



## **Research on the Coordinated Development of Data Sharing and Economic Structure in Anhui Province**

Ling Jiang<sup>1</sup>, Yulu Zhou<sup>2,\*</sup>, Lili Ma<sup>2</sup>, Can Wang<sup>2</sup>

<sup>1</sup>School of Economics, Anhui University of Finance and Economics, Bengbu, Anhui, China

<sup>2</sup>School of Finance, Anhui University of Finance and Economics, Bengbu, Anhui, China

\*zyl2835588420@163.com

**Abstract:** In the era of "digitizing all things, all things are digital", data has become the basis for the development of all things, and the economic structure has been continuously optimized and upgraded. The promotion of data sharing and the coordinated development of the economic structure will also have a profound impact on the economic development of Anhui Province. Anhui Province is committed to breaking information barriers in big data processing, creating a safe and reliable data environment, and building a data audit and risk control environment. The current situation of data and information sharing is analyzed based on the research based on privacy computing, and the industrial structure under the economic structure is taken as the research route to mine the technical and economic situation under the data sharing. Combined with the transformation of economic structure, this paper analyzes the degree of transformation of secondary indicators in Anhui Province and the economic development trend of each city, analyzes the current situation of coordinated development of economic structure and data sharing, and puts forward relevant suggestions for promoting economic development through big data sharing.

**Keywords:** Data sharing; Private computing; Sharing model; Economic structure.

### **1. Introduction**

In recent years, the Pan-Yangtze River Delta regional economic cooperation in Anhui Province has been promoting the transformation and upgrading of the economic structure, but there is still a big gap compared with the surrounding provinces. How to seek breakthroughs and innovations in the ever-changing economic era is a huge

challenge for Anhui Province. . Under the premise that the scale of the economic market continues to expand, Internet technology and information technology continue to promote the optimization of the economic structure. Anhui Province should seize the opportunity, adapt to the new normal of the economy, vigorously promote the processing of data resources, break down information barriers and share big data, use data to promote the development of the economic structure, and further stimulate the economic growth of the province. As a basic resource for the development of various undertakings, data is accurately and effectively shared to provide information for the industrial structure, and both corporate departments and entities can obtain relevant information within a visible range. The data open sharing model based on privacy computing adopts five construction systems to efficiently collect various data. In terms of data collection, induction and disclosure, Anhui Province has a clear plan. Relying on the overall framework system of the JAC Big Data Center, it strengthens data processing, improves the timeliness and effectiveness of data sharing, and effectively guarantees the safety, order, and uniformity of data. Comprehensively promote the construction of "digital Jianghuai" to provide favorable guarantee for the transformation of economic structure. Anhui Province has established the "Anhui General Office" platform to realize information sharing and business coordination in government affairs. In terms of economic development, the data and information covering the whole province will form a complete and mature data system, integration and innovation, and effectiveness will have a qualitative leap. The infrastructure of network data is continuously optimized and configured, and comprehensive data sharing provides convenience for various financial individuals, thereby promoting the steady development of the entire economic market. The regional development pattern of "one circle and five districts" and the development of projects such as the integration of the Yangtze River Delta, coupled with the infusion of massive data, will promote the coordinated development of data sharing and economic structure in cities across the province.

## **2. Anhui Province Breaks Down Information Barriers to Share Big Data**

### **2.1 Status Quo of Data Sharing in Anhui Province under Information Barriers**

As an important basic strategic resource, data is of great significance in promoting economic and social development. To achieve the lawful and orderly sharing of public data, it is also necessary to focus on breaking down information barriers, and propose corresponding solutions to many problems such as privacy and security red lines, breeding black industrial chains, imperfect sharing information mechanisms, and potential competition in the industry. Since March 1, 2021, many places in Anhui have taken many initiatives to efficiently promote the collection and sharing of statistical

data resources. In view of the construction and operation of the big data sharing platform, the aggregation of data resource catalogs, and the use of "Internet + services", a more extensive investigation and research has been carried out, aiming to improve the utilization efficiency of data resources and benefit the development of various industries. Data sharing has a macro-oriented role in industrial development, taking Masteel as an example, as a leading steel enterprise in Anhui Province [1], the various supply and demand revenue data released by it are of great significance in investment evaluation; not only that, the data disclosure of the Photovoltaic Industry in Anhui clearly shows the income status of the photovoltaic equipment industry, and the expansion trend is becoming increasingly clear, further optimizing the industrial structure. The smooth flow of information source channels will further improve the unbalanced pattern of economic development in various cities, as of 2021 data, the overall economic development level of eastern cities and provincial capital cities in Anhui Province is higher than that of central and western cities, and the total economic volume of Hefei in 2020 exceeds trillion yuan for the first time, which plays a leading role in the economic development of the province.

