

# Digital Economy Era: Research on the Concept of Business-Finance Integration Led by Data Value Chain

Xing Gao<sup>1</sup>, Zixi Chen<sup>2</sup>

<sup>1</sup> School of Management, Sichuan University of Science and Chemical Technology, Yibin, Sichuan 644000, China

<sup>2</sup> Sichuan University of Science and Chemical Technology School of Management Sichuan Zigong 643000, China

**Abstract:** In the digital economy era, new technologies and new environments have changed the way business and finance departments create value. Research in the field of business and finance integration must grasp the characteristics of the digital economy era in order to be reborn. Based on this, this paper uses 373 papers on the theme of business and finance integration published in CSSCI journals from 2013 to 2023 as a sample for bibliometric analysis, sorts out the research status, hot spots and trends of business and finance integration in the past decade, and summarizes that business and finance integration may face four problems: "lack of theoretical system, insufficient execution, insufficient personnel skills and shallow technical application". In order to solve these problems, on the basis of fully reading the literature, the concept of business and finance integration led by the data value chain is further proposed, in order to explore the way for enterprises to smoothly implement business and finance integration in the context of the digital economy era, and based on this, it proposes a prospect for the future research direction of business and finance integration in China.

**Keywords:** Industry-finance integration; Data value chain; Literature review.

## 1. Introduction

In the digital economy era, the past economic model is unsustainable. User value dominance and alternative competition, as the two major driving forces of enterprise management change, have not only triggered the transformation of enterprise goals and innovation of governance structure, but also prompted multi-faceted changes in the internal management model of enterprises. (Qi Yudong and Xiao Xu, 2020). The 20th National Accounting Informatization Academic Annual Conference held in 2021 discussed the theme of "Accounting Informatization: From Computerization to Intelligence". Scholars attending the conference generally believed that digital technology would affect the accounting environment, accounting content, accounting organization, accounting concepts and accounting rules, and thus change the way enterprises create value (Hu Renyu, 2021). The essence of corporate business is to create value. In order to adapt to the changes and challenges brought about by the digital economy era, enterprises must change from the traditional business and financial separation model in the past, rely on emerging digital technologies to reshape business and financial processes, explore new business and financial integration models suitable for the digital economy era, and ultimately achieve the integration of business and value creation, that is, business and financial integration.

With the rapid development of digital technology and its penetration and diffusion into various fields of the economy and society, all walks of life have ushered in explosive growth in data, and data has become a key element in the digital economy era (Chen Xiaohong, 2022). On May 11, 2020, the "Opinions on Accelerating the Improvement of the Socialist Market Economic System in the New Era" issued by the Central Committee of the Communist Party of China and the State Council clearly listed data as a new production factor. The new generation of digital technology makes it possible to collect, transmit, store, process and use data, and data has become an important resource that affects the value creation

of enterprises (Li Xiaohua, 2020). Therefore, studying how to effectively implement business-finance integration in the context of the digital economy era must make good use of the resource of "data" and must clarify how data realizes value creation in corporate business, that is, to clarify the relationship between the data value chain and business-finance integration.

Based on this, this paper uses visual bibliometric software to conduct a quantitative analysis of 373 documents on business-finance integration from 2013 to 2023, sorts out the existing research results, related hot spots, development trends and problems faced in business-finance integration, and on this basis proposes a business-finance integration model dominated by the data value chain, in order to attract more scholars' attention and carry out relevant research in the field of business-finance integration in the digital economy era, and to provide suggestions for research in the field of business-finance integration.

## 2. Research Methods

This paper uses the standard sampling method to determine the research sample and conducts a statistical analysis of the research progress in the field of business-finance integration under the background of digital economy. The specific method is divided into four steps: First, the CNKI database is selected, and "business-finance integration", "financial sharing", "intelligent finance" and "accounting digitization" are used as keywords. The academic journals published between 2013 and 2023 are limited, and CSSCI journals are selected as the search objects, and 507 documents are obtained.

Second, the literature was further screened based on the relevance to the research topic, and the literature that did not meet the requirements was eliminated, as it had no authors, no keywords, no publication year, was irrelevant to the topic, lacked representativeness, and was out of date. Finally, 373 documents were selected as the quantitative analysis sample.

Third, with the help of visual measurement software such as Citespace, we preliminarily sorted and analyzed the authors, keywords, publication time, publication journals and other information of these 373 documents, and drew publication trend charts, author cooperation network charts and keyword co-occurrence charts to show the basic situation of research in the field of business-finance integration in the past decade. We also drew keyword clustering, keyword timeline charts and keyword mutation charts to show the mainstream research blocks and trends in this field.

Fourth, after analyzing the current research status in the field of business-finance integration through bibliometrics, this article refers to the practices of Liu Yang (2020) and Chen Xiaohong (2022) to supplement and sort out the missing literature in various aspects, further select important journals for content organization and coding, sort out their document types, research topics, research methods, research conclusions, etc., and summarize the core theories and viewpoints of business-finance integration research under the background of digital economy in the past decade.

### 3. Bibliometrics: Current Status of Research on Industry-Finance Integration

The CiteSpace bibliometric software was used to conduct quantitative statistics on 373 sample documents to obtain multiple data such as publication volume, keyword frequency, keyword co-occurrence map, keyword clustering map, keyword mutation table and keyword timeline map.

