
Digital Renaissance After COVID-19: Economic Recovery, Innovation, and Global Inclusion

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Abstract:

This paper examines the post-COVID-19 digital transformation shaping global society, economy, and industry, calling for inclusive policies addressing connectivity and affordability to ensure resilient and inclusive digital growth. Using a bibliometric and systematic review, it identifies key trends in innovation, technology adoption, and management practices. Results reveal accelerated digitalization in e-commerce, health, education, and finance, driving new dynamics. However, persistent digital divides hinder equitable progress, especially in developing regions. The study highlights digitalization as both a recovery engine and a challenge for inclusion. The findings offer strategic insights for policymakers and business leaders seeking sustainable and equitable digital growth in the post-pandemic era.

Keywords: COVID-19, digital transformation, developing economies, society

Jel Classification Codes : O14, O3.

1. Introduction:

Over the past few decades, the Internet has become an integral part of daily life due to the widespread use of smart mobile devices and the capacity to access enormous quantities of information. Furthermore, the social media revolution has significantly altered how businesses engage with their customers. Numerous sectors, including marketing, were substantially altered by technological innovations and advancements. The digital age and the trend toward online purchasing have resulted in an extraordinary revolution in the business environment (Bist et al., 2022, p. 19). The world has undergone significant transformations as a result of technological advancements, and the term "digital" has become commonplace in the contemporary business sector. Consequently, it is impossible to deny that the term has had an impact on all individuals and is currently affecting the operations of businesses .

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Digital Transformation is the utilization of Information and Communication Technologies (ICT) in conjunction with their advantages (Matt et al., 2015, p. 1) to transform the operational models, products, services, and organizational structures of a business to gain a competitive edge. "Digital Transformation is a process that aims to improve an entity by inducing substantial changes to its properties via combinations of information, computing, communication, and connectivity technologies," as stated by (Vial, 2019, p. 211). Alternative definitions of Digital Transformation include "the chance to establish a novel business model" (Berman, 2012, p. 16). The anticipated outcomes and advantages associated with Digital Transformation are relatively more comprehensive (Westerman et al., 2014, p. 5), as it is expected to instigate modifications to operational models, customer experiences, customer serendipity, business expansion, and customer touchpoint increases, among others. Implementing digital transformation can be highly disruptive, completely altering how businesses function and provide products and services to their customers .

Digitization is one of the most significant and enduring developments in the contemporary global economy (Melanyina et al., 2024, p. 37). Digital transformation is predominantly viewed as the comprehensive application of digital technology to enhance organizational performance and operational efficiency (Abdullah et al., 2024, p.60). It refers to the application of digital technology to enhance operational efficiency, expand market reach, and increase competitiveness (Hendrawan et al., 2024, p.141). Digital transformation seeks to enhance customer value, innovate information-centric services and products, refine operational processes, optimize resource utilization, and elevate employees' digital literacy, while also formulating sustainable business strategies that provide a competitive advantage (Tanushev, 2022, p. 403). Certain research indicates that the increasing utilization of digital technology has resulted in digitalization being a compilation of social, economic, and cultural transformations (Parviainen et al., 2017, p.64). The expanding digital skills gap, which impacts company productivity and competitiveness, is one of the most pressing challenges facing corporations today. As previously indicated, technical, business, and project management competencies are essential (Bist et al., 2022, p. 22). Numerous studies increasingly address the challenges associated with realizing the advantages of digitalization (Majchrzak et al., 2016, p. 275). The coronavirus (COVID-19) pandemic has profoundly impacted the world economy (Fernandes, 2020, p.20). This impact has reverberated throughout various facets, including capital flows and supply chains, leading to disruptions in the distribution and availability of goods. For instance, manufacturers halted production due to decreased demand for automotive parts, components, and garments, spurred by plant closures and reduced

supply (Wang et al., 2020, p.1380). Additionally, the global implementation of lockdown measures and the closure of vital sectors like hospitality, travel, and retail have led to a significant surge in unemployment rates worldwide. Consequently, this rapid and unprecedented economic downturn has inflicted substantial harm (Ozili & Arun, 2020, p. 20). These developments caused substantial harm to the global economy, but the consequences were especially severe for developing economies, which were already vulnerable due to weaker economic structures and limited resources (Safonov et al., 2022, p. 52). In 2020, amidst the global upheaval caused by the COVID-19 pandemic, scholarly focus primarily gravitated toward established economic powerhouses such as Europe, the United States, and China. However, it is essential to recognize that the pandemic's impact transcends national borders. Smaller and more vulnerable developing economies and regions faced challenges of comparable magnitude, warranting attention and support. Developing nations, already struggling with economic fragility, were compelled to adopt global pandemic measures, including travel bans, quarantine protocols, and partial lockdowns. However, these measures had a disproportionate effect on their economies, particularly in sectors crucial for survival, such as food production, banking, construction, and frontline healthcare. Micro and Small Enterprises (MSEs) in developing economies have been particularly susceptible during this crisis (Quayson et al., 2020, p. 108; Korankye, 2020, p. 269). These businesses usually have fewer than 50 employees and are often small, family-run operations with just one or two workers.

The global outbreak of COVID-19 has presented unparalleled difficulties, fundamentally transforming economies, societies, and industries on an international scale. Amid the impending health crisis, countries were compelled to swiftly adjust to an unprecedented landscape marked by pervasive virtual collaboration, digital communication, and remote work (Alfano et al., 2024, p.1059). Amidst these upheavals, the "Digital Renaissance" notion surfaced, signifying a profound paradigm shift towards a more intelligent and interconnected global society.

After the outbreak of the COVID-19 pandemic, the worldwide business landscape has seen significant transformations, with digital technology playing a crucial role in improving the capacity to withstand challenges, adjust to new circumstances, and foster innovation. The need for digital transformation has become increasingly evident as organizations face the difficulties brought about by the crisis and plan their path toward recovery and expansion (Boselli et al., 2024, p. 466). However, the transition to digital platforms has not been uniform across the globe. While many advanced economies have rapidly embraced digitalization, the pace and extent of this transformation in developing economies remain underexplored. The COVID-19 crisis

has highlighted the need for greater digital inclusion, especially in regions that were already facing significant challenges in terms of digital infrastructure (Medini & Baghdadi, 2024, p. 60). This research mostly aims to investigate the extent to which the digital renaissance post-COVID-19 has been inclusive and equitable across different global regions. The research question guiding this study is: How inclusive and equitable is the digital transformation process across different global regions in the post-COVID-19 era, particularly in developing economies ?

Understanding the dynamics of digital transformation is crucial not only for developed economies but also for developing regions where digital adoption is less pervasive. The gap in existing literature is evident in the limited research that examines how these regions are navigating the digital shift and what challenges and opportunities they face in the process (Petropoulou et al., 2024, p. 3). This study aims to fill that gap by focusing on the inclusivity and equity of digital transformation in diverse geographical and economic contexts. The primary objectives of this research are:

- To analyse the extent and nature of digital transformation in different global regions in the post-COVID-19 period.
- To assess the impact of digitalization on societal, economic, and industrial dynamics in both developed and emerging economies.
- To identify the opportunities and challenges associated with the Digital Renaissance and its implications for global development and sustainability.

The rest of this study is organized as follows: Section 2 outlines the methodology and tools used for this research. Section 3 presents the findings from the bibliometric analysis, detailing trends in publications, contributions from key countries, and prevalent themes in the literature. Section 4 explores digital transformation across global regions, examining the impact of digitalization on economic and social dynamics, particularly in developing regions. Section 5 concludes by summarizing key findings and suggesting avenues for future research.

2. Materials and methods:

For the purpose of our study, we gathered reliable peer-reviewed and academic research articles relevant to the fields of digital transformation and COVID-19. Scholarly literature searches can take various forms, and to meet the objectives of this paper, we utilized a combination of bibliometric and systematic review approaches. These methods allowed us to analyze the knowledge structures and identify gaps in the intersection of the "Digital Transformation" and "COVID-19" research fields. Through bibliometric analyses, we constructed comprehensive maps that illustrate the dynamics, growth, and trends in these research areas.

