International Journal of Scientific Research and Management (IJSRM)
||Volume||13||Issue||08||Pages||9625-9633||2025||
Website: https://ijsrm.net ISSN (e): 2321-3418
DOI: 10.18535/ijsrm/v13i08.em13

Digital Transformation and The Labor Market: A Ibliometric Analysis Using The Scopus Database (2020–2025)

Dinh Thi Mung, Tang Anh Cuong
University of Labour and Social Affairs (Campus II), Ho Chi Minh City, Vietnam

University of Labour and Social Affairs

Abstract
In the context of digital transformation exerting an increasingly profound influence on the global economy and labor structure, identifying research trends in this field has become essential for informing policy and guiding strategic human resource planning. This study employs bibliometric analysis on 739 scholarly works published in the Scopus database between 2020 and 2025, aiming to elucidate the academic landscape surrounding the topic of digital transformation and the labor market. Utilizing analytical tools such as keyword co-occurrence networks, thematic cluster mapping, and conceptual structure analysis, the study reveals three dominant thematic axes: (1) the convergence of technology and skills; (2) the transformation of labor forms within the platform economy; and (3) the growing role of education and workforce development. These findings not only offer a comprehensive overview of the current scholarly discourse but also highlight potential research gaps for future exploration.

Keywords: Digital Transformation; Labor Market; Bibliometric Analysis; Digital Skills; Digital Economy; Artificial Intelligence.

1. Introduction

Amid the widespread diffusion of the Fourth Industrial Revolution, **digital transformation** has emerged as an inevitable trend, reshaping modes of production, governance, and interaction across all socio-economic sectors. The far-reaching impact of digital technologies extends beyond the automation of processes or the enhancement of operational efficiency; it is also redefining skill structures, labor behavior, and strategies for human resource development.

Simultaneously, the global labor market is undergoing rapid transformation: flexible work models, the rise of the **platform economy**, and the increasing prevalence of **non-traditional employment forms**—such as **gig work**—are becoming more common. In this context, understanding the interrelationship between digital transformation and labor market structures is a pressing concern, both academically and from a policy-making perspective.

Despite the growing number of studies on digital transformation and the labor market, there remains a lack of **systematic and comprehensive understanding** of the knowledge evolution in this area. Existing research often focuses on specific aspects—such as the impact of artificial intelligence on employment, skill demands in the digital era, or emerging training models—without

offering a scholarly synthesis that maps the broader intellectual landscape, highlights emerging thematic clusters, or identifies underexplored research gaps. This deficiency hinders the development of a comprehensive theoretical framework and limits the capacity to anticipate trends or formulate workforce policies suited to the digital age.

To address this gap, the present study employs **bibliometric analysis** using data extracted from the **Scopus database** covering the period 2020–2025, in order to clarify the structure, trends, and prominent thematic clusters related to the intersection of digital transformation and the labor market. By integrating various analytical tools—such as **keyword frequency analysis**, **co-occurrence networks**, **thematic mapping**, **thematic evolution**, and **conceptual structure mapping**—this research not only provides a descriptive overview of the current academic landscape but also offers **strategic insights** for future research directions.

This study contributes to the scholarly literature in three key ways: (1) It provides a **systematic and visually intuitive knowledge map** of a rapidly developing field; (2) It identifies the dominant research directions, emerging themes, and potential knowledge gaps; and (3) It lays the **theoretical groundwork** for constructing future **quantitative research models**.

The remainder of the article is structured as follows: Section 2 outlines the research methodology; Section 3 presents the bibliometric findings; Section 4 discusses the results in relation to practice; and Section 5 concludes with recommendations for future research.

2. Research Methodology

This study employs **bibliometric analysis** to explore the overarching academic landscape concerning the relationship between **digital transformation** and the **labor market**, based on data retrieved from the **Scopus** database. This method facilitates the identification of scholarly trends, thematic clusters, keyword impact, and conceptual interrelations across academic publications from 2020 to 2025.

