

The Impact of Digital Transformation on Supply Chain Management in Small and Medium Enterprises: A Systematic Literature Review

Khairen Niza Mefid^{1)*}, Fitria Ridhaningsih²⁾

^{1,2} Universitas Negeri Padang, Indonesia

khairennizam@fe.unp.ac.id^{1)*}; Fitria90@fe.unp.ac.id²⁾

ABSTRACT

This study examines the impact of digital transformation on supply chain management (SCM) within Small and Medium Enterprises (SMEs) by utilizing the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology. Digital transformation involves integrating advanced digital technologies to improve business operations and processes. For SMEs, which often face resource limitations and scalability issues, digital transformation can significantly enhance SCM processes by increasing efficiency, reducing costs, and improving agility and collaboration. The research employs a systematic review and meta-analysis of existing literature to assess the effects of digital transformation on SCM in SMEs. The PRISMA methodology ensures a thorough and unbiased selection of relevant studies, providing a solid foundation for the analysis. The key SCM dimensions explored include operational efficiency, cost management, agility, and collaboration. The results reveal that digital transformation leads to substantial improvements in SCM performance. Automation of processes, enhanced real-time data exchange, and better decision-making capabilities are some of the benefits identified. However, the study also highlights challenges such as the high initial costs associated with digital technologies, resistance to change within organizations, and the need for continuous skill development. The findings suggest that successful digital transformation in SMEs' SCM requires strategic planning, investment in employee training, and a supportive organizational culture. This research contributes to the understanding of how digital transformation can be leveraged to optimize SCM in SMEs and provides actionable insights for practitioners and policymakers aiming to foster digital innovation in this critical sector

Keywords: Digital Transformation, Supply Chain Management, SMEs, PRISMA

Copyright (c) 2024 Khairen Niza Mefid, Fitria Ridhaningsih
DOI: <https://doi.org/10.36275/qrqb6628>

INTRODUCTION

Small and medium-sized enterprises (SMEs) are acknowledged as crucial catalysts for economic growth and advancement since they generate employment opportunities and foster competitiveness by means of innovation and the establishment of new businesses (Mago & Modiba, 2022). SMEs have a crucial role in sustaining economic well-being in both developed and developing nations (European, 2019). SMEs play a significant role in driving economic growth. However, they are facing a growing requirement to address sustainability concerns that encompass economic, environmental, and social aspects (Johnson & Schaltegger, 2016). Businesses encounter similar problems and chances to participate in digital transformation by converting their current business processes into digital formats in order to maintain competitiveness (Azevedo, 2021).

In the current age of digitalization, the global community is intricately linked, eliminating any sense of physical separation. This condition also impacts micro, small, and medium enterprises (Safari & Saleh, 2020). These SMEs can enhance the advantages of these technical advancements to achieve faster and broader market penetration (Krammer et al., 2018). SMEs,

can be categorized based on many factors such as company age, market share size, location, supply chain management, number of employees, asset value, sales capacity, and inventive character (Hyland & Gieskes, 2004). The digitalization of operations is crucial for Micro, Small, and Medium Enterprises to effectively compete in the global market (Crupi et al., 2020).

The ongoing process of digitalization is of utmost importance, particularly for SMEs. It can either pose a challenge or present an opportunity for these enterprises to enhance their competitiveness and assure the sustainability of their operation, both in domestic and international markets. The primary goal of digital transformation is to obtain fresh market data and adopt a data-driven approach, hence creating possibilities to create novel competitive advantages through the reorientation of business models. The process of digitalization is intricate and always changing, as advancements in technology define the possibilities for an improved future.

Supply chain management (SCM) is the organized and strategic coordination of activities that take place between suppliers and end users, with the aim of delivering more value to customers while reducing costs through the supply chain. Another explanation suggests that the core of supply chain consists of a series of interlinked interactions and activities between companies involved in the distribution of goods or services. This integration includes coordinating suppliers, personnel and storage facilities to efficiently convert raw materials into final products, which are then delivered to customers in a timely manner, meeting their criteria, quality while reducing costs (Mefid & Ahlunnazak, 2023).

