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Contents

Strategic Support Systems for Crisis Management: A Literature Review

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ABSTRACT

This monograph presents a literature review of Strategic Decision Support Systems (SDSS) used in various fields such as transport, trade, logistics, medicine and education. The main objective of these systems is to provide information to decision makers to mitigate various influences. The chosen case study of this monograph is COVID-19 crisis management, which is an example that has an impact on sectors such as health, education, economy, the environment, and others. It aims to identify critical dependencies and how to develop efficient solutions. In particular, this monograph explores the problem of support for the strategic planning decision making during COVID-19 crisis management.

Keywords: Strategic decision support systems; COVID-19 crisis management; Strategic planning; Strategic management; Generative AI.

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1

Introduction

Crisis management is a strategy-based approach by implementing certain steps to reduce an unanticipated event's negative effects or any negative disruption with the potential to harm business processes, people or property. There are several types of crises that have appeared in recent years: Technological crisis (Google in December 2020), Organizational crisis (Wells Fargo in 2020), and Natural crisis (COVID-19 in December 2019). COVID-19 is a complex catastrophe that has caused immense disruption across the globe. The first case of coronavirus was reported on December 1st, 2019, in Wuhan, China before expanding to the rest of the world in early 2020. During this time, countries have reacted differently to the COVID-19 pandemic.

On the one hand, the ongoing COVID-19 pandemic has had a significant impact on the economic development of various countries (Meyer *et al.*, 2022). Regarding SMEs (Small Medium Enterprises) crisis strategy, Klyver and Nielsen (2021) provide some preliminary empirical evidence on the most promising crisis strategies to manage the COVID-19 crisis. Several solutions have been suggested during the COVID-19 pandemic, as well as several innovations (Sharmaa *et al.*, 2022; Brem *et al.*, 2021; Lee *et al.*, 2020). Sharmaa *et al.* (2022) proposes

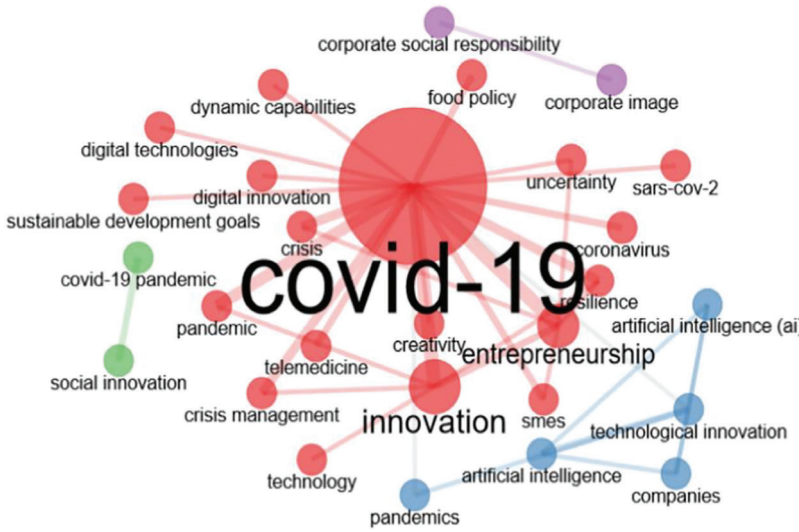

Figure 1.1: Used methodology for searching and selecting papers.

a quantitative approach by filtering papers in the Scopus database using keywords related to innovation in the time of COVID-19, and through the use of the Bibliometrics R-tool in order to emphasize the importance of innovation during the pandemic. Figure 1.1 represents an overview of the keywords network analysis where the larger nodes represent the more frequent occurrence and the lines connecting these nodes show co-occurrences.

Social media allowed organizations and governments to deal with the crisis in the early stage of the pandemic. Chon and Kim (2022) proposed a theory-grounded framework for using social media analytics during the early stages of the COVID-19 pandemic in the U.S to investigate how a potential issue becomes a government crisis. An overview of their study is shown in Figure 1.3. This study presents a model emphasizing the role of issues management in the digital age. It is defined by Chon and Kim (2022) and it is based on the public relations model of strategic management (Grunig *et al.*, 2002).