The research process consists of three primary steps. First, the authors conducted a data query on Scopus by combining keywords such as *"digital transformation," "labor market," "employment,"* and *"future of work"*. The search was limited to the period from January 2020 to June 2025. Only **peer-reviewed** academic articles written in **English** were selected to ensure the reliability and international relevance of the dataset.

Second, the retrieved dataset was processed using **Bibliometrix**, an open-source R-package designed for comprehensive quantitative analysis of scientific literature. Visualizations were generated through **Biblioshiny** (version 2025), the graphical interface of Bibliometrix. These include: charts of frequently occurring keywords, keyword **co-occurrence networks**, **thematic maps**, **thematic evolution over time**, and **conceptual structure maps**.

Finally, the visual results were synthesized, interpreted, and contextualized in relation to both academic discourse and real-world developments. This process enabled the identification of dominant trends, emerging thematic areas, and potential directions for future inquiry.

The bibliometric method not only offers a macroscopic view of the scholarly terrain on digital transformation and labor but also provides a **scientific foundation** for developing theoretical

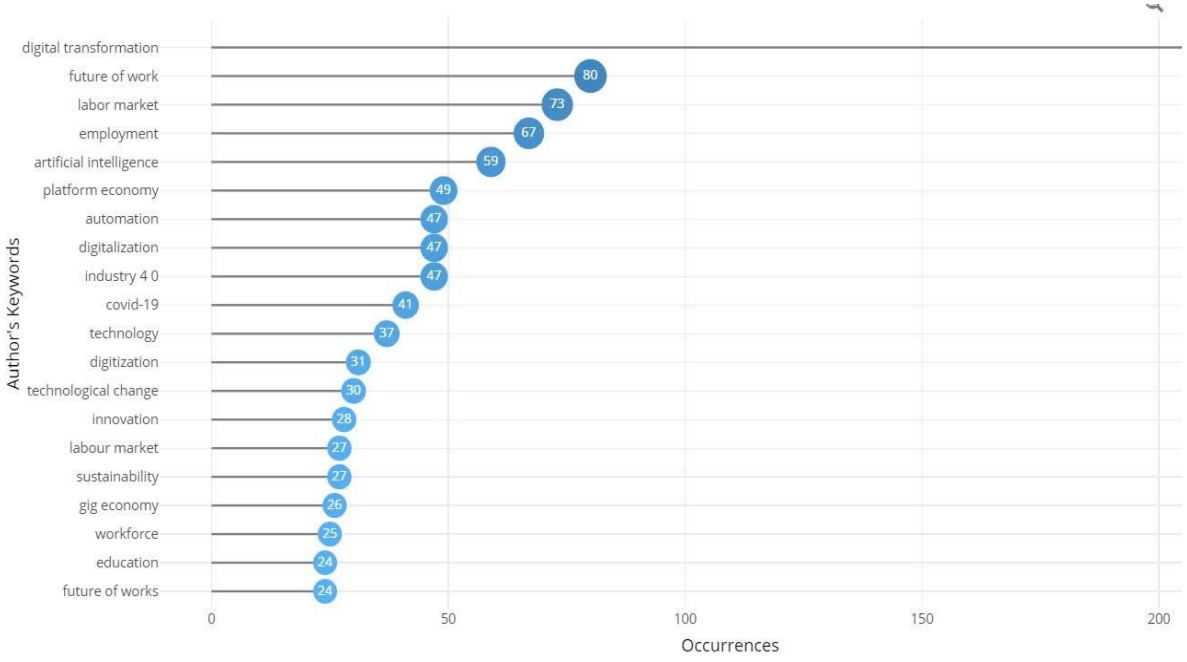
models, formulating hypotheses, and proposing evidence-based policy recommendations in subsequent research.

