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Analyzing and Visualising the Trends in Digital Transformation, Digitalization, and Digital maturity

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Introduction

In the last two decades, technological developments affected almost all aspects of society. These new developments have caused rapid changes in the business environment. Accordingly, the changes have been impacting how businesses operate, as well as have been encouraging firms to adopt digital technologies on a wider scale and under time pressure. Digital transformation leverages the implications of new technologies on how an organization operates to meet rising demands. Additionally, the COVID-19 pandemic accelerated the adoption of digital technologies and digitalization of the companies. Digital technologies create novel opportunities for entrepreneurial or innovative companies. On the other hand, the integration of digital technologies and the adaptation of digitalization processes put pressure on companies that are being outcompeted by their more digitally mature competitors. The adaptation of digitalization or digital transformation is one of the biggest challenges that companies currently face (Rêgo, 2021), while at the same, it is one of the crucial ways to remain ahead of ever-changing digital trends to meet rising demands. Therefore, it is important to build an understanding of how digitalization, digital maturity, and digital transformation reshape the entire business landscape. According to van Veldhoven and Vanthienen (2019), although many researchers, managers, and companies are currently dealing with digital transformation and digitalization, there is a research gap on the exact meaning and scope of this transformation.

To address the research gap described above, the purpose of the study is twofold: to provide an overview of the current landscape of digitalization, digital transformation and digital maturity based on the literature review, and to understand the current research trends regarding these concepts. Through a systematic review of the literature, this study aims to gain insight into the digitalization processes, the development of digital transformation, and how to be digitally mature, as well as understand how digital transformation, digitalization, and digital maturity have been determined in the literature. Additionally, this paper will determine the current research trends of these concepts by analyzing digitalization, digital transformation and digital maturity citation

classics. In this paper, the characteristics of the concepts will be examined by presenting visualized patterns of the co-occurrence of keywords from the results of citation analysis.

Methodology

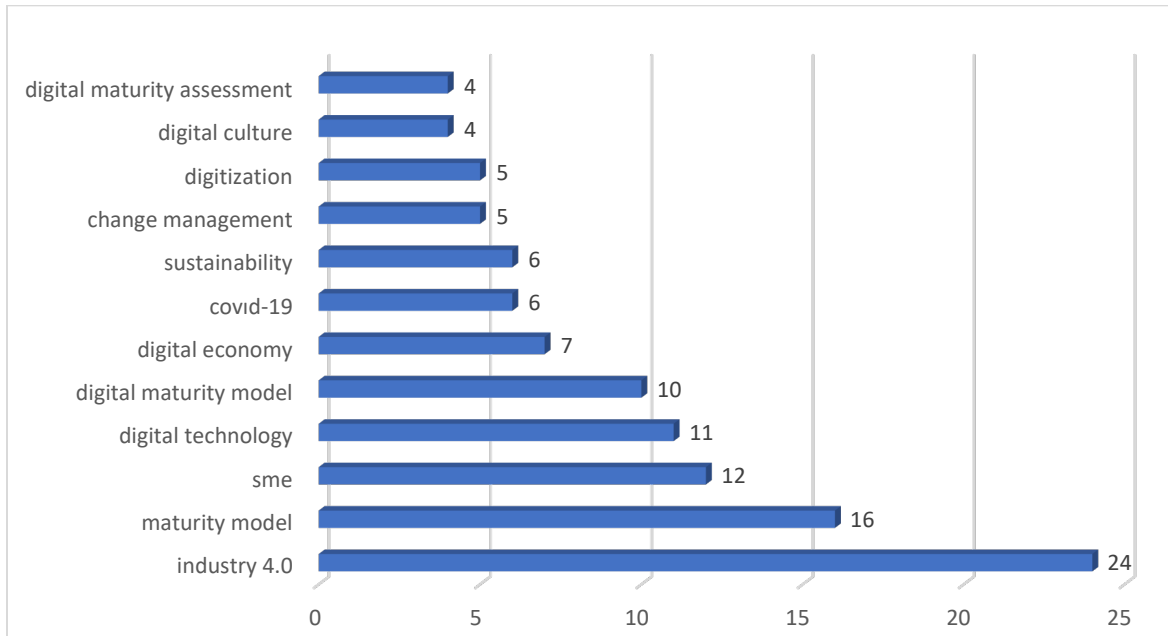
In line with the literature gap, digitalization, digital transformation and digital maturity concepts were reviewed by using a literature review of English publications. In this study, Scopus database was used to find relevant articles in the literature regarding the corresponding concepts. The literature analysis was conducted using the Scopus database considering the following search terms: "Digital Transformation", "Digitalization" and "Digital maturity". These keywords have been searched in titles, abstracts, and keywords of the documents. The exact search was constructed as (Digital Transformation OR Digitalization) AND (Digital matur* OR Digitally matur*). The search criteria has been limited to journal and conference papers written in English by excluding the review from document type and medicine from the subject area. The analysis led to a total of 169 relevant articles between 2017 and 2022, and all of the articles have been used in our analysis. No document published earlier than 2017 in the literature fits our criteria.

