

## Mapping the Digitalization-Innovation Nexus in Strategic Emerging Industries: Insight from China

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**Abstract:** Every industry is being impacted by digital technologies, which are causing firms to reevaluate their operations, strategies for growth, and competition. Researchers call it "digitisation," and it happens when businesses start using digital tools in their everyday operations. This gives them an advantage in the global market and helps the economy thrive. Four research objectives of the study make the study distinguished among bibliometric analysis; to analyse trends in digitalisation-driven innovation across China's strategic emerging industries using bibliometric methods; to identify key research clusters and emerging themes in the digitalisation and innovation literature; to assess collaboration patterns among researchers, institutions, and industries in digitalisation-innovation studies; to examine the evolution of the roles digital technologies play in fostering innovation over time. The study used a systematic bibliometric review to trace the development of technological innovation in China's strategic development sectors, which have been driven by digitalisation. The study concluded that, across China's key developing sectors, digitalisation has evolved from a minor subject before 2019 to a central scholarly and policy concern after 2021. This is because the research domain is rapidly expanding and increasingly organised. Finally, the temporal history of key technology terminology reveals a major conceptual shift from viewing digital tools as generic ICT facilitators to recognising "digital" as a transformative force underpinning green development, industrial upgrading, and firm-level technological innovation.

**Keywords:** Technological Innovation; Strategic Emerging Industries; Digital Technologies; Digitalisation-Driven Innovation; Research Clusters; Collaboration Patterns; Green Development.

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## 1. Introduction

Digital technologies are transforming how organisations operate, compete, and grow across the global economy. The integration of digital technologies into routine business activities, commonly referred to as digitalisation, enables firms to enhance competitiveness and create new sources of economic value [14]. Beyond efficiency gains, digitalisation facilitates the development of entirely new products, services, and business models. The widespread adoption of digital technologies has been a major driver of rapid industrialisation and innovation-led growth, particularly in emerging economies such as China. China presents a distinctive and influential case in this context. As the world's second-largest economy and an increasingly prominent technological innovator, China has placed the development of strategic emerging industries (SEIs) at the centre of its national agenda. These industries, identified as key engines of future growth, include advanced manufacturing, biotechnology, new energy vehicles, and artificial intelligence. The overarching objective is to shift the economy from labour-intensive production to knowledge-based, innovation-driven development. This strategic orientation also reflects broader national priorities, including sustainable development, technological self-reliance, and greater participation in high-value segments of global markets. Since their formal introduction in the 12th Five-Year Plan (2011-2015), strategic emerging industries have remained a cornerstone of China's industrial policy. These sectors are characterised by rapid growth potential, significant spillover effects, and long-term strategic relevance to national development [19].

To accelerate their advancement, the government has implemented a wide range of policy instruments, including financial incentives, regulatory reforms, and substantial investments in 5G technology, quantum computing, and renewable energy, which have earned the country substantial global recognition. Technological advancement is fundamental to the development of these strategic sectors. Innovation, characterised by the generation and application of new ideas, is essential for sustaining competitiveness and fostering industrial transformation. It supports the creation of new markets, enhances production efficiency, and drives continuous product development [4]. Moreover, innovation in these domains generates broader societal benefits, including improvements in healthcare, environmental sustainability, and overall quality of life. Consequently, innovation within strategic emerging industries is not only economically advantageous but also central to addressing long-term national development challenges. The convergence of digitalisation and technological advancement across key sectors is increasingly shaping the trajectory of future innovation. Technologies such as the Internet of Things (IoT), big data analytics, and artificial intelligence not only enhance operational capabilities but also serve as catalysts for innovative activity [11]. They enable data-driven decision-making, accelerate prototyping processes, and improve the efficiency of research and development. For China's strategic emerging industries, digitalisation has the potential to shorten innovation cycles, enhance service delivery, and promote the emergence of digitally integrated organisational structures.

Despite China's rapid technological transformation, the international scholarly understanding of the relationship between digitalisation and innovation within these sectors remains limited. While existing research on China's innovation ecosystem and strategic industrial development provides valuable insights, the broader dynamics linking digital transformation and technological innovation remain underexplored [8]. Given the strategic importance of these industries and the pace of technological change, addressing this knowledge gap is both timely and necessary. Examining how digitalisation shapes technological progress in China's strategic emerging industries presents both significant opportunities and analytical challenges. The growing volume and complexity of data make it difficult for researchers, practitioners, and policy makers to develop a coherent understanding of evolving trends and future possibilities. The inherently interdisciplinary nature of this field, spanning management, computer science, engineering, and economics, further complicates efforts to synthesise relevant knowledge [2]. Moreover, the rapid pace of technological advancement requires continuous engagement with emerging research to support evidence-based decision-making. In this context, bibliometric analysis has emerged as a valuable methodological approach. Unlike conventional narrative reviews, bibliometric techniques employ quantitative methods to map the structure and evolution of research fields. They enable the identification of influential contributors, institutional networks, thematic developments, and emerging research trends.

By providing a systematic overview of scholarly activity, bibliometric analysis supports informed policy formulation, strategic investment decisions, and the identification of promising research directions. It also helps scholars recognise underexplored areas and conceptual gaps within the existing literature. Although a substantial body of research has examined aspects of digitalisation and innovation in China, the literature remains fragmented. Many studies focus on individual industries, specific technologies, or policy initiatives, limiting the ability to develop an integrated understanding of the broader digitalisation-innovation nexus. Empirically grounded, data-driven analyses that capture the systematic interaction between digital transformation and innovation across strategic sectors remain limited. Furthermore, the rapid evolution of digital technologies means that existing findings can quickly become outdated. China's ambition to become a global leader in innovation underscores the importance of understanding how digitalisation drives technological advancement in its most strategically significant industries. This study addresses the existing knowledge gap by conducting a comprehensive bibliometric analysis to map the structure, development, and emerging trajectories of research on the digitalisation-innovation nexus in China's strategic emerging industries. The findings aim to provide valuable insights for scholars, industry practitioners, and

policymakers, contributing to a deeper understanding of the dynamics shaping China's economic transformation and its position in the global digital landscape.