Digitalization, the leading trend in the future of supply chain management (SCM), is employed to facilitate product distribution, enhance organizational adaptability to fluctuations in demand or supply, and improve the overall efficiency of the supply chain (Liu et al., 2022). The survey conducted by Supply Chain Digest reveals that 90% of respondents affirm that companies will experience advantages from implementing digitalization in their supply chain within the next five years. However, 70% of firms express uncertainty regarding the specific implications of supply chain digitalization. Supply chain management (SCM) is a strategic asset and a source of competitive advantage for an organization. It focuses on integrating various functional activities inside each firm to meet client expectations. By achieving a high level of integration among partners in the supply chain, companies can enhance their ability to promptly meet fluctuating client demands. This is made possible by the improved access to supply chain information, resulting in better visibility. Furthermore, a supply chain that exhibits a high level of integration with external partners is expected to result in decreased operational expenses and overall costs incurred by customers (Swink et al., 2007).

SMEs may take advantage of the digitalization paradigm to incorporate technologies such as additive manufacturing, artificial intelligence (AI), Internet of Things (IoT), big data, cloud computing, and augmented and virtual reality (Rindfleisch et al., 2017). Implementing digital transformation in SMEs is crucial for business survival. Digital transformation in SMEs, or Micro, Small and Medium Enterprises, entails leveraging information and communication technologies to enhance business efficiency, productivity, and competitiveness. The occurrence of digital transformation in SMEs can be perceived from several perspectives, such as the difficulties faced in terms of resources during the transformation process. This is because, like any other shift, digital transformation necessitates the allocation of resources (Candra Pratama et al., 2021). Another characteristic that might hinder progress is organizational hurdles, which include insufficient financial resources, lack of support from management, opposition to change, and inadequate infrastructure. Technological hurdles arising from a lack of expertise, causing small and medium-sized enterprises (SMEs) to be hesitant in adopting technologically advanced services. Enterprise Resource Planning (ERP) technology advancements, along with artificial intelligence, are hindered by regulatory obstacles such as the lack of collaboration and integration between management and departments, as well as

privacy concerns. The process of digital transformation will establish a novel entrepreneurial environment focused on digital technologies, enabling it to effectively compete with worldwide rivals. Implementing digital transformation enables SMEs to enhance their competitive edge and broaden their market presence. It also enhances operational efficiency by reducing the time and expenses associated with business processes, while facilitating greater market access to downstream consumers.

This paper provides a concise overview of the impact of digital transformation on the supply chain management (SCM) process, drawing on a comprehensive analysis of existing literature. To achieve this goal, we utilize the PRISMA approach. The aim of this study is to ascertain the impact of digital transformation on SMEs. Subsequently, based on the findings of the literature review, recommendations will be provided to SMEs on how to effectively utilize Cloud Computing as a means of digital transformation.

METHODOLOGY

This systematic review complies with the PRISMA reporting guidelines. The suggestions outline a set of procedures for carrying out this study, which include: 1) establishing the eligibility criteria; 2) identifying the sources of information; 3) choosing the studies to be included; 4) gathering the data; and 5) selecting the specific data elements to be evaluated. Figure A depicts the step-by-step procedure for conducting a systematic review.

- Eligibility Criteria

The guidelines set the following inclusion criteria (IC).

IC1: The article must be based on unique research that has undergone review and has been written in English.

IC2: The purpose of this article is to emphasize the impact of digital transformation on small and medium-sized enterprises (SMEs) in the supply chain management (SCM) process.

Exclusively items produced in the English language are utilized. The primary objective of implementing IC2 was to prioritize the investigation's research question. The research issue centers on Enterprise Resource Planning (ERP), which is a software system specifically developed to effectively oversee supply networks and enhance overall corporate performance.

- Information Sources

We conducted an exhaustive search of significant internet databases, including Science Direct, Emerald, and Google Scholar, which contain vast volumes of scholarly literature. We omitted papers that were not available to the writers.

- Study Selection

The process of selecting the studies was carried out in four distinct phases:

- The keyword search, also known as the search string, was chosen based on our research focus on investigating the impact of digital transformation on the supply chain management (SCM) process in small and medium-sized enterprises (SMEs). The search query contained keywords such as "SMEs and digital transformation", "Technology and SMEs", "SCM and SMEs", and "SMEs and ERP". Each of the specific search queries was searched separately.
- The title, abstract, and keywords of the paper were examined and chosen based on the specified criteria.

