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Research Article

A Study on Synergistic Development of Innovative Public Management and Economic Growth Based on Big Data

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Since the twenty-first century, the Internet of Things technology has developed rapidly, and its impact on China's economy and society is far-reaching, and its significance is also far-reaching. This makes more and more scholars start to pay attention to the related issues of the Internet of Things and economic development. The Internet of Things provides a superior information platform for various economic entities, enabling economic exchanges to transcend the boundaries of time and space. The IoT generates a lot of big data, and it is not easy to get valuable insights from the huge amount of data in various formats, ensuring that sensors are working properly and data is transmitted securely and processed efficiently. In order to study the role of the Internet of Things in promoting economic growth, clarify the status of the Internet of Things in the national economy and explore public management innovation as a change in actual social relations. This paper analyzes the application of the Internet of Things technology in public management. In order to deal with the massive multisource heterogeneous data involved in public management, this paper proposes a resource optimization scheduling algorithm for differentiated distributed storage systems and focuses on the analysis of China's economic growth in recent years. Through experiments, it is found that from 2014 to 2020, China's economy will continue to maintain rapid growth, with a GDP of 101,5986 billion yuan. Since 2014, the number and quality of R&D personnel in China have increased significantly. In 2020, due to the resumption of growth in corporate profits in the second half of the year, the cumulative decline in revenue will result in a decline in domestic value-added tax by 8.9% and corporate income tax by 2.4%.

1. Introduction

Public management, that is, the management of public affairs, is an important part of modern management science. Public management developed in China in the 1990s. Public management is a management concept and management model that is produced in response to the defects of government management. On the one hand, it emphasizes the "publicity" of management objectives, that is, public power must perform public functions. On the other hand, it emphasizes the supervision, restriction, and regulation of public power and emphasizes the scientific method of using public power. After nearly 30 years of development, China's public management has achieved many notable achievements. China's public administration has developed a governance system with strong and local practices that support social and economic development. However, due to China's complex national conditions, the application itself is not satisfactory.

The number of IoT devices is growing at an alarming rate today, all of which are capturing and forwarding disparate data sets that provide previously unknown insights to public and private organizations. The new public management system is an important part of public management innovation. With the development of the public management model, it not only solves the problems faced by government departments, but also helps all public service departments to propose new governance concepts and models. The difference between the public sector and the private sector is not the difference between governance systems and management systems but the difference between serving public interests and pursuing private interests.

This article combines qualitative and quantitative analysis when studying the collaborative development of innovative public management and economic development based on the Internet of Things. First, through the analysis of China's economic development and technological advantages, we can understand China's emphasis on scientific and technological personnel and the intensity of capital investment, which can reflect the speed and quality of China's economic growth. And it analyzes the coordinated development of China's economic growth through the gross domestic product, fiscal revenue, and fiscal expenditure in recent years.