### 1.1. Research Questions

- To analyse trends in digitalisation-driven innovation across China's strategic emerging industries using bibliometric methods.
- To explore the literature on digitalisation and innovation for emerging clusters of research and new subjects.
- To evaluate how digitalisation-innovation studies include researchers, institutions, and industries working together.
- To trace the historical development of the function of digital technology in encouraging innovation.

## 2. Review of Related Literature

### 2.1. Digitalisation in China

In recent decades, China has achieved outstanding economic success, and a large part of that achievement may be attributed to the country's unparalleled rate of digital change. All sorts of things have changed because of the digital revolution, including entire industries, customer behaviour, and even government processes. When the government instituted policies to encourage the use of ICTs in the late 1990s and early 2000s, the ball started rolling. According to De Seta [5], the following steps were taken after the initial ones. According to De Seta [5], the concept of the "digital economy" became a top priority for the Chinese government during the 2016 G20 Hangzhou Summit, which highlighted digital growth at both the global and domestic levels. Over time, digitalisation gained considerable traction. The COVID-19 pandemic has further increased the country's dependence on digital tools for crisis management and daily living. During that period, digital technology was the main force behind high-quality economic growth; it was also useful. By 2020, China's technological sector had grown to 39.2 trillion yuan in worth, or 38.6% of GDP.

Digitalisation aided disease management at a critical juncture and kept the economy afloat; therefore, that Figure was crucial. The influence of policy has been significant throughout. Blending online and offline sectors was the goal of 2015's "Internet Plus" plan. Next, in 2017, the "Digital China" initiative was introduced, outlining a comprehensive strategy for expanding China's digital economy [5]. More digital innovation was spurred by the 2019 introduction of the Science and Technology Journal Excellence Action Plan, which helped improve China's research reputation globally through the China Association for Science and Technology (CAST). Obviously, there will be some problems along the way to digital transformation. It has brought certain challenges but also some fantastic opportunities, especially for long-term growth. To support this claim, studies show that Chinese A-share companies that switch to digital operations experience significant improvements in their ESG performance. Industries that contribute to pollution and inefficient markets are worst hit by this [17]. A more sensible approach to raising the bar for business innovation is digital transformation. Research on agricultural businesses from 2012 to 2020 confirms that digital technology really boosts their innovative capacity. This is particularly true in cases where strict environmental regulations are put in place to regulate the industry.

Despite its progress, China's digital economy continues to face several challenges. Compared to other major countries, China's economy is somewhere in the centre when it comes to the percentage of its total value that is digital. Nevertheless, the overall size is enormous. Consider the year 2020: Digital economies accounted for over 65% of GDP in the United States, Germany, and the United Kingdom, but just 38.6% in China. The future of digital technology's role in people's financial lives is bright. The "digital divide" is a major issue within the nation. Significant growth is concentrated in a few strategic locations, mostly in the eastern part of the country. The West's position is deteriorating, and the disparity is becoming wider. The 'Matthew effect' is now apparent as top industries advance with resources and expertise. Disparities in resource allocation contribute to the widespread problem of poor Internet connectivity. As Tong and Tang [3] and De Seta [5] noted, there remains a disconnect between digital technology and more conventional business strategies. China must move quickly to preserve its technological lead and economic growth amid these threats and opportunities.

### 2.2. Strategic Emerging Industries in China

Strategic emerging industries are crucial to China's economic strategy. These aren't your run-of-the-mill businesses; they're crucial to the nation's success and its ability to compete globally. Typically, SEIs include biotechnology, alternative energy, innovative materials, high-end equipment production, eco-friendly practices, and state-of-the-art information technology. Government officials claim that this sector is spearheading the shift from low-skill, low-value manufacturing to a high-value, innovation-driven economy. The Chinese government has implemented a range of programs to support SEIs. Instead of doing nothing while these sectors grow, the government is lowering taxes, funding research and development, and establishing special economic zones to encourage them. They think these are vital sectors and want to see local companies encouraged to invest

and innovate further. Combining SEIs with more traditional sectors is also part of the plan to make the economy more competitive and enhance the overall industrial environment. Financial backing for SEIs is not the only factor.

To facilitate the growth of these sectors, the government is laying the framework for their legal and regulatory requirements. Industry standards are being established to encourage innovation within the country, and they are also working to strengthen safeguards for intellectual property and expedite the approval process for new goods and technologies. An excellent example is the "Made in China 2025" program, which, after its inception in 2015, established ambitious goals for the share of the Chinese market that Chinese enterprises should achieve in important strategic economic industries (SEIs) and detailed a plan to achieve them. Although it has caused some diplomatic backlash, China's determination to become the world leader in high-tech is evident. Currently, SEIs in China are achieving significant advancements. Industries such as electric cars, renewable energy, and artificial intelligence are seeing rapid development and are beginning to compete with established brands in the developed world. The expanding innovation culture, the massive local market, and the reliable government support in China bode well for SEIs in the future. However, there are some complex concerns. China faces intense worldwide competition, technical hurdles, and the delicate balancing act between state intervention and market forces. It is critical to China's economic future and its position in the global innovation race that SEIs be advanced.

### **2.3. Technological Innovation in Strategic Emerging Industries**

Technological innovation is crucial to the growth of strategic emerging industries (SEIs). This factor propels their company's development and competitiveness. Researchers argue that SMEs in China must innovate to survive in the dynamic global market and keep up with the competition. Introducing new items and services is just one aspect of innovation in these businesses. Innovation, process improvement, and making a splash are the prevailing themes. Several factors, including economic development, national security, and the necessity to maintain technical independence, make SEI innovation a priority for China. This is especially true given the rising global competition. Several variables influence how innovation occurs in SEIs. The most important things are to study and create. Both governmental and commercial funding mechanisms have played significant roles in the growth of China's SEIs. Many locations are now well-suited for innovative research and development because of the concentration of national laboratories, research institutes, and innovation clusters. Natural talents can play a significant role. China has implemented education reforms, forged partnerships with international organisations, and launched programs to attract brilliant minds to build a skilled labour force.