- An extensive or limited analysis of the articles that were not excluded in the previous rounds was conducted to determine their fitness for inclusion in the review, according to the predefined eligibility criteria.
 - The reference lists of the publications were reviewed to identify pertinent studies and commence phase 2 of this procedure.
- **Data Collection**
- The data collection technique comprised the manual extraction of information using a data extraction form. This form included details such as the type of publication, the name of the journal or conference, the year, the topic, the title, keywords, and the research methodologies used.
- **Data Items**
- The data extracted from each article comprises:
- (ID1) The selected articles' demographics are provided with the following information.
 - (i) The impact of digital transformation on micro, small, and medium enterprises (SMEs)
 - (ii) Technological applications utilized in small and medium-sized enterprises (SMEs)
 - (iii) Supply Chain Management process
 - (iv) Dissemination of educational techniques
 - (ID2) Determinants of technology utilization

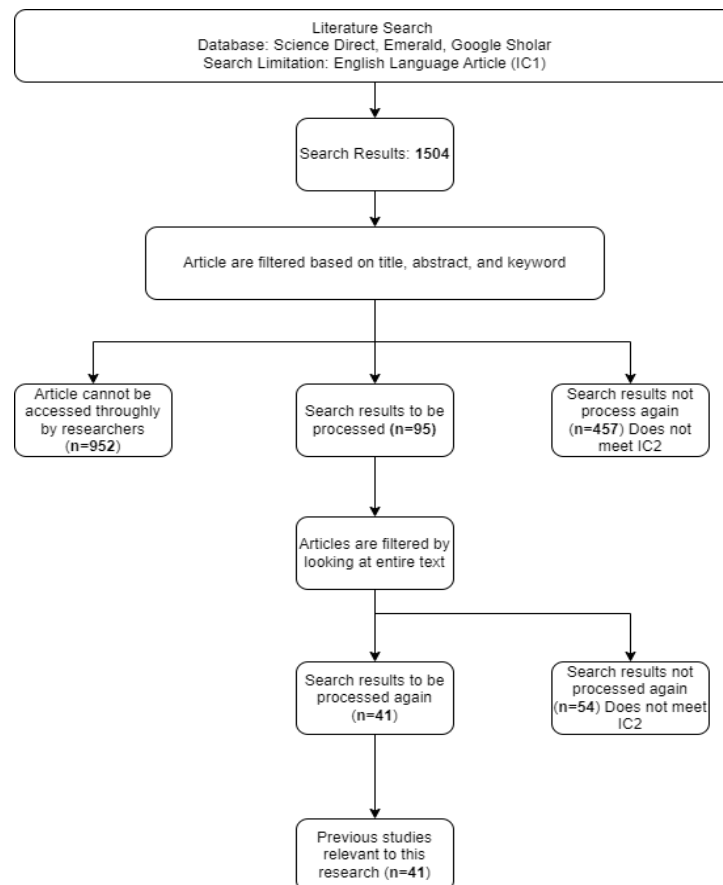


Figure 1 PRISMA Flow Diagram

RESULT AND DISCUSSION

Implementing supply chain digitization allows organizations to effectively respond to consumers changing requirements and effectively tackle issues and expectations in supply chain management, ultimately leading to a competitive edge (Ivanov & Dolgui, 2021). This highlights the necessity of transitioning from traditional supply chains to digitally optimized supply chains (Büyüközkan & Göçer, 2018). Digital transformation empowers firms to create new ideas and enhance efficiency, openness, and adaptability. Disruptive technologies, including IoT, CPS, BDA, ML, RFID, and B2B networks, are employed to create a resilient, transparent, and secure system for managing the supply chain (Oubrahim et al., 2023). Furthermore, they have achieved intelligent manufacturing and expedited innovation at an astonishing rate. Industry 4.0 is an effective tool for enhancing sustainability and can have a substantial impact on supply chain behavior by enabling intelligent and adaptable processes. It facilitates the transition towards circular practices, enhances resource efficiency, automates operations, optimizes measures, and enhances employee well-being (Fatorachian & Kazemi, 2021).