#### 3.1. Publication

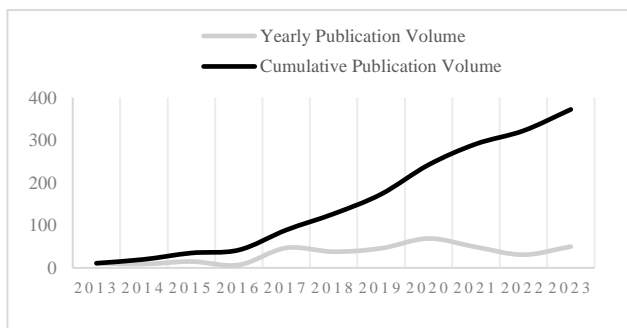


Figure 1. Publication statistics

As can be seen from the publication statistics chart (Figure 1), the number of publications in the field of business-finance integration has shown a stable publication trend in the past decade. The number of publications was low from 2013 to 2016, and it rose steadily from 2017 to 2020. The number of publications decreased to a certain extent from 2020 to 2022, and began to grow again in 2023. This publication trend basically fits the background of the times. The "Guidance of the Ministry of Finance on the Organic Integration of Business and Financial Activities" issued by the Ministry of Finance in 2014 and the "Basic Guidelines for Management Accounting" issued in 2016 promoted research interest in this field. In 2019, government policies promoted high-quality economic development and promoted research growth. After 2020, due to the impact of the COVID-19 pandemic, scholars shifted their focus and the number of publications in this field decreased slightly. After 2023, the economy recovered, and scholars' focus returned to the study of business-finance integration in the digital economy era.

#### 3.2. Hotspot Distribution

Using Citespace software to draw keyword co-occurrence graphs (Figure 2) and keyword clustering graphs (Figure 3), the hot topics of scholars are mainly management accounting, business-finance integration, big data, financial sharing, cloud accounting, value creation, and digital economy. The nine clusters with the highest research popularity are: management accounting, financial management, business-finance integration, intelligent finance, accounting development, financial sharing, cloud accounting, key factors, and accounting logic. In recent years, the research in the field of business-finance integration in China has mainly revolved around "management accounting, digital technology, and value creation". Management accounting research mainly includes financial sharing, accounting transformation, and accounting education. Digital technology research mainly includes big data analysis, cloud accounting, blockchain technology, and smart finance. Value creation research mainly includes value co-creation and value realization.

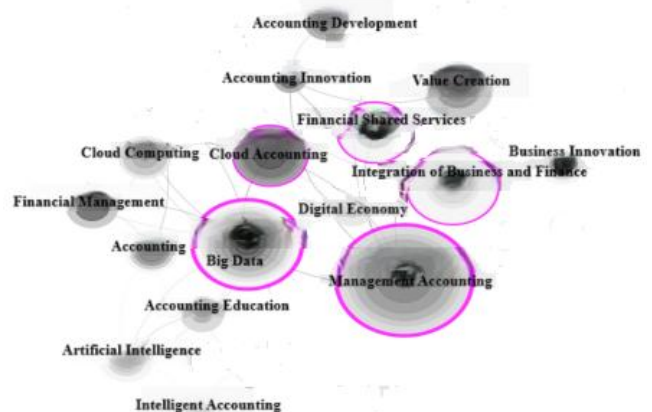


Figure 2. Keyword co-occurrence graph



Figure 3. Keyword clustering diagram

#### 3.3. Theme Evolution

Through the timeline function in Citespace, we draw a keyword mutation graph and a timeline graph with 373 selected documents as samples, and use this as a basis to study the evolution trend of research topics in this field.

The active keywords are "cloud computing, cloud accounting, listed companies and accounting innovation", the active keywords from 2016 to 2029 are "accounting development, Internet+, blockchain, management accounting, accounting information, accounting personnel", and the

active keywords from 2020 to 2023 are "accounting work, artificial intelligence, corporate innovation, talent training".

### Top 22 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2013 - 2023
Cloud Computing	2013	2.43	2013	2017	█
Cloud Accounting	2013	3.88	2014	2016	█
Listed Company	2014	1.09	2014	2015	█
Accounting Innovation	2015	0.83	2015	2016	█
Accounting Development	2016	1.22	2016	2019	█
Internet Plus	2016	1.01	2016	2017	█
Public Hospital	2016	0.82	2016	2018	█
Value Creation	2015	0.48	2016	2018	█
Management Accounting	2014	3.69	2017	2018	█
Management Control	2017	2.48	2017	2018	█
Accounting Information	2017	1.57	2017	2018	█
Accounting Personnel	2017	1.15	2017	2019	█
Accounting Supervision	2017	0.77	2017	2019	█
Corporate Performance	2013	0.52	2017	2019	█
Blockchain	2018	1.69	2018	2020	█
Accounting Work	2018	0.99	2018	2019	█
Corporate Accounting	2018	0.79	2018	2020	█
Government Accounting	2019	1.96	2019	2020	█
Artificial Intelligence	2019	1.41	2019	2021	█
Corporate Innovation	2020	1.16	2020	2023	█
Talent Cultivation	2018	2.07	2021	2023	█

Figure 4. Keyword mutation map

Combined with the keyword time distribution of the keyword timeline chart, it can be seen that the research topics in the field of business-finance integration have generally experienced three stages: " accounting computerization (2013-2015) - accounting function transformation (2016-2020) - smart finance (2021-2023) ", and the latest frontier is digitalization and intelligence, which is in line with the changing situation of the times (Yuan Rongli, 2023). In

October 2014, the Ministry of Finance issued the "Guiding Opinions on Comprehensively Promoting the Construction of Management Accounting System", emphasizing the importance of management accounting in the internal management of units. During this period, digital technology began to be widely used, and research in this field was dominated by "accounting computerization" and "platform economy" (Li Xiaohua, 2019). The 2016 "Basic Guidelines for Management Accounting" emphasized the embedding of management accounting into important areas, levels, and links of business. Therefore, the research from 2016 to 2020 mainly focused on management accounting and financial transformation, focusing on the combination of business and finance, breaking down information barriers, and other issues. After 2020, the government vigorously promoted the application of digital technology, promoted the development of business and financial integration, and directed the research on business and financial integration towards digital intelligence. It is expected that the future will continue to deepen the application of intelligence, promote data sharing and inclusive services, and promote the research of smart finance (Xu Yude, 2022). The research on business and financial integration at any stage is in line with the requirements of the times and is looking for new impetus in the characteristics of the times. In today's digital economy context, the development of business and financial integration research must also find direction from digital means and digital characteristics. Next, this article will analyze the new environment faced by business and financial integration in the implementation of the digital economy era, and further explore how to use the characteristics of the digital economy era to promote new development of business and financial integration.