To begin the process, we conducted a search of the Scopus database, which is known for its extensive archive of peer-reviewed scientific literature. Our search was

specifically focused on articles published in English between 2018 and 2024. We used a carefully crafted search query to retrieve relevant papers, ensuring a broad yet targeted scope. The search terms were designed to capture both synonyms and related terms for digital transformation, as well as for COVID-19, to ensure comprehensive coverage of the literature. The search query we used was:

TITLE-ABS-KEY ("digital transformation" AND ("corona" OR "virus" OR "covid-19")) AND PUBYEAR > 2017 AND PUBYEAR < 2025.

This combination of keywords was selected to encompass various synonyms and terms associated with both digital transformation and the pandemic. We specifically included terms like "corona," "virus," and "COVID-19" to account for any alternative terminologies used in the research literature. Importantly, we did not use "virus" as an independent keyword in the context of COVID-19, as its inclusion could lead to irrelevant results, which is why it was paired with COVID-related terms. Furthermore, the decision to limit our search to journal articles and conference papers allowed us to focus on high-quality, peer-reviewed sources and delineate the boundaries of the analysis more effectively.

The bibliometric analysis was conducted using the Bibliometrix package in R, which enabled us to evaluate the growth, trends, and scientific structure of the literature. Through this method, we were able to create visual maps of the research landscape, identifying clusters of related research and highlighting potential areas for further investigation. This process allowed us to uncover emerging themes and gaps in the research.

Subsequently, we conducted a systematic review to synthesize the findings from relevant studies. The systematic review followed a rigorous selection process, where studies were evaluated based on predefined inclusion and exclusion criteria. After identifying the studies, we extracted key data and analyzed the content using established frameworks to assess the impact of digital transformation on societies, economies, and industries post-COVID-19. This review aimed to provide a global perspective on the digital renaissance and understand the equity and inclusivity of digital transformation across different regions. The combination of bibliometric and systematic reviews allowed us to fulfill the study's objectives, offering both a quantitative overview and a qualitative synthesis of the research in the field.

3. Main Results of the Bibliometric Analysis

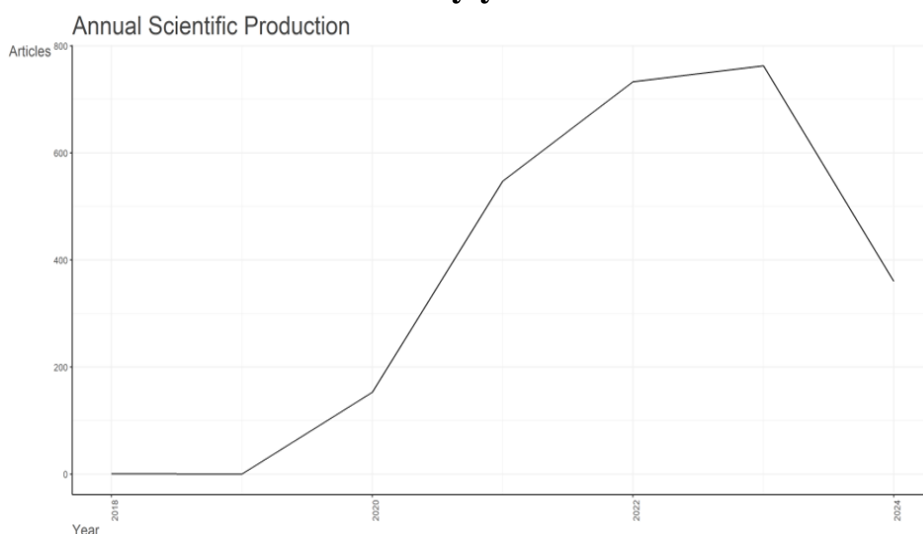
The following section is devoted to an overview of the main results of the bibliometric analysis, which was conducted to map the research landscape at the intersection of "Digital Transformation" and "COVID-19." The bibliometric analysis provides insights into the growth, trends, and key themes within this area of study.

The number of papers on digital transformation and COVID-19 significantly

increased only after 2020, even though the number of documents had evolved. The number of publications increased from 153 in 2020 to 547 in 2021. The COVID-19 pandemic resulted in a substantial increase in the number of papers published on digital transformation. This increase could be interpreted as a turning point, as evidenced by the field's exponential growth over the past three years, 2021–2024 (Fig.1).

Fig.1 demonstrates that most papers concerning digital transformation were published after the pandemic's inception. The global impact of COVID-19 coincided with a substantial surge that began in 2020. The apex of research output during this period is likely due to the urgency to understand and overcome the challenges posed by the pandemic.

Fig N° 1: Publications distribution by years



Source: by the authors using Scopus/Biblioshiny

This trend increased significantly in 2021 and 2022, suggesting that most research and publications on this subject have been concentrated in the post-COVID-19 era. This demonstrates the extent to which the pandemic has amplified academic interest and output in the field of digital transformation in numerous countries. While the period from 2020 to 2023 saw a marked increase in scientific publications on digital transformation, likely driven by the urgent need to adapt to pandemic-induced disruptions, the decline in output starting in 2023 suggests a shift in academic and institutional focus. This trend may reflect a natural saturation point in pandemic-related research themes, as well as a pivot toward implementation over investigation. However, the drop in publication volume does not necessarily imply reduced relevance or urgency of digital transformation initiatives. On the contrary, it may indicate that digitalization has transitioned from a research-intensive phase to a more policy-driven and applied stage.

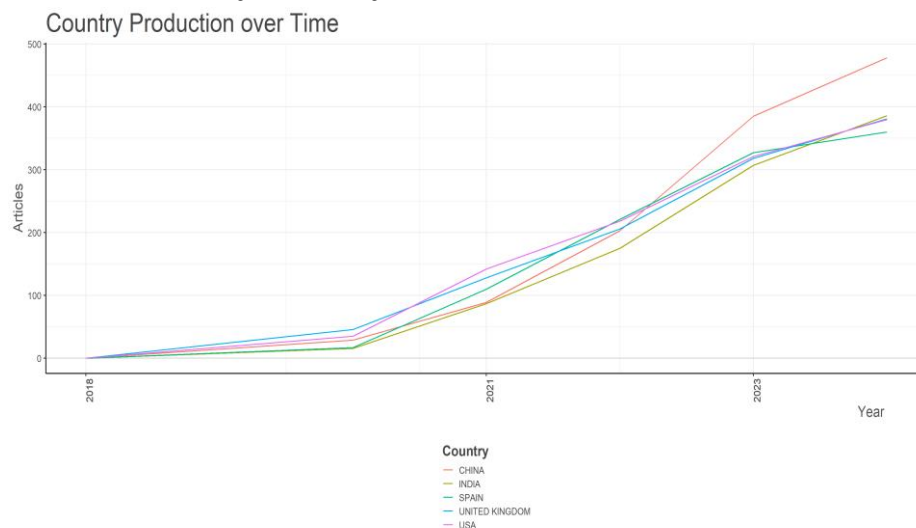
Fig. 2 illustrates the production of papers concerning the interaction between digital transformation and COVID-19 in five countries: the United Kingdom, China, India,

Spain, and the United States, from 2018 to 2024. The global onset of the COVID-19 pandemic coincided with a substantial increase in article production across all countries beginning in 2020.

China leads global output, which has experienced the most significant growth, particularly after 2021, with nearly 500 articles produced by 2023. India, Spain, the United Kingdom, and the United States exhibit comparable development patterns, albeit with lower aggregate production than China.

The close alignment of article production among these four countries indicates the global emphasis on the role of digital transformation during the pandemic. China is emerging as the leader in research output, underscoring the international academic community's response to the challenges and opportunities presented by the pandemic in the context of digital transformation.