## 2.2 How to break down the information barriers under the requirements of coordinated development

Data security cannot be guaranteed, key data is controlled by "leaders", and data sharing laws and mechanisms are imperfect. Anhui Province is trapped in a "data island" on the road to achieve effective data sharing to drive economic structure optimization. We must abandon the idea of data monopoly, and the key is to establish a reliable data security sharing platform, so that data can be "visible" and "intangible". To achieve "visibility", the current effective way is to use blockchain and artificial intelligence technology to achieve information sharing among multiple nodes. Huainan City, Anhui Province has used "blockchain" technology to precisely crack down on various violations in the cross-regional transaction cooperation, with a total of more than 334,000 on-chain records, more than 105,000 on-chain companies, and on-chain projects. More than 18,000 pieces, effectively promoting information sharing; "visible" should be "see clearly". Many people in the industry said that the original intention of many data sharing platforms was not "pure" enough, and the phenomenon of "data mixed with sand" abounds, and to solve the problem of data "credibility", it is possible to solve the problem of data "credibility" through cross-validation of machines and artificial intelligence. The authenticity of the data can be found, making the data more credible; how to make the people "invisible", privacy computing technology provides more professional ideas, and grasps the "security level" of data sharing. Anhui Fuyang Public Legal Service uses digital empowerment technology to package data, set permissions, and continuously optimize algorithms, which not only protects personal

privacy, but also improves work efficiency, and grasps the "safety" of data sharing.

### 2.3 "Regulatory Sandbox" promotes public data sharing

According to statistical data analysis, energy, steel, cement, non-ferrous metals, automobiles, and chemicals are the leading industries in Anhui Province. In the tertiary industry, the financial industry accounts for a relatively high proportion. Financial stability leads to economic stability. Innovative financial supervision models are not only conducive to financial. The development of science and technology enterprises is of great significance to the coordinated development of the economy.

The "regulatory sandbox" was first seen in the "Future of Fintech" published by the UK Government Science Office in March 2015. It is widely used in financial market supervision. This innovative supervision model is playing an increasingly prominent role in the field of digital governance. With the advancement of the pilot work, combined with privacy computing technology, it will be promoted between cities and enterprises. It is not only applied to the financial industry, but also creates a good "regulatory sandbox" ecosystem, which will further feed the real economy. Promote data sharing through the "regulatory sandbox" to further provide a foundation for leading industries, financial industries and other industries.



Figure 1. "Regulatory Sandbox" Ecosystem

### 3. Open Sharing of Data and Information Taking Privacy Computing as an Example

From the perspective of data analysis, the industrial structure and economic structure of Anhui Province have changed in the change of the times, which is inseparable from the integration and openness of data, circulation, sharing, and the emergence of data sharing methods to create a huge value space for economic development. While carrying out data sharing, breaking down information islands and data barriers, and establishing the coordinated development of the economic structure and data sharing in Anhui Province, safeguarding the interests of all parties, protecting the security of data and information, so that data can be shared, further providing support for the direction and structure of economic development, relying on privacy technology and new digital technologies, to achieve data in a complete state of sharing and

confidentiality, in order to achieve the purpose of privacy protection and data sharing, and build a scientific control, safe and efficient data sharing model as the core.

In the data sharing model based on privacy-based computing, there are three main parties: data providers, platform administrators, and data consumers [2]. Departments at all levels of economic services in Anhui Province are both data providers and data users. The platform administrator is responsible for providing an open data sharing platform and managing a secure data sharing space, and providing users with data sharing services based on privacy calculations. The data sharing model based on privacy computing mainly builds five support facilities based on data exchange and privacy computing: data exchange, unified key management, data quality management, privacy algorithm service, and business service.