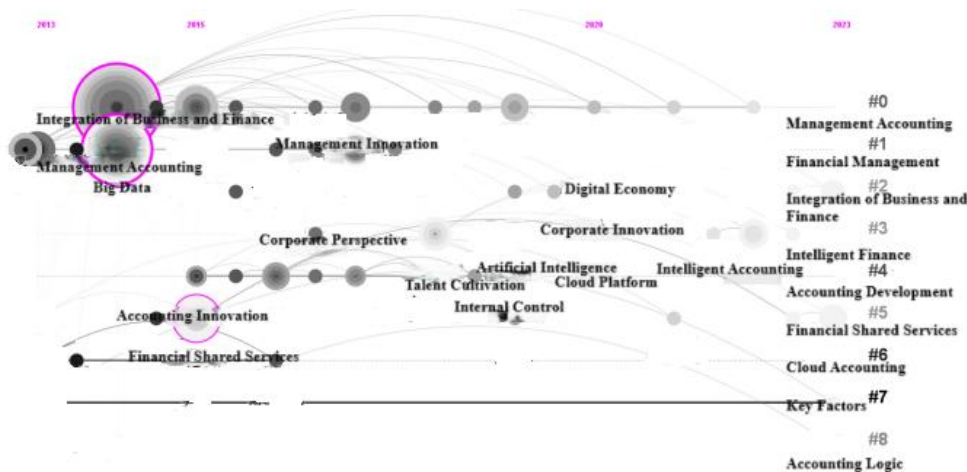


Figure 5. Keyword timeline chart

## 4. The Current Dilemma of Business-Finance Integration Research: Problems Faced

Although scholars have proposed thoughts on the practical implementation of business-finance integration from multiple perspectives, many problems still arise in the actual implementation of business-finance integration. Only by facing these problems and proposing countermeasures can the smooth implementation of business-finance integration be ensured. By combing through the existing literature, this article summarizes various problems into the following four categories:

### 4.1. Lack of Theoretical System

The theory of business-finance integration should originate from the practice of business-finance integration and be higher than the practice of business-finance integration, and constantly guide and promote the practice of business-finance integration. However, the construction of the theoretical system of business-finance integration is still lagging, lacking systematic and forward-looking theoretical guidance (Qin Rongsheng, 2023). Since the beginning of this century, on the one hand, the localization research on business-finance integration is slightly insufficient. The mainstream behavior of Chinese accounting from practice to academia has mostly learned and applied the results of Western accounting theory

and practice, and has not formed a theoretical system adapted to the characteristics of China's economy and society (Yang Xiongsheng, 2020). On the other hand, although some scholars and practitioners are exploring the theoretical framework of business-finance integration, these explorations have not yet formed a unified consensus and standard. There are many different interpretations of "business and finance" and the implementation methods of business-finance integration in China, and there is no dominant theoretical framework yet (Wang Yaxing, 2020). The lack of a theoretical system has made the implementation of business-finance integration face many challenges, and enterprises lack clear directions and norms in the implementation process.

#### **4.2. Insufficient Enforcement**

Top-level design is a key factor in determining the success or failure of the promotion and implementation of business-finance integration in enterprises. However, in the actual implementation process, there are large differences in the degree of attention and promotion of business-finance integration among enterprises (Zhang Yifei, 2019). Although some enterprises have emphasized the importance of business-finance integration in terms of system, in actual operation, there is still a phenomenon of going through the motions (Qiu Yizheng, 2021). Business-finance integration is not handled by the chairman and general manager, but by the financial director of the enterprise. Ultimately, business-finance integration is just a "one-sided" effort of the finance department and financial personnel, resulting in the failure of business-finance integration to be combined with the value creation of the enterprise (Qin Rongsheng, 2023). In fact, the main driving force of business-finance integration should include business departments such as R&D, procurement, production, sales and investment. However, the lack of top-level design has made the implementation focus of business-finance integration fall entirely on the finance department, making it difficult to achieve a true two-way integration of finance and business (Cui Yongmei, 2023).

#### **4.3. Insufficient Staff Skills**

The implementation of business-finance integration by enterprises faces the major challenge that the concepts, capabilities and levels of financial personnel cannot meet the requirements. In the current context of fierce competition and the profound impact of digital technology on the development of enterprises, enterprises have higher requirements for financial personnel (Ma Ruiyang, 2023). In this era, accountants must not only meet the needs of high-quality economic development, major risk prevention and control, and modernization of the national governance system and capabilities, but also meet the new opportunities and challenges brought by technological innovations such as big data, cloud computing, mobile Internet, Internet of Things, artificial intelligence, and blockchain. (Tang Dapeng, 2020). Especially in the process of implementing business-finance integration, enterprises need compound financial personnel with high financial quality and good business quality (Yuan Zeming, 2018). However, at this stage, corporate financial personnel usually only have financial management knowledge and skills, and lack knowledge, skills and experience in business operations. They have insufficient understanding of the system and requirements for implementing business-finance integration, and are also affected by the inherent financial management thinking,

which leads to difficulties in communication and exchange with business departments (Zhang Yifei, 2019).

