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Unlocking Internal and External Innovation Capabilities: The Role of Strategic Leadership in Digital Era

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ABSTRACT

As industrial organizations navigate the complex landscape of digital transformation (DT), the need for effective strategic leadership and innovation capabilities becomes paramount. This empirical study seeks to investigate the competencies crucial for leaders to successfully steer their organizations through the challenges and opportunities presented by the digital era. Focusing on both internal and external innovation, the research employs a comprehensive empirical approach, drawing evidence from a diverse set of industrial organizations. Through a multiple case study approach, this research aims to identify the specific competencies that contribute to strategic leadership in the digital age. The research delves into the complexities of DT, exploring how leadership competencies can leverage technology to enhance internal processes and foster external collaborations for innovation. The findings of this research are expected to contribute to the theoretical understanding of competencies required for strategic leadership in the DT era, offering practical implications for industrial organizations aiming to stay competitive and innovative. As businesses continue to grapple with the challenges of digital disruption, this study provides a timely and valuable contribution to the evolving discourse on leadership and innovation in the industrial context.

Keywords: Competencies, Leadership, Internal and external innovation, Digital transformation

INTRODUCTION

Digital innovations through several emerging digital technologies are significantly impacting the ways firms are structured and governed, creating and capturing values within the boundary conditions (Markus and Rowe, 2023; Hafeez et al., 2025). Thus, a clear interest has been growing towards digital transformation (DT), which enables practitioners and academics to explore how firms strive to digitalize their businesses to harness their full potential through leading DT efforts. However, it requires developing innovative leadership due to its importance in leading DT initiatives (Imran et al., 2021; Imran et al., 2020; Müller et al., 2024). While pursuing the DT agenda, business leaders need to play a crucial role in rethinking their strategy to influence people (Bunjak et al., 2022) and leading the organizational change (Shahzad et al., 2024) to capitalize on the innovation opportunities provided by DT. However, it requires highly skilled individuals (Skare et al., 2023) with a certain combination of competencies (Andriole, 2018) and

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technologies to work together to transform their firms into entities involving internal and external stakeholders for value creation (Altman et al., 2023).

These trends require the development of new competencies for strategic leadership with transformational potential. Consequently, the importance of competencies and skills is increasingly recognized by innovation management researchers, policy makers, and industrial practitioners. Effective management approaches and the development of new practices are crucial for cultivating necessary strategic leadership skills. Strategic leadership refers to the top management team, including directors and other high-level executives responsible for the firm's long-term direction (Hambrick, 1989). Strategic leadership skills serve as a necessary but not solely sufficient condition for innovation. Simultaneously, the introduction of new business models and the adoption of digital technologies can influence the requirements for new work practices and competencies for strategic leadership (Schiuma et al., 2021).

Despite extensive discussion on digital transformation (DT), prior literature provides limited insight into the specific leadership competencies required to drive internal and external innovation in this context. While digital technologies and their organizational implications have been widely examined (e.g., Urbinati et al., 2020; Dąbrowska et al., 2022), insufficient attention has been paid to how DT reshapes leadership competencies and how these competencies influence organizational structure, culture, and innovation outcomes. Accordingly, leaders must develop new practices and capabilities to capture the value of DT (Pihlajamaa et al., 2021). Addressing this gap, this study explores how strategic leadership competencies shape structural and cultural change to enable internal and external innovation in industrial organizations. Drawing on semi-structured interviews from three industrial firms, we identify key competencies that support organizational renewal and ecosystem-based innovation. By specifying these competencies as strategic capabilities for the digital era, this study contributes to the literature on leadership and innovation and delineates a critical skill set required for navigating contemporary digital landscapes.

LITERATURE REVIEW

Digital transformation (DT) represents a multilevel socioeconomic shift—spanning individuals, organizations, ecosystems, and societies—triggered by the adoption of technological innovations (Dąbrowska et al., 2022). Beyond digitizing analogue information and enabling new business models, DT is widely conceptualized as a sociotechnical phenomenon (Sony and Naik, 2020; Imran et al., 2018; Imran et al., 2020) affecting personnel, structures, processes, and culture. Sociotechnical systems theory emphasizes the joint optimization of social and technical subsystems (Butt et al., 2021; Butt et al., 2024; Butt et al., 2025; Pasmore et al., 2019; Mumford, 2006; Trist and Bamforth, 1951), underscoring that transformation extends beyond technology implementation and requires new or reconfigured leadership competencies to enhance innovation performance. Consequently, DT challenges traditional leadership assumptions. Although concepts such as digital leadership highlight digital skills, vision articulation, and adaptive

mindsets (Benitez et al., 2022; Bresciani et al., 2021; Weber et al., 2022; Gençer and Samur, 2016; Bunjak et al., 2022; Vial, 2019), limited attention has been paid to how DT reshapes strategic leadership competencies and how these competencies influence structural and cultural transformation (Oreg and Berson, 2019).

