The Role of Digital Leadership Capabilities in Enterprise-Wide Digital Transformation

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Abstract

In a situation of rapid technological development and the world's transition to a new technological regime, organizations are faced with the need for digital transformation (DT). This process goes beyond the simple implementation of advanced technologies and involves the management of processes of increased complexity, deep recombinations of business processes, structures, methods of external communications, and so on. However, these factors are not considered by most organizations. In other words, DT is underestimated in terms of complexity, duration, and intensity of adaptation stress. Only 10%-20% of organizations succeed in such a transformation at the first attempt, with large companies failing most often. This study analyzes the reasons why most of these initiatives fail to achieve their goals. Particular emphasis is placed on the link between digital competencies of managers and the impact of technological reforms. For this purpose, an array of relevant publications on the topic of DT over the last five years was analyzed. According to the results, the majority of organizations enter DT without proper preparation in the form of early revision of competencies and corporate culture, going beyond the established models of thinking and behavior, which previously provided competitiveness, but in the new context cease to work. Principles that increase the chances of successful digital transformation are formulated. This article contributes to the growing body of knowledge on management practices in transformational transitions.

Keywords: digital transformation, digital competencies of managers; new management models; dynamic capabilities; transition management; sustainable competitiveness

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Introduction

In the context of dynamic technological progress, organizations are faced with the need to move to more complex development models, including the digital economy. According to the UN, in 2019, the volume of the global digital economy already reached an impressive $22.5 trillion (UNCTAD, 2019), and the pandemic crisis has become a powerful driver of its further growth.

The key to the transition to a digital economy is a comprehensive digital transformation (DT), which, when done correctly, can provide organizations with significant benefits in terms of increasing value and maintaining sustainability and competitiveness in an uncertain business environment (Ciao et al., 2024). At the same time, the requirements for entrepreneurship standards and business conduct in general are becoming more stringent.

The main goal of DT is to change value creation practices along the entire value chain: from digitizing production processes to increasing the transparency of relationships in production and supply chains (Kirti et al., 2022), which optimizes management practices (Klos et al., 2021). Thus, the ultimate goal of DT is not simply to go digital, but rather to ensure sustainable growth and value creation. In general, the implementation of DT implies a long-term, comprehensive strategy. Digital technologies are becoming tools for organizations to modernize production models, management, customer service, and marketing strategies. Based on these observations, governments are rethinking laws and policies related to data security, intellectual property, and the formation of digital competencies (Mergel et al., 2019; Nambisan et al., 2019).

The human factor remains the key driver of adaptation to new technological cycles (Schiuma et al., 2024). Whether an organization can master opportunities of a fundamentally different level depends on personnel with the appropriate competencies, including dynamic capabilities, especially for executive management. Despite its importance, the role of management in the implementation of DT is an insufficiently studied factor (Trenerry et al., 2021). The philosophy of resource renewal and competencies aimed at implementing complex DT processes differ significantly from traditional management patterns (Veeraya et al., 2024). The shortage of such a set of skills is demonstrated by the fact that in more than 80% of cases, digital transformations do not achieve the desired goals (Oludapo et al., 2024). The problem is particularly characteristic of large organizations due to the difficulties they experience in moving away from traditional management models that once ensured competitiveness (Oludapo et al., 2024; Trenerry et al., 2021). Removing this barrier requires a radically different perception of the dynamism of change and increased persistence in proactive action (Oludapo et al., 2024).

In-depth research is needed to better understand the aspects that determine the effectiveness of corporate digital transformation. Our article contributes to this process by analyzing the latest literature on the topic and is aimed at identifying the links between transformation processes at organizations, their management practices, effectiveness, and development strategies.

Research Methodology

To select relevant publications, a set of search terms in combination with Boolean operators (AND/OR) was used, namely: "digital transformation", "digital literacy of managers", "dynamic potential", and "company management and efficiency". The search was performed in the Web of Science database due to its authority and representativeness. In accordance with the specified criteria, 14,895 materials were included in the search results, which were filtered by the following criteria:

- open access;
- review publications;
- articles in English;
- published in the last five years (2021–2025);
- belong to the corresponding Web of Science categories (business, management, environmental science, computer science, support staff).

After applying the above criteria, 48 studies remained, of which five studies were subjected to in-depth analysis (see Table 1), the rest supplemented the literature review.