VOSViewer 1.6.18 was used to visualize the bibliometric data. After collecting the keywords, the data was cleaned of redundancies and overlaps. The cleaned data had 454 keywords. Three as a minimum frequency has been used as a threshold for the keywords. 21 keywords satisfied that criterion. Co-occurrences between keywords were visualized to understand their relations.

Results

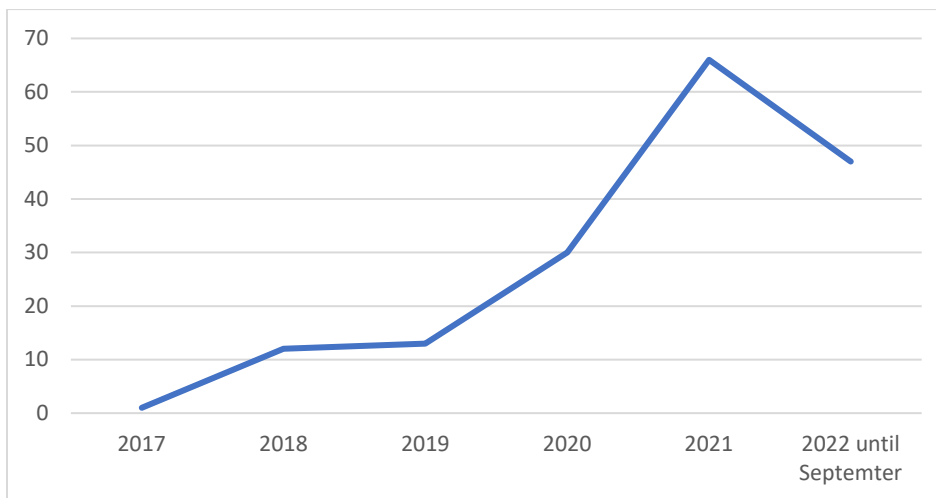
Figure 1 shows keywords with more than three occurrences in our data (not including the original keywords, i.e., digital transformation, digitalization, and digital maturity). SMEs struggle to survive in the digital world because of their limited resources (ex., human and financial resources) compared to large companies. During the Covid 19 pandemic, digital technologies and digital maturity models became exceedingly more critical for companies of all sizes. SMEs had a hard time catching digitalization trends. For this reason, research focusing on SMEs' digitalization in recent years has increased.

Figure 1 Distribution of the top 12 keywords with their frequency counts



With the acceleration of the digitalization process of enterprises during the pandemic period, academic studies on this subject gained momentum. Figure 2 shows that from 2019 to 2021, the number of articles focusing on digital transformation, digitalization, and digital maturity has increased rapidly. In 2022, the number of publications related to digitalization, digital transformation, and digital maturity concepts is 47. It can be concluded that the trend in the frequency of the appearance of the keywords related to the corresponding concepts will continue.

Figure 2 Number of articles per year



The VOSviewer software has assigned the keywords to five clusters. These clusters have been named accordingly:

Development and assessment of Digital transformation (Cluster Red)

