The Economic Effects and Transmission Mechanisms of Digital Economy Industry in China

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Abstract: Currently, as China is in the critical opening period of the 15th Five-Year Plan, the digital economy has emerged as an important strategic lever for driving macroeconomic growth. To reveal its internal mechanisms, this paper scientifically defines the digital economy industries and, based on the input-output (IO) tables from 2018 to 2023, constructs the corresponding digital economy Social Accounting Matrices (SAMs) for these years. Employing the IO model, SAM multiplier decomposition, and Structural Path Analysis (SPA), this study explores the evolutionary trends and dynamics of empowerment of China's digital economy industry from the perspectives of basic industrial characteristics and macroeconomic effects. The results indicate that: Firstly, China's digitalization scale and level exhibit a steadily upward trend. The growth of the digital economy is shifting from being driven by hardware manufacturing sectors to modern information service sectors. Sectors represented by the internet and information technology services have evolved into two-way linkage hubs featuring both strong supporting and pulling capabilities. Secondly, the multiplier effects and structural transmission pathways of the digital economy present significant differentiation characteristics. Approximately 80% of the hardware and specialized equipment sectors are dominated by net transfer effects, whereas about 20% of the service sectors are dominated by net closed-loop effects. Furthermore, the micro-transmission mechanism of the digital economy is evolving into a structural pattern initiated by hardware equipment at the starting end, passing through high-tech intermediate nodes, and subsequently inducing increased output in the basic energy and materials sectors. This paper accurately maps the macroeconomic mechanisms of the digital economy, providing an important decision-making reference for deepening the integration of the digital and real economies and promoting high-quality economic development.

Keywords: Digital economy industry; Input-output analysis; Social Accounting Matrix; Macroeconomic effects

1 Introduction

The digital economy is the core engine for the stable operation and structural optimization of the modern economic system[1]. According to accounting data from the National Bureau of Statistics, the value-added of China's core digital economy industries reached 12.76 trillion RMB in 2023, accounting for 9.9% of the Gross Domestic Product (GDP). By 2024, this proportion further climbed to 10.5%, indicating a new trend of rapid expansion for the digital economy. It is evident that the digital economy is not only the core driving force for improving the quality and efficiency of the macroeconomy but also a strategic space for leading industrial structural transformation and achieving high-quality development[2]. The development of the digital economy has consistently been highly valued by the Party and the State. In July 2024, the Resolution of the Central Committee of the Communist Party of China on Further Comprehensively Deepening Reform and Advancing Chinese Modernization explicitly put forward the strategic deployment of improving the institutional system for promoting the deep integration of the real economy and the digital economy, calling for the accelerated construction of institutional mechanisms that foster digital economy development. As China officially enters the 15th Five-Year Plan period, the Outline of the 15th Five-Year Plan for National Economic and Social Development further establishes the digital economy as a critical pillar for achieving the high-quality development of the national economy, explicitly mandating the expansion of core digital economy industries and the cultivation of digital-intelligent industrial clusters. Currently, the digital economy has broadly penetrated various sectors of China's national economy, acting as the core engine that stimulates the major cycle of domestic demand. However, as the industrial volume continues to surge, the pulling pathways of the digital economy on the macroeconomy are becoming increasingly complex, and its internal sub-sectors exhibit significant differentiation characteristics[3]. As the core carrier of the new round of industrial transformation, the structural evolution and the characteristics of the transmission mechanisms within the digital economy exert profound impacts on the macroeconomic spillover network and resource allocation[4]. Therefore, scientifically measuring the development scale and linkage networks of the digital economy industry, as well as deeply analyzing its macroeconomic effects and micro-transmission dynamics, hold significant theoretical and practical importance for formulating synergistic industrial development strategies, promoting the deep integration of the digital and real economies, and ultimately advancing the high-quality development of the national economy.

The academic community has conducted extensive research on the theme of the digital economy, primarily focusing on two aspects: statistical measurement and economic effects. (1) Statistical measurement of the digital economy. Academia generally defines the digital economy as a series of economic activities that utilize data resources as key factors of production, modern information networks as important carriers, and the effective use of information and communication technology (ICT) as a critical driving force, thereby improving efficiency and optimizing the economic structure[5]. Within this conceptual framework, existing literature measuring the development level and scale of the digital economy mainly focuses on the following three approaches: The first approach is constructing a comprehensive evaluation index system. Referencing the digital economy index systems published by institutions such as the Organization for Economic Co-operation and Development (OECD) and the National Bureau of Statistics of China[6], this method selects indicators from multiple dimensions—including digital infrastructure, digital industry development, and digital technology integration[7], and utilizes weighting models such as Principal Component Analysis (PCA) and the entropy method to calculate the digital economy development index[8]. The second approach is the value-added measurement method based on national economic accounting. In accordance with the Statistical Classification of the Digital Economy and its Core Industries issued by the National Bureau of Statistics, this method extracts the core digital economy industries[9]， and subsequently estimates the proportion of the digital economy's value-added to GDP[10]. The third approach is industrial linkage measurement based on the input-output framework. To further reveal the spillover effects and structural characteristics of the digital economy, some scholars separate and reconstruct the digital economy industries from traditional input-output (IO) tables[11] , utilizing the Leontief inverse matrix to quantify the backward pulling and forward supply effects of digital industries[12]. (2) The economic effects of the digital economy. Existing research has expanded from the analysis of aggregate characteristics to the comparison of economic effects across different countries and the anatomy of economic effects at specific points in time. Studies show that the economic effects of the digital economy vary significantly across different nations[13]. In Europe, the digital economy significantly promotes regional total factor productivity growth, exhibiting a spatial disequilibrium characteristic where Northern Europe leads Eastern Europe[14]. In underdeveloped regions such as Africa, digital infrastructure is a key factor driving local economic development, and its impact is more pronounced in middle- and high-income countries[15]. In Southeast Asia, there are significant differences in the volume of the digital economy among certain Asian countries; for instance, Thailand's digital economy is 3.9 times the scale of Vietnam's, highlighting an urgent need for the latter to undertake substantive reforms to promote digital growth[16]. In China, the digital economy has generated a significant positive impact on sustainable development, and this positive influence is more prominent in the eastern and western regions than in the northeast and central regions[17]. During specific periods of economic transition, structural changes within the digital economy exert profound impacts on macroeconomic resource allocation, one of the core manifestations of which is the deep integration of the digital economy with the real economy. Research indicates that the digital economy is achieving deep integration with the real economy, represented by manufacturing, through industrial linkages and technological penetration[18]. Further industrial linkage analysis reveals that the empowerment characteristics of the digital economy industry on manufacturing development are asymmetric, with its supply-push role being significantly stronger than its demand-pull effect[19]. Based on this, existing literature universally emphasizes the core driving role of data elements in this process, pointing out the urgent need to break down data silos to deeply unlock the multiplier value of data elements[20].