Policy and the regulatory environment are also given significant weight. Innovation is fostered in China through subsidies, tax incentives, and marketplaces for innovative ideas. The statewide 'new quality productive forces' strategy and 'AI Plus' are part of this. Businesses are now more motivated to actively seek new ideas as they work to protect intellectual property and set industry standards. Large state-owned telecommunications organisations, for example, have integrated such cooperation into their objectives, and the government frequently brings together academic institutions, firms, and research institutes to accelerate the transition from lab to customer. The digitalisation of SEIs and innovation are interdependent, influenced by several variables. The creative process is not only made easier but also faster with the help of digital technology. According to Nambisan et al. [11], firms may improve production, accelerate product development, and better meet customer needs by leveraging technologies such as cloud computing, artificial intelligence, and big data. In China alone, 515 million people use generative AI, demonstrating the rapid pace of digital transformation.

New opportunities for SEIs are emerging because of the digital revolution, which is also fueling the search for ever more innovative solutions. There is a direct correlation between societal progress and technological advancement in the digital sphere. Consider modern energy cars: the emergence of connected, smart, and self-driving vehicles is directly attributable to the proliferation of digital technology. A digital revolution is sweeping the biotech industry, changing how drugs are developed and treatments are personalised. The luxury goods sector is spearheading smart manufacturing and automation thanks to the Internet of Things and 5G. The continuous cycle of digitisation and innovation not only benefits whole industries but also generates fresh ideas for the entire economy. China must cultivate an incredibly vibrant innovation ecosystem if it is to rank among the world's top SEIs. Research and development spending must be included among the various reasons. It should remain a national priority to foster an environment that is friendly to open innovation, support entrepreneurial endeavours, and protect intellectual property. This problem has grown in both scale and velocity due to the widespread availability of innovative digital technology and business models.

## **3. Research Methodology**

This comprehensive bibliometric study follows Alaassar et al. [1] in tracking the digitalisation-driven technical progress in China's strategic growth areas. The purpose is to provide a synthesis of the results. To discover patterns in publications, key figures and organisations, topical frameworks, and new ideas in the subject, the methodology integrates scientific mapping with performance analysis.

### 3.1. Data Source and Search Strategy

This work followed Alaassar et al. [1] by using a single, complete bibliographic database for consistency and replicability. The Dimensions database was used, as it covers peer-reviewed publications, conference papers, and policy-oriented research on digitalisation and innovation. The researchers used title-abstract-keyword fields to create a systematic search query:

- ('Digitalisation' or 'Digitalisation' or 'Digital Transformation') and ('Technological Innovation' or 'Technology Innovation') and ('Strategic Emerging Industries' or 'Emerging Industries') and ('China').

From 2016 to 2025, the search revealed the significantly growing sectors in China and their expanding digital transformation. Alaassar et al. [1] suggested removing all non-peer-reviewed document types and retaining only scholarly journal articles. After removing irrelevant and duplicate entries, the dataset contained 2501 records.

### 3.2. Data Cleaning and Standardisation

Alaassar et al. [1] provided recommendations for author names, institutional affiliations, and keyword fields, while discrepancies were corrected through manual examination. For example, "PR China," "China," and "Mainland China" were all corrected. To achieve better results from co-word analysis, researchers merged the keywords of related themes (such as "digitalisation" and "technological innovation").

### 3.3. Bibliometric Performance Analysis

The cleaned dataset was imported into MS Excel and VOSviewer to perform descriptive performance analysis and data visualisation, respectively. Indicators generated included:

- Annual scientific production
- Most influential journals
- Most productive authors
- Most relevant institutions
- Citation structure and local/global citation impacts

This phase provided an overview of research growth and key contributors within the domain.

### 3.4. Science Mapping and Network Analysis

The current study uses science-mapping with VOSviewer software to reveal insights into intellectual and thematic structures, consistent with the methodological framework of Alaassar et al. [1]. Three network types were generated:

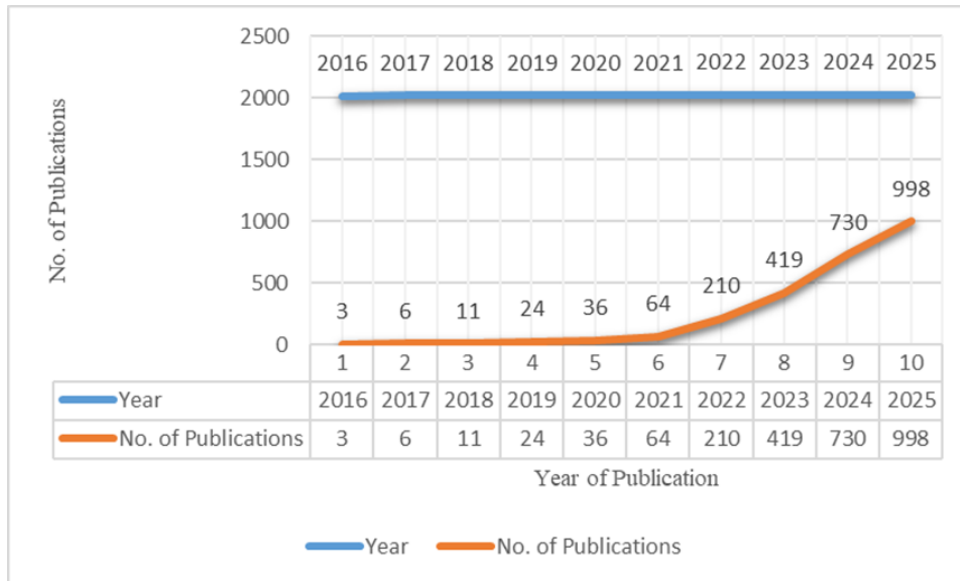
- **Co-authorship Networks (Authors and Institutions):** To assess collaboration patterns.
- **Co-citation Networks:** To identify foundational theories and influential knowledge bases.
- **Keyword Co-occurrence Networks:** To map thematic clusters and emerging research fronts.