ERP systems are extensively employed information technology (IT) solutions in enterprises (Costa et al., 2016). These are meticulously constructed sets of software that collaborate to efficiently merge business processes and facilitate the management of efficient cross-functional operations inside an organization. Specifically, inside ERP systems, a solitary database contains all the pertinent information. It serves as a centralized hub for storing, disseminating, and transmitting data between departments and business processes to facilitate the management of transactions and data exchange across various functional areas. Implementing an ERP system, which is intricate, collaborative, and all-encompassing, goes beyond being a mere computer project. The investment is expensive and has significant risks, while also affecting both the core and support activities of the business (Hailu & Rahman, 2012). Nevertheless, the integration of technical and functional aspects of company operations to align the information flow with the flow of products or services is highly appealing to firms. This integration is a key factor driving the adoption of ERP systems. (Al-Ghofaili & Al-Mashari, 2014)(Marinho et al., 2021)

Research (Winter et al., 2022) indicates that SMEs typically have lower levels of digital information sharing and are less engaged in managing supply chain risks. However, it is crucial to incorporate SMEs into digital supplier networks to ensure transparency and traceability in the supply chain. The sharing of digital information across supply networks is an important subject as it allows for the utilization of data-driven opportunities, such as in the context of Industry 4.0 or the application of Artificial Intelligence (Min, 2010). Nevertheless, numerous firms have yet to acknowledge the significance of data availability and data quality. This is especially applicable to SMEs, who are frequently hindered by a lack of trust, standardization, data exchange interfaces, or technological maturity, and fail to acknowledge the importance of digital technologies for their business. Similarly, the exchange of digital information in multi-tier supply chain management (MSCM) is now in its nascent phase of advancement (Winter et al., 2022).

While SMEs were not initially excluded from the analysis of key factors in ERP implementation, their unique characteristics (Wong & Zhao, 2016) necessitate the highlighting of relevant aspects pertaining to the decision to implement ERP solutions and the potential benefits of their application. Additionally, the selection of appropriate software will be emphasized, with a focus on the latest advancements in this research field. An obstacle frequently mentioned in the research on the SME sector is the economic factor (Chang et al., 2010). It is caused by various factors, including organizational culture, insufficient qualification and training of staff, often linked to the experience of the workforce, and unclear

or insufficiently understood reasons for implementation by the teams, which can result in failure. (Gessa et al., 2023)

In the current economy, small and medium-sized firms are integrated into extensive networks of suppliers. These networks are formed as a result of competitive forces exerted by both suppliers and customers, as well as ongoing changes driven by digitization and the concept of Industry 4.0. In order to address these demands, companies employ several ways to effectively manage their supply chain partners (Winter et al., 2022). Supply chain partners can be utilized by small and medium-sized enterprises (SMEs) to acquire other competencies that complement their primary areas of expertise. (Vaaland & Heide, 2007) evaluated the utilization of formalized planning and control systems that support supply chain management (SCM) across small and medium-sized enterprises (SMEs) and large corporations. They discovered, for instance, that small and medium-sized enterprises (SMEs) require fewer planning and control systems than large organizations. In addition to the reduced complexity in small and medium-sized firms (SMEs), they have the belief that their business will not undergo significant changes. Conversely, larger enterprises anticipate a substantial increase in the influence of technology on their business operations in the future.

The primary objective of implementing a digital supply chain [DSC] framework is to eliminate human errors from all stages of the process and leverage technology and software with superior capabilities to autonomously optimize the efficiency and production costs of the smart factory. The key technologies that will enable and facilitate the implementation of the DSC include Cloud Computing, Big Data and Analysis, Augmented Reality, Artificial Intelligence and Machine Learning, Autonomous Robots, Cyber-physical Systems, Internet of Things, Smart Contracts, and Blockchain (Adeyemi et al., 2024).

In implementing a new technology in an organization, a SWOT analysis needs to be carried out. SWOT analysis is a versatile tool that can be applied in a variety of contexts to improve decision making and strategic planning. It provides a structured approach to analyzing the internal and external environments that impact an organization or project. The following is a SWOT analysis of ERP implementation in SMEs



Figure 2 SWOT Analysis

CONCLUSION

This study reviews previous research on how digital transformation can influence supply chain management processes in the small and medium enterprises (SME) sector. For this research,

we used the PRISMA technique which resulted in a total of 41 publications through literature searches.

Digital transformation empowers companies to create new ideas and increase efficiency, openness, and adaptability. Disruptive technologies including IoT, CPS, BDA, ML, RFID, and B2B networks are being used to create robust, transparent, and secure systems for managing supply chains.