In conclusion, while current research provides a solid theoretical and empirical foundation for understanding the macroeconomic effects of the digital economy, there remains room for breakthroughs in the following aspects: Firstly, in terms of measurement methodology, existing literature predominantly employs traditional input-output (IO) models to analyze the effects of the digital economy. However, these models fail to incorporate factor income distribution and household final consumption into the endogenous circular system, often presenting the limitation of underestimating the true induced effects generated by the digital economy through stimulating the closed loop of domestic demand. Secondly, regarding dynamic evolutionary characteristics, in the context of the recent new round of industrial transformation, most existing studies rely on static cross-sectional data or single base-year tables. This makes it difficult to continuously and dynamically map the structural path transitions through which the digital economy stimulates macroeconomic output. Therefore, comprehensively mapping the macroeconomic effects of the digital economy and deeply analyzing its micro-transmission pathways serves as a crucial lever for deepening the integration of the digital and real economies and promoting the high-quality development of the national economy. The marginal contributions of this paper lie in two aspects: Firstly, utilizing the compiled digital economy Social Accounting Matrices (SAMs) for the corresponding years from 2018 to 2023, it dynamically reveals the structural transitions of the pathways through which the digital economy stimulates macroeconomic output. Secondly, by extending the IO model to a SAM general equilibrium framework, it quantitatively identifies the domestic demand-induced effects that are traditionally underestimated by conventional methods.

This paper focuses on the current focal issue of the digital economy empowering the high-quality development of the macroeconomy amidst the new round of scientific and technological revolution. Building upon a scientific definition of the digital economy industries, and based on the input-output tables published by the National Bureau of Statistics from 2018 to 2023, this study compiles the digital economy Social Accounting Matrices (SAMs) for the corresponding years. Furthermore, it extends traditional input-output analysis to a SAM general equilibrium framework. By comprehensively employing the IO model, SAM multiplier decomposition, and Structural Path Analysis (SPA), this paper systematically analyzes the scale characteristics and critical roles of the digital economy from two dimensions: basic industrial characteristics and macroeconomic effects. Additionally, it deeply explores the driving patterns and transmission mechanisms of the digital economy on macroeconomic output, aiming to provide solid theoretical support and a quantitative basis for deepening the integration of the digital and real economies and optimizing macroeconomic resource allocation.

2 Research Design

2.1 Definition of the Digital Economy Industry

Before measuring the economic effects of the digital economy, it is first necessary to clarify the concept and scope of the digital economy industry. Currently, the definitions and measurement standards for the digital economy industry are relatively mature, primarily divided into two approaches: narrow-scope and broad-scope definitions. The narrow-scope digital economy industry refers to the digital technology production and service sectors, including the Information and Communication Technology (ICT) industry, e-commerce, and digital media. The broad-scope digital economy industry encompasses not only the digital technology production and service sectors but also the sectors where the digital economy integrates with the national economy[21]-[23]. This paper adopts the broad-scope definition of the digital economy industry. Using the Statistical Classification of the Digital Economy and its Core Industries (2021) issued by the National Bureau of Statistics as the standard, and with reference to the Industrial Classification for National Economic Activities (GB/T 4754-2017), this study categorizes and defines the digital economy industries across the 153 sectors of China's input-output (IO) tables.

It is worth noting that certain sectors simultaneously involve both digital and non-digital production activities, such as the wholesale, retail, construction and installation, and leasing sectors. These are referred to as "incompletely digital economy sectors." Including these sectors in their entirety or excluding them completely from the defined scope would lead to either an overestimation or underestimation of the actual scale of the digital economy. In view of this, to accurately isolate the digital components within these sectors, this paper refers to the accounting frameworks of Xu Xianchun, Tian Jinfang, and others. Based on the theoretical assumption that "the proportion of intermediate consumption of the digital economy to its total output is identical to the proportion of intermediate consumption of the corresponding industry to its total output," this study introduces the "digital economy separation coefficient"[24][25]. Furthermore, the proportion of net fixed assets and the proportion of employed personnel are selected to approximate the proportion of value-added for calculating the digital economy separation coefficient. This serves as the core basis for extracting the digitalized components from the incompletely digital economy sectors, with the results shown in Table 1.

Table 1: Separation Coefficients of the Digital Economy Industry

Sector	2018	2020	2023
Printed matter and recorded media	0.006	0.005	0.003
Cultural, educational, sporting, and recreational goods	0.025	0.013	0.011

Specialized chemical products, explosives, pyrotechnics, and fireworks	0.033	0.059	0.066
Cultural and office machinery	0.236	0.223	0.230
Other general-purpose equipment	0.298	0.335	0.471
Other special-purpose equipment	0.424	0.602	0.325
Power transmission, distribution, and control equipment	0.499	0.530	0.599
Wires, cables, optical cables, and electrical equipment	0.549	0.547	0.547
Other electrical machinery and equipment	0.429	0.385	0.586
Instruments and meters	0.569	0.598	0.653
Stadiums and other building constructions	0.081	0.080	0.080
Other civil engineering construction	0.093	0.092	0.090
Building installation	0.076	0.282	0.592
Wholesale	0.197	0.201	0.208
Retail	0.104	0.096	0.085
Monetary, financial, and other financial services	0.676	0.673	0.669
Leasing	0.020	0.020	0.020
Business services	0.095	0.087	0.076
Research and experimental development	0.605	0.604	0.604
Professional and technical services	0.026	0.026	0.025
Technology promotion and application services	0.170	0.218	0.290
Other services	0.047	0.047	0.046
News and publishing	0.147	0.174	0.214

2.2 Data Basis

Firstly, the acquisition of basic macroeconomic data. This paper uses the China input-output (IO) tables for 2018, 2020, and 2023 published by the National Bureau of Statistics as the underlying data. To ensure the consistency of statistical coverage, this paper consolidates the 211 sectors of the 2023 IO table into 153 sectors, thereby aligning them with the sector classification standards of the 2018 and 2020 IO tables and ensuring comparability for the research analysis. Secondly, the consolidation of digital economy sectors. The 153 national economic sectors in the IO tables are categorized into 11 fully digital economy sectors, 23 incompletely digital economy sectors, and 119 fully non-digital economy sectors. On this basis, utilizing data on net fixed assets and employed personnel from the China Economic Census Yearbook and the China Industry Statistical Yearbook for the corresponding years, the digital economy separation coefficients are calculated. Missing values are filled using the linear interpolation method. The digitalized components within the 23 incompletely digital economy sectors are precisely isolated, split, and reconstructed, ultimately resulting in the construction of a digital economy IO table comprising 176 sectors. Finally, the construction of the Social Accounting Matrix. Based on the reconstructed IO tables mentioned above, and referring to the compilation framework of Gao Ying et al.[26] , this paper further expands and compiles the digital economy Social Accounting Matrices (SAMs) for the corresponding three years. The macroeconomic system of this matrix encompasses commodity accounts, activity accounts, factor accounts (subdivided into labor and capital), institutional accounts (subdivided into households, enterprises, and the government), capital accounts, inventory change accounts, and rest of the world accounts.

2.3 Research Methods

2.3.1 IO Model

The input-output (IO) model can comprehensively map the dynamic network linkages among various sectors of the national economy across production, distribution, and consumption, serving as a powerful tool for revealing the quantitative relationships of interdependence and constraint among industries[27]. Based on the reconstructed digital economy IO table, this paper first evaluates the industrial scale and development level of the digital economy, and further explores its driving role and supporting effects on other economic sectors.