On the other hand, since the pandemic's breakout the artificial intelligence (Ahmad *et al.*, 2022; Chamola *et al.*, 2020) as well as data analytic technologies (Shahparvari *et al.*, 2022; Wamba *et al.*, 2020)

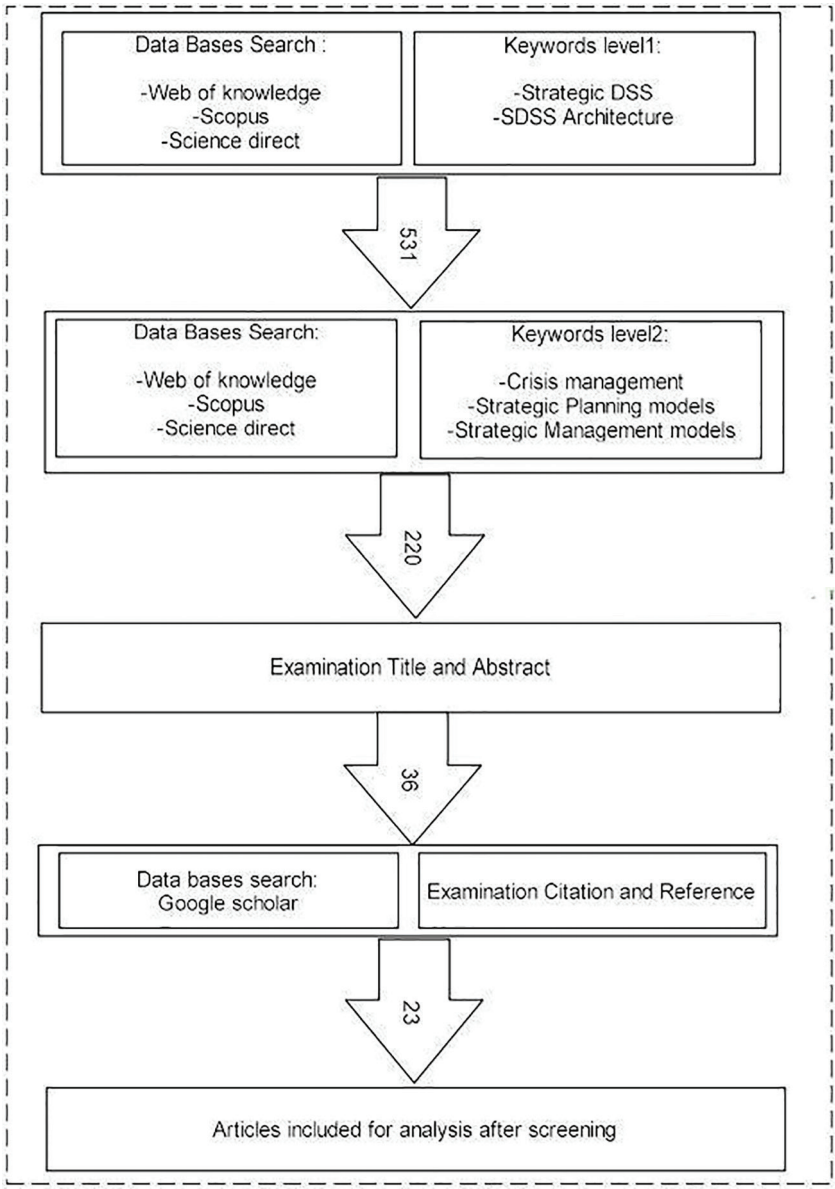

Figure 1.2: Keywords network analysis map (Sharmaa *et al.*, 2022).