#### **4.4. Insufficient Technology Application**

At present, the business information systems and financial information systems of many enterprises operate independently and are not connected to each other. The financial department uses a special system for data management, and these systems lack connection and data sharing with the systems of the business department (Ding Shenghong, 2023). This leads to multiple specific problems: First, there is no unified standard for data collection and transmission between the business and financial systems, and information transmission is not smooth (Liu Meiling and Tong Chengsheng, 2020). Second, the independent operation of the system makes it impossible to comprehensively analyze financial and business data, which limits the strategic decision-making ability of the enterprise (Ma Jian, 2022). Third, the information system is independent, data cannot be shared in real time, and the operating data of the business department cannot be reflected in the financial system in time, affecting real-time monitoring and adjustment (Jiang Yihan, 2022). These problems make it difficult to fully realize the integration of business and finance, and cannot meet the needs of enterprises for joint mining, utilization and real-time sharing of business and financial data, resulting in independent data sharing and the problem of untimely data provision, making it difficult to improve the collaborative efficiency of the integration of business and finance in enterprises.

### **5. The Concept of Business-Finance Integration Led by The Data Value Chain: The Contemporary Focus of Business-Finance Integration Research**

Solving problems must start from the root of the problem. This article believes that the reason why the problems mentioned above occur during the implementation of business-finance integration is mainly because the essence of business-finance integration is not correctly understood, and the impact of the "data asset" factor on the business-finance environment and model in the digital economy era is not grasped. Business-finance personnel lack the guiding theory for carrying out business-finance integration behavior in the context of the digital economy. The digitalization level of enterprises is low or insufficient, and managers cannot see the results of reforms in the short term, which leads to various problems in the implementation of business-finance integration (Xu Yude, 2020). Therefore, this article will sort out the essence of business-finance integration and the data value chain in detail, as well as the logical relationship between the two, in order to find a way to solve practical problems and propose a new model of business-finance integration that adapts to the needs of the times.

#### **5.1. The Essence of Business and Finance Integration**

The essence of accounting is the management activity of disclosing information about the business activities of an enterprise. The information provided by accounting must be highly consistent with the business activities that create value, which is the concept of business-finance integration. The

essence of business-finance integration is that business activities must create value. Therefore, how to achieve more value output with the least value input has become the underlying logic of all business-finance activities.

In recent years, the integration of business and finance has gradually become an important research topic for enterprises to achieve value creation in the digital economy era. Focusing on how to define the integration of business and finance, this article sorted out the sample literature and found that there are roughly five mainstream views: First, the information integration theory believes that business information and financial information must be integrated to achieve the integration of the two. The core of the integration of business and finance lies in the integration of business and financial information in all key areas, levels, links and even the entire process of the business (Tang Guliang and Xia Yifei, 2018). Second, the organizational integration theory believes that the integration of business and finance is an inevitable requirement for organizational operations and value creation, emphasizing that business leads financial development, and finance provides support for business (Wang Bin, 2018). Third, the value integration theory believes that the essence of the integration of business and finance is the integration of business and value, requiring that business must create value, and value must also be realized through business (Xie Zhihua, 2020). Fourth, the technology integration theory believes that the integration of business and finance is not simply the integration of business and finance, but a process of integration of multiple factors. In addition to business and finance, it is also necessary to combine various high-tech technologies, such as XBRL (Extensible Business Reporting Language). Fifth, the conceptual integration theory believes that the concept of "business-finance integration" contains three sub-concepts: the integration of business, finance and accounting. In the "triangle integration", the business is the center, accounting and finance serve the business, support decision-making and enhance value creation capabilities (Wang Yaxing, 2020).

This article believes that the essence of business-finance integration is the integration of business and value, that is, the theory of value integration. The essence of business-finance integration is that business activities must create value, and finance reflects the value creation and realization capabilities of business activities through value accounting (Xie Zhihua, 2019). Therefore, how to achieve more value output with the least value input has become the underlying logic of all business-finance activities (Wang Bin, 2018). In fact, although scholars have different perspectives on business-finance integration, they are essentially aimed at achieving the fundamental demand of value creation. Information fusion theory and technology fusion theory focus on "data information collection and utilization", organizational fusion theory focuses on "organizational change" to improve quality and efficiency, and concept fusion theory and value fusion theory focus on the goal of "creating value". Business-finance integration in the digital economy era is a management model that takes data information (business, finance and all related data) as key resources, digital technology as tools, organizational structure and information equipment as transformation objects, and serves value-creating business activities as goals, and takes organizational change, technology application and talent training as manifestations (Xie Zhihua, 2020). Therefore, we need to return to the main line of "business creates value, finance serves business" and

explore the relationship between "data information" and the goal of "value creation" through the surface, that is, the impact of the data value chain on business and financial integration.

## 5.2. The Concept and Characteristics of The Data Value Chain

The value chain theory is an important theory for analyzing value creation activities and the sources of corporate competitive advantage. The theory believes that the task of an enterprise is to create value, and value and value activities constitute the basis for the analysis of the value chain (Wang Huacheng, 2005). The concept of the value chain was proposed by Michael Porter (1997). He believed that the value chain is a system consisting of a series of production activities and related auxiliary activities required to deliver products or services to users, such as design, production, sales, and delivery. Data is an important production factor in the digital economy era. The data value chain is the data flow and value creation process that accompanies the production chain of an enterprise (Huang Peng, 2021). The data value chain not only provides enterprises with new ways to create value, but also promotes the digital transformation and business model innovation of enterprises (Shao Qianting, 2019). By studying the formation mechanism, operation mode and application of the data value chain in enterprise management, and deeply understanding and effectively utilizing the data value chain, enterprises can better optimize resource allocation, improve production efficiency and enhance market responsiveness (Sha Xiujuan, 2017).