3. Results

3.1. Analysis of Frequently Used Keywords

The figure above illustrates the 20 most frequently used keywords by authors across 739 publications in the Scopus database related to the topic of digital transformation and the labor market during the period 2020–2025. The results indicate that *"digital transformation"* is the most frequently occurring keyword, appearing 80 times, underscoring its central role in current academic discourse on this subject.

Figure 1. Most Frequently Occurring Keywords Based on Authors' Keywords (2020–2025)



Source: Extracted from Scopus and processed using Bibliometrix software (2025)

Subsequent high-frequency keywords include *"future of work"* (73), *"labor market"* (67), and *"employment"* (59). These terms reflect a strong scholarly interest in the transformation of employment and labor market structures in the context of rapid technological advancement. Notably, the keywords *"artificial intelligence"* (59) and *"automation"* (47) also appear prominently, indicating a concentrated research focus on the impact of advanced technologies on jobs and the workforce.

In addition, terms such as *"platform economy," "industry 4.0," "digitalization,"* and *"technological change"* are frequently mentioned (with frequencies ranging from 30 to 49), reflecting the intersection of themes related to technology, innovation, and platform-based economic models. Context-specific terms like *"COVID-19"* (41) remain relevant, indicating the pandemic's prolonged impact on employment and digitalization trends.

The presence of keywords such as *"gig economy"* (26), *"education"* (24), and *"sustainability"* (27) suggests a deepening research agenda—ranging from flexible labor models to the role of education in adapting to digital transformation, as well as the integration of sustainability considerations into labor market policies.

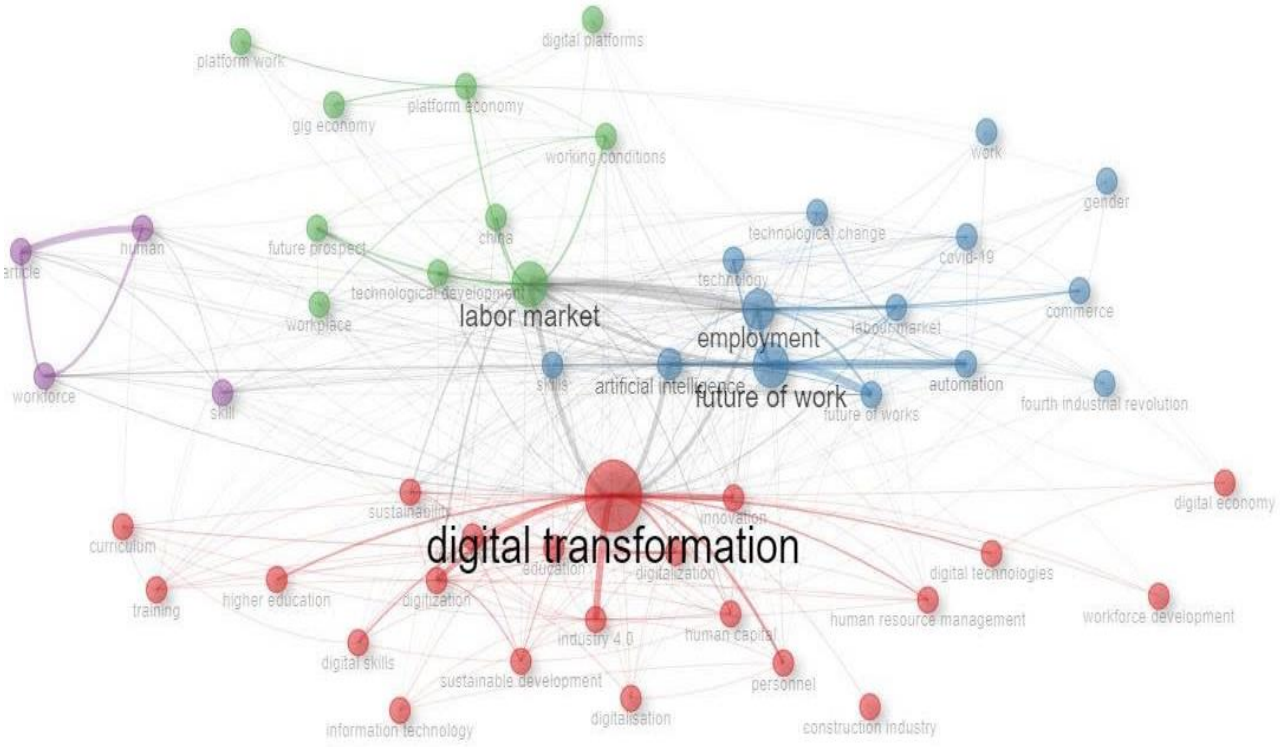
In summary, the keyword analysis reveals that international research is coalescing around three core axes: **digital transformation**, **labor market**, and **emerging technologies**, while gradually expanding into supporting themes such as **education**, **platform-based economies**, and **sustainable development**. This provides a robust foundation for the subsequent analysis of keyword co-occurrence networks and thematic maps in the following sections.