In VOSviewer, a clustering algorithm was applied to visualise thematic communities related to digitalisation, innovation, low-carbon development, industrial upgrading, and enterprise competitiveness.

## 4. Data Analysis

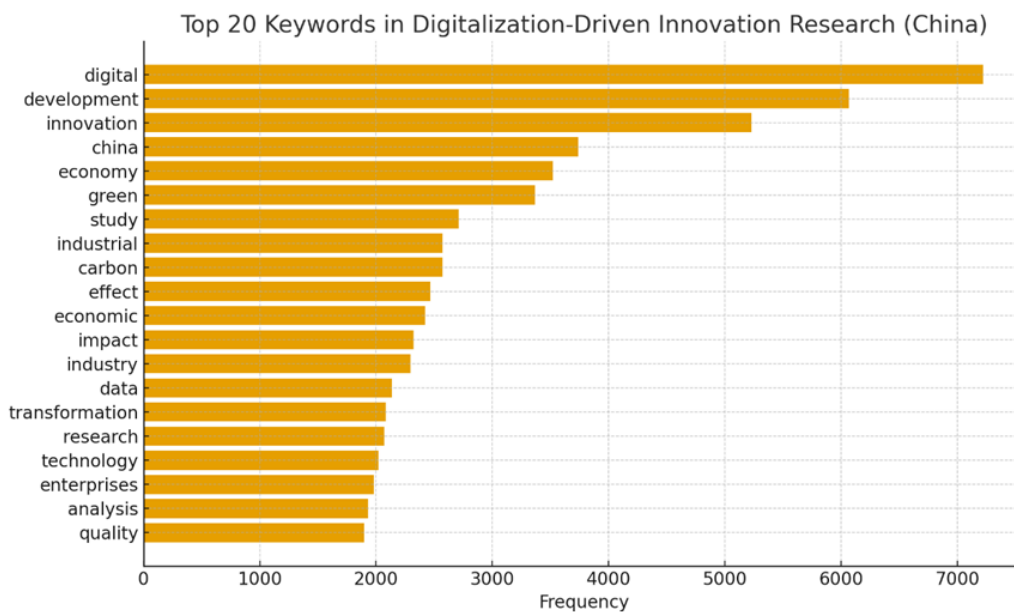
Data analysis of the dataset is as follows: Figure 1 illustrates a clear and compelling temporal progression in studies on digitalisation-driven innovation in China's key developing sectors. Between 2016 and 2025, academic output increased as China's innovation ecosystem evolved. Between 2016 and 2019, publishing activity remained low, with only a minor increase. Digital technologies were primarily used as supplementary tools, and digitalisation and industrial upgrading were not yet major academic or policy topics. The curve slope rises significantly in 2020-2021. Chinese national policies, including the digital China initiative, the growth of 5G infrastructure, and smart manufacturing under the 14th Five-Year Plan, coincide with this key juncture. The COVID-19 pandemic accelerated digital adoption across businesses, prompting researchers to investigate how digital technology can enhance resilience, efficiency, and innovation. Academic engagement increased, indicating a shift from exploratory to systematic research on digitalisation in technological innovation. From 2022 forward, the number of publications spikes to over 1,000 by 2025. Digitalisation is driving innovation across sophisticated manufacturing, new energy vehicles, biotechnology, and information technology, as evidenced by its rapid growth. To assist China's industrial transition,

sustainable growth, and global competitiveness, academic research flourished. Figure 1 illustrates the rapid digitalisation of academic interest and highlights its importance in China’s innovation landscape.



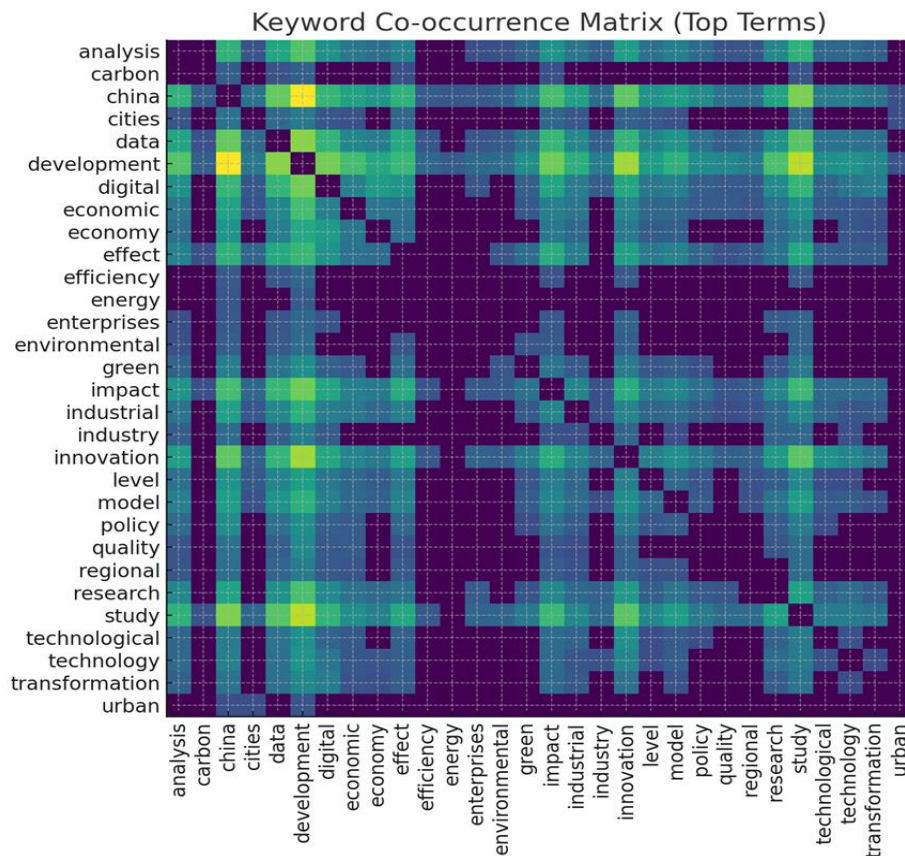
**Figure 1: Year-wise frequency of publication (Temporal Trends)**