Fig.N° 2: Documents by country

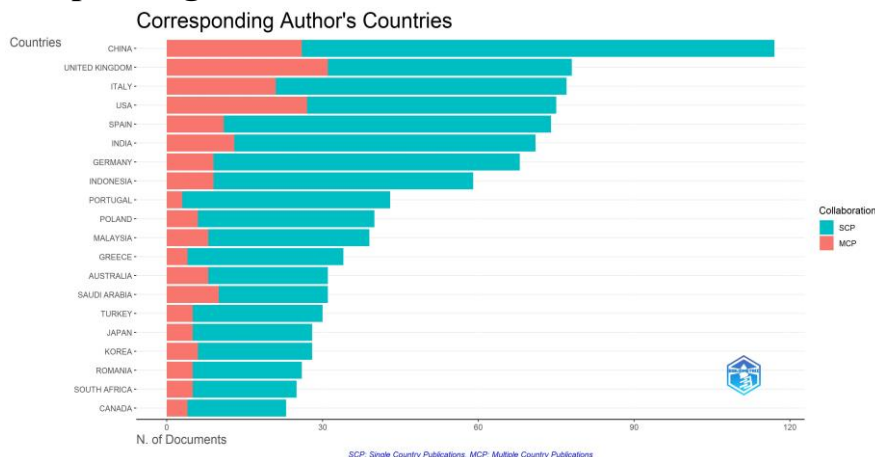


Source: by the authors using Scopus/Biblioshiny

Fig.3 represents the number of documents generated by corresponding authors from various countries, distinguishing between single-country publications (SCP) and multiple-country publications (MCP). The results are consistent with **Fig. 2**, which illustrates the evolution of countries' production over time. This reinforces China's dominant position in research concerning digital transformation and COVID-19. China is the leader in the total number of publications from a single nation, which aligns with its top ranking in **Fig. 3**. Both figures prominently represent the United Kingdom and the United States, with **Fig. 3** emphasizing the UK's substantial international collaboration. Spain, India, and Germany are consistently represented in both figures; however, **Fig. 3** indicates that their levels of cooperation differ. In general, **Fig. 3** replicates the trends in article production over time from **Fig. 2**, providing further insight into the nature of international research collaborations.

Fig.4 depicts a three-field plot, a visual tool that establishes connections between three categories: research sources, essential research domains, and contributing countries or territories. The plot includes lines connecting sources on the left to specific research domains in the center, subsequently connected to countries on the right. Central keywords, including "Digital Transformation," "COVID-19," "Digitalization," "Innovation," and "Artificial Intelligence," are the primary concentration areas of global research. "Digital Transformation" and "COVID-19" are particularly prominent, indicating the global fascination with how the pandemic has expedited the adoption of digital technologies. An in-depth examination of these keywords in the three-field plot enhances our comprehension of how different nations contribute to the worldwide discussion on digital transformation. Every keyword signifies a crucial field of study, with different nations placing varying degrees of emphasis on them. The plot reveals the countries at the forefront of document production and sheds light on the specific research domains they are focusing on. The combination of keywords, sources, and countries highlights the intricate and diverse nature of global research endeavors in addressing the challenges brought about by the pandemic and the continuous digital transformation.

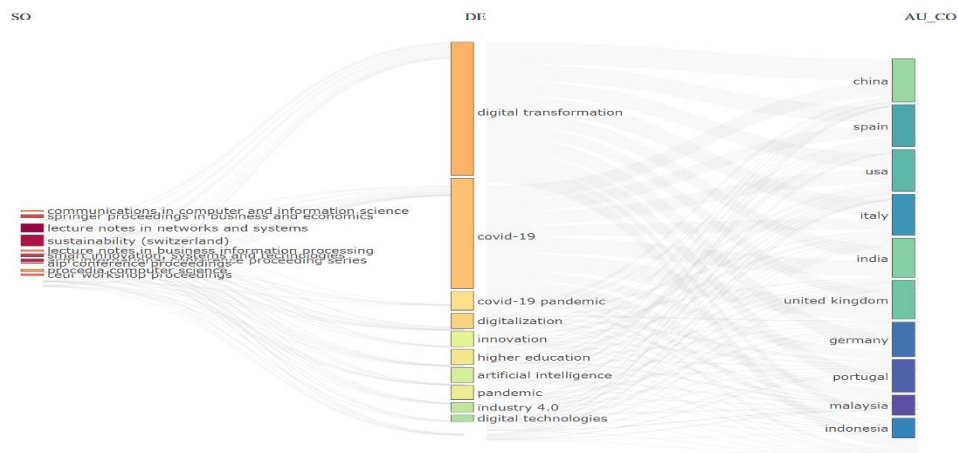
Fig. 3: Corresponding author's countries



Source: by the authors using Scopus/Biblioshiny

The United Kingdom, the United States, China, and Germany demonstrate robust connections to these domains, highlighting their prominent positions in these research areas. This visualization supports previous findings on countries' document production over time, affirming that these nations are generating many documents and prioritizing crucial areas that shed light on the connection between digital transformation and the COVID-19 pandemic.

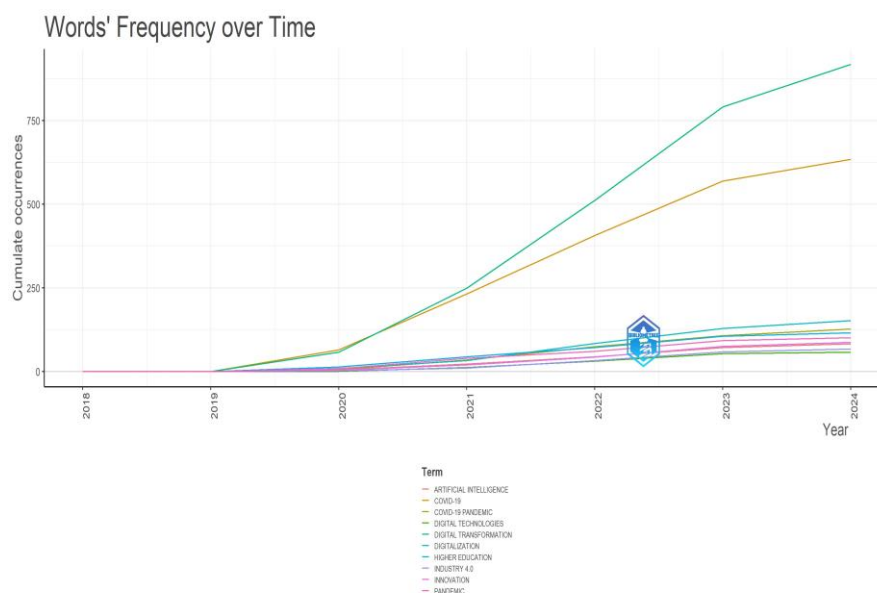
Fig. 4: Three-field plot



Source: by the authors using Scopus/Biblioshiny

Fig.5 captures the cumulative occurrences of specific terms over time, tracking their frequency from 2018 to 2024. These keywords were extracted from the titles, abstracts, and author-assigned keywords of the articles included in the dataset. This data aligns well with the previous findings from **Fig.4**. The terms "COVID-19," "Digital Transformation," and "Digital Technologies" show a significant increase in frequency starting around 2020, which corresponds with the onset of the COVID-19 pandemic. This aligns with the previous analysis that identified these as central research domains, indicating a sharp rise in interest and research output related to these topics. Terms like "Digitalization," "Innovation," and "Artificial Intelligence" show steady growth, reinforcing their importance in the ongoing digital transformation discourse. These terms were also highlighted in Fig.4, indicating that while they may not be the most dominant, they are still critical focus areas. «Higher Education," "Industry 4.0," also shows slower growth, reflecting the broader impact of digital transformation and the pandemic across different sectors, as previously noted. **Fig.5** confirms and aligns with the earlier findings; this alignment further underscores the global research community's focus on understanding and navigating the interplay between the pandemic and digital transformation.