As the analysis shows, China holds the lead in the number of scientific publications on the topic under consideration (3158), more than twice exceeding Germany, which ranks second (Table 2). Its lead is due to the large-scale development of science, technology, and entrepreneurship in the country. A number of European countries (Germany, Great Britain, Italy, and Spain, the BRICS countries (India, Brazil, Russia), and Australia) are also notably active.

Figure 1 shows the dynamics of the number of publications in recent years. It is noteworthy that if about 2,000 articles were published in 2021, then just three years later this figure doubled. There has been a significant shift toward the digitalization of organizational functions, which has led to the interest of researchers in the relevant topic. A large body of work is devoted to the relationship between digital technology and management and the dynamic capabilities, innovative activity, and efficiency of companies.

Figure 2 shows the direct links between DT and other aspects of management.

Table 1. **Publications that Formed the Basis of the Literary Analysis**

a) Schiuma et al., 2024

Topics	• The role of managers in managing digital knowledge and digital technologies of the organization • Human-centered approach to DT
Author's keywords	Leader - Organizational Transformer; Digital Knowledge; Digital Transformation; Leadership Competencies
Methodology	• Grounded Theory Method • Deductive analysis of literature followed by inductive empirical research • Semi-structured interviews
Key findings	Need for deep awareness of the practical aspects of DT at senior management levels

b) Oludapo et al., 2024

Topics	Analysis of problems associated with DT, the frequency of failures of this process and the main reasons
Author's keywords	Digital transformation; failures; organizational transformation; information system; competence transformation
Methodology	• Bibliometric analysis • Thematic mapping of literature
Key findings	• More than 80% of DT initiatives end in failure • Modern research operates with broad categories such as "technology," "information system," and "management," which results in a simplified understanding of the digital transformation ecosystem and leaves the causes of failures unidentified. • Insufficient awareness and understanding of the reasons for the failure of the DT

c) Gouveia et al., 2024

Topics	• Value creation mechanisms and strategic management in the context of digital transformation • The contribution of digital entrepreneurship to sustainable business development • Innovative business models • Digital transformation of SMEs
Author's keywords	Strategic management; digital transformation; c value creation
Methodology	Systematic review, bibliometric and cluster analysis of literature
Key findings	Changes in industry value creation mechanisms under the influence of digital transformation require adaptation of development strategies and technological potential of companies

d) Espina-Romero et al., 2023

Topics	• Evolution of digital management competencies (2018-2023) with a focus on the impact of the pandemic crisis • Study of the geography of the authors of the relevant studies • Specifics of digital management competencies in education and industry • contexts • Dependence of the effectiveness of the digital transformation on the level of technology development • Adaptation of management competencies to the specifics of the digital environment
Author's keywords	Digital management competencies ; digital transformation; technology; adaptation to change; innovation; technical skills; change management; effective communications; strategic decision making
Methodology	Quantitative bibliometric analysis
Key findings	• The pandemic crisis has significantly increased the importance of digital transformation and the role of technological competencies of managers in this process • The main publication activity on the topic under consideration was demonstrated by European and Asian countries, and the top three were the USA, Germany and China

e) Mrugalska, Ahmed, 2021

Topics	Flexibility of organizations; Industry 4.0 Technologies; Intelligent manufacturing; Internet of Things (IoT); Cyber-physical systems; Big data analytics; Cloud computing
Author's keywords	Industry 4.0; organizational agility; Industry 4.0 ecosystem; environment
Methodology	Systematic literature review
Key findings	Strategic flexibility is becoming critical for managing change in organizations in conditions of increased uncertainty. The introduction of Industry 4.0 technologies facilitates the development of this competence in different dimensions. The main technological tools include intelligent manufacturing, the Internet of Things, cyber-physical systems, big data analytics, and cloud computing.

Source: compiled by the authors.

The Main Results of the Literary Analysis

Definition of the Digital Transformation

DT goes beyond the simple implementation of advanced technologies and involves the management of highly complex processes, including the deep recombination of business processes, structures, and external communication methods (Oludapo et al., 2024; Bresciani et al., 2021). The basic condition for its successful completion is the creation of a new culture that allows for flexible adaptation to emerging technologies and effective operation in a variety of interconnected, rapidly changing contexts (Plekhanov et al., 2023).