Figure 2 shows that Chinese digitalisation-driven innovation research is organised into multiple strongly related topic clusters rather than a single concentration. Digital development, innovation, China, and economy are frequent phrases in a cluster on the digital economy's ascent and significance in national development. Scholars view digitalisation as a fundamental driver of economic restructuring, productivity growth, and competitiveness in crucial new industries, not merely a technological transition. The frequency of the terms “enterprises,” “technology,” “data,” and “efficiency” suggests a strong interest in how organisations use digital technologies, big data, and digital transformation to improve operational performance and innovation. Additionally, green, carbon, environmental, and industrial keywords indicate a second important cluster that relates digitisation to green and low-carbon development. In line with China's dual aims of high-quality growth and ecological civilisation, critical growth sectors are exploring digital technologies to reduce carbon emissions, improve environmental efficiency, and upgrade industries. Industry, transformation, and effect link these clusters, suggesting that the study analyses how digital tools change industrial structures and environmental performance.



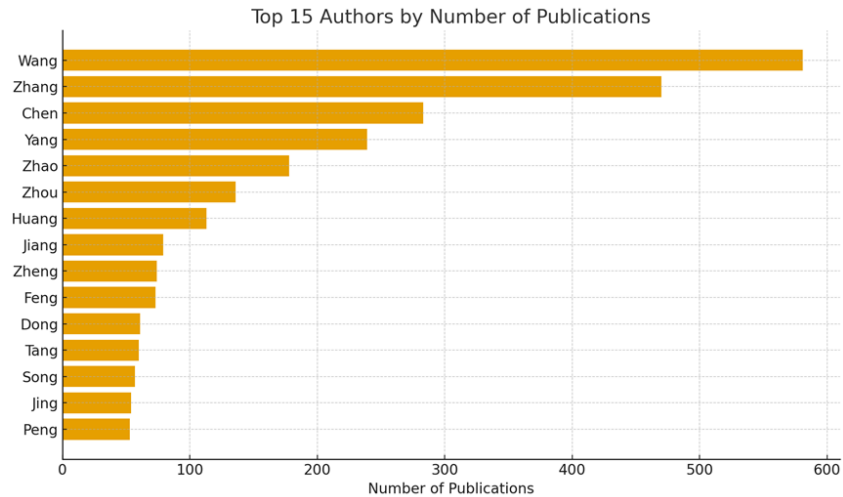
**Figure 2: Keywords in digitalisation-driven innovation research in China**

The mapping shows growing consensus that digitalisation drives technical innovation, corporate performance, green transformation, and systemic industrial upgrading across China's key industries. The keyword co-occurrence matrix in Figure 3 organises research on digitalisation and technological innovation across China's strategic growth sectors. The literature is focused on digital transformation and national development objectives, as shown by the bright, high-frequency co-occurrence cells: China–development, digital development, development innovation, and data–development. It is widely agreed that digitalisation drives economic upgrading, productivity growth, and innovation across China's key industries. The frequent combination of economy and development underlines this macro-level focus and shows how researchers relate digital technology to structural developments in the national economy. The matrix also shows considerable co-occurrences around green–carbon and related environmental phrases. This indicates a new theme cluster on low-carbon innovation, environmental efficiency, and the role of digital technologies in China's green transformation. Environmental, energy, and efficiency keywords indicate increased scholarly interest in how data analytics, smart systems, and digital monitoring technologies reduce emissions and control the environment. Industrial, industry, transformation, technology, and data indicate an industrial upgrading cluster.



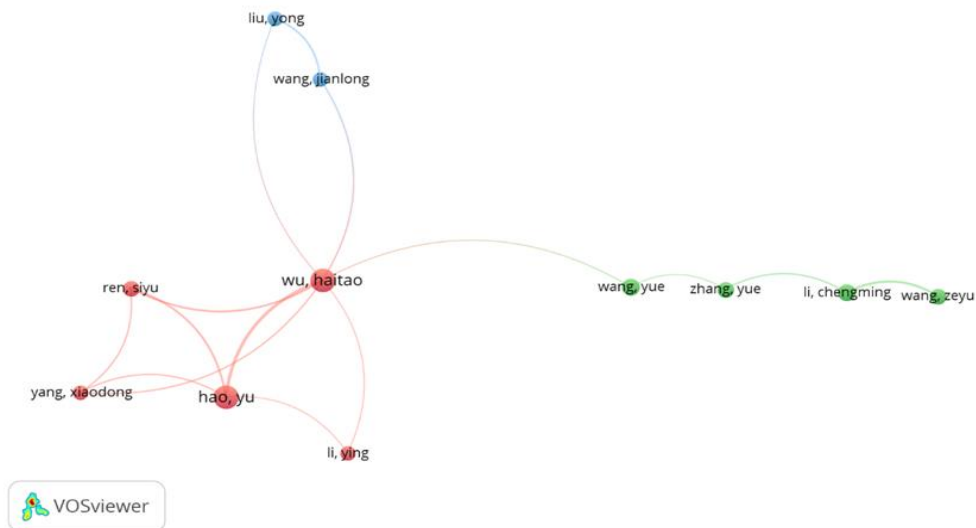
**Figure 3:** Keyword co-occurrence matrix

This is based on studies on how digital technologies are revolutionising manufacturing, enabling smart production and accelerating industry transformation—finally, enterprises, analysis, quality, and technical show a firm-level cluster. Digital adoption improves a company's creativity, operational performance, and competitiveness, according to research. The co-occurrence matrix reveals four interconnected themes—digital economy and development, green digital innovation, industrial transformation, and enterprise-level innovation performance—that help explain the role of digitalisation in China's strategic emerging industries. Figure 4 illustrates that a small number of active researchers hold a dominant position in the study area. Despite problems with name aggregation, Wang, Zhang, Chen, Yang, Zhao, Zhou, Huang, Jiang, and Zheng are frequently mentioned, indicating that these academics are the driving force behind digitalisation and innovation in China's leading rising sectors. Given their frequent appearances, it can be inferred that they pursue long-term research objectives in digital transformation, technological upgrading, and innovation systems, and that they participate in research teams and publish numerous papers. In a typical co-authorship map created by VOSviewer, these authors are central nodes with many connections, indicating extensive collaboration networks. Because of their widespread recognition, they have the potential to shape the discipline's conceptual frameworks, thematic priorities, and methodological orientations. Another thing these shared last names mean is that there is much academic cooperation in China.