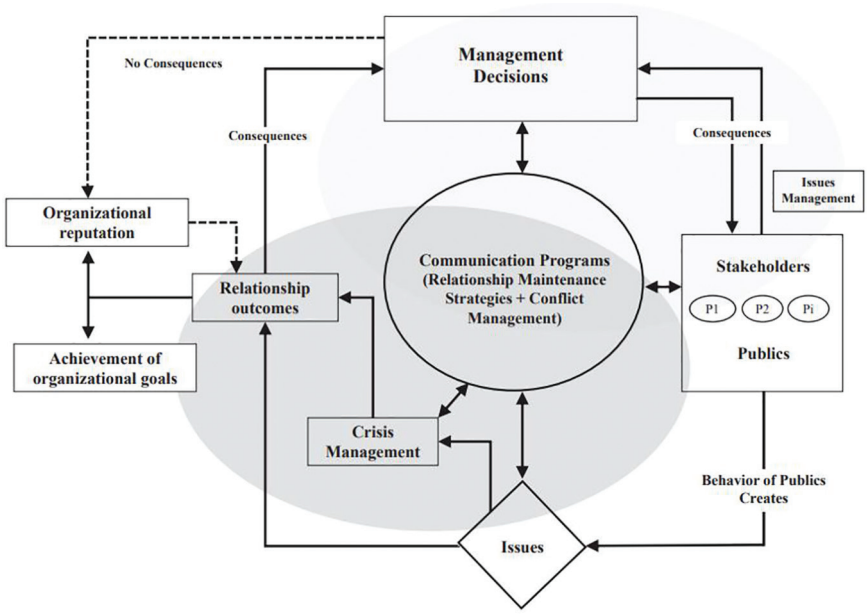

Figure 1.3: Model of strategic management of public relations (Chon and Kim, 2022).

have opened up new possibilities to assist in scientific research and create a wide variety of relevant data. Ahmad *et al.* (2022) proposed an improved convolutional neural network **(CNN)** model for the detection of COVID-19 disease from chest X-ray images leveraged by a human-machine system using deep learning techniques.

Since this period, there exists a growing body of literature on crisis management. For instance, Aussilloux *et al.* (2021) presents a report that defines a thorough comparison and in-depth analysis of the emergency and recovery plans announced by European countries.

However, so far, Strategic Decision Support Systems **(SDSS)** have become important despite deployment complexity, and have been widely incorporated in many specialized areas like the medical domain (Shahparvari *et al.*, 2022), logistics (Kamariotou *et al.*, 2017; Henrik *et al.*, 2008), transport (Barfod and Salling, 2015), and industry (Agostino *et al.*, 2020), and with several terminologies such as strategic management (Bader and Alyoubi, 2015), strategic planning (Tunčikienė *et al.*, 2010),

etc. In this monograph, we present a literature review of SDSS, their general concepts, and how they were incorporated during the COVID-19 pandemic to help managers make decisions. This monograph is an extended version of Elandaloussi and Zaraté (2023), including a detailed analysis of COVID-19 pandemic management. Elandaloussi and Zaraté (2023) define a literature review to enable SDSS for crisis management. Defining the research question involves analyzing the literature review on Strategic Decision Support Systems (SDSS) and crisis management during the COVID-19 pandemic. This process helps identify connections and overlaps between these two areas. By understanding how SDSS has been used in managing crises like the COVID-19 pandemic, we can better formulate a focused and relevant research question.

The rest of this monograph is divided into seven sections as follows. We begin by discussing a comprehensive methodology for the literature review. Then, we offer an overview of our study background. Section 4 is devoted to discussing a brief description of the most important studies in SDSS technologies. In Section 5 SDSS models are presented. Next, we explore the application of generative AI, specifically ChatGPT, in the context of pandemic decision support systems by highlighting its role during the COVID-19 pandemic. Section 7 encompasses a brief discussion of our conducted surveys. Finally, in Section 8 we summarize the study and point out some concluding remarks.

References

Accorsi, R., R. Manzini, and F. Maranesi (2014). "A decision-support system for the design and management of warehousing systems". *Computers in Industry*. 65(1): 175–186.

Agostino, B., M. Massei, and K. Sinelshnkov (2020). "Enabling strategic decisions for the industry of tomorrow". *Procedia Manufacturing*. 42: 548–553. DOI: 10.1016/j.promfg.2020.02.028.

Ahmad, M., S. Sadiq, A. A. Eshmawi, A. S. Alluhaidan, M. Umer, and S. Ullah (2022). "Industry 4.0 technologies and their applications in fighting COVID-19 pandemic using deep". *Computers in Biology and Medicine*. 145: 105418.