DT is developing in three stages: digitalization, the transformation of management models, and value creation (Kraus et al., 2022; Zhu et al., 2021). The first two stages involve the digitalization of data and business processes, respectively, becoming the basis for the deep integration of digital technologies into management mechanisms (Pagani, 2013; Piepponen et al., 2022; Verhoef et al., 2021). Digital technologies improve communication and collaboration, reduce the costs of implementing business processes, increase the efficiency of logistics, capital movement, and the circulation of information flows (Heredia et al., 2022; Nambisan, 2019), and facilitate value creation under conditions of uncertainty (Ferreira et al., 2019). However, it is necessary to take into account that DT is a continuous and long-term process (Bharadwaj et al., 2013), requiring maintaining a focus on creating innovation (Gao et al., 2022; Hinings et al., 2018). The stumbling block for DT is outdated organizational practices and rigid corporate culture (Correani et al., 2020).

Digital Competencies of Managers

The penetration of digital technologies into all aspects of business makes the relevant competencies of management personnel critically important. We are talking about the skills of managing organizations as complex systems and their adaptation to a changing environment (Karakose, Tulubas, 2023), in which new technological solutions create opportunities of a fundamentally different level. DT involves going beyond the technological dimension into the area of strategic and cultural aspects, and, consequently, reformatting thinking and behavioral patterns (Veeraya et al., 2024; Oludapo et al., 2024; Trenerry et al., 2021; Peng et al., 2024).

Managers with such competencies are able to become powerful motivators of innovative activity and transmit the relevant skills and knowledge to all levels of personnel (Karakose et al., 2022; Wang et al., 2024) and integrate technical capabilities and social systems into

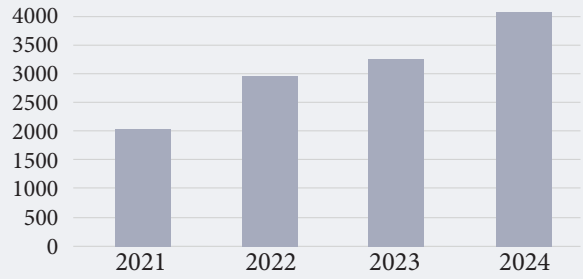
Table 2. Number of Publications by Country and Region

Country	Number of Publications
China	3158
Germany	1204
USA	1083
United Kingdom	914
Italy	840
Spain	746
Russia	657
India	570
Australia	497
Brazil	467

Note: the number of publications is calculated on the basis of initial sample.

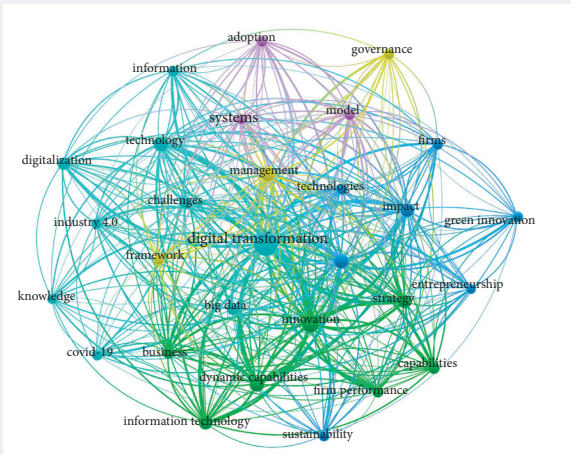
Source: authors.

Figure 1. Number of Publications by Year



Source: authors.

Figure 2. The Relationship between Digital Transformation and Digital Competencies of Managers



Source: authors.

a single strategic framework (Qiao et al., 2024). Digital competencies, superimposed on the previous skill base and corresponding to emerging opportunities, help to effectively implement more complex technological solutions (Schiuma et al., 2024) and create innovations.

Strategic agility and dynamic capabilities enable the acceleration of an organization's digital transformation. Interdisciplinary collaboration enables the coordination of DT initiatives with different areas of the organization's activities (Mrugalska, Ahmed, 2021).

Leaders with digital competencies can ensure their organizations are better positioned strategically to both seize digital opportunities and to address challenges and manage the risks associated with technological change (Mollah et al., 2024). As a result, their competitiveness, operational efficiency and customer base indicators improve (Karippur, Balaramachandran, 2022).

Managers with such competencies are able to become powerful stimulators of innovation and transmit the relevant skills and knowledge to all levels of staff (Feliciano et al., 2023).