3.2. Keyword Co-occurrence Network

The scholarly landscape surrounding the relationship between digital transformation and the labor market is vividly illustrated through the keyword co-occurrence network. At the very center of the map lies a prominent red node—*"digital transformation"*—which functions as a hub radiating dozens of connections to other key concepts. Surrounding this central node are several vivid red satellites representing closely related themes such as *"digitization," "digital skills," "education," "industry 4.0,"* and *"information technology."*

This configuration underscores that digital transformation is not merely a technological trend; rather, it acts as a catalyst that is reshaping skill structures and redefining lifelong learning pathways. The dense connectivity within the network reflects the integrated and interdisciplinary nature of current research in this domain.

Figure 2. Keyword Co-occurrence Network in Research on Digital Transformation and the Labor Market



Source: Data processed from Scopus using Bibliometrix (2025)

Adjacent to the central cluster, a prominent **blue cluster** emerges, featuring keywords such as *"employment," "future of work," "automation,"* and *"artificial intelligence."* This cluster reflects a research stream concerned with the future of work under the influence of emerging technologies.

The interwoven connections among these nodes resemble neural pathways, illustrating the inseparable interactions between AI, automation, and transformations in labor structures.

On the opposite side, a **green cluster** centered around *"labor market"* and *"platform economy"* is also clearly visible. Keywords such as *"gig economy," "working conditions,"* and *"platform work"* appear frequently, highlighting the shift from traditional employment models toward more flexible, platform-based, and informal forms of work—an increasingly prominent trend in the digital age.

Further toward the left margin of the map, **smaller purple nodes**—such as *"human," "skill,"* and *"gender"*—play a distinct role, serving as a reminder to scholars not to overlook social, human, and gender dimensions within an increasingly technologized landscape. The multidimensional linkages across these keyword clusters—from education and innovation to sustainability—form a complex yet coherent network. This affirms that digital transformation is not an isolated phenomenon but rather a pervasive and interwoven process that penetrates every facet of the contemporary labor market.

3.3. Thematic Map

The thematic map can be envisioned as an academic stage, where each keyword plays a different role in the evolving narrative of digital transformation and the labor market. The most prominent area appears in the **upper-right quadrant**, where keywords such as *digital transformation*, *digitalization*, *innovation*, *industry 4.0*, and *higher education* converge. These are the **"leading actors"** of the discourse—characterized by both high centrality (horizontal axis: degree of relevance to other themes) and high density (vertical axis: level of internal development). This cluster represents the core thematic pillars currently commanding strong academic attention and providing strategic direction to the broader research field.