Al-Maseb, H., M. Al-Sejari, and D. Kondrat (2023). "The effects of the COVID-19 pandemic on the lives and social daily life of married individuals during the total curfew in Kuwait". *Journal of Affective Disorders Reports*. DOI: 10.1016/j.jadr.2023.100676.

Alter, S. (1980). Addison-Wesley Publishing Co. 316. DOI: 10.1002/bs.3830270109.

Alyoubi, B. A. (2015). "Decision support system and knowledge-based strategic management". *Procedia Computer Science*. 65: 278–284.

Andrews, K. R. (1980). *The Concept of Corporate Strategy*. Oxford. 52–59. DOI: 10.1093/oso/9780198781806.003.0005.

Aussilloux, V. D., A. B. Mavridis, and M. Garrigue (2021). "The effects of the COVID-19 crisis on productivity and competitiveness". Report published in france on the national productivity council.

Bader, A. and P. D. Alyoubi (2015). "Decision support system and knowledge-based strategic management". *Procedia Computer Science*. 65: 278–284.

Barfod, M. B. and K. B. Salling (2015). "A new composite decision support framework for strategic and sustainable transport appraisals". *Transportation Research*. 72: 1–15.

Belardo, S., P. Duchessi, and J. R. Coleman (1994). "A strategic decision support system at Orell Fussli". *Journal of Management Information Systems*: 135–157.

Beraldi, P. and A. F. Violi (2011). "Simone a decision support system for strategic asset allocations". *Published on Decision Support Systems*. 51(3): 549–561.

Brem, A., E. Viardot, and P. A. Nylund (2021). "Implications of the coronavirus (COVID-19) outbreak for innovation: Which technologies will improve our lives?" *Technological Forecasting and Social Change*. 163: 120451. DOI: 10.1016/j.techfore.2020.120451.

Carey, T. P. A. (1989). "Strategy formulation by banks". *International Journal of Bank Marketing*.

Cash, J., F. McFarlan, J. McKenney, and M. Vitali (1992). Corporate Information Systems Management: Text and Cases, Published by Irwin Professional Pub.

Chamola, V., V. Hassija, V. Gupta, and M. Guizani (2020). "A comprehensive review of the COVID-19 pandemic and the role of IoT, drones, AI, blockchain, and 5G in managing its impact". *IEEE Access: Practical Innovations, Open Solutions*: 90225–90265. DOI: 10.1109/ACCESS.2020.2992341.

Chinho, L. and P. Hsieh (2003). "A fuzzy decision support system for strategic portfolio management". *Decision Support Systems*. DOI: 10.1016/S0167-9236(03)00118-0.

Chon, M. G. and S. Kim (2022). "Dealing with the COVID-19 crisis: Theoretical application of social media analytics in government crisis management". *Public Relations Review*. DOI: 10.1016/j.pubrev.2022.102201.

Chung, C. H., J. R. Lan, and K. N. Shaw (1989). "An approach for developing support systems for strategic decision making in business". *Omega*: 135–146.

Cooper, R. and R. S. Kaplan (1999). "The design of cost management systems: Text and cases". *Prentice Hall*. 14(4): 730–731.

Courtney, J. F. (2001). "Decision making and knowledge management in inquiring organizations: Toward a new decision-making paradigm for DSS". *Decision Support Systems*: 17–38.

Dung, L. and P. Giang (2021). "Strategic responses of the hotel sector to COVID-19: Toward a refined pandemic crisis management framework". *International Journal of Hospitality Management*. 94: 102808.

Dutton, J. E. and R. B. Duncan (1987). "The influence of the strategic planning process on strategic change". *Strategic Management Journal*. 8(2). DOI: 10.1002/smj.4250080202.

Eden, C. (1985). "Perish the thought!" *Journal of the Operational Research Society*. 36(9): 809–819.

Elandaloussi, S. and P. Zaraté (2023). "A literature review enabling strategic decision support systems for crisis management". In: *The Second Workshop on Collaboration in Knowledge Discovery and Decision Making. Decisioning*. Colombia, Popayan.