four characteristics that are different from the traditional value chain: First, data plays a role in the combination of various production links with production tools and factors. The traditional value chain relies on the basic business activities of the enterprise, which are closely linked to each other and constitute the basic production process. The data value chain emphasizes the generation and use of a large amount of data in the production process and the specific activities of each production and operation department (Qian Jinlin, 2023). These data are combined with various production tools or production factors along the value chain to generate value; second, data shows a multi-directional flow trend in the value chain and forms a closed loop of flow (Li Xiaohua, 2020). As shown in the diagram of the data value chain (Figure 6), unlike the one-way flow of product or service data along the production line in the traditional value chain, the data in the data value chain presents the characteristics of multi-directional flow, and forms a closed-loop data value chain with four flows: forward, reverse, internal production and sales, and internal and external communication of the enterprise; third, the data value chain can transcend the boundaries of the enterprise organization. Not only can the data of suppliers and users be combined with the internal data of the enterprise to generate value, but the data of the government, Internet platforms and other enterprises can also be associated with the R&D, production and service links of the enterprise, further enhancing value creation (Zhu Xiumei, 2023) and becoming an input factor for creating additional value; fourth, the data value chain creates value through the high integration of industry-specific technologies and new generation information technology (Ma Feicheng, 2023). In the traditional value chain, although a large amount of data is generated, due to the limitations of information technology at the time, data collection,

transmission and processing are very difficult and costly. Enterprises must make a trade-off between technology and cost, and usually use aggregated or sampled data for decision-making, thereby discarding a large amount of information, with large data granularity and many details being ignored. The development of new-generation information technology

has provided more powerful connections, algorithms and computing capabilities for data collection, transmission, storage and processing, greatly improving the efficiency and capabilities of data generation, collection, transmission, storage, processing and utilization in all aspects of production.

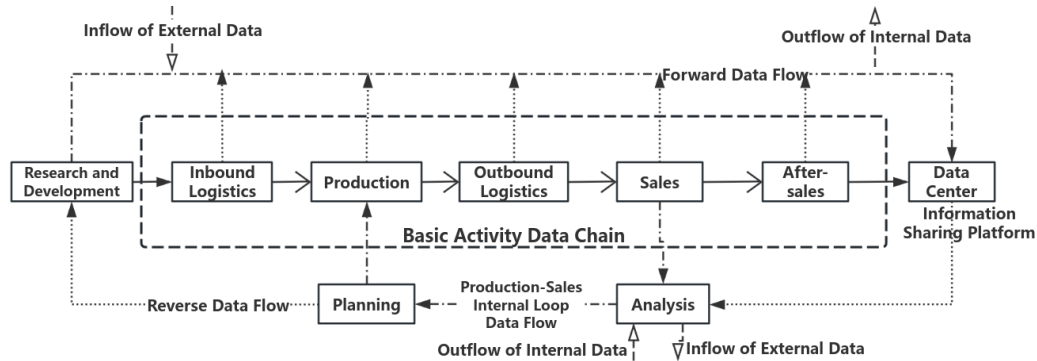


Figure 6. Schematic diagram of data value chain [82]

### 5.3. Business-Finance Integration Model Led by Data Value Chain: A Mechanism to Support Business Value Creation Based on Data

With the data value chain as the leading factor, we must first sort out the value chain links and major business activities, including both basic activities directly subordinate to value creation (warehousing, production, outbound, sales, after-sales), and supporting activities involving personnel, finance, planning, research and development, procurement, etc. In each link of the enterprise's production activities, data may interact with other production factors to create new economic value, that is, the value creation mechanism of the data value chain (Becker, 2016). In other words, the concept of business and finance integration with the data value chain as the leading factor is to follow the mechanism of data value creation, follow the value chain of data flow, use digital technology or professional functions to explore the potential of data value creation, and further help the business create value. The business and finance integration model under this concept focuses on the essence of business value creation, and relies on organizational change and technology application to create value. In this way, it can effectively avoid problems such as "lack of theoretical guidance, insufficient execution, insufficient personnel skills, and shallow technology application" in the process of implementing business and finance integration. In the data value chain, data flow forms four value chains: forward, reverse, internal production and sales loop, and internal and external data exchange of the enterprise. This article will start from these four data value chains, sort out the value creation mechanism of the data value chain, and how to carry out business and financial integration activities based on the data value chain.

First, the positive flow data value chain. Like the traditional value chain, starting from the research and development node, as the product or service progresses along the path of "warehouse-production-warehouse-sales-after-sales" one by one to the data center node. Each node will generate data, which is collected, transported, processed by data acquisition equipment, and finally gathered in the data center. At each node, data is collected through sensors and IoT devices and transmitted to the data processing system. Through blockchain technology, the transparency and immutability of

data in the flow process can be ensured, and the credibility and security of data can be enhanced (Zhu Jianming, 2019). In the production link, a comprehensive budget management system is used to track production costs, resource usage and output efficiency in real time, adjust production plans in time, and improve resource allocation efficiency (Chi Guohua, 2015, Zheng Yong, 2023). In the sales link, big data is used to analyze customer purchasing behavior, optimize inventory management, precision marketing, and improve sales conversion rate (Yuan Hong, 2022). In after-sales service, customer feedback data is used to improve product quality and service, and increase customer satisfaction and loyalty (Tang Guliang, 2018).

Second, reverse flow of data value chain. Unlike the transmission of physical products, which requires time and money, data can be quickly and at almost zero cost from the downstream links of production to the upstream links of production, thereby affecting the previous links. The data of the data center is output to the data analysis node in reverse, and after the data is analyzed by digital technology, it enters the planning node with the goal of value creation, and formulates a new round of research and development plans (Jiang Xue, 2022). This data flow mode can reflect the changes in market and customer needs in real time, and has a significant impact on the company's R&D and production decisions. Enterprises can establish an information sharing platform to promote cross-departmental collaboration, break information silos, and achieve efficient data circulation (Li Licheng, 2019). Through digital twin technology, simulate the performance of products in actual use, predict and solve potential problems in advance, and optimize product design (Chen Xiaohong, 2022). In terms of finance, use real-time data to monitor capital flow, optimize capital allocation, and reduce financial risks (He Ying, 2013).