Leadership is central to driving both internal and external innovation by redesigning structures, minimizing rigid hierarchies, and fostering collaborative ecosystems (Sebastian et al., 2020; Hesse, 2018; Imran et al., 2022). Through appropriate skill configurations, leaders align social and technical systems, implement structural change, and cultivate innovation-oriented cultures, particularly within incumbent firms lacking emerging capabilities (Imran, 2023; Reck and Fliaster, 2019; Imran et al., 2021). Digital leadership enhances responsiveness, cross-hierarchical collaboration, and innovation performance (Abbu et al., 2020), requiring digital literacy, forward-looking vision, and adaptability (Neumeyer and Liu, 2021). Such vision clarifies technological opportunities and customer value creation (Singh et al., 2020; Pihir et al., 2019), while leadership competencies foster agility through rapid structural adjustments (Crocitto and Youssef, 2003; Busse and Weidner, 2020). Moreover, effective leaders organize knowledge processes, leverage business intelligence, and strengthen stakeholder ties (Zhang et al., 2022), enhancing collaboration, trust, and coordinated responses to dynamic environments (Li et al., 2021).

METHODOLOGY

This research employs a qualitative multiple case study approach as a qualitative case study design is well-suited approach as it opens up several emerging issues related to internal and external innovation (Yin, 2018). The empirical findings were drawn from investigating in three leading industrial firms headquartered in Northern European countries that went through a DT journey through strategic transformation initiative at the organizational level.

The data was collected through semi-structured interviews during from 41 interviewees from people who hold influential leadership positions in their organizations. In addition to the interview data, secondary data comprising publicly available documents including web blogs, online interview videos, organizational reports, marketing material and information on websites were utilized to advance further insights. We continued interviewing the participants until we reached the saturation point, that is no additional insights can be gained through more interviews (Guest et al., 2006).

NVivo14 was used to develop the case study database and maintain a clear chain of evidence, preserving data collection conditions and aligning them with the study's objectives (Yin, 2011). Analysis involved systematic coding of over 500 pages and 46 hours of interview transcripts, alongside secondary data. Two authors independently conducted parallel coding following Gioia et al.'s (2013) methodology. Initial coding was guided by relevance to the research phenomenon, recurrence across informants, and analytical usefulness. Statements were organized into first-order categories

using informant-centric terms, then distilled into second-order and aggregated themes. Data triangulation with secondary sources ensured construct validity and strengthened analytical rigor.

RESULTS

To enhance internal and external innovation, our data finds that the leadership of industrial organizations is paying special attention to re-inventing their organizational structures and updating the existing culture to achieve organizational agility, enhanced collaboration with external stakeholders, and customer-centricity. However, to do so, leadership has to update their competencies first.

In alignment with DT, digital knowledge is one of the most important leadership competencies to lead internal and external innovation. As mentioned by one interviewee, leaders need to be more technology oriented more than ever. However, possessing digital knowledge does not necessarily mean possessing hardcore technical knowledge. Rather, understanding of a particular technology and knowing what possibilities/opportunities it may bring and how to utilize it to its maximum potential will be the main capability of leadership. Furthermore, the data analysis found digital vision to be another very important leadership competency. The ability to understand digital technologies and devise an appropriate digital vision is key to enhancing innovation. However, our data showed that organizational leaders are struggling to devise a digital vision. Therefore, the leaders of industrial organizations must pay attention to developing a workable digital vision that can define the digital future of their organizations.

This digital age comes with very high uncertainty, where things are changing rapidly, requiring leaders to constantly adapt to new situations. Unlike the past, things are no longer happening in a linear and predictable manner. Therefore, organizational leaders must be brave enough to take risks to tackle the uncertainty. At the same time, it is the leader's task to identify and mitigate the associated risks. Moreover, this study found that digital technologies help leadership to reduce risks.