Fanti, M. P., G. Iacobellis, W. Ukovich, V. Boschian, G. Georgoulas, and C. Stylios (2015). "A simulation based decision support system for logistics management". *Journal of Computational Science*. 10: 86–96.

Finlay, P. N. and C. Marples (1992). "Strategic group decision support systems a guide for the unwary". *Long Range Planning*: 98–107.

Gorry, G. A. and M. S. Morton (1989). "A framework for management information systems". *Sloan Management Review*: 49–61.

Grunig, J. E., L. A. Grunig, and D. M. Dozier (2002). *Excellent Public Relations and Effective Organizations*. Routledge: Copyright By Lewrence Erlbaum Associates, Inc.

Hajimirzajana, A., M. Vahdat, A. Sadegheih, E. Shadkam, and H. El Bilali (2021). "An integrated strategic framework for large-scale crop planning: Sustainable climate-smart crop planning and agri-food supply chain management". *Sustainable Production and Consumption*. 26: 709–732.

Hax, A. C. and N. S. Majluf (1984). Strategic Management: An Integra tive Perspective. 468.

Henrik, N., A. Thompson, P. Lindahl, and G. Broman (2008). "Introducing strategic decision support systems for sustainable product-service innovation across value chains". In: *Proceedings of Sustainable Innovation, Malmö*. Sweden.

Hornby, R. E., P. A. Golder, and J. Williams (1994). "SDP: A strategic DSS". *Decision Support Systems*: 45–51.

Huang, J. J. (2009). "The evolutionary perspective of knowledge creation". A mathematical representation". *Knowledge-Based Systems*: 430–438.

Jaime, A. (2023). "Can ChatGPT rescue or assist with language barriers in healthcare communication?" *Patient Education and Counseling*. 115. DOI: 10.1016/j.pec.2023.107940.

Jauch, L. R. and W. F. Glueck (1988). *Business Policy and Strategic Management*. McGraw-Hill. URL: 10.5465/ambpp.1972.4981324.

Jaziri, R. and M. S. Miralama (2021). "The impact of crisis and disasters risk management in COVID-19 times: Insights and lessons learned from Saudi Arabia". *Medicine and Public Health*. 18: 100705.

Jessup, L. M. and S. Kukalis (1990). "Better planning using group support systems". *Long Range Planning*: 100–105.

Jim, Q. C. and S. M. Lee (2002). "An exploratory cognitive DSS for strategic decision making". *Decision Support Systems*. DOI: 10.1016/S0167-9236(02)00139-2.

Kamariotou, M., F. C. Kitsios, A. Michael, and V. Manthou (2017). "Strategic decision support systems for logistics in the agrifood industry". In: *Proceedings of 8th International Conference on Information and Communication Technologies in Agriculture*. Chania, Greece.

Khalfan, Z. A. (2014). "Strategic management model for academic libraries". *Procedia*. DOI: 10.1016/j.sbspro.2014.07.080.

Kitsios, F. and M. Kamariotou (2018a). "Decision support systems for strategic information systems planning: An approach for logistics strategic management". 3(3–4): 207–221. DOI: 10.1504/IJDSS.2018.100188.

Kitsios, F. and M. Kamariotou (2018b). "Decision support systems and strategic planning: Information technology and SMEs' performance". *International Journal of Decision Support Systems*. 3(1–2): 53–70.

Klyver, K. and S. L. Nielsen (2021). "Which crisis strategies are (expectedly) effective among SMEs during COVID-19?" *Journal of Business Venturing Insights*. DOI: 10.1016/j.jbvi.2021.e00273.

Komathi, K., B. Milne, M. von, C. Bullen, S. Marsh, and J. Crump (2024). "Public opinion on global COVID-19 vaccine procurement and distribution policies: A nationally representative survey in Aotearoa New Zealand 2022". *Vaccine*. 42(6): 1372–1382.

Korpela, J. and M. Tuominen (1996). "A decision support system for strategic issues management of logistics". *International Journal of Production Economics*. 46: 605–620.