**Figure 4:** Top authors and their publications

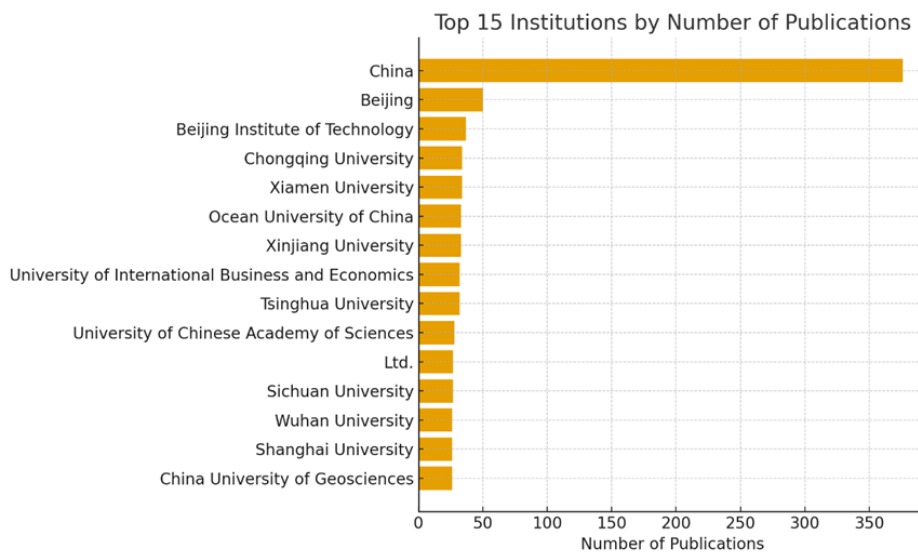
This kind of partnership is characterised by large research groups that do much of the work; these organisations may be affiliated with prominent institutions or government laboratories. There is also the possibility that this pattern reflects a culture of collaboration within the scientific community. Many of the most prolific writers are likely to have connections to institutions that promote multidisciplinary approaches. These institutions frequently serve as hubs for integrating various fields, including environmental governance, digital technology, management science, industrial engineering, and economics. They have been involved in innovation-driven development initiatives, national digital economy strategies, cooperative research, and cross-institutional collaborations through their participation in multi-author papers. The distribution of top authors reveals that, while the field is broad and multidisciplinary, a concentrated group of productive scholars shapes its intellectual momentum and influences digitalization–innovation research in China. Their centrality boosts knowledge generation and the coherence and maturity of this burgeoning research subject. The network visualisation of authors’ co-authorship is also described in Figure 5.



**Figure 5:** Network visualisation of authors in technological innovations in emerging industries

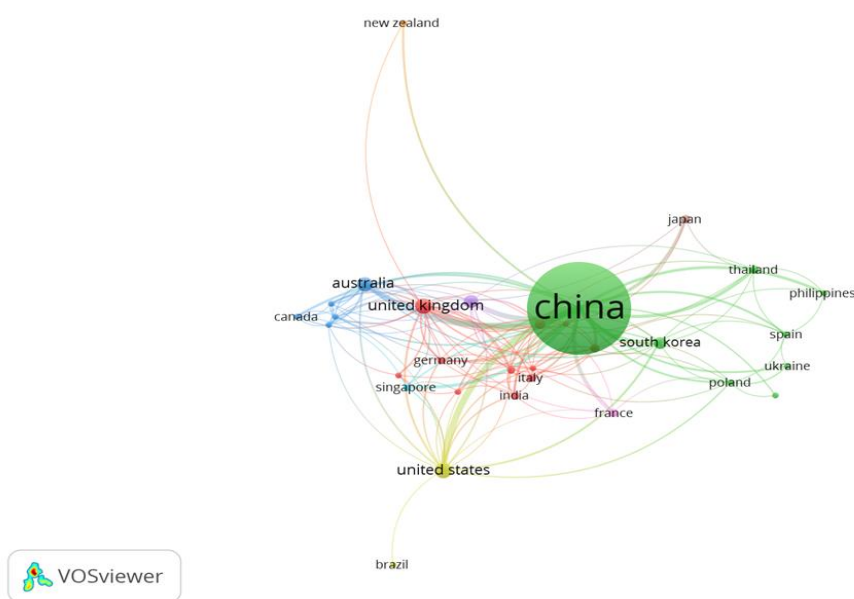
In Figure 6, researchers can see how many institutions in China's rapidly developing industries are studying the relationship between digitisation and technical innovation. Geographical dispersion and diversity characterise this study environment. In addition to Xinjiang University, Shanghai University, Tsinghua University, Ocean University of China, Wuhan University, Chongqing University, and Xiamen University, several other notable universities are represented. Universities in the region, as well as well-known national institutions, are making contributions. This dispersed network of institutions indicates nationwide

participation in digital innovation research, rather than a focus on any one field of study. A variety of regional development agendas and speciality research topics likely influence this network. As evidence of the field's strong foundation in engineering and industrial technology, schools focused on technology, such as Tsinghua and the Beijing Institute of Technology, are also present. Common areas of specialisation for these kinds of organisations include, but are not limited to, digital industrial systems, smart manufacturing, digital infrastructure, and technology upgrading. Research on digital economy development, innovation efficiency, and regulatory frameworks that support digital transformation is underway at several Chinese universities, including Xiamen University and the University of the Chinese Academy of Sciences. These universities are among those that have excellent economics, management, and policy programs. These clusters break down into several regions, representing different areas of progress in China, if the VOSviewer institutional co-authorship map were to be shown. Digital trade, the digitalisation of the maritime industry, and innovation-driven industrial upgrading are common threads among coastal colleges in China, such as Xiamen, Shanghai, and the Ocean University of China.