(1) Digitalization Scale and Digitalization Level

To accurately assess the industrial scale and development level of the digital economy, referencing the studies by Zhang Qing, Yu Jinping, and others[28] , this paper measures the indicators of digitalization scale and digitalization level from the perspective of backward industrial linkages based on the Leontief inverse matrix in the digital economy IO model. The specific measurement process is as follows:

The digitalization scale of a sector refers to the total output of the digital economy industries that is fully induced by the sector tracing backwards through the industrial chain to meet its unit final demand. Let the Leontief inverse matrix be $L = (I - A)^{-1} = \left[l_{ij}\right]$, the calculation formula is as follows:

$$DS_j = Y_j \sum_{i=1}^{k} l_{ij}$$

Where DS_j is the total backward–induced digitalization scale of sector j; Y_j is the final use of sector j; l_{ij} is the element in the Leontief inverse matrix L, representing the complete consumption of sector i induced by a one-unit increase in the final use of sector j; and k is the total number of digital economy industry sectors.

The sectoral digitalization level refers to the proportion of the digitalization scale induced by the sector to its backward-induced total output of the entire economy. The calculation formula is as follows:

$$DI_j = \frac{DS_j}{TS_j} \times 100\% = \frac{Y_j \sum_{i=1}^{k} l_{ij}}{Y_j \sum_{i=1}^{n} l_{ij}} \times 100\%$$

Where DI_j is the backward digitalization level of sector j; TS_j is the total output scale of the entire economy backward-induced by sector j to meet its unit final demand; and n represents the total number of sectors.。

(2) Influence Coefficient and Sensitivity Coefficient

To further analyze the macroeconomic two-way linkage effects of the digital economy industry, this paper calculates the influence coefficient and sensitivity coefficient to measure the backward driving role and forward supporting effects of the digital economy industry on other economic sectors.

The influence coefficient reflects the extent of the production demand ripple effect generated on other sectors when a specific digital economy sector increases its final use by one unit. The calculation formula is as follows:

$$F_j = \frac{\sum_{i=1}^{n} l_{ij}}{\frac{1}{n} \sum_{j=1}^{n} \sum_{i=1}^{n} l_{ij}}$$

Where the numerator is the sum of the elements in the j-th column of the Leontief inverse matrix, representing the backward complete pulling scale of the digital economy sector j on all sectors of the entire economy; the denominator is the social average of the column sums of all sectors. If $F_j > 1$, it indicates that the backward driving role of this digital economy sector on the macroeconomy is significantly stronger than the average level of the entire economy.

The sensitivity coefficient reflects the degree of demand sensitivity experienced by a specific digital economy sector when all other sectors each increase their final use by one unit. The calculation formula is as follows:

$$E_i = \frac{\sum_{j=1}^{n} l_{ij}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} l_{ij}}$$

Where the numerator is the sum of the elements in the i-th row of the Leontief inverse matrix, representing the forward complete pulling scale experienced by the digital economy sector i from the entire economy; the denominator is the social average of the row sums of all sectors. If $E_i > 1$, it indicates that the forward supporting effect of the digital economy sector on the macroeconomy is significantly stronger than the average level of the entire economy.

2.3.2 SAM Model

The Social Accounting Matrix (SAM) is a microcosm of the national economic cycle. It effectively addresses the limitations of traditional input-output models, which are confined to the production stage, and serves as a fundamental tool for comprehensively mapping the macroeconomic closed-loop system and accurately capturing deep induced effects[29] . Based on the constructed digital economy SAM, this paper employs SAM multiplier decomposition and Structural Path Analysis (SPA) to deeply analyze the driving effects of the digital economy on the macroeconomy and its micro-transmission mechanisms.

(1) SAM Multiplier Decomposition

The multiplier model can be used to study the extent of the impact that shocks to exogenous accounts have on endogenous accounts throughout the entire economic system. The IO multiplier is the sum of the corresponding column in the Leontief inverse matrix and is used to measure the impact of exogenous changes in final demand on the output of other sectors in the economy. However, it is limited by only covering the production domain and the primary distribution of income. In contrast, the SAM multiplier can quantitatively identify the traditionally underestimated effects of domestic demand-driven growth. It extends the impact of changes in exogenous demand from the production sphere to the entire socio-economic system, thereby better reflecting the status and role of various sectors within that system[30].In this section, this study categorizes commodity, activity, factor, and institutional (household and enterprise) accounts as endogenous accounts, while categorizing institutional (government), capital, inventory changes, and rest of the world accounts as exogenous accounts. The SAM multiplier decomposition is then calculated as follows:

Based on the account balance relationships of the SAM, the income identity for endogenous accounts can be expressed as:

$$y_n = A_n y_n + x = (I - A_n)^{-1}x = M_a x$$

Where y_n is the income vector of endogenous accounts, x is the investment vector of exogenous accounts, A_n is the average expenditure propensity matrix, and M_a is the account multiplier matrix.

Based on the economic attributes of the accounts, the endogenous average expenditure propensity matrix $A_n$is decomposed into a diagonal block matrix $A_{n1}$and an off–diagonal block matrix A_{n2}, namely $A_n = A_{n1} + A_{n2}$. Specifically, A_{n1} contains only the diagonal block matrices, reflecting the direct expenditure linkages within each subsystem; A_{n2} contains the off-diagonal block matrices, reflecting the cross-expenditure linkages between different subsystems. To reveal the different transmission levels of the digital economy within macroeconomic operations, the total account multiplier matrix M_a can be decomposed into the product of three multiplier matrices. The formulas are as follows:

$$M_a = M_{a3}M_{a2}M_{a1}$$
$$M_{a1} = (I - A_{n1})^{-1}$$
$$M_{a2} = I + M_{a1}A_{n2} + (M_{a1}A_{n2})^2$$
$$M_{a3} = [I - (M_{a1}A_{n2})^3]^{-1}$$

In the formulas, M_{a1} epresents the intra-group transfer multiplier matrix, reflecting the direct and indirect pulling effects within the production system triggered solely by the upstream and downstream intermediate input-output linkages of the core digital economy industries. M_{a2} represents the open-loop spillover multiplier matrix, reflecting the primary distribution spillover effect where the output expansion of the digital economy is unidirectionally converted into factor returns and flows into institutional accounts. M_{a3} represents the closed-loop feedback multiplier matrix, reflecting the global endogenous circular induction effect where the digital economy, after increasing factor and institutional income, feeds back into and stimulates the macroeconomic production system through the stimulation of consumption demand.