Fig.5: Words' Frequency over Time

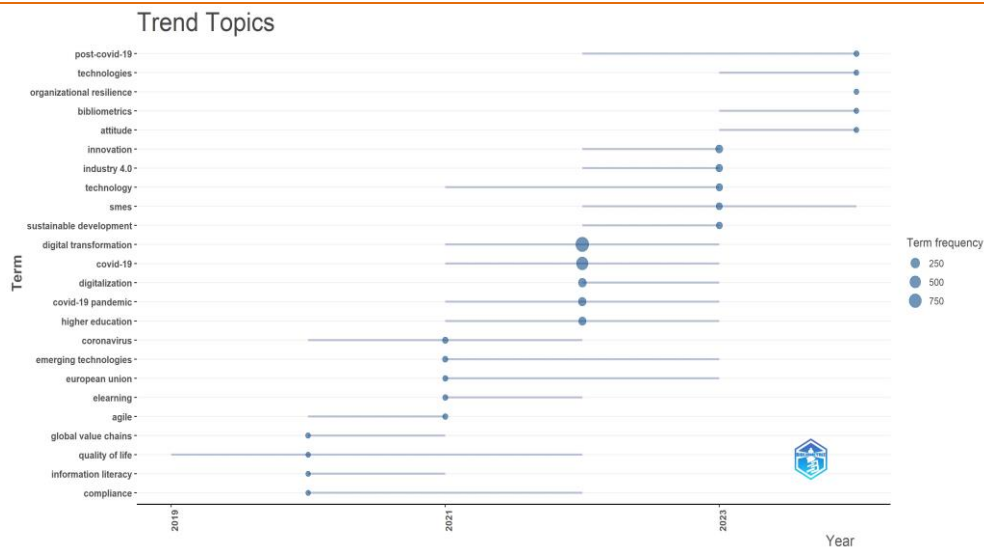


Source: by the authors using Scopus/Biblioshiny

Fig.6 shows the frequency and emergence of specific research terms over time, specifically from 2019 to 2023. Every term is depicted by a horizontal line, showing its occurrence over time. The circles' size corresponds to the term's frequency during those years. Starting around 2020, there has been a noticeable increase in the presence of terms like "COVID-19," "Digital Transformation," and "Digitalization." The size of the associated circles indicates the frequency of these terms. This trend aligns with the previous findings, where these terms were emphasized as crucial to the research focus, particularly in light of the pandemic. Terms such as "post-COVID-19," "Technologies," and "Organizational Resilience" have gained significant prominence in recent years, especially starting in 2021. This suggests a change in research emphasis towards recovery and adaptation in the post-pandemic era. The observations made in Fig.6 are consistent with Fig.4 and Fig.5. The global research focus on COVID-19, digital transformation, and related terms highlights the significance of these critical areas, which have dramatically influenced the impact of the pandemic.

In today's rapidly changing world, there is a clear shift in focus towards the future. Terms like "post-COVID-19" and "Organizational Resilience" are gaining prominence as we strive to comprehend the lasting effects of the pandemic and develop strategies to thrive in a digitally transformed society. Post-pandemic recovery and resilience are giving rise to new terms. This indicates that although the initial crisis phase of COVID-19 may be fading, its impact on digital transformation and organizational strategies will remain crucial research subjects.

Fig.N° 6: Trend Topics



Source: by the authors using Scopus/Biblioshiny

Fig.7 displays the co-occurrence network map, highlighting the relationships between prominent keywords within two central themes: "Digital Transformation" and "COVID-19." These themes appear as the most prominent and connected nodes in the network, suggesting that they are heavily interlinked in research, reflecting the significant influence of the pandemic on accelerating digital transformation across various sectors.

The three clusters in **Fig. 7** were identified using Biblioshiny, an R package designed for bibliometric analysis. The co-occurrence analysis was performed based on keyword frequencies extracted from the titles, abstracts, and author-assigned keywords of articles in the dataset. The clustering was conducted using modularity optimization, a technique that groups keywords based on their co-occurrence patterns across the selected research papers.

Keywords were included if they occurred together frequently enough to indicate a thematic relationship. The Biblioshiny tool was used to visualize these clusters, with the terms positioned based on their co-occurrence relationships, forming distinct clusters of related keywords. While the results provide valuable insights, it is important to note that the prominence of certain terms, such as "Digital Transformation" and "COVID-19", is directly influenced by the keyword selection within the search query. The query design focused specifically on terms closely tied to the pandemic and digitalization, which led to the prominence of these keywords.

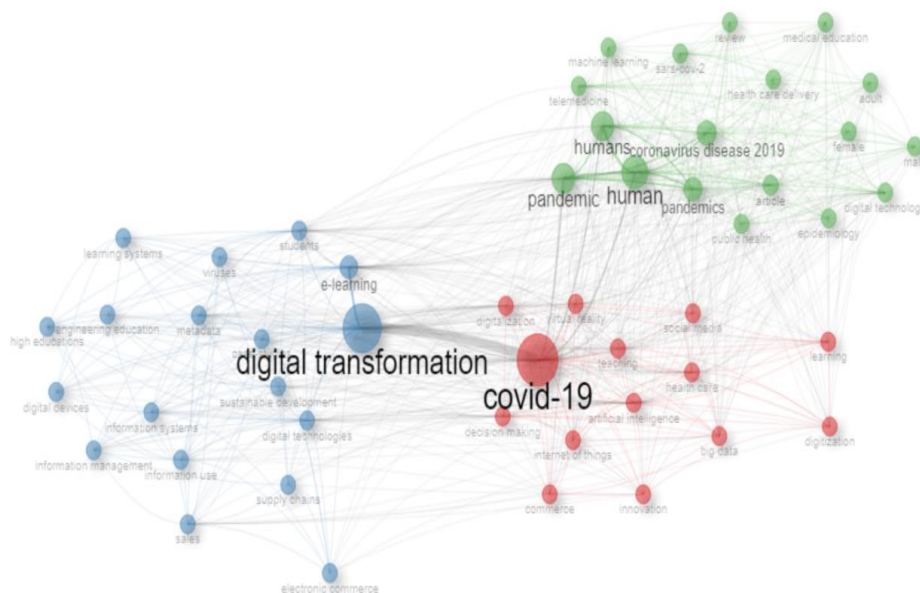
•*Blue Cluster (Digital Transformation and Education)*: This cluster emphasizes the role of digital transformation in education and information systems. Keywords like "e-learning," "learning systems," and "information management" suggest a focus on how digital technologies have reshaped educational practices during the pandemic. This cluster highlights the shift to online learning, the importance of digital tools in

education, and the broader implications for knowledge dissemination in the digital age.

•*Red Cluster (Digitalization and Technological Innovation)*: This cluster is centered around COVID-19, with terms such as "digitalization," "virtual reality," "artificial intelligence," and "Internet of Things". These terms reflect the technological innovations and digital solutions that have been implemented to address the challenges posed by the pandemic, particularly in sectors like healthcare, commerce, and remote communication. This cluster underscores the acceleration of digitalization across industries as a response to the crisis.

•*Green Cluster (Health and Pandemic Response)*: This cluster includes keywords such as "human," "pandemic," "telemedicine," and "public health," illustrating the intersection of digital transformation and healthcare during the COVID-19 crisis. This cluster reflects how digital technologies have played a pivotal role in pandemic management, particularly through innovations like telemedicine and remote healthcare services. The focus is on how digital tools have supported public health responses and healthcare delivery during the pandemic. The connections between these clusters illustrate the interdisciplinary nature of research on digital transformation during COVID-19, showing how different domains, such as education, technology, and healthcare, are interconnected in response to the global crisis. This visualization provides a comprehensive overview of the key themes and trends in the research field.

Fig N° 7. The Co-Occurrence Network Map



Source: by the authors using Scopus/Biblioshiny

4. Discussion:

4.1 Digital Transformation in Different Global Regions Post-COVID-19

The COVID-19 pandemic has catalyzed an unprecedented acceleration in digital transformation, compressing changes that would ordinarily span several years into mere months or even weeks, often with limited strategic planning (Paul et al., 2024, p. 2). This rapid shift has accentuated the existing gap between technological capabilities and the requirements of effective risk management (Benharkat & Aslan, 2023, p. 71). The profound disruptions to routine business operations during the pandemic have underscored the critical role of digital transformation in fostering organizational resilience and ensuring business continuity. As organizations move through the complex phase of recovery, there is an urgent need to understand the multifaceted relationship between the COVID-19 crisis and the processes of digitalization. It is essential to examine how the pandemic not only accelerated digital initiatives but also posed considerable challenges to digital development. In the face of these disruptions, many businesses were compelled to prioritize immediate survival, initiating efforts to restore normal operations wherever possible (Maritz, 2020, p. 64). Moreover, the pace and nature of digital transformation have varied widely across regions, influenced by disparities in technological infrastructure, levels of economic development, governmental policy responses, and cultural attitudes towards change. These differences have shaped the trajectory and outcomes of digital transformation in diverse ways, highlighting the importance of contextual factors in shaping organizational responses to global crises (Alfano et al., 2024, p. 1060). This section provides a comparative analysis of digital transformation trends across major global regions post-pandemic.