Empowering people for accountability is another very important leadership competence, especially for internal innovation. Leaders are catalysing agents to set the direction for their teams and subordinates, and empower them to achieve those goals. However, some interviewees said that they prefer to empower their teams with accountability. Leaders can enable the sense of empowerment by fostering a rapid sense of accountability of internal innovations to match the pace of external changes. Our research finds that team orchestration is a critical skill for innovation. Leaders need a skill set to make and break the team more frequently than in the past, when organization hierarchies defined innovation teams. Managing such diverse teams is another very important competency of leadership found in this study. Leaders have to define processes among team members to keep things flowing. Leaders form teams based on skill requirements rather than hierarchy and they have to keep their team members focused on overall team

goals leading towards overall organizational goals. Leaders define each team member's roles according to what is expected from them to keep them focused. In relation to the leadership role of experimentation, failing fast (or learning fast) is required for impactful innovation. Leaders must be experimentation-oriented, but at the same time they must be competent enough to realize if something is not working correctly. Failed innovations consume the available resource; leaders need to build competences on how to fail safely with less burden on resource capacity and motivations.

Leaders must be competent to deal with uncertain, disruptive situations, as this digital age brings lots of uncertainty. Innovation requires leaders to be open-minded, which relates to the experimentation leadership role and the failing fast competency. To be experimentation-oriented, leaders must be very open-minded. Leaders must acknowledge that they cannot do everything by themselves; they must be open to delegating tasks and decision-making to their teams and subordinates. Moreover, open-mindedness helps leaders to understand the opportunities that come with digital tools and to deal better with uncertainty and ambiguity. Embedding trust is a must-have leadership ability in this digital age to enhance internal and external innovation. Without embedded trust, leaders cannot perform many roles, including promoting collaboration, encouraging experimentation through their team, and having a coaching style of leadership. In addition, leaders must have good collaborative skills to do that. They must be able to partner effectively. Moreover, leaders must be sufficiently competent to break silos between different teams or organizational functions by bringing them together to innovate while ensuring that innovation teams have distributed risk and reward between the internal and external experts.

Our data found evidence on leadership competencies that can play a crucial role in attaining and maintain organizational agility. Coaching organization for agility is a compound competence the leaders must hone. Therefore, it becomes a leadership job to set up a core team, coach them to upskill for organizational agility. Customer-centric innovations bring long-lasting business performances wherein leaders secure the freedom and flexibility in the innovation process to make this happen. Leaders are proprietors who ensure their team remain connected with the customer needs. Our data showed that leaders should involve their customers in piloting or experimenting with new product or service. Our data confirms that no one else than leaders who can successfully ingress customer-awareness in their teams to make organizations truly customer-centric. In particular, we found that the top leadership sends this message from the top to the bottom. Lastly, collaboration has been discussed as a leadership competency in the previous section. However, our findings show collaboration amongst an overall organizational goal that case companies are targeting to achieve through DT. Innovation leaders are in forefront to build collaboration within own organizational boundaries, however, even more importantly with external stakeholders. Todays' innovation demand leadership competencies that strength the sense of belongingness across whole ecosystem. For example, we found that the leaders of case organizations were now not only sharing

success stories but also placing more stress on sharing failure stories to mitigate the risk of repeating similar decisions or actions across their own teams. To recover from failure, leaders identify the right internal or external resources and collaborate to find the right solutions. Leading innovations is working beyond job titles, collaborate with different stakeholders, and gather around a certain problem beyond their hierarchical authorities. Overall, such leadership skills also enhance organizational collaboration capabilities, as such leaders have better possibilities to orchestrate teams, and make innovation process agile and customer centric.

CONCLUSION

Future business leaders must possess competences to foster digital technology (Bresciani et al., 2021) driven innovations that address grand challenges (Benitez et al., 2022). Our case studies of industrial organizations bring insight into such leadership competences which are complexly interwoven within the innovation process (Urbinati et al., 2020) and innovation context (Bunjak et al., 2022). The leaders' digital quotient, digital vision, risk-proneness, accountability catalyzing, team orchestration, failing safely, managing disruption, open-mindedness, embedding trust, partnership building, agility coaching, customer proprietorship, ecosystem collaboration competences are of essence for internal and external innovation. These strategic competences (Bresciani et al., 2021; Oreg and Berson, 2019) are crucial to lead internal and external stakeholder ties (Zhang et al., 2022) innovation at our industrial case organizations.