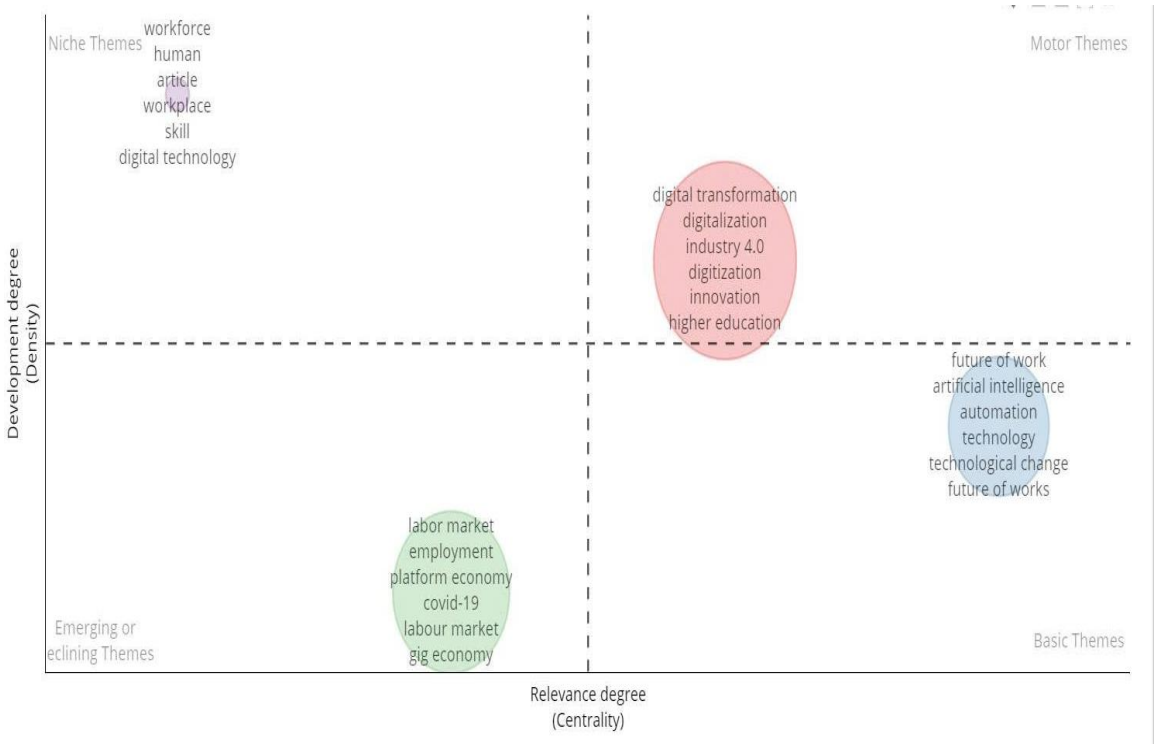
Shifting the focus to the **lower-right quadrant**, we find terms such as *future of work*, *artificial intelligence*, *automation*, *technological change*, and *technology*. This group demonstrates wide thematic reach but remains in the mid-range of developmental density. They may be viewed as **"underground currents"**—themes with strong potential to emerge as dominant streams, particularly as AI and technology continue to permeate all aspects of working life.

Conversely, the **lower-left quadrant** includes keywords like *labor market*, *employment*, *platform economy*, *gig economy*, and *COVID-19*. These reflect practical, often weighty issues that appear to be **struggling for renewed scholarly direction**. Their relatively low centrality and density suggest that while they remain relevant, they may be experiencing a decline in prominence or are being explored more in breadth than in depth.

Finally, the **upper-left quadrant** comprises themes such as *workforce*, *human*, *skill*, and *digital technology*. These can be seen as **"niche pathways"**—topics with good internal development but weak connectivity to the central discourse. They resemble **branch roads** yet to be integrated into the main academic thoroughfare.

To further illustrate how research themes surrounding digital transformation and the labor market are clustered and positioned, the following figure presents the **thematic map**, dividing topics into four categories—from foundational themes to those currently driving research trends.