From this discussion, it can be concluded that digital transformation has an impact on SMEs. This is explained by the fact that when companies implement SCM with DT, they will effectively respond to changing consumer needs and effectively overcome problems and expectations in SCM, which ultimately leads to a competitive advantage. Thus, it facilitates the transition to circular practices, increases resource efficiency, automates operations, optimizes actions and improves employee well-being. One example of digital transformation in SCM that can be utilized by SMEs is by using ERP, by utilizing Cloud-based ERP.

By using cloud computing solutions like Odoo, small and medium businesses (SMEs) can accelerate their digital transformation by leveraging enterprise resource planning (ERP) systems.

Cloud-based enterprise resource planning (ERP) systems offer small and medium-sized businesses (SMEs) an economical and adaptable platform that consolidates multiple business operations into a unified, coherent system. SMBs can optimize their operations, increase data accuracy, and improve decision making by implementing Odoo, which offers real-time analysis and reporting capabilities. Cloud computing eliminates the need for large initial investments in IT infrastructure, allowing SMBs to leverage advanced ERP functionality through a pay-as-you-go framework, which is especially beneficial for managing limited resources. This method not only enables smooth collaboration and remote access, but also ensures small and medium enterprises (SMEs) remain competitive in a rapidly changing digital environment by keeping up with the latest technological breakthroughs and features.

REFERENCE

- Adeyemi, O. A., Pinto, P. M. G., Sunmola, F., Aibinu, A. M., Okesola, J. O., & Adeyemi, E. O. (2024). Towards the Adoption of Industry 4.0 Technologies in the Digitalization of Manufacturing Supply Chain. *Procedia Computer Science*, 232(2023), 337–347. <https://doi.org/10.1016/j.procs.2024.01.033>
- Al-Ghofaili, A. A., & Al-Mashari, M. A. (2014). ERP system adoption traditional ERP systems vs. cloud-based ERP systems. *4th International Conference on Innovative Computing Technology, INTECH 2014 and 3rd International Conference on Future Generation Communication Technologies, FGCT 2014*, 135–139. <https://doi.org/10.1109/INTECH.2014.6927770>
- Azevedo, A. (2021). *Grasp the Challenge of Digital Transition in SMEs—A Training Course Geared towards Decision-Makers*. 1–20.
- Büyüközkan, G., & Göçer, F. (2018). Digital Supply Chain: Literature review and a proposed framework for future research. *Computers in Industry*, 97, 157–177. <https://doi.org/10.1016/j.compind.2018.02.010>
- Candra Pratama, F., Purnomo, A., Iqbal Maulana, F., Abdul Aziz, N., & Kresna Maharsih, I. (2021). Digital Transformation in Small Medium Enterprises: Mapping of the Knowledge Base. *Proceedings of the International Conference on Industrial Engineering and Operations Management Monterrey, Mexico*, 2214–2223.
- Chang, S. I., Hung, S. Y., Yen, D. C., & Lee, P. J. (2010). Critical factors of ERP adoption for small- and medium- sized enterprises: An empirical study. *Journal of Global Information Management*, 18(3), 82–106. <https://doi.org/10.4018/jgim.2010070104>
- Costa, C. J., Ferreira, E., Bento, F., & Aparicio, M. (2016). Enterprise resource planning