Third, the data value chain within the production and sales loop. Within the same production link, the data generated in the previous period can become the input factor of the production activities in the next period, forming the flow of data within the same production link, that is, "production-warehouse-sales-data analysis-planning-a new round of production". In the value creation of the production and sales loop, enterprises can use cloud accounting systems to achieve real-time updating and sharing of financial data to assist production decisions (Qiao Pengcheng, 2019). Use smart

decision-making systems to analyze production and sales data, predict market demand, and optimize production plans (Li Wenyi, 2016, Fu Yuanlue, 2019, Liu Meiling, 2020). In the front-end penetration strategy, strengthen the interaction between sales personnel and production teams, and adjust production strategies in a timely manner based on market feedback (Liu Shangxi, 2023).

Fourth, the data value chain of internal and external communication of enterprises. Since the data value chain has the characteristics of breaking through the boundaries of enterprise organizations, data exchange is not limited to exporting enterprise data to the outside, but also includes obtaining valuable data from the outside, and conducting two-way data flow and integration (Chen Guoqing, 2022). The data exported to the outside mainly includes the production data, sales data, inventory data and financial data of the enterprise, which can help supply chain partners better understand the needs and operating conditions of the enterprise, thereby optimizing their production and supply chain management. By establishing a data sharing platform, enterprises can update and share production progress, inventory levels and sales data with supply chain partners in real time to improve the efficiency of supply chain collaboration (Jiang Yihan, 2022, Ding Shenghong, 2023). The data entering from the outside mainly includes market supervision data released by the government, industry trend data, market analysis data provided by intermediary organizations, and data from supply chain partners and other enterprises. These data can provide enterprises with more extensive market insights and support for operational optimization. Using big data analysis technology, enterprises can conduct in-depth analysis of market supervision data and industry trend data released by the government to explore market opportunities and potential risks (Wei Dehong and Xie Zhihua, 2022). By establishing an external data integration platform, enterprises can gather data from the government, intermediary organizations and supply chain partners to form a unified data resource pool and provide comprehensive data support for decision-making (Li Haijian, 2021).

Through effective management of the data value chain, enterprises can achieve seamless connection between business data and financial data, improve data transparency and consistency, and thus provide a solid foundation for business-finance integration (Tang Hongying, 2009). The data value chain not only supports the refined management of enterprises in production, sales, logistics and other links, but also provides more accurate data support for financial analysis, cost control, budget management, etc. In this way, enterprises can not only gain timely insight into market changes and business dynamics, but also make more scientific and flexible financial decisions and enhance the overall operational efficiency of enterprises (Li Baobao, 2008). In short, the study of the data value chain is the only way for enterprises to implement business-finance integration in the digital economy era. The study of the underlying logic of the data value chain and business-finance integration can not only explore the correct way of business-finance integration in the digital economy era, and ensure that all changes serve the fundamental purpose of using data to create value, but also provide a strong guarantee for the sustainable development and long-term competitiveness of enterprises (Zhu Wei, 2016).

## **6. Future Outlook: The Future Direction of Business-Finance Integration in the Context of Digital Economy**

Although this article proposes the basic concept of business-finance integration led by the data value chain, the fundamental foothold of business-finance integration research is still in specific practice, in the case analysis of enterprises, governments and units. With the penetration of digital technology and the development of data assets, what challenges do these new elements bring to business-finance integration, how do they affect the transformation of business-finance integration, how can we smoothly promote the digital transformation of business-finance, and how can we improve the business-finance model theory under China's unique national conditions to guide enterprises to break through the dilemma of "information barriers"? These will become important propositions for future theoretical and empirical research on business-finance integration.

### **6.1. Transition to Value Chain Accounting**

The accounting function in the future will shift from traditional accounting dominated by accounting to value chain accounting oriented by strategy. This transformation is not only an upgrade of technical means, but also a profound change in concepts and strategies (Sun Fangcheng, 2018). Under the framework of business-finance integration dominated by data value chain, accounting functions will be more diversified and in-depth. Value chain accounting not only focuses on the recording and reporting of financial data, but also focuses on the analysis and application of data, helping enterprises to formulate and implement strategies, optimize resource allocation, and improve the overall operational efficiency of enterprises (Ge Yujie, 2020). By analyzing production costs, sales data and market trends, value chain accounting can help enterprises discover potential market opportunities and risks, so as to formulate more scientific production and sales strategies (Wang Man, 2012). Traditional accounting usually operates independently of business departments, while value chain accounting requires accountants to go deep into the business front line and understand the specific operation of each link such as production, sales, and supply chain. In this way, financial data is no longer just a simple number, but a strategic resource closely related to the actual operation of the enterprise (Sha Xiujuan, 2017). The transformation of accounting functions from traditional accounting-dominated to strategy-oriented value chain accounting is a major development trend of business and financial integration in the context of the digital economy era. It is an act of returning to the essence of accounting in an economic society with rapid development of productivity. It is an inevitable choice for enterprises to improve their competitiveness and achieve sustainable development in the digital economy era.

### **6.2. Accelerate the Construction of Smart Finance**

Since the 2020 government report mentioned "Digital China" again, the digital economy has become one of the hot topics of academic research. The application of digital technology in smart finance, financial shared cloud, digital-driven decision-making, digital supply chain and value chain is gradually deepening and expanding (Zeng Fanrong, 2022).