### 3.1 Data exchange system.

In the data sharing model based on privacy computing, the participation in the information resources to provide exchange services, one is to exchange encrypted data directly to the data user, the other is to realize encrypted data storage, data exchange system to achieve batch transmission of data, the core of data exchange is to use different algorithms to protect data classification exchange to the corresponding database for update protection.

### 3.2 Unified Key Management System

Using homomorphic encryption and multi-party secure computing to protect data privacy [3], the premise is that unified key management is carried out, and the key generated by the system is sent to the data sharing parties, mainly including key generation, storage, distribution, backup, recovery, etc. Function.

### 3.3 Data Quality Management System

The sharing model developed based on data exchange will inevitably lead to inaccurate data provision and tampering by other behaviors in the process of data provision, management, and use. Data quality control starts from the source, and the data quality control system includes data standard management, quality plan management, data quality index management and data quality assessment. On the basis of clarifying the characteristics and rules of data, formulate a data quality plan in a unified manner, clarify the scope of data quality inspection and data quality control links, set up and manage data quality in a unified manner, and conduct evaluation reports based on the data quality uploaded by the data provider. Propose quality comprehensive analysis and evaluation, etc.

### 3.4 Privacy Algorithm Service System

In the section of data sharing based on privacy computing, the privacy algorithm is used reasonably to serve the system. The privacy computing service system selects appropriate data from the data platform shared by data providers from fully

homomorphic encryption, multi-party secure computing, federated learning, trusted execution environment, etc. to fuzzify the data, encrypts the original data, and prepares for data sharing, to support our development needs, use data to generate computing models, perform data modeling, and realize independent computing, collaborative computing, and data fusion computing in the case of data encryption. Privacy computing is a key technology used to protect data privacy from being leaked, and supports multi-party privacy computing protection.

### 3.5 Business service system

The business service system provides specific services for data users, uses privacy computing services to analyze data, generates calculation and system analysis results, and can support the special system usage requirements of data users, accelerating data processing on the basis of privacy computing data sharing [4].

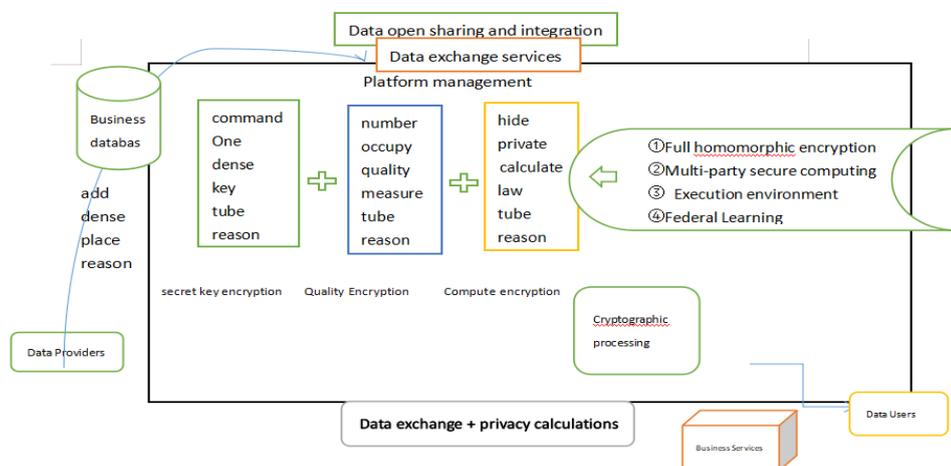


Figure 2. Data sharing model based on data exchange and privacy computing

## 4. Economic Development and Change Course of Anhui Province under the Transformation of Economic Structure

The transformation of the economic structure is a basic measure for adjusting the national economic sector and social reproduction, an essential means for economic development and improving economic quality and efficiency, and an inevitable choice for China to seek the happiness of the entire people. The 17th National Congress of the Communist Party of China pointed out that the economic structure has been transformed from mainly relying on the promotion of the secondary industry to drive the primary industry, the secondary industry, and the tertiary industry, comprehensive consideration of urban and rural, regional, socio-economic structure[5]. The "Thirteenth Five-Year Plan" pointed out that the proportion of strategic emerging industries should be increased, the secondary industry should be used to support the

accelerated development of the tertiary industry, and the connection channel between the secondary industry and the tertiary industry will be opened up, and the industrial structure will be further optimized.