(2) Structural Path Analysis

To further measure the specific transmission process of external shocks within the complex economic network, this paper adopts the Structural Path Analysis (SPA) method. This approach reveals the influence paths and action mechanisms of the digital economy on the non-digital economy, providing a clearer demonstration of how the digital economy affects different economic entities. The specific measurement process is as follows:

Structural Path Analysis treats the SAM as a network, where endogenous accounts are viewed as nodes and the average expenditure propensity a_{ji} between accounts is viewed as a directed arc connecting node i (the producer) and node j (the consumer). The numerical value represents the arc strength. Based on the levels of shock transmission, SPA decomposes the ripple effects of the digital economy industry on other sectors into the following three core indicators:

Direct Influence: Suppose there exists an elementary path p=(i→x→y→j) from the origin account \$i\$ to the destination account \$j\$ that does not pass through repetitive nodes. The direct influence $I^D_{(i\to j)p}$ of this path is the product of the arc strengths between all adjacent nodes along that path:

$$I^D_{(i\to j)p} = a_{jy}a_{yx}a_{xi}$$

Total Influence: When an exogenous shock is transmitted along an elementary path, it undergoes continuous circulation and amplification due to the existence of closed feedback loops. The total influence $I^T_{(i\to j)p}$ is the result of the direct influence being magnified by these loop effects:

$$I^T_{(i\to j)p} = I^D_{(i\to j)p}M_p$$

Where M_p is the path multiplier, reflecting the cyclic amplification factor generated by all local feedback loops attached to this elementary path.

Global Influence: The global influence $I^G_{(i\to j)}$ from the origin account i to the destination account j covers the cumulative final effect generated after the initial shock is transmitted through all possible paths, which is the sum of the total influences of all elementary paths:

$$I_{(i\to j)}^{G} = \sum_{p=1}^{n} I_{(i\to j)p}^{T} = m_{ji}$$

3 Research Results

3.1 Evolutionary Characteristics of the Digitalization Scale in the Digital Economy Industry

To scientifically measure the evolutionary trends of the digital economy industry's scale, this paper calculates the digitalization scale of each sector from the perspective of backward industrial linkages—specifically, using digital inputs in the sector's final output to characterize its digitalization scale. The results are shown in Figure 1.

China's digitalization scale increased continuously from 2018 to 2023, rising from 42.54 trillion RMB in 2018 to 70.38 trillion RMB in 2023, an increase of 65.44%. This indicates that China's digital economy industry is experiencing a rapid growth trend and serves as the core driving force for the high-quality development of the national economy. Breaking it down by sector, as shown in Figure 1: In 2018, the top five sectors by digitalization scale were communication equipment, computers, software services, electronic components, and research and experimental development. The bottom five were leasing; printed matter and recorded media; specialized chemical products, explosives, pyrotechnics, and fireworks; other services; and professional and technical services. In 2020, the top five sectors were software services, communication equipment, computers, electronic components, and research and experimental development. The bottom five were printed matter and recorded media; leasing; specialized chemical products, explosives, pyrotechnics, and fireworks; cultural, educational, sporting, and recreational goods; and other services. In 2023, the top five sectors were software services, communication equipment, information technology services, computers, and building installation. The bottom five were printed matter and recorded media; leasing; cultural, educational, sporting, and recreational goods; specialized chemical products, explosives, pyrotechnics, and fireworks; and professional and technical services. It is evident that the top five sectors account for the vast majority of the digitalization scale. In 2023, the digitalization scales of the two core sectors—software services and communication equipment—reached as high as 6.29 trillion RMB and 5.81 trillion RMB, respectively; these sectors constitute the primary components of the digital economy. Conversely, the sectors in the bottom five have extremely small digitalization scales, generally under 20 billion RMB. For instance, the digitalization scale of printed matter and recorded media in 2023 was only 182 million RMB. The digitalization process in these sectors may be constrained by objective factors such as strong traditional physical attributes or limited application scenarios, resulting in a smaller digital volume. Nevertheless, they remain indispensable components for building an all-encompassing, all-factor digital economy.

From 2018 to 2023, modern information service sectors exhibited robust growth momentum. Specifically, information technology services surged from 166.80 billion RMB in 2018 (ranked 21st) to 5.29 trillion RMB in 2023 (ranked 3rd), a 30-fold increase. Internet and related services grew from 457.04 billion RMB in 2018 (ranked 12th) to 2.06 trillion RMB in 2023 (ranked 9th), a 3.5-fold increase. Notably, since 2020, the digitalization scale of software services reached 5.36 trillion RMB, surpassing communication equipment to take the top spot and becoming the largest sub-sector of the digital economy. This indicates that China’s digital economy dividends are accelerating their extension toward high-value-added, knowledge-intensive services. In contrast, some hardware manufacturing sectors faced a trend of scale fluctuation and contraction. The computer sector fluctuated downward from 3.68 trillion RMB in 2018 (ranked 2nd) to 3.09 trillion RMB in 2023 (ranked 4th). Similarly, audio-visual equipment decreased from 909.05 billion RMB in 2018 (ranked 8th) to 855.09 billion RMB in 2023 (ranked 13th). These shifts suggest that between 2018 and 2023, the growth engine of China's digital economy gradually shifted from hardware manufacturing toward modern information services.

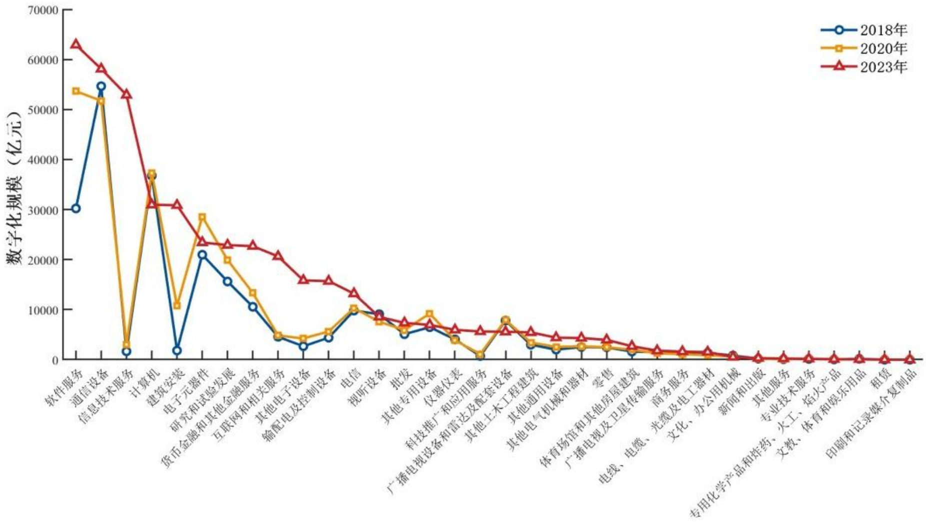

Figure 1: Digitalization Scale of Digital Economy Sub-sectors (2018–2023)

3.2 Evolutionary Characteristics of Industrial Linkages in the Digital Economy Industry

To quantitatively measure the linkage effects between the digital economy industry and other economic sectors, this paper calculates the sensitivity coefficient (representing forward linkages) and the influence coefficient (representing backward linkages). These are combined with the digitalization degree of each sub-sector to construct a four-quadrant bubble chart (Figure 2), enabling a deep analysis of the digital economy's status as a core hub and its evolutionary characteristics within the macroeconomic network.