- ***North America***

North America, particularly the United States and Canada, was already among the most digitally mature regions globally before the pandemic. However, the public health crisis accelerated the adoption of remote work tools, e-commerce platforms, telehealth services, and online education systems (Sherif, 2023, p.1). In the U.S., the rapid shift to remote work led to increased reliance on collaboration platforms such as Zoom, Microsoft Teams, and Slack. Also, the e-commerce sales jumped about 43% in 2020 (UNCTAD, 2022, p.20). These trends show how digital platforms enabled business continuity and innovation during lockdowns. The pandemic caused substantial changes in consumer behaviors, rapidly increasing the need for effortless digital experiences. Digital Transformation enables organizations to prioritize a customer-centric approach and improve customer experience across many interaction points. Businesses may enhance customer loyalty and happiness by using data analytics, AI-driven personalization, and omnichannel engagement strategies to provide customized solutions that align with changing consumer demands and preferences (Karri et al., 2025, p. 847). E-commerce also experienced unprecedented

growth, with online retail sales increasing by over 32% in 2020, according to the U.S. Department of Commerce. Telehealth utilization surged during this period, with 76% of U.S. Despite these advancements, the region faced challenges including heightened cybersecurity risks due to expanded digital footprints and persistent inequalities in digital access, especially in rural and low-income communities. Governments responded with initiatives such as the U.S. CARES Act, which provided funding for digital infrastructure and remote learning, while Canada introduced the Digital Charter Implementation ACT (2023) to enhance data privacy and digital rights (Gary NG, 2021, p.1).

- ***Europe***

Europe's approach to digital transformation was structured and policy-centric, emphasizing regulatory coherence, sustainability, and digital sovereignty (Gary NG, 2021). The European Digital Strategy (2020) laid the groundwork for digital innovation while safeguarding privacy and competition through the Digital Services Act (DSA) and the Digital Markets Act (DMA). Northern and Western European nations, particularly Germany, France, and the Nordic countries, have advanced investments in artificial intelligence (AI), Industry 4.0, and cloud computing. However, Southern and Eastern Europe trailed due to weaker digital adoption among small and medium-sized enterprises (SMEs) and lower R&D expenditure (Jun et al., 2022, p. 40). Concerns over data dependency spurred the development of GAIA-X, an initiative aimed at creating a European cloud ecosystem independent from dominant U.S providers such as AWS and Microsoft Azure. To harmonize digital progress, the EU launched the Digital Compass Plan (2022), which set specific targets for digital literacy, gigabit connectivity, and cloud adoption by 2030 (Gary NG, 2021).

- ***Asia-Pacific***

The Asia-Pacific region exhibited remarkable dynamism in digital transformation, propelled by both state-led initiatives and private sector innovation. In China, the government leveraged its digital infrastructure to scale platforms such as Alibaba, WeChat Pay, and AI-driven surveillance systems during lockdowns. The Made in China initiative continued to advance smart manufacturing and automation (Jun et al., 2022, p.64). India experienced a digital surge through the Unified Payments Interface (UPI), its Aadhaar-linked digital identity system, and the expansion of EdTech firms like Byju's and Unacademy (Matsieli & Mutula, 2024, p. 8). Southeast Asian countries, including Singapore, Malaysia, and Indonesia, saw rapid growth in fintech ecosystems and super-apps such as Grab and Gojek. Nevertheless, the region contended with infrastructural deficiencies in rural areas, regulatory fragmentation, and uneven digital literacy, which posed challenges to inclusive digital growth (Jun et al., 2022, p. 40).

- *Latin America's*

Latin America's digital transformation was marked by uneven progress, with Brazil, Mexico, and Colombia emerging as regional leaders. Brazil's fintech sector flourished, producing global firms like Nubank, StoneCo, and Mercado Pago. Chile and Colombia expanded digital government services, streamlining public service delivery and improving accessibility (Joia et al., 2024, p.2173; Vasconcellos et al., 2022, p. 60). However, inequality in digital access, outdated regulatory frameworks, and fragmented digital education systems impede broader transformation (Matsieli & Mutula, 2024, p. 6).

- *Middle East and Africa*

The Middle East and Africa presented a complex mosaic of digital transformation experiences, combining top-down national strategies with grassroots innovations. In the Middle East, countries like the United Arab Emirates and Saudi Arabia pursued ambitious agendas under Vision 2021 and Vision 2030, with investments in smart cities, blockchain, and AI. Dubai's 10X Initiative exemplified forward-looking digital governance aimed at placing the city a decade ahead of other metropolises (Farfán Chilicaus et al., 2025, p. 25).

Africa witnessed notable progress through mobile money and financial technology. Platforms like M-Pesa (Kenya) and MTN Mobile Money enabled millions of unbanked individuals to access financial services (Nasser, 2024, p10). African startups such as Flutterwave and Andela garnered international recognition in fintech and tech talent development. Nonetheless, widespread challenges persisted, including political instability, limited internet penetration, and low levels of digital literacy, particularly in Sub-Saharan Africa (Pisu et al., 2021, p. 31).

4.2 The Impact of Digitalization on Societal, Economic, and Industrial Dynamics in both established and emerging economies

The global trajectory of digitalization has undergone a profound transformation, particularly since the onset of the COVID-19 pandemic. Prior to 2020, digital technologies were gradually permeating select industries and sectors, primarily within technologically advanced nations and among digitally literate consumers and enterprises (Boselli et al., 2024, p. 452). However, the pandemic functioned as an unprecedented accelerant, marking the transition from "slow diffusion" to "ubiquitous digitalization" across the globe. The shift redefined digital technologies from being optional enhancements to essential infrastructure for continuity, resilience, and competitiveness in both developed and developing economies. This section critically examines the multifaceted effects of digitalization on societal, economic, and industrial systems, with a focus on the diverging experiences of established and emerging economies. It draws upon recent scholarly literature and empirical findings

to highlight how structural, infrastructural, and cultural differences shape digital transformation outcomes.

- ***Global Acceleration of Digital Adoption***

The COVID-19 pandemic marked a critical inflection point for digital adoption globally. Pre-pandemic, digital technologies such as e-commerce, telehealth, remote work platforms, and cloud computing were gradually adopted, with more penetration in technologically advanced societies. However, during the pandemic, digital adoption surged across both producers and consumers as a survival strategy to sustain operations amidst lockdowns and social distancing protocols (Alfano et al., 2024, p.1045). According to (Nagel, 2020, p. 5) the pandemic served as a forced experiment in digital living, wherein the need for rapid digitization bypassed traditional barriers like cost and resistance to change. This abrupt shift accelerated the adoption curve significantly, compressing what might have taken years into a matter of months. Nevertheless, the surge was uneven. While developed countries rapidly scaled up digital capabilities due to existing infrastructure and robust digital ecosystems, many developing countries struggled to adapt due to infrastructural deficiencies, limited broadband.

- ***Digital Transformation in High-Income Economies***

In high-income nations, digital transformation has been facilitated by longstanding investments in ICT infrastructure, innovative ecosystems, and human capital. Studies such as (Matt et al., 2015, p. 5) detail how advanced economies leveraged mature technological systems to transition smoothly into remote work, e-learning, and digital financial services. These countries were not immune to disruption; however, they demonstrated higher resilience by rapidly deploying digital tools for adaptive governance, public health management, and industrial continuity. For instance, in the financial services sector, developed nations witnessed a significant migration of consumers to online and mobile banking platforms. Banks and fintech institutions deployed AI-driven customer service, blockchain solutions, and advanced cybersecurity mechanisms to support this shift (Carletti et al., 2020, p. 59). Similarly, digital health systems such as telemedicine platforms became vital in delivering healthcare without risking exposure to the virus. AI and Internet of Things (IoT)-enabled diagnostics emerged as critical innovations, allowing for remote monitoring and predictive healthcare delivery. However, data privacy and regulatory clarity lag behind these rapid advancements (World Health Organization, 2021).