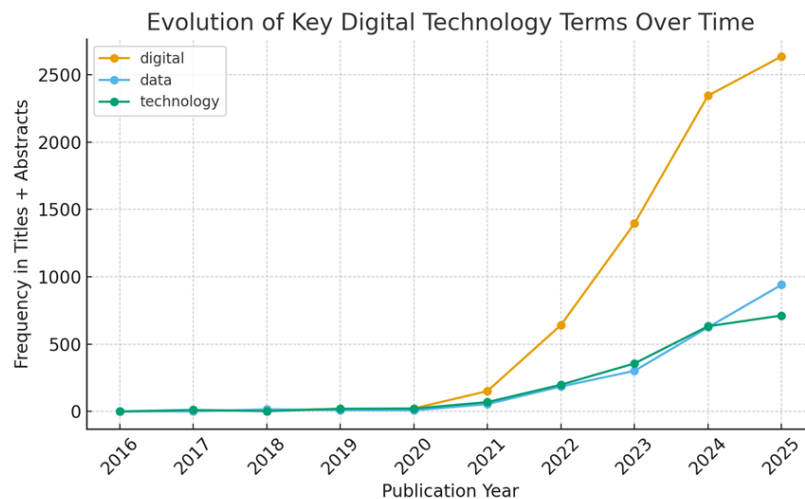
**Figure 6:** Top institutions and their publications

Thematic connections on industrial restructuring, digital infrastructure deployment, and regional innovation ecosystems would bring together central and western institutions (such as Xinjiang University and Chongqing University). Additionally, there is significant inter-institutional cooperation, driven by strong connections between prominent universities and national academies.



**Figure 7:** Network visualisation of countries in technological innovations in emerging industries

Collaborative efforts by interdisciplinary research teams can tackle national goals, such as expanding the digital economy, promoting environmentally responsible innovation, and creating emerging sectors. All things considered, digitalisation-innovation studies in China are advancing through a well-developed, cooperative, and geographically linked research ecosystem. Network visualisation of countries is depicted in Figure 7. Research on technical innovation in developing sectors is conducted by scholars from around the world, as shown in Figure 7, which represents a network of these scholars. Given China's prominent position and extensive collaborative linkages in this study sector, it is not surprising that it appears as the most dominant and centrally positioned node. China's neighbours, the US, UK, Germany, Australia, and South Korea, have strong co-authorship links that might increase international research. The clustering pattern shows Asian and Western nations working on innovation policies, digitalisation, and industrial upgrading. International academic relationships, as measured by network density, affect technological innovation in crucial emerging sectors more than national initiatives alone, according to a study. This strengthens China's position in global innovation research.



**Figure 8:** Evolution of key digital technology terms over time

Figure 8 shows how significant digital technology buzzwords and China's digitalisation research have evolved alongside technological and government goals. Before 2020, when "data" and "technology" predominated, digital tools were likely seen as supplements to innovation talks. Current research has concentrated on broad technical skills rather than digital transformation techniques and has only indirectly integrated digital or data-related features. Around 2020–2021, "digital" began to rise and exceeded "data" and "technology" by a big margin. Digitisation processes are taking precedence over technology. China's national goal to enhance the digital economy, infrastructure, and governance coincides with this increase. Current research focuses on data-driven public administration, digital trade mechanisms, smart services, and digital platforms, demonstrating the emergence of digitalisation as an industrial and strategic aim. Digitalisation becomes increasingly prevalent in the mature phase, which begins in 2022, making it central to innovation discussions. Digital technology is increasingly recognised for its revolutionary potential in new realms beyond mere tools. The growth of "green transformation," "low-carbon development," "smart industrial upgrading," and "enhanced enterprise competitiveness" with digital buzzwords is multidimensional. Big data analytics, AI-driven decision-making, and digital intelligence systems are rising as data volumes rise. Temporal patterns show a shift from broad technology talks to a comprehensive, digitally based innovation paradigm that defines China's main new sectors.

## 5. Findings

### 5.1. Trends in Digitalisation-Driven Innovation Across China's Strategic Emerging Industries

Research on digitalisation-driven innovation in China's key developing sectors has been steadily increasing over the last decade, according to a bibliometric trend study. Between 2016 and 2019, publications were very rare, suggesting that research on digitalisation and innovation was still in its early stages. There was a lack of a unified focus on "digital transformation" as an innovation strategy in early literature, which instead tended to address more basic ideas connected to IT, economic development, and industrial restructuring [6]. However, starting in 2020, there was a significant increase in publications. Qian [20] notes that this aligns with China's "Digital China" plan, which has accelerated the deployment of technology and spurred academic interest, as well as the country's overall drive toward the digital economy and new infrastructure investment. Publications continue to increase at an exponential rate through 2025, according to the statistics. This time frame aligns with China's goals

of intelligent manufacturing, high-quality development, and the integration of digital architecture into industrial systems [12]. The exponential growth shows that innovation driven by digitisation is now a hot topic in academia, policy, and business. Over time, there has been a shift from more exploratory, foundational work to more established, policy-driven, and industry-aligned studies. According to bibliometric data, academic works in China represent the country's digital transformation strategy, and digital innovation is a key component in boosting crucial emerging sectors.

## 5.2. Key Research Clusters and Emerging Themes in Digitalisation and Innovation Literature

The intellectual landscape of digitalisation-driven innovation in China is shaped by four significant research clusters, as revealed by co-occurrence and keyword-frequency analyses. In network visualisation, these clusters mimic the results produced by VOSviewer's clustering algorithm, which represents theme coherence. Two of the most important aspects of the first and largest cluster are the digital economy and the creation of high-quality products. There is significant academic research on how digitalisation enhances economic growth, productivity, and structural upgrading. This is implied by the frequent use of the phrases 'digital', 'development', 'innovation, and 'economy' in the same context. Zuo and Lin [19] noted that the trend supports theoretical theories linking digitalisation to productivity and industrial resilience. In a second huge cluster, digital technology-based green innovation is shown.