Accounting digitization is the comprehensive application of digital technologies such as big data, artificial intelligence, mobile Internet, cloud computing, Internet of Things and blockchain by enterprises, which has profoundly changed the processing methods, scope, rules and application frequency of accounting data. This makes the accounting function no longer limited to traditional accounting, bookkeeping, verification and reporting, but expands to new areas including value management, capital operation and strategic decision-making assistance. Therefore, accounting digitization tends to be automated, information-based and intelligent, becoming a new management model (Liu Shangxi, 2023). The current application rate of digital technology is far from reaching its efficiency limit. Faced with the rapid development of science and technology, the digitalization process in the field of business and finance integration is still in a stage of being rebuilt. Various technologies have an impact on the traditional accounting ecology in different aspects: Internet technology further expands accounting business scenarios; big data technology leads accounting into the digital age; blockchain technology changes the methods of creating, transmitting and storing accounting information; cloud computing effectively reduces accounting management costs; the Internet of Things helps accounting management break through the boundaries of time and space; artificial intelligence greatly improves the accuracy and efficiency of accounting decisions. In this wave of digitalization, enterprises should actively embrace digital technology, accelerate the process of business and finance integration, comprehensively improve financial management and decision-making capabilities, and achieve efficient and intelligent financial transformation.

### **6.3. Improve Data Application Facilities**

In the future, the business and finance departments will make more in-depth use of data, which puts higher requirements on the construction of data collection, transportation, processing and utilization facilities. In order to support the strategic transformation and value creation of enterprises in the digital economy era, it is necessary to improve the relevant data infrastructure and make full use of data to help the business create value (Zhang Junrui, 2020). According to the value chain theory proposed by Porter, the value chain of an enterprise can be divided into multiple links, including R&D, production, logistics, marketing and services. The development of the future business and finance model is bound to be inseparable from the use of data. Each link in the value chain generates and uses a large amount of data. In order to make full use of this data to help the business create value, enterprises must build and improve the corresponding data collection, transportation, processing and utilization facilities (Wang Weiqiu, 2017).

In the R&D stage, the construction of data collection facilities is the foundation. Enterprises need to deploy various sensors and data collection equipment to monitor and record various data in the R&D process, including test data, design parameters and project progress. In the production stage, efficient and safe data transportation facilities are the key. Data in the production process needs to flow between various processes and be transmitted to the management for real-time monitoring and decision-making. Enterprises need to establish a high-speed and stable internal network and use advanced encryption technology to ensure the security of data during transmission. At the same time, the application of cloud computing technology can enable data to be quickly

transmitted between different departments and systems, and realize seamless docking and sharing of production data. In the logistics stage, the construction of data processing facilities is the core. The large amount of data generated in the logistics stage needs to be quickly processed and analyzed to optimize logistics management and supply chain efficiency. Enterprises need to configure high-performance computing equipment and big data processing platforms to support the storage and rapid processing of logistics data. Advanced database management systems and distributed computing technologies can help enterprises conduct in-depth mining and analysis of logistics data and provide valuable decision support. In the marketing stage, the construction of data utilization facilities is the goal. The ultimate value of marketing data lies in its application. Enterprises need to build intelligent data application systems to enable marketing data to play the greatest role in actual business. In the service link, the use of data is also crucial. Enterprises need to build a customer relationship management system to collect and analyze customer feedback and service data in real time to improve service quality and customer satisfaction. In the future, if the business and finance departments want to give full play to the value of data, they must improve the construction of facilities for data collection, transportation, processing and utilization (Li Hui, 2020). This is not only an improvement in the technical level, but also an important guarantee for enterprises to achieve strategic transformation and sustainable development in the digital economy era. By building a sound data infrastructure, enterprises can better use data to drive business innovation, enhance overall competitiveness, and ultimately maximize business value.

### **6.4. Carry Out Value Unit Construction**

For a long time, the units within the enterprise have been mainly functional units, which has led to each unit being responsible for its own functions and lacking linkage. Enterprises should use value-based units as new unit organizations. There are different departments under the same unit, and these departments are linked together with the same value goals, so that effective linkage can be formed (Xie Zhihua, 2020). Traditional functional units, such as the finance department, production department, and marketing department, although they play an important role in their respective fields, often lead to information barriers and low coordination efficiency due to the independence of their functional division. While fulfilling their own responsibilities, it is difficult for each department to integrate resources and conduct collaborative innovation from a global perspective, thus affecting the creation and improvement of overall value. In order to meet this challenge, enterprises need to reshape their organizational structure and replace functional units with value-based units. The core concept of value-based units is to integrate different functional departments around specific value goals and maximize value through cross-departmental collaboration (Li Gang, 2018). Each value unit can include multiple departments such as R&D, production, sales, and customer service, which are jointly committed to achieving specific value goals, such as improving product quality, increasing customer satisfaction, or increasing market share.

In the process of building a value-based unit, each unit needs to set clear value goals and measure and evaluate them through scientific performance indicators. This ensures that all departments can always maintain efficient communication

and collaboration in the process of achieving common goals, and promote the continuous growth of the overall value of the enterprise. The transformation from functional units to value-based units is an important measure for enterprises to improve organizational effectiveness and competitiveness in the digital economy era. By building a value-oriented unit organization, enterprises can break down traditional functional barriers and achieve efficient cross-departmental linkage, thereby continuously creating and enhancing corporate value in a changing market environment.

### **6.5. Build a Cross-Enterprise Value Co-Creation Platform**

In the digital economy era, enterprises are no longer isolated, but embedded in a broader ecosystem (Wu Yao, 2017). The flow and processing of internal data are important, but the acquisition, sharing and utilization of external data are equally critical. Through data exchanges with external entities such as suppliers, customers, and partners, enterprises can more comprehensively understand market demand, optimize supply chain management, and improve customer service quality, thereby achieving more efficient resource allocation and more accurate decision support. Therefore, the future integration of business and finance requires not only the close integration of business and finance within the enterprise, but also cross-enterprise collaboration and data sharing (Xie Zhihua, 2020). This cross-enterprise value co-creation platform can break the boundaries of traditional enterprises and realize the efficient flow and sharing of resources and information. Through platform-based operations, enterprises can jointly participate in the entire process of value creation, from product design, production and manufacturing to marketing and after-sales service, to achieve value enhancement of the entire chain.