Factors of DT Failure at Organizations

Change management and technology adoption initiatives represent a significant expense in today's organizations. Despite this, failure rates remain high, especially at large companies (Oludapo et al., 2024). A McKinsey study of a sample of over 800 traditional enterprises worldwide shows that while 70% have started using digital transformation, 71% of that number are still in the experimentation stage. For example, as of 2021, only 16% of Chinese enterprises achieved their initial digital transformation goals (Ciao et al., 2024). The key constraints to digital transformation include cultural and structural barriers, the importance of which is often underestimated. In the context of large-scale contextual changes, organizations can no longer rely on established management models (which ensured success in previous conditions) and incremental transformations. There is a need for a shift in the strategic paradigm. The previously noted 80% failure rate in the implementation of digital transformation is only an average figure. In large organizations, it can reach 90% (Ramesh, Delen, 2021)[1], which can partly be associated with their larger scale of operations and ambitious goals. However, the decisive contribution to this increased figure is made by: rigid hierarchical structures, inflexible business models and cultural inertia (O'Brien et al., 2023). Let us consider the listed factors in more detail.

Structural complexity. An important prerequisite for effective digital transformation is: significant systemic changes based on a holistic strategic approach, taking into account technological, process, and personnel components. As a rule, several initiatives are implemented simultaneously, related to the distribution of roles and responsibilities, as well as the creation of special digital units. This implies changes in the organizational culture aimed at adapting personnel to new forms of work (Jöhnk et al., 2020). Large organizations typically have numerous interdependent units that are semi-autonomous and build their own operating models. Any changes in their activities, especially within the framework of DT, which is complex, spread to other business units, causing a cascading effect of changes. Thus, efforts to direct this process onto the right path inevitably go beyond local adjustments (Karakose et al., 2022). At the same time, they should vary in scope, since, for example, in some cases it is impossible to ignore taking into account local specifics (different regulatory requirements may apply in different regions of the company's operations, etc.).

Significant barriers to DT arise at the operational and strategic levels due to the slow speed of decision-making, which is caused by *cultural inertia* and the complexity and rigidity of organizational structures. Some culturally homogeneous organizations with a rich history demonstrate reluctance to change their patterns, despite changed external circumstances (Haskamp et al., 2021). This is especially true in cases where established models have been successful for a long time. A conflict of interests arises between the different levels of the hierarchy: middle management begins to perceive radical changes, including DT, as a threat to their status quo.

Initiatives to experiment and implement new approaches can also be held back by such "convincing" arguments of their opponents as excessively high costs of modernization. Another significant factor determining the failure of digital transformation is the lack of a knowledge base that is not adapted to the modern context, since most existing theories of organizational transformation were created before the advent of the Internet (Haskamp et al., 2021). In modern conditions, the dynamics of the spread of new technologies requires their prompt coordination with existing products, processes, and strategies.

The scale of the required changes. The digital transformation of large organizations affects many stakeholders, including hundreds of employees located in different territories. As a result, the process is extended over

[1] The remaining 10% of initiatives can be considered successful because they are implemented within the planned budget and within the planned time frame.

a long period, during which the market situation may change unpredictably. Despite this, the organization is still expected to provide acceptable economic indicators. Overcoming such a multidimensional challenge requires thorough preparation.

Limitations of Traditional Approaches to Change Management

Linear nature of management models. Traditional change management tools are based on the idea of the predictable and linear nature of change. There are many approaches that assume a step-by-step logical progression, including Kotter's eight-stage model (Kotter, 1995). However, the modern context makes them irrelevant due to the failure to take into account such aspects as complexity, non-linearity, the iterative nature of transformational transitions, and the need for rapid adaptation.

Limitations on flexibility and pace. Risk mitigation and structured planning are the core components of traditional models. However, DT requires the integration of aspects such as rapid prototyping, adaptive reconfiguration, and strategic flexibility. Large organizations tend to have entrenched, difficult-to-adjust risk management mechanisms and planning cycles, making these challenges difficult.