Figure 3. Thematic Map



***Source**: Extracted and processed from Scopus using Bibliometrix (2025)*

3.4. Thematic Evolution Over Time

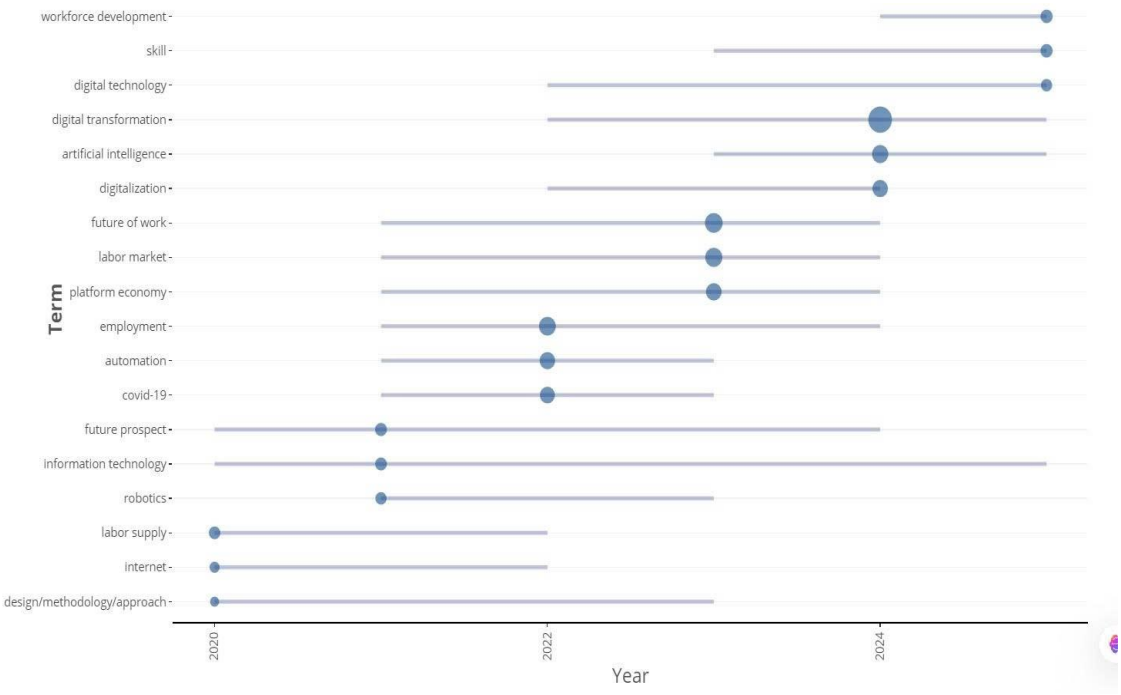
To better understand the shifting academic focus within the field of digital transformation and the labor market, the figure below illustrates the **evolution and diffusion of research themes** over time, from 2020 to 2025. Horizontal lines extending from left to right represent the **longevity** of each theme, while the **size of the circles** indicates the level of scholarly attention during each period.

Some topics—such as *design/methodology/approach*, *internet*, and *labor supply*—emerged early in the timeline but show signs of decline. These can be understood as **foundational themes**, providing initial conceptual grounding, though they no longer occupy a central role in contemporary scholarly debates.

In contrast, keywords such as *digital transformation*, *artificial intelligence*, *digitalization*, and *future of work* demonstrate **steady and significant growth**, reflecting a shift in research attention toward **technology-driven themes** that are actively reshaping the labor ecosystem.

Notably, during the **2023–2025 period**, concepts like *skill*, *digital technology*, and *workforce development* not only appear more frequently but also sustain consistent presence over time. This signals an increasing academic interest in preparing the human workforce to adapt to the challenges and opportunities of digitalization. These trends emphasize the critical intersection of **technology and human capital** in the formulation of labor policies and economic development strategies.