- ***Digital Transformation Challenges in Developing Economies***

Conversely, digital transformation in developing countries continues to face structural challenges, including poor digital infrastructure, inconsistent electricity supply, and low levels of digital inclusion. (Avgerou, 2001, p. 20) argues that digital transformation cannot be universally interpreted or applied, as context-specific socio-

cultural and economic dynamics significantly influence technology adoption outcomes. In the context of banking, for example, despite substantial investments, many financial institutions in Africa and parts of Asia still struggle with user adoption (Ayalew & Xianzhi, 2019, p. 5). In a study focused on Ghana, (Ofosu-Ampong, 2021, p. 72) identifies critical barriers such as limited technological access, digital illiteracy, and consumer skepticism. His findings highlight that a hybrid model, combining physical and digital services, remains most effective in these regions. Moreover, as (Nagel, 2020, p. 9) observes, infrastructural challenges, such as unstable internet connections and inadequate digital tools, significantly impede remote work and online education. These limitations not only deepened existing inequalities but also reinforced the digital divide between urban and rural, rich and poor populations.

- ***The Banking Sector: A Case of Digital Divide***

Digitalization in the banking industry illustrates the divide in implementation success across developed and developing economies. In developed markets, online banking adoption soared during the pandemic, facilitated by mature digital ecosystems, user-friendly platforms, and high consumer trust (Reis & Melão, 2023, p. 6). In wealthier economies, consumers generally have better connectivity and digital literacy, allowing rapid adoption of new online services. For example, North American and Western European users increasingly turned to mobile banking, e-commerce, and e-learning platforms during lockdowns. In contrast, developing countries faced substantial resistance and operational challenges. OECD research highlights that the pandemic widened pre-existing divides: COVID accelerated e-commerce uptake for those already online, but low-income and rural consumers remained vulnerable due to limited skills, low trust in online systems, and high costs (Pisu et al., 2021, pp. 10–12). Gaps in digital literacy, not just device availability, are a key factor driving these disparities. As noted by (Ofosu-Ampong, 2021, p 72), both employees and customers expressed reluctance toward fully digital banking, citing unfamiliarity, security concerns, and inadequate support infrastructure. Furthermore, (Karri et al., 2025, p .846) emphasize that even where digital banking services exist, uptake remains low due to societal habits and lack of awareness. Technological constraints and internet instability also emerged as significant obstacles to successful financial transactions during the COVID-19 period in developing countries. These limitations became especially apparent when the COVID-19 protocol urged citizens to use digital banking services more than ever before. Additionally, challenges such as family distractions, reluctance to work remotely, and difficulty adapting to new technologies were widely reported in developing countries. These findings indicate that while the push for digital transformation is strong, the implementation and acceptance of such

changes in developing countries face significant resistance due to a range of social and technological factors (Ayalew & Xianzhi, 2020, p. 5).

- ***Digitalization in Manufacturing and Industrial Systems***

The impact of digitalization in manufacturing also underscores the disparity between developed and developing nations. According to (Benharkat and Bentaalla-Kaced 2022, p. 254), firms in developed countries utilized Industry 4.0 technologies, such as IoT, AI, and additive manufacturing, to repurpose production lines and produce personal protective equipment (PPE) swiftly during the pandemic. This rapid responsiveness was enabled by digital manufacturing systems and agile supply chains. By contrast, manufacturers in developing countries often lacked the digital maturity required for such adaptations. In many cases, manual systems, outdated machinery, and fragmented supply chains hindered the ability to pivot production efficiently. This lack of responsiveness exposed vulnerabilities in industrial systems and emphasized the need for digital capacity-building in manufacturing (Benharkat et al., 2023, p.138).

In summary, while digital transformation has been widely adopted in developed countries, it remains a significant challenge in developing nations, which face barriers such as inadequate technological infrastructure, low internet penetration, and resistance to change. However, the pandemic has highlighted the urgency of embracing digital technologies for survival and competitiveness, especially in banking and manufacturing, and the need for more research to understand the specific challenges in developing countries.

4.3 The Challenges Associated with Digital Transformation and Its Implications for Global Development and Sustainability:

In today's ever-changing landscape, embracing digital transformation can give businesses a competitive edge and set them apart. Companies that actively adopt digital technologies gain the advantage of being more agile, innovative, and able to adapt quickly to changes in the market. With the help of digital platforms, IoT, and AI-driven insights, businesses can tap into new revenue streams, explore untapped markets, and gain an edge over their competitors, setting themselves up for long-term success. Embracing digital transformation empowers organizations to stay ahead of the curve and easily navigate changing circumstances. Organizations can proactively navigate disruptions, capitalize on opportunities, and maintain a competitive edge by strategically investing in adaptable technologies and fostering a forward-thinking culture (Omol, 2024, p. 244). Quickly adapting to shifting market conditions and emerging trends is crucial for maintaining growth and relevance in a fast-changing business landscape.

- ***The Complex Nature of Digital Transformation***

However, despite these benefits, digital transformation remains an arduous undertaking, often marked by high failure rates and systemic obstacles. These challenges stem not only from technological constraints but also from organizational, cultural, and governance-related complexities. (Vial, 2019, p. 173; Wade & Shan, 2020, p. 215). This section critically examines the multifaceted barriers to digital transformation and their implications for development and sustainability.

- ***Unrealistic Expectations and Strategic Misalignment***

One of the primary reasons for digital transformation failure is the unrealistic expectations placed on technology and project outcomes. Organizations often oversell digital transformation as a quick fix or magic bullet, rather than recognizing it as a long-term, iterative process involving complex organizational change. As (Benharkat & Aslan, 2023, p. 65) argue, many digital initiatives are approved based on overestimated returns, underestimated timelines, and insufficient understanding of associated risks. This mismatch between expectations and outcomes often leads to dissatisfaction, loss of stakeholder confidence, and project abandonment.

A study by (Fitzgerald et al., 2013, p. 8) found that companies that lack a coherent digital strategy are 2.5 times more likely to report transformation failures. Instead of aligning digital initiatives with core business objectives, some organizations pursue "digital for the sake of digital," investing in technologies like AI, blockchain, or digital twins without clear strategic justification or organizational integration (Omol, 2024, p.246). As a result, these technologies remain siloed or underutilized, failing to generate the expected impact.

- ***Overemphasis on Technology Versus Systemic Change***

Another critical challenge arises from an overemphasis on specific digital tools rather than on systemic change. While emerging technologies can indeed be transformative, their successful deployment requires alignment with organizational needs, processes, and culture (Vial, 2019, p. 133). Without this alignment, digital initiatives risk becoming fragmented and disconnected from operational realities. For instance, introducing a digital innovation such as a real-time analytics platform without adapting organizational decision-making processes, especially in consensus-oriented or hierarchical cultures, can hinder adoption and impact. The McKinsey Global Institute (2020) reports that over 70% of digital transformations fail due to poor integration of technology into business workflows and insufficient user engagement (Benharkat & Aslan, 2023, p. 66) .

- ***Governance and Leadership Challenges***

Effective digital transformation requires robust governance structures that clearly delineate roles, responsibilities, and accountability. However, many organizations suffer from fragmented leadership and unclear ownership of digital initiatives. Digital

leaders often face resistance from functional managers who feel disempowered or marginalized (Omol, 2024, p. 246). Without cross-functional coordination and a centralized governance framework, digital portfolios can become incoherent and misaligned with broader strategic goals (Sebastian et al., 2017, p. 204). Research by (Westerman, 2014, p. 2) stresses the importance of digital leadership in guiding transformational efforts. Companies with strong governance are more likely to balance innovation with risk management, ensuring that digital investments are both strategic and sustainable. Conversely, in the absence of such structures, digital projects may proliferate without oversight, leading to redundancies, inefficiencies, and eventual failure.