Fragmented transformation management. DT is not limited to the implementation of technologies, but assumes their holistic synthesis with cultural and operational dimensions. In turn, with the traditional approach to modernization, the implementation of technologies and organizational changes are considered as separate areas (Verhoef et al., 2021). However, the lack of connectivity between the mentioned aspects hinders successful digital transformation. The implementation of technologies should not be seen as an end in itself, but rather should become part and a natural tool of an integrated corporate digital transformation strategy. This will require dynamic capabilities, continuous learning, interdisciplinary collaboration, and adaptive leadership (traditional models rarely take these areas into account). For example, if an organization updates its management system but does not adjust production processes and personnel skills accordingly, the transformation will stop. It is necessary to move from a fragmented approach to a holistic model, to form a new culture (Verhoef et al., 2021) and ensure the effective integration of technologies into the organizational structure.

Limitations of management structures. Traditional top-down management structures are not compatible with the interdisciplinary, collaborative nature of DT. It is advisable to form a distributed management network that goes beyond traditional hierarchical chains, covering all regions of activity and divisions of the organization. Granting autonomy to target groups will provide flexibility in adapting to a new level of technological complexity, which will increase the effectiveness of DT implementation.

New Methods of Scaling Digital Technologies

One of the previously mentioned tools that ensure effective digital transformation are *dynamic capabilities,* the bearers of which are able to increase the potential for mastering emerging opportunities, quickly redistribute resources (Teece, 2007), and increase the strategic flexibility and adaptability of management systems. It is important to view DT not as an internal project, but as an open platform that closely interacts with the external *ecosystem.* Such an approach will allow us to take full advantage of platform models, open innovations and external partnerships, and will make it possible to complete DT with minimal costs. For example, the Minimum Viable Transformation method ensures the rapid launch of pilot versions of innovative business models, their testing and adjustment.[2]

Examples of Successful Large-Scale Transformations

Microsoft has transformed itself from a manufacturer of operating systems for local devices into a provider of cloud services. The key drivers of the transformation were: moving away from a fragmented business process model, appointing leaders capable of organizing such a transition, a culture of continuous learning and growth, and establishing collaboration in the format of interdisciplinary working groups (Ali, Begum, 2024). The combination of these factors gave rise to the Azure cloud ecosystem, thanks to which Microsoft was able to significantly increase its market capitalization, becoming one of the leaders in innovation in the field of AI and cloud computing. **Siemens,** having made large-scale investments in attracting digital transformation specialists, was able to smoothly move from a production to a platform model based on the Industrial Internet of Things and digital twins.[3] **DBS** has reshaped its business model and corporate culture, using immersive employee training methods and engaging executives in customer experience transformation projects.[4]

[2] https://www2.deloitte.com/us/en/insights/focus/business-trends/2015/minimum-viable-business-model-transformation-business-trends.html, accessed 04.03.2025.

[3] https://www.powermag.com/long-form-stories/digitalization-how-siemens-is-leading-the-transformation-of-the-energy-industry/, accessed 11.04.2025.

[4] https://www.mckinsey.com/capabilities/mckinsey-digital/how-we-help-clients/rewired-in-action/dbs-transforming-a-banking-leader-into-a-technology-leader, accessed 18.04.2025.

All of these initiatives, despite having differences in priorities and methods, have contributed to expanding the knowledge base on the "recipes" for successful DT.

Conclusion

Digital transformation allows one to integrate into a new technological world offering higher-level capabilities only under certain conditions, which for most organizations can be perceived as insurmountable barriers. This is especially true for large enterprises that have been successful and competitive for a long time. If the average failure rate of digital transformation for companies of different sizes is 80%, then for large players it can reach up to 90% (Ramesh, Delen, 2021). This state of affairs is mainly explained by the lack of dynamic capabilities as a key component of transformation potential. Many organizations enter this process unprepared, without fully understanding the hidden complexity of this phenomenon. To overcome this trend, a shift in the strategic paradigm and significant efforts to update the competence of personnel are required. The large-scale and rapid development of digital ecosystems based on AI necessitates a fundamental change in the composition of competencies and types of management models to adapt organizations to an increasingly complex context. We are talking about higher-order capabilities, from the point of view of which managing complex technological transitions, leading companies through different cycles of renewal in many dimensions, looks like a natural practice.

