ARTIFICIAL INTELLIGENCE, BIG DATA, STRATEGIC FLEXIBILITY, AGILITY, AND ORGANIZATIONAL RESILIENCE: A CONCEPTUAL FRAMEWORK BASED ON EXISTING LITERATURE

Francesco Ciampi[1], Giacomo Marzi[2] and Riccardo Rialti[3]

[1]*Università degli Studi di Firenze, Firenze, Italy*
[2]*Lincoln International Business School, Lincoln, UK*
[3]*Università di Pisa, Pisa, Italy*

ABSTRACT

In today's economically turbulent times, it is imperative that organizations remain flexible and resilient in order to adapt themselves to an ever-changing environment. To facilitate this, organizations should rely upon pliant structures of information, whilst simultaneously continuing to incorporate more rigid infrastructures in order to allow for the collection and analysis of large amounts of both internal and external data. This juxtaposition gives rise to the need for a trade-off. While academic literature has stressed that information systems may represent a burden for organizations pursuing strategic agility, flexibility, and organizational resilience, this paper highlights the ways in which Analytical, Automatic, Adaptive, and Agile information systems - or Big Data Analytics (BDA) capable information systems - may be helpful. In particular, this paper proposes BDA capable information systems, tied with artificial intelligence capabilities, as a trade-off solution. Alongside this, it also proposes some further implications of the topic for scholars and practitioners.

KEYWORDS

Organizational Resilience, Strategic Agility, Strategic Flexibility, Big Data Analytics, Artificial Intelligence, Information Systems

REFERENCES

Annarelli, A., and Nonino, F. (2016). Strategic and operational management of organizational resilience: Current state of research and future directions. *Omega*, Vol. 62, 1-18.

Bianchi, M., Marzi, G., & Guerini, M. (2018). Agile, Stage-Gate and their combination: Exploring how they relate to performance in software development. *Journal of Business Research*. In press

Caputo, A., Marzi, G., and Pellegrini, M.M (2016). The internet of things in manufacturing innovation processes: development and application of a conceptual framework. *Business Process Management Journal*, Vol. 22, No. 2, pp. 341-358.

Caputo, A., Marzi, G., Pellegrini, M. M., & Rialti, R. (2018). Conflict management in family businesses: A bibliometric analysis and systematic literature review. *International Journal of Conflict Management*. In press

Carvalho H., Cruz-Machado V., and Tavares J.G. (2012). A mapping framework for assessing supply chain resilience. *International Journal of Logistics Systems and Management*, Vol. 12 No. 3, pp. 354–73.

Ciampi F. (2017a). The potential of top management characteristics for small enterprise default prediction modelling. *WSEAS Transactions on Business and Economics,* Vol. 14, No. 1, pp. 397-408.

Ciampi F. (2017b). *Top management diversity, ambidexterity and performance in independent small firms. Evidence from the Italian fashion industry*, The 21st WMSCI Conference Proceedings, Volume 1 (pp. 9-12), July 8-11, Orlando (FL), USA.

Ciampi F. (2017c). *How management consulting creates knowledge*, The 21st WMSCI Conference Proceedings, Volume 1 (pp. 9-12), July 8-11, Orlando (FL), USA.

Ciampi F. (2018a). Using corporate social responsibility orientation characteristics for small enterprise default prediction. *WSEAS Transactions on Business and Economics,* Vol. 15, No. 1, pp. 113-127.

Ciampi F. (2018b). *Closing the gap between scientific research and management consulting*, The 22nd WMSCI Conference Proceedings, Volume 3 (pp. 38-40), July 8-11, Orlando (FL), USA.

Ciampi F. (2018c). *The possible evolution of management consultant's knowledge creation roles*, The 22nd WMSCI Conference Proceedings, Volume 3 (pp. 38-40), July 8-11, Orlando (FL), USA.

Ciampi, F., Cillo, V., and Fiano, F. (2018). Combining Kohonen maps and prior payment behavior for small enterprise

default prediction. *Small Business Economics*, first online 08 November 2018, DOI https://doi.org/10.1007/s11187-018-0117-2, pp. 1-33.

Davenport, T.H (2014). How strategists use big data to support internal business decisions, discovery and production. *Strategy & Leadership*, Vol .42, No. 4, pp. 45-50.

Davenport, T.H., Barth, P., and Bean, R. (2012). How big data is different. *MIT Sloan Management Review*, Vol. 54, No. 1, pp. 43 - 46.

Davidsson, P., Achtenhagen, and L., Naldi, L., (2007), What do we know about small firm growth?, in: Parker S. (eds) *The Life Cycle of Entrepreneurial Ventures* (pp. 361–398). International Handbook Series on Entrepreneurship, Vol 3, Boston (MA): Springer.