At present, with the rapid development of big data, the Internet, and cloud sharing, the digital economy has become a big stage for economic competition in the new era, and the world has ushered in the digital era. The digital economy has led to the emergence of new information storage and transmission methods, and data exchange and data sharing have emerged as the times require. The level of information development of a region and a country begins to be reflected by the degree of data sharing. The integration and collision of the digital economy and the traditional economy has become a new research point for the industrial economic development of Anhui Province.

Taking 2006 to 2011 as the time node, the overall economic structure adjustment degree of Anhui Province is 3.10%, and the economic development strategy focuses on the optimization of economic development momentum and the improvement of people's livelihood security. In terms of economic structure adjustment and optimization, the transformation rate of Anhui's 6-year economic development mode is 11.93% [6].

Table 1. Transformation degree of economic development mode and secondary indicators

Year	Economic structure adjustment and optimization	Economic growth efficiency	Optimization of economic development power	Construction level of two oriente society	Government function	Improvement of people's livelihood security	Transformation of economic development mode
2006	43.09%	41.02%	42.67%	50.75%	53.16%	54.33%	46.99%
2007	43.56%	42.78%	43.84%	44.28%	50.78%	59.66%	47.20%
2008	44.14%	46.01%	46.81%	50.71%	56.73%	60.91%	50.24%
2009	44.43%	47.06%	45.22%	52.79%	58.39%	61.93%	50.97%
2010	44.30%	48.11%	47.18%	51.42%	61.12%	59.34%	51.12%
2011	44.43%	48.39%	51.53%	52.91%	56.32%	66.60%	52.59%
Degree of change	3.10%	17.96%	20.75%	4.25%	5.95%	22.57%	11.93%
Development type	Extensive and inefficient	Extensive and inefficient	Extensive and efficient	Extensive and efficient	Semi intensive type	Semi intensive type	Extensive and efficient

Since the 13th Five-Year Plan, Anhui Province has always followed the party's pace, implemented the important speeches and instructions of the Party Central Committee, emphasized the unity of the military and the people, forge ahead with goals, solidified the work arrangements for "six stability" and "six guarantees", and successfully completed the "13th Five-Year Plan". From 2016 to 2020, the economic development of Anhui Province has successfully achieved a phased transformation from "the total amount is in the middle, the per capita is behind" to "the total amount is in the front,

and the per capita is in the middle". In 2020, the gross domestic product (GDP) of Anhui Province was 3,868.060 billion yuan, ranking eleventh in the country. Compared with the previous year, the growth rate of the primary industry was 2.2%, and the growth rate of the secondary industry was 5.2%. The growth rate of the tertiary industry was 2.8%. The three industrial structures were adjusted from 7.9 : 40.6 : 51.5 of the previous year to 8.2 : 40.5 : 51.3. The economic structure was successfully adjusted from "231" to "321". In 2020, the high-tech industry module will increase by 16.4%, accounting for 43.8%, and the output value of strategic emerging industries will increase by 18%. At the same time, all strategic emerging industries are showing relative growth. In 2020, the regional innovation capability of Anhui Province is still in the first echelon of the country. The regional development pattern of "one circle and five districts" has gradually formed. The integrated development of the Yangtze River Delta has been successfully deepened into a national strategic development. The goals of each stage have been achieved one after another, and Anhui Province has developed in a coordinated manner. , innovative development, green development, open development, and shared development have made historic progress. In the face of the raging new crown epidemic, more serious flood disasters and complex internal and external environment, the Anhui Provincial Government united the people, completed the task with quality and quantity, successfully met the party's target requirements, and achieved the comprehensive and reasonable development goals of Anhui Province. The 14th Five-Year Plan has built a solid foundation and made full preparations.

By comparing the GDP of various cities in Anhui Province in the past three years to observe the economic development status of Anhui Province, the total GDP of Anhui Province will reach 3,868.06 billion yuan in 2020, an increase of 183.51 billion yuan over 2019, with an actual growth rate of 3.9% and a nominal growth rate of 4.98%. The total annual GDP reached 4,295.92 billion yuan, an increase of 427.86 billion yuan over 2020, with an actual growth rate of 8.3% and a nominal growth rate of 11.6%. The specific changes in each city are as follows.