While the digital technologies are crucial for the innovation performance (Benitez et al., 2022), agility coaching, customer proprietorship, and ecosystem collaboration are found as compounding competencies of innovation leaders (Bunjak et al., 2022). These competencies provide foundation for executing the innovation leadership competencies as found during our research. Leaders as coaches can enabled shared meaning of agility, what it means for their business context and for the partners involved. Leaders are in best position to own the responsibility that their innovation teams' (comprising of internal and external experts) understanding of customers problem and own with collective accountability. This requires the leaders to establish ecosystem wide collaborative practices, build partnerships, embed trust, and orchestrate team skills to achieve successful innovations.

These findings have profound implications for building the future of organization where people matter (Gale and Aarons, 2018) in bringing up sociotechnical innovations built over DT (Imran, 2023). Future innovations require leaders to perform beyond their formally defined structural roles (Imran et al., 2022) and build ties with stakeholders (Zhang et al., 2022) across the workforce ecosystem (Altman et al., 2023). The strategic leadership in our case organizations deploy their (as identified) competences while collaborating over digital platform (Benitez et al., 2022) and carve certainty, stability, and predictability throughout the innovation process.

A future research opportunity, while being our limitation, is to explicate the strategic leadership competence development process along with the key drivers, enablers, and mechanisms for developing strategic leadership. Such research can also establish the technical models of strategic leadership

for digital technologies driven open innovation in industrial organizations (Chen et al., 2021) to support strategic renewal of traditional industrial organizations (Warner and Wäger, 2019). The future research could further establish causal relationship between the strategic leadership competencies for innovation and the process of internal and external innovations.

While our research focused on leading industrial organizations who have global operations, it remained obscure to conclude if these identified competencies are (partly or completely) sufficient for the small and medium size organizations operating in one or a few markets. Future research could address this limitation, and furthermore extend the list of strategic leadership competencies for effective digital technologies driven innovations. By founding a holistic framework for these competencies, future research can explicate the interplay between different players of innovation, for example, form institutional theory and agent-based theory perspective.

REFERENCES

Abbu, H., Mugge, P., Gudergan, G., & Kwiatkowski, A. (2020, June). Digital leadership-character and competency differentiates digitally mature organizations. In 2020 IEEE international conference on engineering, technology and innovation (ICE/ITMC) (pp. 1–9). IEEE.

Altman, E. J., Kiron, D., Schwartz, J., & Jones, R. (2023). Workforce Ecosystems: Reaching Strategic Goals with People, Partners, and Technologies. MIT Press.

Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. In Handbook of Labor Economics (Vol. 4, pp. 1043–1171). Elsevier.

Benitez, J., Arenas, A., Castillo, A., & Esteves, J. (2022). Impact of digital leadership capability on innovation performance: The role of platform digitization capability. Information & Management, 59(2), 103590.

Bresciani, S., Huarng, K. H., Malhotra, A., & Ferraris, A. (2021). Digital transformation as a springboard for product, process and business model innovation. Journal of Business Research, 128, 204–210.

Butt, A., Imran, F., Help, P., Kantola, J.: Strategic design of culture for digital transformation. Long Rang. Plann., vol. 57 (2024)

Butt, A., Imran, F., Help, P., Kantola, J (2021). "Cultural Preparation for Digital Transformation of Industrial Organizations: A Multi-case Exploration of Socio -technical Systems". Advances in Physical, Social & Occupational Ergonomics. Lecture Notes in Networks and Systems. Vol. 273. pp. 457–463. ISBN 978-3 -030-80712-2. S2CID 237298363.

Butt, A., Imran. F.: Sociotechnical Leadership for the Digital Transformation of Global Corporations. Human Factors, Business Management and Society 176, 242

Bunjak, A., Bruch, H., & Černe, M. (2022). Context is key: The joint roles of transformational and shared leadership and management innovation in predicting employee IT innovation adoption. International Journal of Information Management, 66, 102516.

Busse, R., & Weidner, G. (2020). A qualitative investigation on combined effects of distant leadership, organisational agility and digital collaboration on perceived employee engagement. Leadership & Organization Development Journal, 41(4), 535–550.

Chen, J., Di Minin, A., Minshall, T., Su, Y. S., Xue, L., & Zhou, Y. (2021). Introduction to the Special Issue on the New Silk Road of Innovation: R&D Networks, Knowledge Diffusions, and Open Innovation. R&D Management, 51(3), 243–246.