De Mauro, A., Greco, M., and Grimaldi, M. (2016). A formal definition of Big Data based on its essential features. *Library Review*, Vol. 65, No. 3, pp. 122-135.

De Oliveira Teixeira, E., and Werther, W.B. (2013). Resilience: Continuous renewal of competitive advantages. *Business Horizons*, Vol. 56, No. 3, pp. 333-342.

Del Giudice, M. (2016). Discovering the Internet of Things (IoT) within the business process management: A literature review on technological revitalization. *Business Process Management Journal*, Vol. 22, No. 2, pp. 263-270.

Del Giudice, M., Caputo, F., and Evangelista, F. (2016). How are decision systems changing? The contribution of social media to the management of decisional liquefaction. *Journal of Decision Systems*, Vol. 25, No. 3, pp. 214-226.

Erol, O., Sauser, B.J., and Mansouri, M. (2010). A framework for investigation into extended enterprise resilience. *Enterprise Information Systems*, Vol. 4, No. 2, pp. 111-136.

Gao X. (2013), *Towards the Next Generation Intelligent BPM – In the Era of Big Data.* In: Daniel F., Wang J., Weber B. (eds.) Business Process Management. Lecture Notes in Computer Science (p.4-9), vol. 8094. Berlin, Springer International Publishing.

Ketter, W., Peters, M., Collins, J., and Gupta, A. (2016). A multiagent competitive gaming platform to address societal challenges. *Mis Quarterly*, Vol. 40, No. 2, pp. 447-460.

Kim, W.C., and Mauborgne, R.A. (2014), *Blue ocean strategy, expanded edition: How to create uncontested market space and make the competition irrelevant*, Harvard Business Review Press, Boston, Ma.

Kohlborn, T., Mueller, O., Poeppelbuss, J., and Roeglinger, M. (2014). Interview with Michael Rosemann on Ambidextrous Business Process Management. *Business Process Management Journal*, Vol. 20, No. 4, pp. 634-638.

Laudano, M. C., Marzi, G., & Caputo, A. (2018). A decade of the international journal of entrepreneurship and small business: A bibliometric analysis. *International Journal of Entrepreneurship and Small Business*, *33*(2), 289-314.

Lee, O.K., Sambamurthy, V., Lim, K.H., and Wei, K.K. (2015). How does IT ambidexterity impact organizational agility?. *Information Systems Research*, Vol. 26, No. 2, pp. 398-417.

Lengnick-Hall, C.A., Beck, T.E., and Lengnick-Hall, M.L. (2011). Developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, Vol. 21, No. 3, pp. 243-255.

Limnios, E.A.M., Mazzarol, T., Ghadouani, A., and Schilizzi, S.G. (2014). The resilience architecture framework: four organizational archetypes. *European Management Journal*, Vol. 32, No. 1, pp. 104-116.

Linnenluecke, M.K. (2017). Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews*, Vol. 19, No. 1, pp. 4-30.

Lu, Y., and Ramamurthy, K. (2011). Understanding the link between information technology capability and organizational agility: An empirical examination. *MIS Quarterly*, Vol. 35, No. 4, pp. 931-954.

Maita, A.R.C., Martins, L.C., Lopez Paz, C.R., Peres, S.M., and Fantinato, M. (2015). Process mining through artificial neural networks and support vector machines: A systematic literature review. *Business Process Management Journal*, vol. 21, No. 6, pp. 1391-1415.

Marzi, G., Dabić, M., Daim, T., & Garces, E. (2017). Product and process innovation in manufacturing firms: a 30-year bibliometric analysis. *Scientometrics*, *113*(2), 673-704.

Marzi, G., Zollo, L., Boccardi, A., & Ciappei, C. (2018). Additive manufacturing in SMEs: empirical evidences from Italy. International *Journal of Innovation and Technology Management,* 15(01), 1850007.

Marzi, G., Caputo, A., Garces, E., & Dabić, M. (2018). A three decade mixed-method bibliometric investigation of the IEEE transactions on engineering management. *IEEE Transactions on Engineering Management*. In press

McAfee, A., and Brynjolfsson, E. (2012). Big data: the management revolution. *Harvard Business Review*, Vol. 90, No. 10, pp. 60-68.

McCarthy, I.P., Collard, M., and Johnson, M. (2017). Adaptive organizational resilience: an evolutionary perspective. *Current Opinion in Environmental Sustainability*, Vol. 28, pp. 33-40.

Mishra, D., Luo, Z., Jiang, S., Papadopoulos, T., and Dubey, R. (2017). A bibliographic study on big data: concepts, trends and challenges. *Business Process Management Journal*, Vol. 23, No. 3, pp. 143-160.