China's degree of digitalization exhibited a steady upward trend from 2018 to 2023, reaching 17.59% by 2023—a cumulative increase of approximately 3.35 percentage points. Furthermore, between 2018 and 2023, more than 18 digital economy sub-sectors were consistently positioned to the right of the vertical baseline in the four-quadrant chart. This indicates that the influence coefficients of the vast majority of digital economy sectors are greater than 1, demonstrating that most digital economy sectors exert a powerful backward linkage and demand-pull effect on the national economy. At the same time, over 24 digital economy sub-sectors are distributed below the horizontal baseline of the four-quadrant chart, meaning that approximately 70% of digital economy sectors have a sensitivity coefficient of less than 0.5. This suggests that the forward linkage effects of the majority of digital economy sectors remain relatively weak; their role as intermediate inputs providing supply support to downstream industries is limited, with output flowing more significantly into final consumption, investment, and other application segments.

Analyzing by quadrant, as shown in Figure 2: First Quadrant (High Influence, High Sensitivity): This area primarily concentrates hardware manufacturing sectors such as communication equipment, computers, electronic components, and power transmission and control equipment. These sectors generally exhibit a high degree of digitalization. They not only drive the development of upstream industries but also serve as critical intermediate products supporting the production activities of downstream industries, playing a vital role as two-way linkage hubs Second Quadrant (Low Influence, High Sensitivity): This quadrant mostly comprises modern information service sectors, including monetary, financial, and other financial services, information technology services, telecommunications, and internet and related services. These sectors show an extremely high degree of digitalization. While their demand-pull effect on upstream industries is relatively limited, they act as core service factors widely integrated into the operations of various national economic sectors, exerting a significant forward supply-support effect. Third Quadrant (Low Influence, Low Sensitivity): This quadrant mainly covers traditional service sectors such as retail, leasing, and other services. The digitalization degree of these sectors is generally low, and their input-output linkages with other sectors are relatively weak. Their pulling effect on the upstream and support for the downstream are both below the social average, placing them in a relatively isolated position. Fourth Quadrant (High Influence, Low Sensitivity): This includes specialized equipment sectors like cultural and office machinery, audio-visual equipment, and other electrical machinery. These sectors have a relatively lower degree of digitalization but exert an extremely significant scale-pulling effect on upstream industries. Their forward support effect is relatively weak, characterized by distinct demand-driven features.

From 2018 to 2023, sectors represented by internet and related services and information technology services transitioned from the second quadrant to the first quadrant, accompanied by a deepening degree of digitalization. This indicates that the demand-pull effect of these modern information services on upstream industries is continuously strengthening, evolving them into two-way linkage hubs with both strong supply support and strong demand pull. Meanwhile, sectors such as audio-visual equipment and cultural and office machinery remain in the fourth quadrant with a slight increase in digitalization. This suggests that specialized equipment sectors oriented toward consumption and investment continue to maintain robust scale-pulling efficiency on upstream industries, playing a key role in maintaining the internal demand resilience of the digital economy industrial chain.

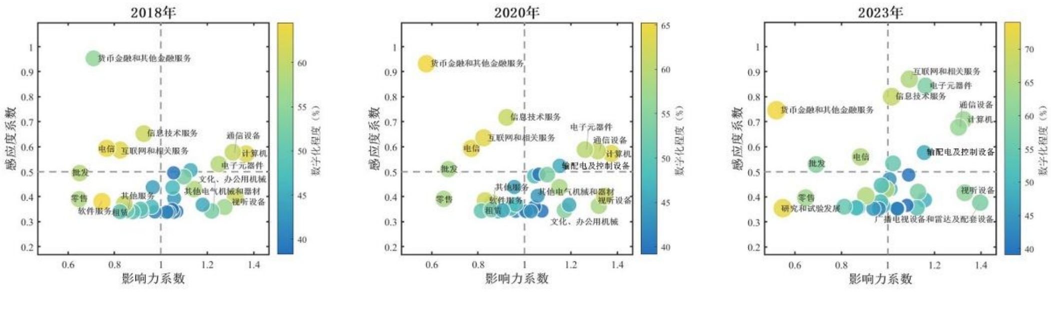

Figure 2: Influence and Sensitivity Coefficients of Digital Economy Sub-sectors (2018–2023)

3.3 Multiplier Effect Analysis of the Digital Economy Industry

To systematically capture the driving role of the digital economy industry within the macroeconomic network, this section introduces IO and SAM multiplier analysis methods to quantify the global pulling effects of various digital economy sub-sectors on the overall economic scale. The measurement results are shown in Figures 3 and 4.

According to Figure 3, from 2018 to 2023, the SAM multipliers of digital economy sub-sectors were distributed within the 4.5–8.5 range, while the IO multipliers were distributed within the 1–4 range; in all cases, the SAM multipliers were significantly larger than their corresponding IO multipliers. The reason for this phenomenon lies in the fact that the IO model only depicts the direct and indirect technical-economic linkages between industries. In contrast, the SAM model further endogenizes factor returns and household consumption behavior, accurately capturing the macroeconomic induced effects stimulated by the income distribution closed-loop. This reflects that the development of the digital economy industry not only brings about an increase in intermediate inputs but also creates a substantial amount of high-value-added employment and corporate profits. The digital economy has increasingly become the core engine for increasing national wealth, enhancing resident welfare, and driving the domestic demand cycle.

Further comparing the differences between the IO and SAM multipliers across various sectors reveals significant heterogeneity in economic influence following external shocks, driven by sector-specific characteristics such as factor intensity and industrial chain features. Notably, the values and rankings of IO and SAM multipliers for many sectors exhibit a sharp contrast. Specifically, from 2018 to 2023, sectors such as cultural, educational, sporting, and recreational goods; printed matter and recorded media; other civil engineering construction; stadiums and other building constructions; news and publishing; technology promotion and application services; and business services showed SAM multipliers significantly larger than their IO multipliers. Furthermore, their SAM multiplier rankings jumped by more than 10 positions compared to their IO rankings. The reason is that the first four sectors consist largely of light industry manufacturing and construction installation, which are characterized by high labor intensity, while the latter three are modern service sectors defined by high human capital intensity. Although these sectors have relatively short physical industrial chains, a high proportion of their incremental output is converted into employee compensation and benefits. This factor income exerts a powerful pull on domestic demand within the income-consumption closed-loop, leading to the dramatic leap in their SAM multiplier rankings. Conversely, from 2018 to 2023, sectors such as cultural and office machinery; communication equipment; audio-visual equipment; computers; instruments and meters; other electronic equipment; and electronic components exhibited SAM multipliers larger than their IO multipliers, yet their IO multiplier rankings were more than 10 positions higher than their SAM rankings. This is attributed to the fact that these sectors are primarily involved in digital hardware manufacturing and specialized equipment production, which are capital-intensive and technology-intensive. On one hand, their physical industrial chains are relatively long, possessing strong technical linkages and pulling efficiency within the production system, which keeps their IO multiplier rankings at the forefront. On the other hand, due to the high organic composition of capital, the proportion of incremental output converted into employee compensation is relatively limited. Consequently, the domestic demand-pull effect stimulated within the income-consumption closed-loop is comparatively weak. Thus, these sectors present a contrasting pattern where IO multiplier rankings significantly lead their SAM multiplier rankings.