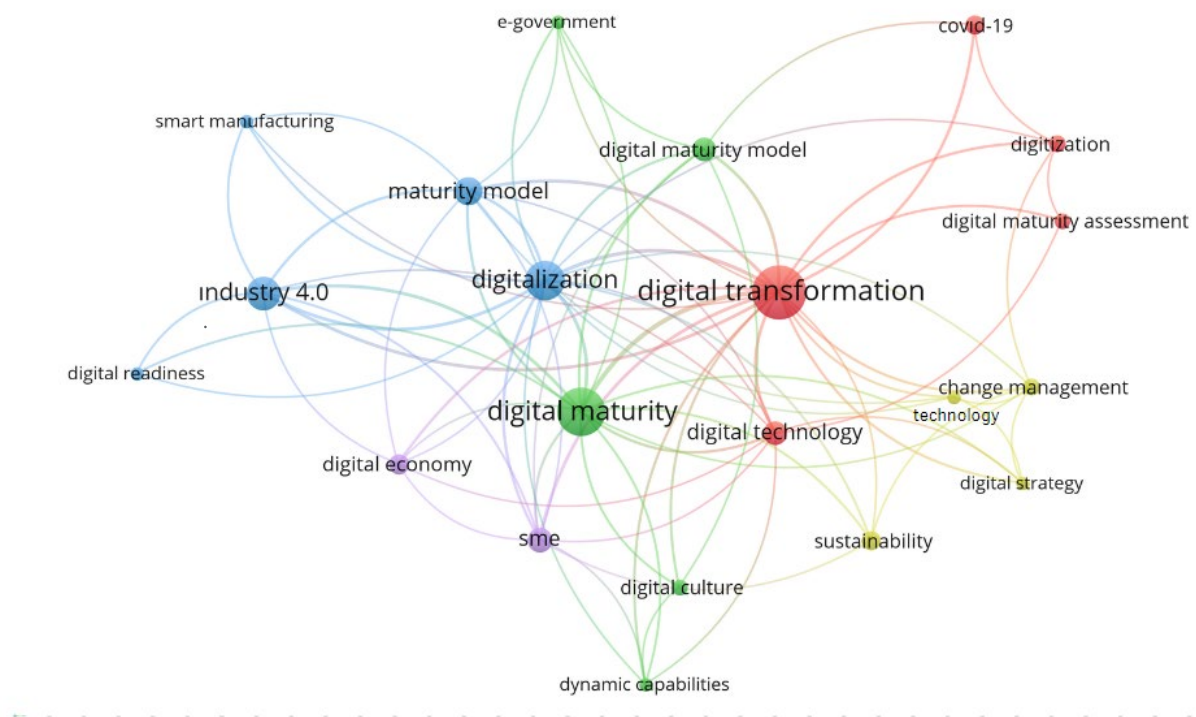
Digital dynamic capabilities (Cluster Green)

Digitalization and Digital Readiness under Industry 4.0 (Cluster Blue)

Sustainable digital change (Cluster Yellow)

SMEs in the Digital Economy (Cluster Purple)

Figure 3 Co-occurrence of keywords



Conclusion and Implications

The purpose of this study is to gain more insight into digital transformation and digital maturity by systematic literature review and examining their characteristics using a combination of bibliometric and scientometric methods and visualizing the outcomes. Based on the findings of our study, several implications arise that should be explored further:

Implication #1: Development and assessment of digital transformation: How to prepare for the future or be digitally mature

The global COVID-19 pandemic and the ensuing economic crisis have impacts on businesses and the lives of citizens. Accordingly, the Covid-19 pandemic has suddenly accelerated digital transformation in all areas. Therefore, during the Covid-19 pandemic, enterprises needed to focus more on the development of digital transformation and assessment of their digital maturity. Additionally, the pandemic has performed as an accelerator for the usage of digitization and digital technologies. In line with the literature review and the results of keyword analysis (see Figure 1, cluster red), digitization can be defined as the organizational transformation triggered by the need of preserving digital content for future use and the adoption of digital technologies to generate, process, share and transact information (Katz et al., 2013; Netshakhuma, 2022). Digital transformation is defined as an organization's sustainable transformation strategy caused and formed by value-added digitization and the broad use of digital technologies (Hanelt et al., 2021; Williams et al., 2022).

Implication #2: Digital dynamic capabilities

Due to a constantly changing environment, organizations need to develop their dynamic capabilities to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. According to Teece (2018), dynamic capabilities refer to organizational abilities to sense opportunities and threats, seize these opportunities through new services and products, and transform the organization's structures and culture. Facing rapid digitalization in a more and more dynamic world, organizations need to adjust their dynamic capabilities in order to develop digital culture (see Figure 1, cluster green). Building dynamic capabilities for achieving digital maturity transforms an organization's culture into a digital culture. Accordingly, digital culture may promote the organization's digital maturity level. However, previous literature showed that a lot of firms did not achieve digital maturity yet (Weritz et al., 2020). Therefore, it's important to develop a digital maturity model to adjust the strategic planning and decision-making needs and cultural change shaped by the emergence of digital technologies and their usage in organizations. From the results of keyword mapping analysis (see Figure 1), digital dynamic capabilities refer to capabilities to sense digital opportunities and threats, seize these opportunities, and transform the digital assets of the firm.

