1108/JSBED-11-2018-0346>
- Ryman, J. A., & Roach, D. C. (2022). Innovation, effectuation, and uncertainty. *Innovation*, 1-21. <https://doi.org/10.1080/14479338.2021.2012499>
- Samuelsson, P., Witell, L., Gottfridsson, P., & Elg, M. (2019). Incremental and radical service innovation in healthcare. In *Handbook of Service Science, Volume II* (pp. 619-638). Springer.
- Saridakis, G., Idris, B., Hansen, J. M., & Dana, L. P. (2019). SMEs' internationalisation: When does innovation matter? *Journal of Business Research*, 96, 250-263. <https://doi.org/10.1016/j.jbusres.2018.11.001>
- Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*, 47(9), 1554-1567. <https://doi.org/10.1016/j.respol.2018.08.011>
- Tidd, J., & Bessant, J. R. (2020). *Managing innovation: Integrating technological, market and organizational change*. John Wiley & Sons.
- Torres de Oliveira, R., Gentile-Lüdecke, S., & Figueira, S. (2022). Barriers to innovation and innovation performance: The mediating role of external knowledge search in emerging economies. *Small Business Economics*, 1-22. <https://doi.org/10.1007/s11187-021-00520-5>
- Ukpabio, M. G., Oyebisi, T. O., & Siyanbola, O. W. (2019). Effects of innovation on performance of manufacturing SMEs in Nigeria: An empirical study. *Management Research News*, 30(2), 115-132. <https://doi.org/10.1108/01409170710722982>
- Wellalage, N. H., & Fernandez, V. (2019). Innovation and SME finance: Evidence from developing countries. *International Review of Financial Analysis*, 66, 101370. <https://doi.org/10.1016/j.irfa.2019.101370>