Chiarello, F., Fantoni, G., Hogarth, T., Giordano, V., Baltina, L., & Spada, I. (2021). Towards ESCO 4.0–Is the European classification of skills in line with Industry 4.0? A text mining approach. Technological Forecasting and Social Change, 173, 121177.

Ciarli, T., Kenney, M., Massini, S., & Piscitello, L. (2021). Digital technologies, innovation, and skills: Emerging trajectories and challenges. Research Policy, 50(7), 104289.

Cortellazzo, L., Bruni, E., & Zampieri, R. (2019). The role of leadership in a digitalized world: A review. Frontiers in Psychology, 10, 1938.

Crocitto, M., & Youssef, M. (2003). The human side of organizational agility. Industrial Management & Data Systems, 103(6), 388–397.

Dąbrowska, J., Almpanopoulou, A., Brem, A., Chesbrough, H., Cucino, V., Di Minin, A., ... & Ritala, P. (2022). Digital transformation, for better or worse: a critical multi-level research agenda. R&D Management, 52(5), 930–954.

Davis, M. C., Challenger, R., Jayewardene, D. N., & Clegg, C. W. (2014). Advancing socio-technical systems thinking: A call for bravery. Applied Ergonomics, 45(2), 171–180.

El Sawy, O. A., Kræmmergaard, P., Amsinck, H., & Vinther, A. L. (2020). How LEGO built the foundations and enterprise capabilities for digital leadership. In Strategic Information Management (pp. 174–201). Routledge.

Ferrigno, G., Crupi, A., Di Minin, A., & Ritala, P. (2023). 50+ years of R&D Management: A retrospective synthesis and new research trajectories. R&D Management.

Gale, M., & Aarons, C. (2018). Why people matter far more than digital technology or capital. Strategic HR Review, 17(1), 29–32.

Gençer, M. S., & Samur, Y. (2016). Leadership styles and technology: Leadership competency level of educational leaders. Procedia-Social and Behavioral Sciences, 229, 226–233.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. Organizational Research Methods, 16(1), 15–31.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. Handbook of Qualitative Research, 2(163–194), 105.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. Field Methods, 18(1), 59–82.

Hambrick, D. C. (1989). Putting Top Managers back in the Strategy picture-Introduction. Strategic Management Journal, 10, 5–15.

Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. Journal of Management Studies, 58(5), 1159–1197.

Hesse, A. (2018). Digitalization and Leadership-How experienced leaders interpret daily realities in a digital world. In the Proceedings of the 51st Hawaii International Conference on System Sciences.

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. Information and Organization, 28(1), 52–61.

Huberman, A., Miles, M., & Janet Ward, S. (2012). Increasing the Generalizability of Qualitative Research. In The Qualitative Researcher's Companion (pp. 171–202). https://doi.org/10.4135/9781412986274.n8

Imran, F. (2023). Digital transformation of industrial organisations: A sociotechnical study on the role of leadership, structure and culture in achieving performance outcomes. University of Vaasa.

Imran, F., Shahzad, K., Butt, A., & Kantola, J. (2020). Leadership competencies for digital transformation: evidence from multiple cases. In Advances in Human Factors, Business Management and Leadership: July 16–20, 2020, USA (pp. 81–87). Springer International Publishing.

Imran, F., Shahzad, K., Butt, A., & Kantola, J. (2021). Digital transformation of industrial organizations: Toward an integrated framework. Journal of Change Management, 21(4), 451–479.

Imran, F., Shahzad, K., Butt, A. F., & Kantola, J. (2022). Structural challenges to adopt digital transformation in industrial organizations: A multiple case study. Human Factors in Management and Leadership, *55*, 47.

Imran, F., & Kantola, J. (2018). Review of Industry 4.0 in the light of sociotechnical system theory and competence based view: A future research agenda for the evolute approach. In J. Kantola, S. Nazir, & T. Barath (Eds.), Proceedings of the AHFE 2018

Kane, G. C., Phillips, A. N., Copulsky, J., & Andrus, G. (2019). How digital leadership is (n't) different. MIT Sloan Management Review, 60(3), 34–39.

Leiponen, A. (2005). Skills and innovation. International Journal of Industrial Organization, 23(5-6), 303–323.