Implication #3: Digitalization and digital readiness under Industry 4.0

Industry 4.0 requires companies to go through a complex transformation of technology usage and business processes. The complex transformation requires measuring the digital readiness of firms through maturity models. However, there is a lack of research in developing and/or determining maturity model(s) for digital readiness. In this regard, it is important to create a systematic approach for building maturity model(s) to improve digital readiness. Therefore, maturity models should be developed to assess the digital readiness and digital maturity of the companies. Additionally, with the evolution of Industry 4.0 in the 21st century, digitalization gains popularity in companies, because it is a need that makes the company competitive and optimizes the work (Almasbekkyzy et al., 2021). Digitalization is defined as fundamental changes made to business operations based on newly acquired knowledge gained via value-added digitization initiatives (Williams et al., 2022). The findings of the keyword co-occurrence analysis imply that digitalization is related to the organizational readiness level for the usage of digital technologies and transforming business processes or operations.

Implication #4: Sustainable digital change

During the pandemic and post-pandemic world, the critical necessity for digitalization and digital transformation has become obvious. The findings of this study present implications for enterprises by emphasizing not only the necessity of digital transformation but also the necessity of developing digital strategies for enterprises' sustainable development. Therefore, it is crucial to not only identify key areas where automation and digital strategies can be implemented to reduce the time, effort, and costs associated with data collection and maintenance but also to provide examples of tools and processes that have been successfully utilized to develop a resilient and sustainable structure as a core foundation for these tasks (Hazur & Moquin, 2021). Hence, it's important to analyze the features of digital strategy development to provide insight into digital strategies for sustainable development. Sustainable digital strategies trigger organizational changes to unlock opportunities for digitalization by adopting the right digital strategy to reach sustainability.

Implication #5: SMEs in the digital economy

The implication of the Covid-19 global pandemic is driving the transition of SMEs' business towards digitalization and leveraging the opportunities of the digital economy. However, despite the use of digital platforms, many SMEs are unable to survive in the digital economy age. The

requirements of the digital economy challenge organizations, in particular SMEs, with various technological, organizational and cultural barriers, accordingly creating a socio-technical shift that implies the redefinition of the role of people in the organization, the integration of all organizational decision layers (from the factory floor to the decision support structures) and the digital connection of the entire value chain, including processes, people and machines (Cunha & Sousa, 2021). Thereby, developing a more holistic understanding of the requirements of the digital economy assists SMEs' digital transformation journey.

References:

- Almasbekkyzy, A., Abdikerim, D., Nabi, D., Abdallah, Y. O., & Shehab, E. (2021, April). Digital Maturity and Readiness Model for Multiple-Case of Kazakhstan Large Companies. In *2021 IEEE International Conference on Smart Information Systems and Technologies (SIST)* (pp. 1-7). IEEE.
- Cunha, L., & Sousa, C. (2021, March). A Model for Designing SMES' Digital Transformation Roadmap. In *World Conference on Information Systems and Technologies* (pp. 439-448). Springer, Cham.
- Hanelt, A, R Bohnsack, D Marz and C Antunes Marante (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.
- Hazur, M, Moquin, P. (2021). Translating digital strategies into practical and sustainable solutions – How automation can redefine the use of Environmental Management Information Systems (EMIS). *Proceedings of the Air and Waste Management Association's Annual Conference and Exhibition, AWMA, 2021-June*.
- Katz, R. L., Koutroumpis, P., & Callorda, F. (2013). The Latin American path towards digitization. Vol 15 (3). *Info*.
- Netshakhuma, N. S. (2022). The Link Between Climate Change and Digitization of Archives in South Africa. In *Handbook of Research on Sustainable Development Goals, Climate Change, and Digitalization* (pp. 537-552). IGI Global.

Rêgo, B.S., Jayantilal, S., Ferreira, J.J., Carayannis, E.G. Digital Transformation and Strategic Management: a Systematic Review of the Literature. *J Knowl Econ* (2021). <https://doi.org/10.1007/s13132-021-00853-3>

Teece, D. (2018). Business models and dynamic capabilities. *Long Range Planning*, 51(1), pp.40-49.

Van Veldhoven, Z., & Vanthienen, J. (2019). Designing a Comprehensive Understanding of Digital Transformation and its Impact. *Bled eConference*, 22.

Weritz, Braojos, J., Matute, J.. (2020). Exploring the Antecedents of Digital Transformation: Dynamic Capabilities and Digital Culture Aspects to Achieve Digital Maturity. *26th Americas Conference on Information Systems, AMCIS 2020*.

Williams, C. A., Schallmo, D., & Scornavacca, E. (2022). How Applicable are Digital Maturity Models to SMEs?: A Conceptual Framework and Empirical Validation Approach. *International Journal of Innovation Management*, 2240010.