Affected by the epidemic, the economic development has been affected to a certain extent, but the total GDP of Anhui Province is still showing a growth trend, and the growth rate is increasing. Anhui has taken appropriate measures to maintain internal economic stability and data maintenance, which has reduced many unnecessary losses. The economic development of Hefei City ranks high in the whole province, which is closely related to the overall overall planning. With the transformation of the economic structure, Hefei City has adjusted rapidly in its economic development, and in the financial economy, it has also explored the openness of public data to solve financing difficulties. A standardized database shall be constructed and tested in the whole city,

so as to give full play to the basic utility of data in the economic market. The development of the whole province is inseparable from the cooperation of various cities, building a provincial real-time data sharing mechanism for 12 departments, and supporting the operation of each department with massive data.

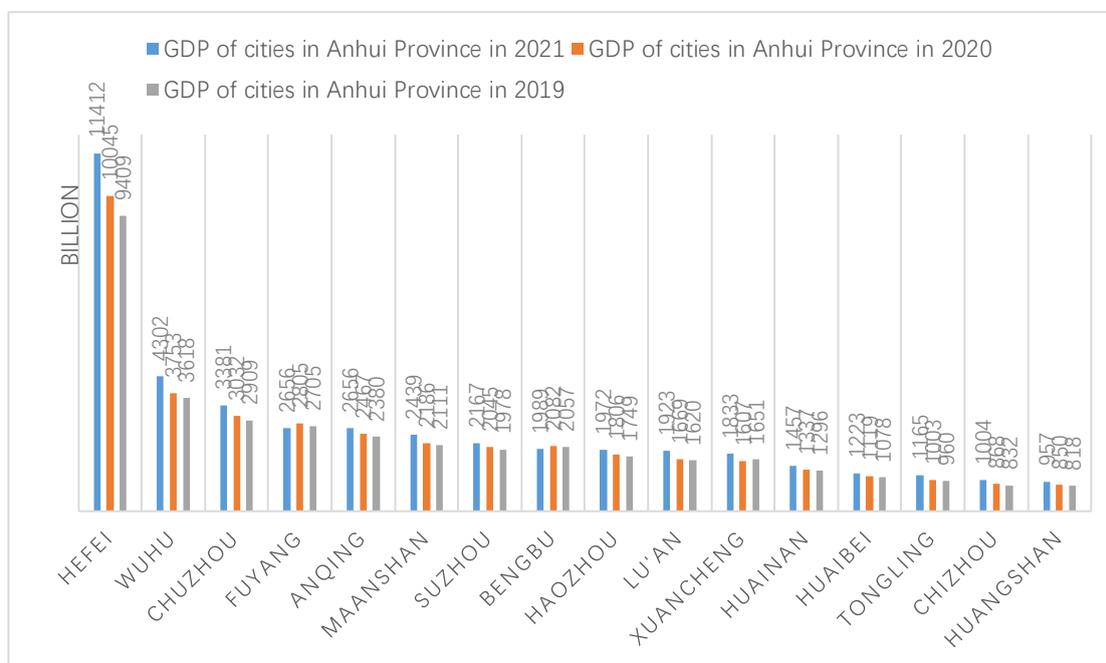


Figure 3. GDP of each city in Anhui Province in the past three years

## 5. Suggestions for Promoting the Economic Development of Anhui Province through Data Sharing

### 5.1 Optimizing modern information network technology to promote the development of digital economy

Data sharing has become the most important part of the digital economy, and its role has been increasingly demonstrated. Data sharing is undoubtedly to promote the cooperation of two or even more relevant subjects by sharing some relevant data, so as to achieve the purpose of increasing the interests of both parties. The digital economy is a new type of economy with modern information networks as an important carrier. The rapid development of modern information networks in recent years has provided a powerful development carrier for the digital economy, and data sharing also happens to be based on modern information networks. Data sharing can greatly improve the efficiency of resource allocation, and the market economy also provides a favorable environment for its development. The new crown epidemic in 2020 has brought obstacles to the development of traditional economy, but also promoted the development of digital economy from a certain perspective. Under this influence, data sharing can further promote the stable development of various industries. For example,

during the epidemic, Suning Group opened data to platform merchants for free, and cooperated with settled enterprises, which greatly improved the platform efficiency and service industry quality; Hefei Zhizhi Medical Assistant Robot checked healthy people through data sharing, etc. Promote the development of the new economy through data sharing, providing people with broader employment opportunities and platforms.