Li, H., Wu, Y., Cao, D., & Wang, Y. (2021). Organizational mindfulness towards digital transformation as a prerequisite of information processing capability to achieve market agility. Journal of Business research, 122, 700–712.

McCarthy, P., Sammon, D., & Alhassan, I. (2022). Digital transformation leadership characteristics: A literature analysis. Journal of Decision Systems, 32(1), 79–109.

Mumford, E. (2006). The story of socio-technical design: Reflections on its successes, failures and potential. Information Systems Journal, 16(4), 317–342.

Neumeyer, X., & Liu, M. (2021). Managerial competencies and development in the digital age. IEEE Engineering Management Review, 49(3), 49-55.

Oberer, B., & Erkollar, A. (2018). Leadership 4.0: Digital leaders in the age of industry 4.0. International Journal of Organizational Leadership.

Oreg, S., & Berson, Y. (2019). Leaders' impact on organizational change: Bridging theoretical and methodological chasms. Academy of Management Annals, 13(1), 272–307.

Pasmore, W., Winby, S., Mohrman, S. A., & Vanasse, R. (2019). Reflections: sociotechnical systems design and organization change. Journal of Change Management, 19(2), 67–85.

Pihir, I., Tomičić-Pupek, K., & Tomičić Furjan, M. (2019). Digital transformation playground-literature review and framework of concepts. Journal of Information and Organizational Sciences, 43(1), 33–48.

Pihlajamaa, M., Malmelin, N., & Wallin, A. (2023). Competence combination for digital transformation: a study of manufacturing companies in Finland. Technology Analysis & Strategic Management, 35(10), 1355–1368.

Reck, F., & Fliaster, A. (2019). Four profiles of successful digital executives. MIT Sloan Management Review.

Schiuma, G., Schettini, E., Santarsiero, F., & Carlucci, D. (2022). The transformative leadership compass: six competencies for digital transformation entrepreneurship. International Journal of Entrepreneurial Behavior & Research, 28(5), 1273–1291.

Schwarzmüller, T., Brosi, P., Duman, D., & Welpe, I. M. (2018). How does the digital transformation affect organizations? Key themes of change in work design and leadership. Management Revue, 29(2), 114–138.

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., & Fonstad, N. O. (2020). How big old companies navigate digital transformation. In Strategic Information Management (pp. 133–150). Routledge.

Siepel, J., Camerani, R., & Masucci, M. (2021). Skills combinations and firm performance. Small Business Economics, 56, 1425–1447.

Singh, A., Klarner, P., & Hess, T. (2020). How do chief digital officers pursue digital transformation activities? The role of organization design parameters. Long Range Planning, 53(3), 101890.

Sony, M., & Naik, S. (2020). Industry 4.0 integration with socio-technical systems theory: A systematic review and proposed theoretical model. Technology in Society, 61, 101248.

Tigre, F. B., Curado, C., & Henriques, P. L. (2023). Digital leadership: A bibliometric analysis. Journal of Leadership & Organizational Studies, 30(1), 40–70.

Trist, E. L., & Bamforth, K. W. (1951). Some social and psychological consequences of the longwall method of coal-getting: An examination of the psychological situation and defences of a work group in relation to the social structure and technological content of the work system. Human Relations, 4(1), 3–38.

Urbinati, A., Chiaroni, D., Chiesa, V., & Frattini, F. (2020). The role of digital technologies in open innovation processes: An exploratory multiple case study analysis. R&D Management, 50(1), 136–160.

Vial, G. (2021). Understanding digital transformation: A review and a research agenda. Managing Digital Transformation, 13–66.

Warner, K. S., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. Long Range Planning, 52(3), 326–349.

Weber, E., Büttgen, M., & Bartsch, S. (2022). How to take employees on the digital transformation journey: An experimental study on complementary leadership behaviors in managing organizational change. Journal of Business Research, 143, 225–238.

World Economic Forum (2023) Reskilling Revolution: Preparing 1 billion people for tomorrow's economy. Accessed from: https://www.weforum.org/impact/reskilling-revolution/

Yin, R. K. (2011). Applications of Case Study Research. Sage Publications.

Yin, R. K. (2018). Case Study Research and Applications (Vol. 6). Thousand Oaks, CA: Sage.

Zhang, M., Liu, H., Chen, M., & Tang, X. (2022). Managerial ties: How much do they matter for organizational agility?. Industrial Marketing Management, 103, 215–226.