- ***Cultural and Organizational Resistance***

Cultural misalignment is frequently cited as one of the most significant barriers to digital transformation (Uzule & Verina, 2023, p. 135). Organizational culture influences how digital tools are perceived, adopted, and integrated into daily operations. For instance, in cultures where consensus and hierarchy dominate decision-making, the implementation of agile, data-driven systems may be resisted or underutilized. (Omol, 2024, p. 247) notes that introducing tools like AI-driven dashboards or collaborative platforms may clash with entrenched cultural norms, leading to passive resistance or outright rejection. These issues are especially salient in multinational or multicultural organizations, where divergent cultural expectations can lead to inconsistent adoption across business units. Moreover, digital transformation often requires a mindset shift toward experimentation, continuous learning, and adaptability. Cultures that value stability and risk aversion may struggle to embrace such changes, resulting in inertia and limited innovation

- ***Financial and Infrastructural Barriers in Developing Economies***

Financial and infrastructural constraints in developing economies significantly hinder progress toward digital transformation and broader socio-economic development. These limitations manifest in multiple ways, affecting both the public and private sectors and exacerbating existing inequalities. One of the most pressing infrastructural challenges is the lack of reliable physical and digital infrastructure. In many developing regions, limited broadband access, unreliable power supply, and inadequate transportation networks constrain the ability of businesses and governments to adopt and scale digital technologies. For instance, poor internet connectivity limits the effectiveness of e-government services, online education, and digital financial systems, which are essential for modern economic activity (Uzule & Verina, 2023, p. 137). In addition to these infrastructural barriers, financial constraints further impede development. Many firms in developing countries face significant obstacles in accessing credit or capital, which restricts their ability to invest in technology, human capital, or production capacity. (Ayalew and Xianzhi, 2020, p. 6) highlight that such financial barriers are particularly acute for small and medium enterprises (SMEs), which often lack the collateral or financial history required by lenders. This not only limits firm-level innovation but also slows overall economic growth (Priya & Sharma, 2023, p. 15) .

The interplay between financial and infrastructural constraints creates a self-reinforcing cycle: limited financing hampers infrastructure development, while poor infrastructure deters investment and perpetuates underdevelopment. Furthermore, corruption and weak governance can amplify these problems by distorting resource allocation and reducing the efficiency of public spending (Vereshchagina, 2023, p.339).

5. Conclusion:

This study explored the drivers and implications of digital transformation in the wake of the COVID-19 pandemic, offering a global perspective on how technological change has reshaped societal, economic, and industrial systems. Central to these developments is the profound transformation of consumer behavior, as individuals across regions rapidly adapted to digital platforms for shopping, banking, education, and healthcare. The pandemic acted as a catalyst for digital adoption, compelling both consumers and organizations to shift to digital interfaces, often out of necessity rather than preference. The bibliometric and systematic review revealed that while digital tools have enhanced resilience, operational efficiency, and innovation for many businesses, they have also exposed persistent disparities in digital access and inclusion, particularly in developing and underserved regions. These inequalities in connectivity, affordability, and digital literacy continue to shape the pace and scope of consumer engagement in the digital economy. Moreover, the research highlights that consumer expectations have evolved significantly, with growing demand for convenience, personalization, trust, and seamless omnichannel experiences. Organizations must respond not only by enhancing internal capabilities but by placing consumers at the center of their digital strategies, leveraging data analytics, artificial intelligence, and customer experience platforms to deliver tailored value. For practitioners, this study underscores the importance of adopting a customer-centric digital transformation model, backed by robust infrastructure, responsive service design, and inclusive policies. Future research should further explore variations in consumer adaptation across sectors and regions, as well as the long-term behavioral shifts resulting from this digital acceleration. Understanding these patterns is essential for building equitable, sustainable, and human-centered digital futures.

5. List of references:

1. Abdullah, S., Mohd Naw, M. N., Halim, M. A. S. A., Omar, K., Rosli, N. A., & Harun, A. N. (2024). Digital Transformation for Sustainable Business Performance: A Systematic Literature Review. *UCJC Business and Society Review*, 21(80), 48–83. <https://doi.org/10.3232/UBR.2024.V21.N1.02>
2. Alfano, V., Mariotti, I., Nappo, N., Gaetano Vecchione, ., & Vecchione, G. (2024). Work-life balance during the COVID-19 pandemic. A European perspective. *Journal of Industrial and Business Economics*. <https://doi.org/10.1007/s40812-024-00316-1>
3. Ayalew, M. M., & Xianzhi, Z. (2019). Bank Competition and Access to Finance: Evidence from African Countries. *Journal of Industry, Competition and Trade*, 19(1), 155–184. <https://doi.org/10.1007/s10842-018-0283-6>

4. Ayalew, M. M., & Xianzhi, Z. (2020). The effect of financial constraints on innovation in developing countries: Evidence from 11 African countries. *Asian Review of Accounting*, 28(3), 273–308. <https://doi.org/10.1108/ARA-02-2019-0036>
5. Benharkat, N. E. H., & Aslan, I. (2023). Social-Technical Hazards and Their Correlations within the Framework of Digital Transformation. In Mehmed Zahid Cogenli (Ed.), *Organizational Behavior in the Digital World* (pp. 61–81). Nova Science Publishers.
6. Benharkat, N. E. H., Bentaalla-Kaced, S., & Chergui, A. (2023). The influence of manufacturing digitisation on safety management and reliability engineering. *International Journal of Reliability and Safety*, 17(2). <https://doi.org/10.1504/IJRS.2023.134291>
7. Benharkat, N. E. H., & Bentaalla-kaced, S. (2022). The Impact of COVID-19 Pandemic on Industrial Digital Transformation : A Literature Review and Guidelines for Future Research. 2 En International Students Conference on Academic Multidisciplinary Research, 250–256.
8. Berman, S. J. (2012). Digital transformation: opportunities to create new business models. *Strategy & Leadership*, 40(2), 16–24. <https://doi.org/10.1108/10878571211209314>
9. Bist, A. S., Agarwal, V., Aini, Q., & Khofifah, N. (2022). Managing Digital Transformation in Marketing: “Fusion of Traditional Marketing and Digital Marketing.” *International Transactions on Artificial Intelligence (ITALIC)*, 1(1), 18–27. <https://doi.org/10.34306/italic.v1i1.86>
10. Boselli, C., Costa, S., Rinaldi, M., & Vicarelli, C. (2024). The pandemic crisis in Italy: an assessment through a new classifier of firm economic-financial solidity. *Journal of Industrial and Business Economics*. <https://doi.org/10.1007/s40812-024-00328-x>
11. Carletti, E., Claessens, S., Fatás, A., & Vives, X. (2020). The bank business model in the post-Covid-19 world. Centre for Economic Policy Research. ISBN :9781912179343
12. Farfán Chilicaus, G. C., Licapa-Redolfo, G. S., Arbulú Ballesteros, M. A., Corrales Otazú, C. D., Apaza Miranda, S. J., Flores Castillo, M. M., Castro Ijiri, G. L., Guzmán Valle, M. D. los Á., & Arbulú Castillo, J. C. (2025). Digital Transformation and Sustainability in Post-Pandemic Supply Chains: A Global Bibliometric Analysis of Technological Evolution and Research Patterns (2020–2024). *Sustainability (Switzerland)*, 17(7). <https://doi.org/10.3390/su17073009>
13. Fernandes, N. (2020). Economic effects of coronavirus outbreak (COVID-19) on the world economy. <https://ssrn.com/abstract=3557504>
14. Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2013). Embracing Digital Technology, A New Strategic Imperative: Findings from the 2013 Digital Transformation Global Executive Study and Research Project. MIT Sloan Management Review, 1–16. <http://sloanreview.mit.edu/faq/>
15. Gary NG. (2021). Digital transformation for a post-COVID world. <https://www.legco.gov.hk/research-publications/english/essentials-2021ise33-digital-transformation-for-a-post-covid-world.htm>
16. Karri, V., Rao, P. N. A., Sanapala, G. K., Kumar, V. V., & Challa, V. N. S. K. (2025). A Data-Driven Approach for Enhancing Customer Loyalty through Strategic Business Innovations and Technology Integration. *Ianna Journal of Interdisciplinary Studies*, 7 2(2), 831–850. <https://doi.org/10.5281/zenodo.15602189>
17. Hendrawan, S. A., Afdhal Chatra, Nurul Iman, Soemarno Hidayatullah, & Degdo Suprayitno. (2024). Digital Transformation in MSMEs: Challenges and Opportunities in Technology Management. *Jurnal Informasi Dan Teknologi*, 6, 141–149. <https://doi.org/10.60083/jidt.v6i2.551>
18. Joia, L. A., Chatterjee, S., Abitia, G. R., & Graeml, A. R. (2024). Digital transformation in Latin America: Challenges and opportunities. *Information Systems Journal*, 34(6), 2173–2175. <https://doi.org/10.1111/isj.12528>
19. Jun, S., Park, J., & Kim, J. Y. (2022). Digital Transformation Landscape in Asia and the Pacific: Aggravated Digital Divide and Widening Growth Gap. ESCAP Working Paper Series, 1–69. <http://www.unescap.org/kp>