Motamarri, S., Akter, S., and Yanamandram, V. (2017). Does big data analytics influence frontline employees in services marketing?. *Business Process Management Journal*, Vol. 23, No. 3. Available online: https://doi.org/10.1108/BPMJ-02-2017-0046

O'Reilly, C.A., and Tushman, M.L. (2013). Organizational ambidexterity: past, present, and future. *Academy of Management Perspectives*, Vol. 27, No. 4, pp. 324-338.

Ortiz-de-Mandojana, N., and Bansal, P. (2016). The long-term benefits of organizational resilience through sustainable business practices. *Strategic Management Journal*, Vol. 37, No. 8, pp. 1615-1631.

Pal, R., Torstensson, H., and Mattila, H. (2014). Antecedents of organizational resilience in economic crises—an empirical

study of Swedish textile and clothing SMEs. *International Journal of Production Economics*, Vol. 147, pp. 410-428.

Provost, F., and Fawcett, T. (2013). Data science and its relationship to big data and data-driven decision making. *Big Data*, Vol. 1, No. 1, pp. 51-59.

Rialti, R., Marzi, G., Ciappei, C., and Caputo, A. (2018b). *Reframing Agile Organization. Do Big Data Analytics Capabilities Matter?*. Academy of Management Global Proceedings (Vol. Surrey), Guilford, United Kingdom.

Rialti, R., Marzi, G., Silic, M., and Ciappei, C. (2018a). Ambidextrous organization and agility in big data era: the role of business process management systems. *Business Process Management Journal*. DOI: doi.org/10.1108/BPMJ-07-2017-0210

Rialti, R., Marzi, G., Ciappei, C., & Busso, D. (2019). Big data and dynamic capabilities: a bibliometric analysis and systematic literature review. *Management Decision*. In press

Sassetti, S., Marzi, G., Cavaliere, V., & Ciappei, C. (2018). Entrepreneurial cognition and socially situated approach: a systematic and bibliometric analysis. *Scientometrics*, *116*(3), 1675-1718.

Roberts, N., and Grover, V. (2012). Leveraging information technology infrastructure to facilitate a firm's customer agility and competitive activity: An empirical investigation. *Journal of Management Information Systems*, Vol. 28, No. 4, pp. 231-270.

Tallon, P.P., and Pinsonneault, A. (2011). Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model. *MIS Quarterly*, Vol. 35, No. 2, pp. 463-486.

Thiede, M., Fuerstenau, D., and Bezerra Barquet, A.P. (2018). How is process mining technology used by organizations? A systematic literature review of empirical studies. *Business Process Management Journal*, Vol. 24, No .4, pp. 900-922.

Vera-Baquero, A., Colomo Palacios, R., Stantchev, V., and Molloy, O. (2015). Leveraging big-data for business process analytics. *The Learning Organization*, Vol. 22, No. 4, pp. 215-228.

Vossen, G. (2013). Big data as the new enabler in business and other intelligence. *Vietnam Journal of Computer Science*, Vol. 1, No. 1, pp. 3-14.

Vlajčić, D., Caputo, A., Marzi, G., & Dabić, M. (2019). Expatriates managers' cultural intelligence as promoter of knowledge transfer in multinational companies. *Journal of Business Research*, *94*, 367-377.

Waller, M.A., and Fawcett, S.E. (2013). Data science, predictive analytics, and big data: a revolution that will transform supply chain design and management. *Journal of Business Logistics*, Vol. 34, No. 2, pp. 77-84.

Wamba, S.F., and Mishra, D. (2017). Big data integration with business processes: a literature review, *Business Process Management Journal*. Vol. 23, No. 3, Available online: https://doi.org/10.1108/BPMJ-10-2015-0149

Wamba, S.F., Gunasekaran, A., Akter, S., Ren, S.J.F., Dubey, R., and Childe, S.J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities, *Journal of Business Research*, Vol. 70, No. 1, pp. 356-365.

Yin, S., and Kaynak, O. (2015). Big data for modern industry: challenges and trends [point of view]. *Proceedings of the IEEE*, Vol. 103, No. 2, pp. 143-146.

Zain, M., Rose, R.C., Abdullah, I., and Masrom, M. (2005). The relationship between information technology acceptance and organizational agility in Malaysia. *Information & Management*, Vol. 42, No. 6, pp. 829-839.

Zollo, L., Marzi, G., Boccardi, A., & Surchi, M. (2015). How to match technological and social innovation: Insights from the biomedical 3d printing industry. *International Journal of Transitions and Innovation Systems*, *4*(1-2), 80-95.