Lederer, A. L. and V. Sethi (1988). "The implementation of strategic information systems planning methodologies". *MIS Quarterly*. 12(3): 445–461.

Lederer, A. L. and V. Sethi (1996). "Key prescriptions for strategic information systems planning". *Journal of Management Information Systems*: 35–62.

Lee, G. K., J. Lampel, and Z. Shapira (2020). "After the storm has passed: Translating crisis experience into useful knowledge". *Organization Science*. 31: 1037–1051. DOI: 10.1287/orsc.2020.1366.

Lee, J. M., I. Chen, R. C. Chen, and C. H. Chung (2002). "A target-costing based strategic decision support system". *Journal of Computer Information Systems*: 110–116.

Margaret, C. K., F. Gil, L. Joshua, and N. Heidi (2023). "Artificial intelligence in sport management education: Playing the AI game with ChatGPT". *Journal of Hospitality, Leisure, Sport & Tourism Education*. 33. DOI: 10.1016/j.jhlste.2023.100456.

Meyer, N., T. Niemand, A. Davila, and S. Kraus (2022). "Biting the bullet: When self-efficacy mediates the stressful effects of COVID-19 beliefs". *PLOS ONE*. 17: 1–16. DOI: 10.1371/journal.pone.0263022.

Min, H. (2009). "Application of a decision support system to strategic warehousing decisions". *International Journal of Physical Distribution & Logistics Management*.

Mohd, J., A. Haleem, and R. Pratap (2023). "ChatGPT for healthcare services: An emerging stage for an innovative perspective". *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*. 3(1). DOI: 10.1016/j.tbench.2023.100105.

Mohsen, A. (1988). *Improving the Effectiveness of Strategic Decision Making Using an Integrated Decision Support System*. Information and Software Technology.

Moormann, J. and M. Lochte-Holtgreven (1993). "An approach for an integrated DSS for strategic planning". *Decision Support Systems*. 10(4): 401–411.

Naseem, A., S. T. H. Shah, S. A. Khan, and A. W. Malik (2017). "Decision support system for optimum decision making process in threat evaluation and weapon assignment: Current status, challenges and future directions". *Annual Reviews in Control*. 43.

Nemati, H. R., D. M. Steiger, L. S. Iyer, and R. T. Herschel (2002). "'Knowledge warehouse: An architectural integration of knowledge management,' decision support, artificial intelligence and data warehousing". *Decision Support Systems*: 143–161.

Newkirk, H. E., A. L. Lederer, and C. Srinivasan (2003). "Strategic information systems planning: Too little or too much?" *The Journal of Strategic Information Systems*: 201–228.

Nonaka, I. and H. Takeuchi (1995). "The knowledge-creating company: How Japanese companies create the dynamics of innovation". *Journal of International Business Studies*. 27(1): 196–201.

Peppard, J. and J. Ward (2004). "Beyond strategic information systems: Towards an IS capability". *The Journal of Strategic Information Systems*: 167–194.

Pietrzak, M., K. Jałosiński, J. Paliszkiewicz, and A. Brzozowski (2015). "A case study of strategic group map application used as a tool for knowledge management". *Journal of Computer Information Systems*: 68–77.

Rezaie, A., R. D. Parker, and M. Abdollahi (2007). *Oxidative Stress and Pathogenesis of Inflammatory Bowel Disease: An Epiphenomenon or the Cause?* Vol. 52. 2015–2021.

Saaty, T. L. (1990). "The analytic hierarchy process in conflict management". *International Journal of Conflict Management*.

Schendel, D. and C. W. Hofer (1979). "Strategic management: A new view of business policy and planning". *Little, Brown, Boston*. 25(3): 536–543.

Scott Morton, M. S. (1986). "Strategy formulation methodologies". CISR WP No. 149, Sloan WP No. 1845-86, 90s WP No. 86-028.

Shahparvari, S., B. Hassanizadeh, A. Mohammadi, B. Kiani, K. H. Lau, P. Chhetri, and B. Abbasi (2022). "A decision support system for prioritised COVID-19 two-dosage vaccination allocation and distribution". *Transportation Research*. 159: 102598. DOI: 10.1016/j.tre.2021.102598.