20. Korankye, B. (2020). The Impact of Global Covid-19 Pandemic on Small and Medium Enterprises in Ghana. *International Journal of Management, Accounting and Economics*, 7(6), 255–276. www.ijmae.com
21. Majchrzak, A., Lynne Markus, M., & Wareham, J. (2016). Designing for digital transformation: Lessons for information systems research from the study of ICT and societal challenges. *MIS Quarterly: Management Information Systems*, 40(2), 267–277. <https://doi.org/10.25300/MISQ/2016/40>
22. Maritz, A. (2020). A MULTI-DISCIPLINARY BUSINESS APPROACH TO COVID-19: LA TROBE BUSINESS SCHOOL PERSPECTIVES. In *IJOI The International Journal of Organizational Innovation* (Vol. 13). <http://www.ijoi-online.org/>
23. Matsieli, M., & Mutula, S. (2024). COVID-19 and Digital Transformation in Higher Education Institutions: Towards Inclusive and Equitable Access to Quality Education. *Education Sciences*, 14(8). <https://doi.org/10.3390/educsci14080819>
24. Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, 57(5), 339–343. <https://doi.org/10.1007/s12599-015-0401-5>
25. Medini, A., & Baghdadi, L. (2024). COVID-19 shock on supply chains: evidence from a developing country. *Journal of Industrial and Business Economics*. <https://doi.org/10.1007/s40812-024-00307-2>
26. Melanyina, M. V., Ruzina, E. I., Shkvarya, L. V., & Verenikina, A. Y. (2024). Digital Transformation in the Middle East: Directions, Outcomes and Challenges. *Ikonomicheski Izsledvania*, 33(4), 35–47.
27. Nagel, L. (2020). The influence of the COVID-19 pandemic on the digital transformation of work. *International Journal of Sociology and Social Policy*, 40(9–10), 861–875. <https://doi.org/10.1108/IJSSP-07-2020-0323>
28. Nasser, H. (2024). Digital Banking in Middle East and Africa : Seven Key Trends Shaping the Future.
29. Omol, E. J. (2024). Organizational digital transformation: from evolution to future trends. *Digital Transformation and Society*, 3(3), 240–256. <https://doi.org/10.1108/DTS-08-2023-0061>
30. Ozili, P. K., & Arun, T. G. (2020). Spillover of COVID-19: impact on the Global Economy. <https://ssrn.com/abstract=3562570>
31. Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International Journal of Information Systems and Project Management*, 5(1), 63–77. <https://doi.org/10.12821/ijispm050104>
32. Paul, J., Ueno, A., Dennis, C., Alamanos, E., Curtis, L., Foroudi, P., Kacprzak, A., Kunz, W. H., Liu, J., Marvi, R., Nair, S. L. S., Ozdemir, O., Pantano, E., Papadopoulos, T., Petit, O., Tyagi, S., & Wirtz, J. (2024). Digital transformation: A multidisciplinary perspective and future research agenda. *International Journal of Consumer Studies*, 48(2), 1–28. <https://doi.org/10.1111/ijcs.13015>
33. Petropoulou, A., Angelaki, E., Rompogiannakis, I., Passas, I., Garefalakis, A., & Thanasas, G. (2024). Digital Transformation in SMEs: Pre- and Post-COVID-19 Era: A Comparative Bibliometric Analysis. *Sustainability (Switzerland)*, 16(23). <https://doi.org/10.3390/su162310536>
34. Pisu, M., Ruden, C., Hwang, H., & Nicoletti, G. (2021). Spurring Growth and Closing Gaps Through Digitalisation in a Post-COVID World: Policies to Lift All Boats. *OECD Economic Policy Papers*, 30(30).
35. Priya, P., & Sharma, C. (2023). Reinforcing the effects of corruption and financial constraints on firm performance: Normal versus crisis period in developing economies.

- Economic Modelling, 127, 106463.
<https://doi.org/https://doi.org/10.1016/j.econmod.2023.106463>
36. Quayson, M., Bai, C., & Osei, V. (2020). Digital Inclusion for Resilient Post-COVID-19 Supply Chains: Smallholder Farmer Perspectives. *IEEE Engineering Management Review*, 48(3), 104–110. <https://doi.org/10.1109/EMR.2020.3006259>
 37. Reis, J., & Melão, N. (2023). Digital transformation: A meta-review and guidelines for future research. *Heliyon*, 9(1). <https://doi.org/10.1016/j.heliyon.2023.e12834>
 38. Safonov, Y., Borshch, V., Shulzhenko, I., Zahrebelna, I., & Bolshakova, I. (2022). Digital Transformation in Developing Economies Under the COVID-19 Pandemic. *IEEE Engineering Management Review*, 50(3), 46–57. <https://doi.org/10.1109/EMR.2022.3195873>
 39. Sebastian, I. M., Moloney, K. G., Ross, J. W., Fonstad, N. O., Beath, C., & Mocker, M. (2017). How big old companies navigate digital transformation. *MIS Quarterly Executive*, 16(3), 197–213. <https://doi.org/10.4324/9780429286797-6>
 40. Sherif, A. (2023). Global impact of COVID-19 on digital transformation speed 2020, by industry. <https://www.statista.com/statistics/1200484/covid-digital-transformation-process-industry/>
 41. Tanushev, C. (2022). Digital Transformation: The Impact on Corporate Strategy. *Economic Alternatives*, 28(3), 383–404. <https://doi.org/10.37075/EA.2022.3.01>
 42. UNCTAD. (2022). Recovering from COVID-19 in an increasingly digital economy: Implications for sustainable development. Intergovernmental Group of Experts on E-Commerce and the Digital Economy, 02101(February).
 43. Uzule, K., & Verina, N. (2023). DIGITAL BARRIERS IN DIGITAL TRANSITION AND DIGITAL TRANSFORMATION: LITERATURE REVIEW. *Economics and Culture*, 20(1), 30–42. <https://doi.org/10.2478/jec-2023-0003>
 44. Vasconcellos, J., Martins, A., Ramos, V., Wong, N., Pinto, C., Pereira, M., Guimaraes, A. L., & Feng, A. (2022). Latin America Digital Transformation Report 2022. 79. <https://www.informeticplus.com/latin-america-digital-report-2022-atlantico>
 45. Vereshchagina, G. (2023). Financial constraints and economic development: The role of firm productivity investment. *Review of Economic Dynamics*, 51, 322–342. <https://doi.org/https://doi.org/10.1016/j.red.2023.01.005>
 46. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/https://doi.org/10.1016/j.jsis.2019.01.003>
 47. Wade, M., & Shan, J. (2020). Covid-19 has accelerated digital transformation, but may have made it harder not easier. *MIS Quarterly Executive*, 19(3), 213–220. <https://doi.org/10.17705/2msqe.00034>
 48. Wang, B., Schlagwein, D., Cecez-Kecmanovic, D., & Cahalane, M. C. (2020). Beyond the factory paradigm: Digital nomadism and the digital future(s) of knowledge work post-COVID-19. *Journal of the Association for Information Systems*, 21(6), 1379–1401. <https://doi.org/10.17705/1jais.00641>
 49. Westerman, G. ;, Bonnet, D. ;, & McAfee, A. (2014). The Nine Elements of Digital Transformation. <https://sloanreview.mit.edu/article/the-nine-elements-of-digital-transformation/>