This study analyzes the impact of digital competencies of managers on the effectiveness of digital transformation in organizations, focusing on the reasons why most such initiatives do not achieve their goals. The key components of digital transformation are analyzed, including technological competencies, transformation potential, strategic flexibility, and the management of cooperation networks. It is found that the optimal balance of transformational, strategic, and technological competencies stimulates innovation and ensures a competitive advantage. One of the most difficult cognitive options to master is synthesizing seemingly incompatible aspects, keeping multidirectional processes in focus, and seeing the unity of opposites. In other words, before starting digital transformation at an organization, it is necessary to revise the competency portfolio and corporate culture. The staff must undergo a radical update of established ideas about development in the era of constant change and accept more complex work patterns. All this requires going beyond the established models of thinking and behavior that previously guaranteed successful development dynamics, but stopped working in the new context. To better understand the specifics of digital transformation processes, it is necessary to conduct longitudinal studies of cases of such transformations in different national and industry contexts. It is advisable to create dynamic roadmaps that allow for adjusting the movement toward a given goal as technological innovations develop in different countries. Particular attention should be paid to the principles of ethical management concerning the retraining of personnel, ensuring data confidentiality, and minimizing the "bias" of algorithms.

Digitally competent executives implement complex transformation processes, determine the optimal trajectory, and coordinate business strategies. However, their impact on the functionality and structure of the organization, the specific effects for specific industries and organizations of different sizes remain understudied. Theoretical foundations are given more attention than empirical data, which limits the diversity of studies. Geographical bias (developed countries are primarily analyzed) creates gaps in understanding the role of digital competencies of executives in the digital transformation of organizations in developing countries. In addition, the main focus is on large enterprises, while SMEs are ignored. It should be noted that there are no standard tools for assessing the effect of digital competencies of executives. In an era when digital transformation covers an increasing number of industries, the digital competencies of personnel are becoming the most important factor in the effectiveness of this process. Organizations that invest sufficient funds in their development increase the likelihood of their success in the modern digital world.

References

Al Maazmi A., Piya S., Araci Z.C. (2024) Exploring the Critical Success Factors Influencing the Outcome of Digital Transformation Initiatives in Government Organizations. *Systems*, 12(12), 524. https://doi.org/10.3390/systems12120524

Aldoseri A., Al-Khalifa K.N., Hamouda A.M. (2024) AI-powered innovation in digital transformation: Key pillars and industry impact. *Sustainability*, 16(5), 1790. https://doi.org/10.3390/su16051790

Ali M.M., Begum S. (2024) Case Study: Satya Nadella's Leadership at Microsoft. *IOSR Journal of Business and Management (IOSR-JBM),* 26(12), 74–79.

AlNuaimi B.K., Singh S.K., Ren S., Budhwar P., Vorobyev D. (2022) Mastering digital transformation: The nexus between leadership, agility, and digital strategy. *Journal of Business Research*, 145, 636–648. https://doi.org/10.1016/j.jbusres.2022.03.038

Bharadwaj A., El-Sawy O.A., Pavlou P.A., Venkatraman N. (2013) Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, 37, 471–482. https://doi.org/10.25300/MISQ/2013/37:2.3

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. https://doi.org/10.1016/j.jbusres.2021.02.003

Carroll N., Conboy K., Wang X. (2023) From transformation to normalisation: An exploratory study of a large-scale agile transformation. *Journal of Information Technology*, 38(3), 267–303. https://doi.org/10.1177/02683962231164428

Correani A., De-Massia A., Frattini F., Petruzzelli A.M., Natalicchio A. (2020) Implementing a digital strategy: Learning from the experience of three digital transformation projects. *California Management Review*, 62, 37–56. https://doi.org/10.1177/0008125620934864

Espina-Romero L., Norono-Sanchez J.G., Rojas-Cangahuala G., Palacios Garay J., Parra D.R., Rio Corredoira J. (2023) Digital Leadership in an Ever-Changing World: A Bibliometric Analysis of Trends and Challenges. *Sustainability*, 15(17), 13129. https://doi.org/10.3390/su151713129

Feliciano M.M., Ameen N., Kotabe M., Paul J., Signoret M. (2023) Is digital transformation threatened? A systematic literature review of the factors influencing firms' digital transformation and internationalization. *Journal of Business Research*, 157, 113546. https://doi.org/10.1016/j.jbusres.2022.113546

Gao J., Zhang W., Guan T., Feng Q., Mardanic A. (2022) The effect of manufacturing agent heterogeneity on enterprise innovation performance and competitive advantage in the era of digital transformation. *Journal of Business Research*, 155, 113387. https://doi.org/10.1016/j.jbusres.2022.113387

Haskamp T., Dremel C., Marx C., Uebernickel F. (2021) *Understanding Inertia in Digital Transformation: A Literature Review and Multilevel Research Framework*. Paper presented at the 42th International Conference on Information Systems (ICIS), December 2021, Austin, USA.