Figure 4. Thematic Evolution Over Time

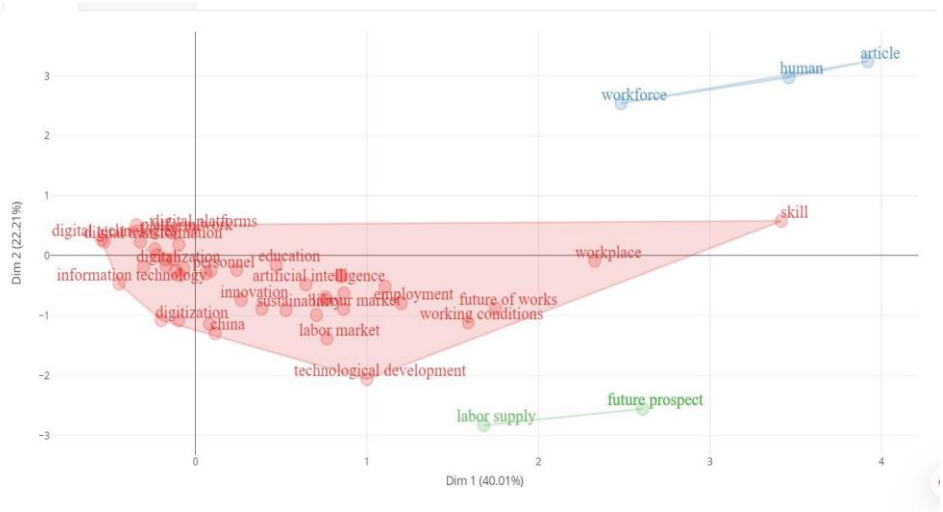


Source: Analysis of Scopus data using Bibliometrix (2025)

3.5. Conceptual Structure

Another approach to understanding how key concepts are organized within the research space is through the **conceptual structure map**. The results of the **Multiple Correspondence Analysis (MCA)** reveal three clearly defined clusters across a two-dimensional plane, representing groups of concepts that tend to co-occur and collectively contribute to shaping the intellectual structure of the field of **digital transformation and the labor market**.

Figure 5. Conceptual Structure Map Based on Authors' Keywords Using Multiple Correspondence Analysis (MCA).



***Source**: Analysis of Scopus data using Bibliometrix (2025)*

The **central red cluster** stands out clearly in both the number and density of conceptual keywords, bringing together core terms such as *digital transformation*, *digitization*, *information technology*, *technological development*, *artificial intelligence*, *innovation*, and *labor market*. This

group illustrates the tight linkage between technological innovation and human resource structures in the digital era. It also reflects the integration of technology with workforce and organizational management—suggesting that digital innovation is inseparable from the contexts of education, organizational dynamics, and labor markets.

In contrast, the **blue cluster**, located on the right side of the map, includes keywords such as *workforce*, *human*, and *article*. This group represents a **human-centered approach**, focusing on the individual and workforce dimensions of digital transformation. Its distance from the central cluster suggests a more independent perspective, less influenced by technological frameworks.

The **green cluster**, found in the lower right area, contains keywords like *labor supply* and *future prospect*. Although smaller in size, this cluster reflects emerging concerns related to labor forecasting and future workforce provision—indicating a **strategic, long-term development pathway** within the research domain.

4. Discussion

The bibliometric analysis provides a comprehensive picture of how the academic community has approached the relationship between **digital transformation** and the **labor market** from 2020 to 2025. Through keyword statistics, co-occurrence networks, thematic mapping, and conceptual structure analysis, three key content layers emerge:

First, *digital transformation* serves as a central and pervasive axis in the scholarly discourse. It is no longer perceived merely as a technological phenomenon but as a catalyst for deep structural changes in skills, employment, and organizational behavior. Keywords such as *digital transformation*, *digitization*, *industry 4.0*, and *artificial intelligence* consistently appear as highly connected nodes across multiple analyses. This confirms that the academic community views digital transformation not as an isolated trend, but as a **foundational force reshaping the entire labor ecosystem**.

Second, there is a pronounced shift in research toward a **skills–human–future orientation**. Keywords like *future of work*, *skill*, and *workforce development* have appeared with increasing frequency over time, reflecting growing interest in the human capital dimension of digital transformation. This trend suggests that research is moving beyond technical analyses toward developing **adaptive models, training frameworks, and policy recommendations** aimed at enhancing workforce resilience in a digital economy.