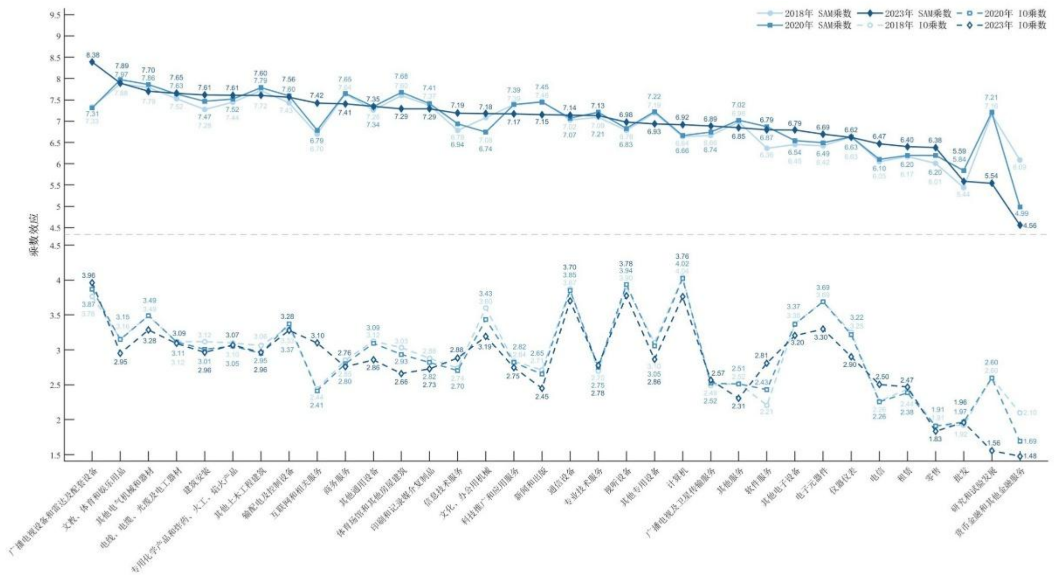

Figure 3: Comparison of IO Multipliers and SAM Multipliers of the Digital Economy (2018–2023)

Since the decomposition effects of the SAM multiplier provide a more comprehensive reflection of the economic impact of digital economy sectors, this paper further conducts a decomposition analysis of the SAM multipliers. According to Figure 4: In 2018, a total of 28 sectors exhibited relatively large net transfer effects. The top eight sectors were: other electrical machinery and equipment; broadcasting and television equipment, radar and supporting equipment; power transmission, distribution, and control equipment; communication equipment; cultural, educational, sporting, and recreational goods; computers; audio-visual equipment; and specialized chemical products, explosives, pyrotechnics, and fireworks. Additionally, 6 sectors showed relatively large net closed-loop effects, namely: other services; research and experimental development; retail; software services; monetary, financial, and other financial services; and wholesale. In 2020, the number of sectors with relatively large net transfer effects decreased to 27. The top eight sectors evolved into: other electrical machinery and equipment; power transmission, distribution, and control equipment; broadcasting and television equipment, radar and supporting equipment; cultural, educational, sporting, and recreational goods; communication equipment; audio-visual equipment; wires, cables, optical cables, and electrical equipment; and computers. Meanwhile, the number of sectors with relatively large net closed-loop effects increased to 7, including: other services; retail; research and experimental development; software services; internet and related services; wholesale; and monetary, financial, and other financial services. In 2023, the number of sectors with relatively large net transfer effects remained at 27. The top eight were: broadcasting and television equipment, radar and supporting equipment; communication equipment; audio-visual equipment; power transmission, distribution, and control equipment; computers; other electrical machinery and equipment; wires, cables, optical cables, and electrical equipment; and specialized chemical products, explosives, pyrotechnics, and fireworks. There were 7 sectors with relatively large net closed-loop effects: retail; other services; news and publishing; research and experimental development; telecommunications; wholesale; and monetary, financial, and other financial services. Overall, from 2018 to 2023, approximately 80% of digital economy sectors were dominated by the net transfer effect, while approximately 20% held a relative advantage in the net closed-loop effect. The reason is that the former are predominantly digital hardware manufacturing and specialized equipment production sectors, which generate larger transfer effects within production accounts. In contrast, the latter are mostly service sectors, whose influence is more prominently reflected in the income circulation and transfer effects among endogenous accounts.

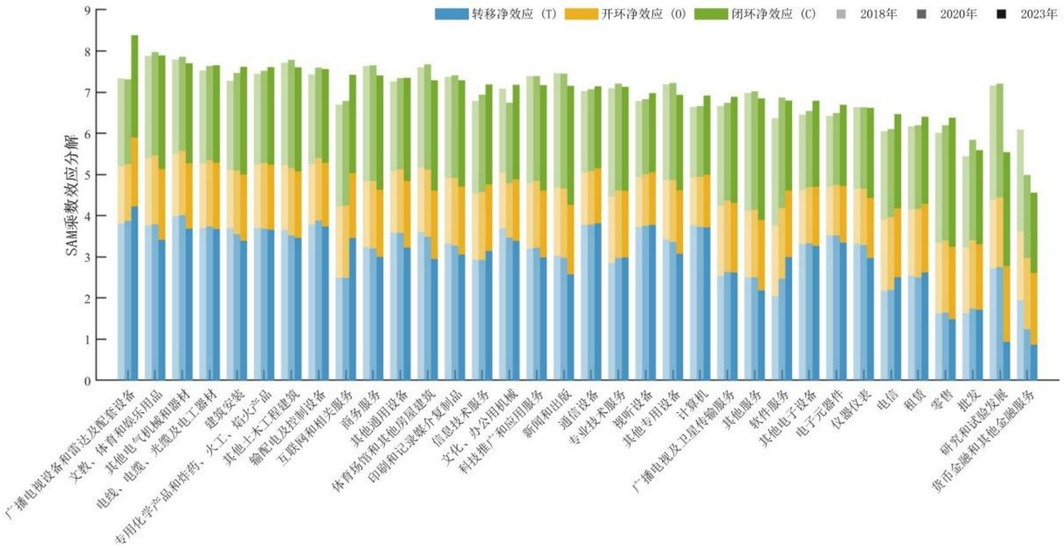

Figure 4: SAM Multiplier Effects of the Digital Economy Industry (2018–2023)

3.4 Structural Path Decomposition of the Digital Economy Industry

To further explore the specific transmission channels through which the digital economy industry exerts its pulling effects on the macroeconomy, this paper employs Structural Path Analysis (SPA). Given that the Global Influence indicator organically combines the direct transmission efficiency of a path with its associated closed-loop feedback effects, it serves as a superior measure for evaluating the absolute pulling weight of specific transmission paths within the economic network. Therefore, using Global Influence as the screening criterion, this study extracts the top 10 core transmission paths for the period 2018–2023. The results are presented in Tables 2 through 4 below. Selecting the transmission paths of core industries helps identify their functional roles and provides a basis for optimizing their impact.