Heredia J., Castillo V.M., Geldes C., Carbajal F.M.G. (2022) How do digital capabilities affect firm performance? The mediating role of technological capabilities in the "new normal". *Journal of Innovation & Knowledge*, 7(2), 100171. https://doi.org/10.1016/j.jik.2022.100171

Hinings B., Gegenhuber T., Greenwood R. (2018) Digital innovation and transformation: An institutional perspective. *Information and Organization*, 28, 52–61. https://doi.org/10.1016/j.infoandorg.2018.02.004

Hussein H., Albadry O.M., Mathew V., Al-Romeedy B.S., Alsetoohy O., Abou Kamar M., Khairy H.A. (2024) Digital leadership and sustainable competitive advantage: Leveraging green absorptive capability and eco-innovation in tourism and hospitality businesses. *Sustainability,* 16(13), 5371. https://doi.org/10.3390/su16135371

Jöhnk J., Oesterle S., Ollig P., Riedel L.N. (2020) The Complexity of Digital Transformation – Conceptualizing Multiple Concurrent Initiatives. In: *WI2020 Zentrale Tracks* (eds. C.M. König, N. Guhr, J. Svetachova, M.H. Breitner), Berlin: GITO, pp. 1051–1066. https://doi.org/10.30844/wi_2020_j8-joehnk

Karakose T., Kocabas I., Yirci R., Papadakis S., Ozdemir T.Y., Demirkol M. (2022) The development and evolution of digital leadership: A bibliometric mapping approach-based study. *Sustainability,* 14(23), 16171. https://doi.org/10.3390/su142316171

Karakose T., Tülübaş T. (2023) Digital leadership and sustainable school improvement — A conceptual analysis and implications for future research. *Educational Process: International Journal,* 12(1), 7–18. https://doi.org/10.22521/edupij.2023.121.1

Karippur N.A., Balaramachandran P.R. (2022) Antecedents of Effective Digital Leadership of Enterprises in Asia Pacific. *Australasian Journal of Information Systems*, 26, 2525. http://dx.doi.org/10.3127/ajis.v26i0.2525

Kirti N., Rakesh D.R., Vinay S.Y., Pragati P., Balkrishna E.N. (2022) The impact of sustainable development strategy on sustainable supply chain firm performance in the digital transformation era. *Business Strategy and the Environment*, 31(3), 845–859. https://doi.org/10.1002/bse.2921

Klos C., Spieth P., Clauss T., Klusmann C. (2021) Digital Transformation of Incumbent Firms: A Business Model Innovation Perspective. *IEEE Transactions on Engineering Management*, 99, 3075502. https://doi.org/10.1109/TEM.2021.3075502

Kotter J.P. (1995) Leading change: Why transformation efforts fail. *Harvard Business Review*, May-June 1995. https://hbr.org/1995/05/leading-change-why-transformation-efforts-fail-2, accessed 11.12.2024.

Kraus S., Durst S., Ferreira J.J., Veiga P., Kailer N., Weinmann A. (2022) Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*, 63, 102466. https://doi.org/10.1016/j.ijinfomgt.2021.102466

Mergel I., Edelmann N., Haug N. (2019) Defining digital transformation: Results from expert interviews. *Government Information Quarterly*, 36(4), 101385. https://doi.org/10.1016/j.giq.2019.06.002

Mollah M.A., Amin M.B., Debnath G.C., Hosain M.S., Rahaman M.A., Abdullah M. (2024) Nexus among digital leadership, digital transformation, and digital innovation for sustainable financial performance: Revealing the influence of environmental dynamism. *Sustainability*, 16(18), 8023. https://doi.org/10.3390/su16188023

Mrugalska B., Ahmed J. (2021) Organizational Agility in Industry 4.0: A Systematic Literature Review. *Sustainability*, 13(15), 8272. https://doi.org/10.3390/su13158272

Nambisan S., Wright M., Feldman M. (2019) The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, 48(8), 103772. https://doi.org/10.1016/j.respol.2019.03.018

O'Brien J., Singh M., Whelan A., Manning E., Jayes F., Murphy J., Brosnan A. (2023) *Unpacking Digital Transformation Risk: A Systematic Review On Why Digital Transformations Often Fail To Deliver Value*. Paper presented at the 2023 European Academy of Management Conference, March 2023, Dublin, Ireland.