Energy, carbon, green, and environmental are common academic concepts. Smart systems, digital platforms, and big data enhance resource consumption, production, and emissions, according to Huang et al. [18]. This suggests seeing digitisation as a tool for sustainable development rather than merely a driver of technical advancement. Improvements and changes in the industrial sector are the focus of the third grouping. Industrial, technology, transformation, and industry are common terms that support the growing body of research on how digital tools, particularly AI, II, and automation, affect manufacturing and industrial supply chains. This research matches China's advanced manufacturing and high-end equipment strategic goals [10]. Organisational ability to innovate is the subject of the fourth cluster. Business, efficiency, competence, and competitiveness are among the terms that show how much people are still interested in the finer points of digitalisation's effects. Researchers look at how digital tools help businesses innovate, make better decisions, and gain a competitive edge [2]. Overall, these groupings show that digitisation improves economic performance, sustainability, industrial upgrading, and corporate performance.

## 5.3. Collaboration Patterns among Researchers and Institutions

Collaboration is complex and dispersed, according to the authors' and institutional pattern analyses. The research network is centred around highly prolific writers, who are generally from top Chinese universities. The pattern makes it clear that there is a community of scholars who collaborate closely across institutions, despite the dataset containing aggregated surnames, which are certain to result in some degree of overlap. There is a clear cluster of Chinese universities, including Xiamen University, Ocean University of China, Chongqing University, and Beijing Institute of Technology. The reputations of these educational institutions for distinction in subjects such as innovation studies, industrial engineering, and the digital economy have been established over a long period. The engagement of research bodies such as the Chinese Academy of Social Sciences is another piece of evidence of the multidisciplinary nature of the area, which brings together viewpoints from technology, economics, and policy [7]. Research on digital innovation is not restricted to a single region, as evidenced by the participation of boom zones in the west, core provinces in the middle, and coastal locations in the east. It represents, in keeping with the national industrial strategy, a national interest in research. Research on digital economy cooperation networks generally shows multi-centre research clusters rather than single-hub dominance, which is consistent with this trend [16]. Although no specific companies are named in the dataset, several academic institutions that have contributed to this study have formed partnerships with businesses. Therefore, research driven by universities both shapes and reflects the demands of business, especially in areas such as novel materials, renewable energy, and high-tech manufacturing.

## 5.4. Evolution of Digital Technologies in Fostering Innovation Over Time

Using time-series analysis of keywords associated with digital technology, it has been demonstrated that the innovation literature has shifted significantly in how it frames digital technologies. The sporadic use of terms such as data and technology before 2020 provides evidence that digital tools were seen as a supplementary component of information and communication technology (ICT) rather than an essential part of the innovation process. There have been larger developments in artificial intelligence, digital ecosystems, and data-driven innovation, and the growth of the terms data, platforms, intelligence, and cloud reflects these trends. In recent times, there has been widespread agreement among academics that the advent of digitisation can bring innovative new business models. When discussing topics such as "green," "carbon," "industry," and "innovation" beyond 2022, digital technologies are more frequently mentioned. This synergy illustrates that academics are researching not only the technological aspects of digitalisation but also its implications for industry upgrading and the sustainability of industries. For this reason, digital technologies have progressed from straightforward tools that enhance efficiency to indispensable platforms for innovation-driven development across all industries.

## 6. Discussion

China's major stream sectors are prioritising digitalisation-driven innovation, according to bibliometric data. A historical review shows that research on digitisation has increased dramatically, especially after 2021. In 2022, the State Council of China emphasised China's strategic priority for digital upgrading and industrial modernisation. The study by Qian [20] supports the claim that national policies and policy frameworks significantly contribute to the growth of academic fields of study [15]. It has been essential to identify four significant research clusters to support the idea that digitalisation interests many elements of socio-economic development [9]. The digital economy and development cluster's rising profile is consistent with theoretical models that suggest digital technology use may enhance innovation, coordination, and production [11]. China's policy climate has lately shifted toward carbon neutrality and green growth, as reflected in the development of a green digital innovation cluster [18]. This movement has occurred, on the other hand. The diversity of institutional engagement in China's digital innovation research is shown via partnership patterns. The field's multi-centre innovation ecosystem includes universities and research organisations across many locations. The government manages China's decentralised innovation ecosystem, and other research finds the same [16]. Finally, the terminology of digital technology has evolved intellectually. Digital technologies enable innovation, sustainability, and industrial upgrading, not merely supplementing. Verhoef et al. [13] found that this aligns with global research indicating that digital transformation is reshaping enterprises' and nations' innovation systems. In conclusion, the bibliometric data demonstrate that digitalisation has become deeply ingrained in China's innovation story to the point that it affects theoretical, empirical, and policy-oriented research across a variety of fields.

## 7. Conclusion

The conclusions of this bibliometric study indicate that the field is rapidly growing and well-organized. China's digitization of its important emerging sectors has gone from a minor topic before 2019 to a major academic and policy issue after 2021. Research is rapidly developing and becoming increasingly structured. Co-occurrence and grouping patterns show a coherent intellectual framework around four core concepts. This includes the digital economy's role in national development, green and low-carbon digital innovation, industrial digital transformation, and enterprise-level innovation performance. Each problem is crucial to China's digital development. Author and institutional mapping show that a global yet linked academic community drives this research. This group is centered on top institutions and national academies that promote cross-disciplinary and regional collaboration. Even if academic centers still buffer direct corporate interaction. Finally, the temporal history of key technology terminology reveals a major conceptual shift from digital tools as generic ICT facilitators to "digital" as a transformative force driving green development, industrial upgrading, and firm-level technological innovation. The findings presented here indicate that digitalization has emerged as a central focus of innovative research in China's most significant growing industries, serving not just as an analytical instrument but also as an operational engine. With this, an established, rapidly consolidating academic discipline develops.

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