According to Table 2, in 2018, the origins of the top ten core paths in the digital economy industry included specialized equipment sectors such as cultural, educational, sporting, and recreational goods and specialized chemical products, explosives, pyrotechnics, and fireworks. They also encompassed service sectors like business services and research and experimental development, as well as hardware manufacturing sectors such as communication equipment, other communication equipment, and cultural and office machinery. The intermediate stages of these ten paths were largely concentrated in basic material sectors, such as paper and paper products, plastic products, and basic chemical raw materials, as well as traditional energy sectors like refined petroleum and nuclear fuel processing and coal processing products. The path destinations were primarily focused on heavy chemical industries and mineral mining sectors, including metal products, ferrous metal mining and dressing, daily chemical products, and iron and ferroalloy products. Specifically, the top-ranked core path was: Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products → Waste resources and materials recovery and processing → Repair services for metal products, machinery, and equipment. When 100 units are injected into the "cultural, educational, sporting, and recreational goods" sector, it results in a 2.8-unit increase in the output of "repair services for metal products, machinery, and equipment." This specific path accounts for 87.80% of its total influence, primarily facilitating transmission through the intermediate paper products and waste recycling sectors.

Table 2: Structural Path Decomposition of the Digital Economy Industry (2018)

No.	Transmission Path	Total Influence	Direct Influence	Path Multiplier	Global Influence	Path Transmission Weight
1	Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products → Waste resources recovery and processing → Repair services for metal products, machinery, and equipment	0.032	0.019	1.491	0.028	87.801
2	Cultural and office machinery → Basic chemical raw materials → Fertilizer → Electricity and heat production and supply → Gas production and supply	0.095	0.014	1.699	0.023	24.316
3	Other electrical machinery and equipment → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products → Non-ferrous metal mining and dressing products → Non-metallic mineral mining and dressing products	0.051	0.015	1.201	0.018	36.238
4	Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products → Specialized chemical products, explosives, pyrotechnics, and fireworks → Cultural and office machinery	0.051	0.012	1.542	0.018	34.586
5	Specialized chemical products, explosives, pyrotechnics, and fireworks → Plastic products → Cement, lime, and gypsum → Synthetic materials → Daily chemical products	0.082	0.012	1.375	0.017	20.189
6	Business services → Refined petroleum and nuclear fuel processing products → Coal processing products → Oil and natural gas extraction products → Ferrous metal mining and dressing products	0.021	0.015	1.060	0.016	74.725
7	Other general purpose equipment → Plastic products → Cement, lime, and gypsum → Synthetic materials → Daily chemical products	0.050	0.010	1.375	0.014	29.077
8	Communication equipment → Electronic components → Other electronic equipment → Non-ferrous metal rolling and processing products → Metal products	0.035	0.008	1.609	0.014	39.252
9	Research and experimental development → Printed matter and recorded media → Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products	0.076	0.010	1.392	0.014	17.782
10	Other special purpose equipment → Metal products → Boilers and motive power equipment → Steel rolling products → Iron and ferroalloy products	0.125	0.010	1.267	0.013	10.545

In 2020, at the path origins, sectors such as cultural, educational, sporting, and recreational goods and specialized chemical products continued to maintain strong ripple effects. Additionally, service sectors represented by information technology services saw a rise in their rankings. In the intermediate transmission stages, sectors like paper and paper products and plastic products continued to serve as key intermediaries, while the node functions of sectors such as electronic components and non-ferrous metals and alloys became more prominent. The path destinations gradually expanded to include energy sectors such as gas production and supply. Specifically, the top-ranked core path remained relatively stable: when 100 units are injected into the cultural, educational, sporting, and recreational goods sector, it results in a 3.0-unit increase in the output of repair services for metal products, machinery, and equipment. This path's influence accounts for 87.34% of its total impact, primarily facilitating transmission through the paper and paper products, arts and crafts products, and waste resources recovery and processing sectors.

Table 3: Structural Path Decomposition of the Digital Economy Industry (2020)

No.	Transmission Path	Total Influence	Direct Influence	Path Multiplier	Global Influence	Path Transmission Weight
1	Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products → Waste resources recovery and processing → Repair services for metal products, machinery, and equipment	0.035	0.020	1.480	0.030	87.335
2	Cultural and office machinery → Basic chemical raw materials → Fertilizer → Electricity and heat production and supply → Gas production and supply	0.100	0.014	1.706	0.024	24.071
3	Other electrical machinery and equipment → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products → Non-ferrous metal mining and dressing products → Non-metallic mineral mining and dressing products	0.048	0.015	1.206	0.018	37.359
4	Specialized chemical products, explosives, pyrotechnics, and fireworks → Plastic products → Cement, lime, and gypsum → Synthetic materials → Daily chemical products	0.081	0.011	1.369	0.016	19.403
5	Information technology services → Printed matter and recorded media → Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products	0.035	0.011	1.358	0.014	41.194
6	Communication equipment → Electronic components → Other electronic equipment → Non-ferrous metal rolling and processing products → Metal products	0.034	0.008	1.608	0.013	39.342
7	Other special purpose equipment → Metal products → Boilers and motive power equipment → Steel rolling products → Iron and ferroalloy products	0.119	0.010	1.263	0.013	11.038
8	Research and experimental development → Printed matter and recorded media → Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products	0.069	0.009	1.358	0.013	18.520

9	Instruments and meters → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products → Non-ferrous metal mining and dressing products → Non-metallic mineral mining and dressing products	0.026	0.010	1.206	0.012	46.718
10	Business services → Refined petroleum and nuclear fuel processing products → Coal processing products → Oil and natural gas extraction products → Ferrous metal mining and dressing products	0.017	0.011	1.063	0.012	72.239

In 2023, the path origins underwent a notable shift, becoming more concentrated in hardware manufacturing sectors such as other electrical machinery and equipment, communication equipment, and broadcasting and television equipment, radar, and supporting equipment. The intermediate transmission stages became more focused on electronic components and other electronic equipment, while the intermediary role of the electricity and heat production and supply sector became significantly more prominent. The path destinations primarily included sectors such as gas production and supply and non-ferrous metal rolling and processing products. Specifically, the top-ranked core path evolved: when 100 units are injected into the other electrical machinery and equipment sector, it results in a 3.8-unit increase in the output of gas production and supply. This specific path accounts for 26.34% of its total influence.