Oludapo S., Carroll N., Helfert M. (2024) Why do so many digital transformations fail? A bibliometric analysis and future research agenda. *Journal of Business Research*, 174, 114528. https://doi.org/10.1016/j.jbusres.2024.114528

Pagani M. (2013) Digital business strategy and value creation: Framing the dynamic cycle of control points. *MIS Quarterly*, 37, 617–632. https://doi.org/10.25300/MISQ/2013/37.2.13

Peng Y., Alias B.S., Mansor A.N., Ismail M.J. (2024) Charting the evolving landscape of digital leadership in education: A systematic literature review. *Journal of Infrastructure, Policy and Development*, 8(8), 5925. https://doi.org/10.24294/jipd.v8i8.5925

Piepponen A., Ritala P., Keränen J., Maijanena P. (2022) Digital transformation of the value proposition: A single case study in the media industry. *Journal of Business Research*, 150, 311–325. https://doi.org/10.1016/j.jbusres.2022.05.017

Plekhanov D., Franke H., Netland T.H. (2023) Digital transformation: A review and research agenda. *European Management Journal,* 41(6), 821–844. https://doi.org/10.1016/j.emj.2022.09.007

Qiao G., Li Y., Hong A. (2024) The strategic role of digital transformation: Leveraging digital leadership to enhance employee performance and organizational commitment in the digital era. *Systems,* 12(11), 457. https://doi.org/10.3390/systems12110457

Qiao W., Ju Y., Dong P., Tiong R.L.K. (2024) How to realize value creation of digital transformation? A system dynamics model. *Expert Systems with Applications*, 244, 122667. https://doi.org/10.1016/j.eswa.2023.122667

Ramesh N., Delen D. (2021) Digital Transformation: How to Beat the 90% Failure Rate? *IEEE Engineering Management Review*, 49(3), 22–25. https://doi.org/10.1109/EMR.2021.3070139

Schiuma G., Santarsiero F., Carlucci D., Jarrar Y. (2024) Transformative leadership competencies for organizational digital transformation. *Business Horizons*, 67(4), 425–437. https://doi.org/10.1016/j.bushor.2024.04.004

Teece D.J. (2007) Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal,* 28(13), 1319–1350. https://doi.org/10.1002/smj.640

Trenerry B., Chng S., Wang Y., Suhaila Z.S., Lim S.S., Lu H.Y., Oh P.H. (2021) Preparing Workplaces for Digital Transformation: An Integrative Review and Framework of Multi-Level Factors. *Frontiers in Psychology*, 12, 620766. https://doi.org/10.3389/fpsyg.2021.620766

Trischler J., Trischler W.J. (2022) Design for experience – A public service design approach in the age of digitalization. *Public Management Review*, 24(8), 1251–1270. https://doi.org/10.1080/14719037.2021.1899272

UNCTAD (2019) *Digital Economy Report 2019*, Geneva: United Nations.

Veeraya S., Raman M., Gopinathan S., Singh J. (2024) Digital Business Transformation of Malaysian Small and Medium-Sized Enterprises: A Review on Digital Leadership and Digital Culture. *International Journal of Organizational Leadership*, 13(4), 703–721. https://doi.org/10.33844/ijol.2024.60439

Verhoef P.C., Broekhuizen T., Bart Y., Bhattacharya A., Dong J.Q., Fabian N., Haenlein M. (2021) Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Wang L., Jin X., Yoo J.J. (2024) The process of visionary leadership increases innovative performance among IT industry 4.0 for SMEs for organizational sustainability: Testing the moderated mediation model. *Sustainability,* 16(19), 8690. https://doi.org/10.3390/su16198690

Zhang H., Ding H., Xiao J. (2023) How organizational agility promotes digital transformation: An empirical study. *Sustainability*, 15(14), 11304. https://doi.org/10.3390/su151411304

Zhu X., Ge S., Wang N. (2021) Digital transformation: A systematic literature review. *Computers & Industrial Engineering*, 162, 107774, 10.1016/j.cie.2021.107774