- adoption and satisfaction determinants. *Computers in Human Behavior*, 63, 659–671. <https://doi.org/10.1016/j.chb.2016.05.090>
- Crupi, A., Del Sarto, N., Di Minin, A., Gregori, G. L., Lepore, D., Marinelli, L., & Spigarelli, F. (2020). The digital transformation of SMEs – a new knowledge broker called the digital innovation hub. *Journal of Knowledge Management*, 24(6), 1263–1288. <https://doi.org/10.1108/JKM-11-2019-0623>
- European, C. (2019). *Commission, E. Entrepreneurship and Small and Medium-Sized Enterprises (SMEs)*. Available online: <https://ec.europa.eu/growth>(accessed on 12 August 2019)./smes_en. 12(1).
- Fatorachian, H., & Kazemi, H. (2021). Impact of Industry 4.0 on supply chain performance. *Production Planning and Control*, 32(1), 63–81. <https://doi.org/10.1080/09537287.2020.1712487>
- Gessa, A., Jiménez, A., & Sancha, P. (2023). Exploring ERP systems adoption in challenging times. Insights of SMEs stories. *Technological Forecasting and Social Change*, 195(June). <https://doi.org/10.1016/j.techfore.2023.122795>
- Hailu, A., & Rahman, S. (2012). Evaluation of key success factors influencing ERP implementation success. *Proceedings - 2012 IEEE 8th World Congress on Services, SERVICES 2012*, 88–91. <https://doi.org/10.1109/SERVICES.2012.74>
- Hyland, P., & Gieskes, J. (2004). Entrepreneurial orientation of SMEs, total quality management and firm performance. *Journal of Manufacturing Technology Management*, 15(4), 313–314.
- Ivanov, D., & Dolgui, A. (2021). A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0. *Production Planning and Control*, 32(9), 775–788. <https://doi.org/10.1080/09537287.2020.1768450>
- Johnson, M. P., & Schaltegger, S. (2016). Two Decades of Sustainability Management Tools for SMEs: How Far Have We Come? *Journal of Small Business Management*, 54(2), 481–505. <https://doi.org/10.1111/jsbm.12154>
- Krammer, S. M. S., Strange, R., & Lashitew, A. (2018). The export performance of emerging economy firms: The influence of firm capabilities and institutional environments. *International Business Review*, 27(1), 218–230. <https://doi.org/10.1016/j.ibusrev.2017.07.003>
- Liu, K. P., Chiu, W., Chu, J., & Zheng, L. J. (2022). The Impact of Digitalization on Supply Chain Integration and Performance. *Journal of Global Information Management*, 30(1), 1–20. <https://doi.org/10.4018/jgim.311450>
- Mago, S., & Modiba, S. F. (2022). Is informal financing important for micro and small businesses in Africa? *Small Business International Review*, 6(1), 2–16.
- Marinho, M., Prakash, V., Garg, L., Savaglio, C., & Bawa, S. (2021). Effective cloud resource utilisation in cloud erp decision-making process for industry 4.0 in the united states. *Electronics (Switzerland)*, 10(8). <https://doi.org/10.3390/electronics10080959>
- Mefid, K. N., & Ahlunnazak, A. I. (2023). Odoo-ERP as a Solution to Business Performance in Supply Chain of the Coffe Industry: A Systematic Literature Review. *Jurnal Manajemen Strategi Dan Simulasi Bisnis (JMASSBI)*, 4(2), 69–81.
- Min, H. (2010). Artificial intelligence in supply chain management: Theory and applications. *International Journal of Logistics Research and Applications*, 13(1), 13–39. <https://doi.org/10.1080/13675560902736537>
- Oubrahim, I., Sefiani, N., & Haponen, A. (2023). The Influence of Digital Transformation and Supply Chain Integration on Overall Sustainable Supply Chain Performance: An Empirical Analysis from Manufacturing Companies in Morocco. *Energies*, 16(2). <https://doi.org/10.3390/en16021004>
- Rindfleisch, A., O'Hern, M., & Sachdev, V. (2017). The Digital Revolution, 3D Printing, and

- Innovation as Data. *Journal of Product Innovation Management*, 34(5), 681–690. <https://doi.org/10.1111/jpim.12402>
- Safari, A., & Saleh, A. S. (2020). Key determinants of SMEs' export performance: a resource-based view and contingency theory approach using potential mediators. *Journal of Business and Industrial Marketing*, 35(4), 635–654. <https://doi.org/10.1108/JBIM-11-2018-0324>
- Swink, M., Narasimhan, R., & Wang, C. (2007). Managing beyond the factory walls: Effects of four types of strategic integration on manufacturing plant performance. *Journal of Operations Management*, 25(1), 148–164. <https://doi.org/10.1016/j.jom.2006.02.006>
- Vaaland, T. I., & Heide, M. (2007). Can the SME survive the supply chain challenges? *Supply Chain Management*, 12(1), 20–31. <https://doi.org/10.1108/13598540710724374>
- Winter, M., Dopler, S., Müller, J. M., & Zeisler, A. (2022). Information sharing and multi-tier supply chain management of SMEs in the context of Industry 4.0. *Procedia Computer Science*, 217(2022), 1378–1385. <https://doi.org/10.1016/j.procs.2022.12.336>
- Wong, I. K. A., & Zhao, W. M. (2016). Exploring the effect of geographic convenience on repeat visitation and tourist spending: the moderating role of novelty seeking. *Current Issues in Tourism*, 19(8), 824–844. <https://doi.org/10.1080/13683500.2013.870538>