Table 4: Structural Path Decomposition of the Digital Economy Industry (2023)

No.	Transmission Path	Total Influence	Direct Influence	Path Multiplier	Global Influence	Path Transmission Weight
1	Other electrical machinery and equipment → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products → Electricity and heat production and supply → Gas production and supply	0.143	0.019	2.031	0.038	26.338
2	Cultural and office machinery → Basic chemical raw materials → Fertilizer → Electricity and heat production and supply → Gas production and supply	0.122	0.018	2.001	0.036	29.170
3	Cultural, educational, sporting, and recreational goods → Paper and paper products → Arts and crafts products → Agricultural products → Forest products	0.040	0.019	1.449	0.028	68.553
4	Specialized chemical products, explosives, pyrotechnics, and fireworks → Synthetic materials → Daily chemical products → Basic chemical raw materials → Fertilizer	0.073	0.016	1.389	0.022	30.810
5	Communication equipment → Electronic components → Other electronic equipment → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products	0.045	0.011	1.690	0.019	41.986
6	Business services → Refined petroleum and nuclear fuel processing products → Coal processing products → Oil and natural gas extraction products → Ferrous metal mining and dressing products	0.023	0.017	1.015	0.017	72.497

7	Broadcasting and television equipment, radar, and supporting equipment → Electronic components → Other electronic equipment → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products	0.049	0.009	1.690	0.016	32.963
8	Audio-visual equipment → Electronic components → Other electronic equipment → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products	0.063	0.009	1.690	0.016	25.145
9	Other special purpose equipment → Metal products → Boilers and motive power equipment → Steel rolling products → Iron and ferroalloy products	0.131	0.012	1.279	0.016	11.851
10	Instruments and meters → Non-ferrous metals and alloys → Non-ferrous metal rolling and processing products → Electricity and heat production and supply → Gas production and supply	0.104	0.007	2.031	0.014	13.060

Overall, from 2018 to 2023, the structural path transmission mechanism of the digital economy industry to the macroeconomy has exhibited distinct evolutionary characteristics: Shift in Path Origins: The starting nodes have transitioned from a mix of sectors, including cultural, educational, sporting, and recreational goods as well as information technology services, to a more concentrated focus on hardware manufacturing sectors like other electrical machinery and equipment and communication equipment. This indicates that the initial traction exerted by the digital economy on the macroeconomy is increasingly prioritizing physical equipment and infrastructure construction. Evolution of Intermediate Nodes: The core nodes in the transmission process have shifted from paper and paper products and plastic products toward electronic components, other electronic equipment, and electricity and heat production and supply. The prominence of these nodes suggests that the industrial chains upon which transmission relies are evolving toward technology-intensive and energy-transformation sectors. Changes in Path Destinations: The terminal points have moved from metal products and ferrous metal mining to a more concentrated focus on gas production and supply and non-ferrous metal rolling and processing. This shift demonstrates that the manufacturing of digital hardware and the construction of supporting facilities are generating significant derived demand for upstream critical technical materials and basic energy.

4 Conclusion and Policy Recommendations

4.1 Conclusion

Measuring the development scale and linkage networks of the digital economy industry, and identifying its economic effects and transmission mechanisms, provides essential reference value for promoting the deep integration of the digital economy with the real economy and driving high-quality development of the national economy. This paper systematically analyzes the evolutionary trends and empowerment patterns of China's digital economy industry from 2018 to 2023 across two levels and four dimensions: fundamental characteristics (digitalization scale, industrial linkages) and economic effects (multiplier effects, transmission paths). The conclusions are as follows:

(1) China's digitalization scale and degree exhibit a steady upward trend, with most digital economy sectors possessing extremely strong backward linkages and demand-pull effects.

Regarding the digitalization scale, the volume increased from 42.54 trillion RMB in 2018 to 70.38 trillion RMB in 2023, indicating a rapid growth momentum and serving as a core driver for

China's high-quality economic development. Specifically, modern information service sectors—represented by information technology services and internet-related services—showed significant scale increases. Since 2020, the digitalization scale of software services reached 5.36 trillion RMB, taking the top position. Conversely, hardware manufacturing sectors such as computers and audio-visual equipment exhibited a trend of fluctuating contraction. This suggests a strategic shift in the growth engine of China's digital economy from hardware manufacturing toward modern information services. Regarding industrial linkages, the digitalization degree rose steadily to 17.59% by 2023. Digital economy sectors generally characterize strong backward linkage effects but relatively weak forward linkage effects. Notably, sectors like internet services and IT services transitioned from "weak influence, high sensitivity" to "high influence, high sensitivity," evolving into two-way linkage hubs that provide both robust supply support and strong demand pull.

(2) The digital economy has become a core engine for stimulating economic growth, and its structural transmission paths display distinct evolutionary characteristics.

Regarding multiplier effects, the SAM multipliers for the digital economy were significantly higher than the IO multipliers from 2018 to 2023, establishing the digital economy as a core engine driving the "domestic demand cycle." Specifically, approximately 80% of digital economy sectors are dominated by net transfer effects, as they are primarily hardware manufacturing and specialized equipment sectors with large transfer effects within production accounts. In contrast, roughly 20% of sectors—mostly in services—hold a relative advantage in net closed-loop effects, which is manifested in the income circulation and transfer effects among endogenous accounts. Regarding transmission paths, the origins of digital economy paths became increasingly concentrated in sectors such as other electrical machinery and communication equipment. The intermediate nodes shifted toward electronic components and other electronic equipment, with their roles as intermediaries becoming more prominent. The path destinations converged toward gas production and supply and non-ferrous metal rolling. This indicates that the transmission mechanism of the digital economy is evolving into a structural pattern led by hardware equipment, which in turn induces increased input of upstream high-tech intermediate products and output from basic energy sectors.

4.2 Policy Recommendations

Based on the aforementioned research findings, the following policy recommendations are proposed to further leverage the macroeconomic efficiency of the digital economy, promote the deep integration of digital and real economies, and drive high-quality national economic development.

(1) Coordinate the Synergistic Development of Digital Industries and Deepen the Empowerment of the Real Economy via Digital Technology. In light of the shift in digital growth drivers toward information technology and internet services, and the fact that these service sectors have increasingly become two-way linkage hubs: First, the strong supply-support and demand-pull effects of the modern information service industry should be fully utilized. Encouraging the penetration of digital technologies, such as the Industrial Internet, into traditional manufacturing will elevate the overall digitalization level of the real economy. Second, addressing the scale contraction in hardware manufacturing sectors like computers and audio-visual equipment is crucial to stabilizing the physical industrial foundation of the digital economy. It is recommended to increase technical renovation in basic hardware manufacturing and promote synergy between hardware manufacturing and information services to maintain a balanced and robust industrial structure.

(2) Optimize Macro-demand and Supply Chain Systems Based on Multiplier Effects and

Transmission Paths. Given that SAM multipliers exceed IO multipliers and considering the evolution of micro-path structures, categorized guidance should be implemented: At the economic pulling level, categorized strategies should be implemented based on the dominant multiplier effects: For digital service sectors where net closed-loop effects prevail, priority should be given to refining factor markets and income distribution mechanisms. This ensures that industrial growth is effectively converted into household final consumption capacity, thereby unblocking the economic circulation between factor income and final consumption. For digital hardware sectors primarily driven by net transfer effects, the focus must be on reducing intermediate transaction costs between industries to enhance the efficiency of production account transfers. At the transmission level, in response to the structural evolution where the mechanism increasingly induces demand for upstream high-tech intermediate inputs and basic energy: Emphasis should be placed on bolstering the independent innovation capabilities of key intermediary nodes, such as electronic components and other electronic equipment, to safeguard the supply chain security of critical intermediate products. Simultaneously, addressing the clustering effect at the path terminals, it is necessary to coordinate the construction of relevant digital infrastructure with appropriate lead time. This will guarantee a stable supply of basic energy and strategic materials, including gas and non-ferrous metal rolling and processing products, from upstream sectors.

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