In this process, data standardization, interoperability and security will become key factors (Yang Xuecheng, 2016). Only by establishing unified data standards and security mechanisms can we ensure the smooth flow and efficient use of data across enterprises. At the same time, by using advanced technologies such as big data analysis and artificial intelligence, we can tap into potential business value from massive data and provide a continuous source of power for the innovation and development of enterprises. In short, building a cross-enterprise value co-creation platform is an inevitable trend to achieve business and financial integration, and it is also a key path for enterprises to enhance their competitiveness in the digital economy era. Through this platform-based collaboration model, enterprises can better integrate internal and external resources to achieve value maximization and sustainable development.

### **6.6. Cultivating Talents for The New Era**

The training of business and financial personnel will pay more attention to cultivating compound talents with all-round capabilities. First, the training of digital technology skills will be more in-depth, and financial personnel need to have a solid foundation in digital technology, including knowledge and skills in automation tools, intelligent system architecture, data analysis, etc. (Ma Ruiyang, 2023). This means that the curriculum will be more diversified and in-depth, covering a wider range of fields, such as financial robots, artificial intelligence, machine learning, Python, etc., and emphasizing practical operations and project applications to cultivate students' ability to solve practical problems. Second, cross-

departmental communication and collaboration capabilities will become the focus of personnel training (Tang Dapeng, 2020). Financial personnel need to have good communication and collaboration skills, be able to work closely with other departments, deeply understand business needs, promote the application of digital technology in the financial field, and work with business departments to formulate strategic plans and implementation plans (Wang Aiguo, 2021). To this end, the curriculum will emphasize team projects and case analysis, cultivate students' teamwork, problem solving and decision support capabilities, and strengthen practical links to allow students to exercise communication and collaboration skills in real cross-departmental projects. Third, emphasize the strategic thinking and innovation capabilities of financial personnel. In the context of business-finance integration, financial personnel need to have keen strategic insight, be able to understand the strategic direction of corporate development, and propose innovative financial solutions to support the sustainable development of the company (Wang Xiaoxiang, 2015, Zhang Min, 2022). Therefore, the course setting will focus on cultivating students' strategic thinking, innovative awareness and problem-solving ability, and through case analysis and simulation exercises, cultivate students' analytical and decision-making abilities, so that they can become business leaders and financial experts who can cope with complex business environments (Zhou Shouliang, 2019).

## **7. Summary and Discussion**

This paper selected 373 academic journals in the field of business-finance integration published in the CSSCI journals of HowNet between 2013 and 2023 as research samples, and used Citespace software to conduct a visual analysis of the publication situation, hot spot distribution, and theme evolution in the field of business-finance integration in the past decade. Combining bibliometrics and the reading and sorting of specific literature content, this paper summarizes the existing achievements and problems in the field of business-finance integration, and conceives how to smoothly carry out business-finance integration practices in the digital economy era from the perspective of the data value chain, and draws the following research conclusions:

First, this paper summarizes the research status and problems of business-finance integration in my country over the past decade through bibliometric analysis of 373 research papers on business-finance integration. On the one hand, the research on business-finance integration has grown steadily driven by policy promotion and economic needs. Research hotspots focus on management accounting, big data, financial sharing, cloud accounting, value creation and digital economy. The research topic has gradually evolved from "accounting computerization" to "accounting function transformation" and "smart finance", reflecting the development trend of digitalization and intelligence. On the other hand, the main problems facing the current business-finance integration include: the lack of a systematic and forward-looking theoretical system, resulting in unclear direction during implementation; insufficient execution of enterprises and insufficient top-level design, making business-finance integration a formality; insufficient skills of business-finance personnel, unable to adapt to the demand for compound talents in business-finance integration; shallow application of digital technology, lack of connectivity and data sharing between business and financial systems, limiting

collaborative efficiency and strategic decision-making capabilities. Secondly, on the basis of combing through the past research on business-finance integration, the concept of business-finance integration under the data value chain is proposed, pointing out that in order to achieve the core purpose of business value creation, enterprises should attach importance to the use of data, and transform the traditional business-finance model by using various data technologies and functional means along the four data value chains of forward flow, reverse flow, internal production and sales loop, and internal and external data exchange of enterprises. Finally, through the systematic management of the data value chain, the seamless connection between business and financial data can be achieved, the transparency and decision-making ability of enterprises can be improved, thereby promoting efficient business-finance integration and enhancing the competitiveness and sustainable development capabilities of enterprises. Finally, under the background of digital economy, the future prospects of business-finance integration focus on the leading role of the data value chain and promote the transformation of accounting functions to strategic orientation. Smart financial construction will deepen financial management and decision-making support capabilities through digital technology. Improving data application facilities is the key to achieving data-driven business innovation and efficiency improvement. Building a value-oriented organizational unit will help cross-departmental collaboration and resource integration, and enhance the overall value creation capabilities of enterprises. The establishment of a cross-enterprise value co-creation platform will promote the efficient flow and sharing of resources and information among enterprises.

In summary, the research on the integration of business and finance in China has continued to develop over the past decade. In the future, it will be key to emphasize the use of data, build an organizational structure based on value creation, deeply apply digital technology, and strengthen the training of financial talents. By solving existing problems and seizing future trends, the research on the integration of business and finance in China is expected to continue to deepen, provide support for corporate development, promote the development of smart finance and data sharing, and achieve the improvement of management efficiency and value creation capabilities. Based on the research process of the integration of business and finance in the past decade, this paper preliminarily proposes the concept of integration of business and finance dominated by the data value chain. Although there are many shortcomings, the more important significance of this paper is that it hopes to arouse the attention of Chinese scholars of the integration of business and finance to the new changes brought to the research of the integration of business and finance in the digital economy era. On the one hand, it will continue to accelerate the research on the various processes of the integration of business and finance, and on the other hand, it will use the characteristics of the digital economy era (such as data resources) as new driving force support.

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