Third, several traditional topics—such as *employment* and *labor supply*—show signs of diminishing prominence or **decoupling** from central thematic clusters. This may indicate either a decline in academic interest or a need for **reconceptualization** within modern frameworks. Meanwhile, emerging themes such as *gig economy*, *platform work*, and *working conditions* signal the increasing **diversity and fluidity of labor models** in the digital age—departing from the conventional full-time, formal employment archetype.

In summary, the bibliometric findings reveal a **reconfigured knowledge structure**, transitioning from a purely technological lens to an integrated model encompassing **technology, human capital, and policy context**. This evolution opens new research opportunities and simultaneously poses urgent demands for education systems, skill development strategies, and flexible labor institutions to adapt to the accelerated pace of digitalization.

5. Conclusion

The bibliometric analysis of Scopus data (2020–2025) demonstrates that **digital transformation** is the central thematic axis, shaping most research trajectories related to technology, skills, and the labor market. Beyond commonly examined concepts such as *digital transformation* and *labor market*, the academic landscape also highlights the rapid emergence of themes like *artificial intelligence (AI)*, *platform economy*, and *workforce development*. At the same time, several traditional topics appear to be waning, pointing to a need for **theoretical restructuring** or reintegration into modern analytical frameworks.

From an academic perspective, this study offers a **systematic knowledge map** that helps identify core keyword groups, thematic intersections, and research gaps requiring further exploration. It serves as a **preliminary theoretical foundation** for the formulation of hypotheses and the development of more advanced analytical models in future studies.

Looking ahead, applying **quantitative methods** or conducting **in-depth case analyses** could help validate the bibliometric findings and enrich the theoretical understanding of the interrelationship between **digital transformation, digital competencies, and employment outcomes** within a rapidly evolving labor market.

References

1. Aroles, J., Mitev, N., & de Vaujany, F. X. (2019). Mapping themes in the study of new work practices. *New Technology, Work and Employment, 34*(3), 285–299. https://doi.org/10.1111/ntwe.12145
2. Brougham, D., & Haar, J. (2018). Smart technology, artificial intelligence, robotics, and algorithms (STARA): Employees' perceptions of our future workplace. *Journal of Management & Organization, 24*(2), 239–257. https://doi.org/10.1017/jmo.2017.62
3. Choudhury, P., Foroughi, C., & Larson, B. Z. (2021). Work-from-anywhere: The productivity effects of geographic flexibility. *Strategic Management Journal, 42*(4), 655–683. https://doi.org/10.1002/smj.3251
4. Ghislieri, C., Molino, M., & Cortese, C. G. (2018). Work and organizational psychology looks at the fourth industrial revolution: How to support workers and organizations? *Frontiers in Psychology, 9*, 2365. https://doi.org/10.3389/fpsyg.2018.02365
5. Kudyba, S. (2020). *Healthcare informatics: Improving efficiency and productivity*. CRC Press.
6. Reddy, P., Sharma, B., & Chaudhary, A. (2023). Digital transformation in employment: Challenges and opportunities for developing economies. *Technological Forecasting and Social Change, 190*, 122377. https://doi.org/10.1016/j.techfore.2023.122377
7. Schwab, K. (2016). *The fourth industrial revolution*. World Economic Forum.
8. Sostero, M., Milasi, S., Hurley, J., Fernandez-Macías, E., & Bisello, M. (2020). Teleworkability and the COVID-19 crisis: A new digital divide? *JRC Working Papers Series on Labour, Education and Technology, 2020/05*.
9. Spies, M. (2022). Digital skills and employability: A bibliometric analysis. *Education and Information Technologies, 27*, 9121–9142. https://doi.org/10.1007/s10639-022-11258-x
10. World Economic Forum. (2023). *The Future of Jobs Report 2023*. https://www.weforum.org