#### 5.2 Connect with neighboring developed cities, vigorously develop the sharing economy, and form a new industrial chain

The sharing economy is now sweeping the economic world with an unstoppable trend. As a province with a large proportion of the traditional economy, Anhui Province should vigorously develop the sharing economy. According to the survey report, in recent years, the secondary industry in Anhui Province has shown rapid growth and ranks at the top of the industrial structure in Anhui Province, while the proportion of the primary industry and the tertiary industry has continued to decline. Since the reform and opening up, the tertiary industry has developed rapidly, and data sharing is an important tool to promote the development of the tertiary industry. Anhui has a unique geographical location and is the province closest to the Yangtze River Delta Economic Zone in my country. Anhui should take advantage of its dominant position to actively connect with the neighboring developed regions such as Jiangsu, Zhejiang and Shanghai. For example, Zhejiang took the lead in carrying out market-oriented reforms, forming a unique financial transfer payment system, developing the tertiary industry in rural areas, and averaging the regional economic level in the province. Anhui should improve its industrial structure, introduce advanced sharing economy technology, form its own new service industry chain, and promote the development of some emerging markets through consumption according to the current market situation; at the same time, promote the development and development of data sharing in other original fields and industries. Actively develop the tertiary industry in rural areas, and in light of local conditions, the government can share agriculture-related data and improve the pricing mechanism for agricultural products. Promote industrial transformation and upgrading, so as to promote high-quality economic development.

#### 5.3 Promote the development of innovation mechanisms and drive technological innovation with the digital economy

Anhui Province lacks an innovation mechanism, and the industrialization of high-tech achievements is slow. The development of regional economy is inseparable from the cultivation of emerging technical talents. In today's rapid development of data, the important source of regional development mainly depends on human capital. The quality of human capital has become an important standard. The digital economy has higher technical requirements, and the quality standard of human capital is

increasingly inclined to the use of emerging technologies. Enterprise innovation is also an important link. Traditional enterprises still occupy the majority in Anhui Province, and promoting enterprise transformation has become the primary task. Data sharing can promote the transformation and development of enterprises with high quality. Through data sharing, it can promote the professional integration of enterprises, improve the influence of enterprises in the province in emerging industries, and realize the coordinated development of data sharing and economic structure. For example, BOE Technology Group Co., Ltd. is a manufacturer of LCD panel generation lines. It can reduce production costs by sharing resources and data with related companies and industries such as parts processing; it can also cooperate with universities in Anhui to introduce high-tech products. Quality talents, improve production efficiency, promote production specialization through methods such as reducing overcapacity, so as to improve the competitiveness of enterprise products.

### **Acknowledgments**

This work is supported by the 2021 Anhui Provincial College Students Innovation and Entrepreneurship Training Program Project, "*Research on the coordinated development of data sharing and economic structure in Anhui Province*" (No.S202110378558), and the project of Research on the Path of Data-driven Improvement of Residents' Consumption Level in Anhui Province (No. 2020CX098).

### **References**

- [1] Qin Wanwan. Research on the Supply-side Structural Reform of the Iron and Steel Industry in Anhui Province [J]. Master Thesis of Dalian Maritime University, 2020(06): 44-45.
- [2] Chen Yuehua. Research on Data Security Management Model and Countermeasures of Government Information Sharing [J]. 2020'Network Security Technology and Application Innovation' Seminar, 2020(05): 1-4.
- [3] Sun Zhanli. Observation of Network Security Law of Blockchain [J]. Journal of Chongqing University of Posts and Telecommunications; Social Science Edition, 2020(08):1-11.
- [4] Ma Ying. Research on a Data Sharing Model Based on Privacy Computing [J]. Information Security Research, 2022, 8(2): 122-128.
- [5] Xi Jinping. The report of the 17th National Congress of the Communist Party of China: Accelerating the Three Transformations of the Mode of Economic Development [M]. People's Publishing House, 2007.
- [6] Wang Wei. Research on Evaluation of the Transformation of China's Provincial Economic Development Mode [J]. Postgraduate Doctoral Dissertation, 2013 (11): 150-151.