Shahrooz, S., B. Hassanizadeh, A. Mohammadi, B. Kiani, K. Hung Lau, P. Chhetri, and B. Abbasi (2022). "A decision support system for prioritised COVID-19 two-dosage vaccination allocation and distribution". *Transportation Research Part E*. 159: 102598.

Sharmaa, G. D., S. Krausb, M. Srivastavad, R. Chopraa, and A. Kallmuenzere (2022). "The changing role of innovation for crisis management in times of COVID19: An integrative literature review". *Behalf of Journal of Innovation & Knowledge*. DOI: 10.1016/j.jik.2022.100281.

Shuliang, L., Z. L. Jim, and H. Hong (2011). "WebDigital: A web-based hybrid intelligent knowledge automation system for developing digital marketing strategies". *Expert Systems with Applications*. 38: 10606–10613.

Simon, H. A. (1960). "The new science of management decision". *Harper & Brothers*. DOI: 10.1037/13978-000.

Sprague, R. H. and E. D. Carlson (1982). *Building Effective Decision Support Systems*. Prentice Hall Professional Technical Reference.

Stephen, R. N. and K. Witkowski (2024). "Belief in misinformation and acceptance of COVID-19 vaccine boosters: A survey analysis". *PEC Innovation*. DOI: 10.1016/j.pecinn.2024.100261.

Thierauf, R. J. (1988). "User-oriented decision support systems: Accent on problem finding". *International Journal of Business Intelligence Research*: 38–52.

Tunčikienė, Z., J. Bivainis, and R. Drejeris (2010). "Integrated DSS for strategic planning in public institutions". *Journal of Business Economics and Management*. 11(4): 671–688.

Wamba, S. F., A. Gunasekaran, S. Akter, and R. Dubey (2020). "The performance effects of big data analytics and supply chain ambidexterity: The moderating effect of environmental dynamism". *International Journal of Production Economics*. 222: 423–444.

Warwick, M. and R. Fernando (2023). "The global economic impacts of the COVID-19 pandemic". *Economic Modelling*. DOI: 10.1016/j.econmod.2023.106551.

Waxlax, J. (1993). "An object-oriented DSS for strategic management". *Computers & Industrial Engineering*. 25(1–4): 573–576.

Weihrich, H. (1982). "The TOWS matrix-a tool for situational analysis". *Long Range Planning*. 15(2).

Xiaodong, L., D. Ouelhadj, X. Song, D. Jones, G. Wall, K. E. Howell, P. Igwe, S. Martin, D. Song, and E. Pertin (2016). "A decision support system for strategic maintenance planning in offshore wind farms". *Renewable Energy*. DOI: 10.1016/j.renene.2016.07.037.

Yanfang, S., L. Yun, and L. Chun (2023). "Collaborating with ChatGPT in argumentative writing classrooms". *Assessing Writing*. 57: 100752. DOI: 10.1016/j.asw.2023.100752.

Ye, F., K. Liu, L. Li, K. Lai, Y. Zhan, and A. Kumar (2022). "Digital supply chain management in the COVID-19 crisis: An asset orchestration perspective". *International Journal of Production Economics*. 245: 108396.

Yoo, S. and L. A. Digman (1987). "Decision support system: A new tool for strategic management". *Long Range Planning*: 114–124.

Yoshiyasu, T. (2023). "Impact of COVID-19 on mental health in the US with generative AI". *Asian Journal of Psychiatry*. 88. DOI: 10.1016/j.ajp.2023.103736.

Yu-Pei, Y., P. Shuang-Jun, Z. Mei-Xian, C. Hai-Xiao, and T. Tao-Hsin (2023). "The impact of COVID-19 pandemic on healthcare workers under the 'Ten New Guidelines' in Taizhou". *Preventive Medicine Reports*. DOI: 10.1016/j.pmedr.2023.102550.

Zviran, M. (1990). "ISSPSS: A decision support system for information systems strategic planning". *Information & Management*. 19(5): 345–359.