2. Related Work

Mobility and accessibility are two important factors in urban transportation planning and design. Generally speaking, mobility is described as the right and convenient to use different modes of transportation. We usually pay attention to commuting mobility, commercial mobility, and mobility of disadvantaged groups but often ignore the mobility of public affairs, which is also an extremely important consideration. Due to the public's concern for green travel, the reform of the official car system, and the reduction of public expenditure, official bicycles have become a crucial issue. In order to study the feasibility of this new mode of official travel, Shi conducted a survey of official bicycles in the Gulou District Government of Nanjing City, through the monitoring and modeling of official travel behavior. On this basis, a comparison is made between official bicycles and official vehicles in terms of efficiency, cost, and carbon emissions. The results confirmed the feasibility and rationality of official bicycles. In order to promote the feasibility and rationality of bicycle traffic and to maximize its advantages, suggestions are made from the perspective of changing public policies, urban planning optimization, and social value. Use official bicycles in urban traffic and reform the official car system to save external costs, but it has not been widely adopted [1]. Yu's research found that the Asian Security Conference found the synergy of the "Belt and Road" Initiative. In the past three decades, with the emergence of a small number of emerging economies, Asia is the most dynamic region in the world for economic growth. It has more than two-thirds of the world's population and accounts for one-third of the global economy [2]. In the past ten years, more than 3,000 villages in China (known as Taobao villages) have achieved significant economic growth due to e-commerce. The changes in these villages represent a new development path different from traditional Chinese villages. Zhou studied this growth experience and believes that the "blooming fruit" of Taobao Village is essentially the result of the interaction and coevolution of information and communication technology (ICT) and Chinese rural society. The research will be based on case studies of three Taobao villages. As ICT and e-commerce have been embedded in rural society, the potential of existing organizations and skills in rural areas can be fully tapped through synergy. The research found that the coevolution of ICT and rural society is still in the development stage and will have a broad and profound impact on the future transformation of China's rural areas [3]. At present, for developing countries, economic growth and environmental protection are the two main goals for achieving sustainable development. Sustainable development means maintaining, rationally using, and improving the natural resource base. This foundation supports ecological resistance and economic growth, so that future generations can enjoy sufficient resources and a good resource environment. Facts have proved that fiscal decentralization has a great effect on economic growth, but its impact on the environment is still inconclusive. Since the complex mechanism of fiscal decentralization's impact on the environment is still unclear, Kuai used the method of maximizing utility to conduct a detailed theoretical analysis. He analyzed two types of fiscal decentralization, namely, income decentralization and expenditure decentralization; the decentralization of fiscal revenue can help improve economic efficiency, and the decentralization of fiscal expenditure can effectively promote the construction of infrastructure in various regions, which is conducive to narrowing the regional gap to a certain extent. In addition, he further conducted an empirical test on their impact on environmental quality and two types of laws and regulations (i.e., fiscal environmental input and environmental administrative fees). According to the results of theoretical analysis, both types of decentralization have a positive effect on the improvement of the environment. The empirical test results based on panel data of 30 provinces/cities have confirmed the above theoretical inferences, and the following conclusions can also be drawn. First, fiscal decentralization has a positive regulatory effect on the aforementioned environmental regulations, which shows that there is a synergy between these two policy tools. Second, the empirical results confirm the threshold effect of fiscal decentralization on the environment. Finally, compared with the decentralization of expenditures, the decentralization of fiscal revenue has proven to be more effective for environmental improvement. It is suggested that the central government should simultaneously strengthen environmental management and fiscal decentralization systems to achieve a win-win situation for economic growth and environmental protection. In particular, in order to maximize its potential, it is recommended to give priority to fiscal revenue decentralization [4]. Economic growth (EG) and energy consumption (EC) are interactive processes that are critical to regional sustainability. The Beijing-Tianjin-Hebei region is one of the most important urban agglomerations in China, and the evolution mechanism and the relationship between the two have not been systematically revealed in the development process. Zhong used the impact-gross domestic product-technology (IGT) model to examine the trend of decoupling between EG and EC during the period 2001-2016. Then, EG and EC are defined as two subsystems to form an overall system, EG is a fast variable, and EC is a slow variable. Through the Haken model based on the synergy theory, the evolution and interaction between the two subsystems and the entire system are explained. By identifying the changes in the decoupling index (D-r) and the control variables (a, b, lambda(1), and lambda(2)) simulated by the Haken model, it can be proved that Beijing's development has reached a relatively good state [5]. The Chinese government has invested hundreds of billions of dollars in new business parks to promote economic growth by attracting new companies to the parks and causing local economic downturns. Zheng measured the impact of the decline of 110 industrial parks established in 8 cities on industry, commerce, and industrial development. The impact of park landscape economic spillovers is the ever-increasing level of "cooperation" (measured by the Marshall factor) with the park's human capital, foreign direct investment departments, and nearby companies. He used geocoding data to record local employment and income growth, which promoted the construction of nearby houses and the opening of retail stores [6]. Li takes the Pearl River Delta urban agglomeration as the research object, improves the gravity model, and estimates and analyzes the coordinated development potential of the exhibition economy of the eight major cities in the Pearl River Delta. First, he conducts a realistic analysis of the overall development trend and characteristics of China's exhibition economy and introduces the development status of the exhibition economy in the Pearl River Delta Economic Circle. Second, he builds an evaluation index system for the development of convention and exhibition economy to evaluate the comprehensive development capabilities of the convention and exhibition economy of the eight cities in the Pearl River Delta. Third, he improves the gravity model to calculate the potential for the coordinated development of the convention and exhibition economy of the eight cities in the Pearl River Delta. The local government should set up a management department for the coordinated development of the convention and exhibition economy of the Pearl River Delta City Group, rationally allocate the resources of the convention and exhibition economy, optimize the structure of the coordinated development of the convention and exhibition economy, tap the distinctive image of the city, and integrate into the Pearl River Delta economic circle, promoting the coordinated development of the convention and exhibition economy of the Pearl River Delta urban agglomeration, thereby enhancing the domestic and international competitiveness of the convention and exhibition industry, and driving the strong growth of the regional economy. At present, there are few researches on the coordinated development of exhibition economy in China's urban agglomerations [7]. The experimental method is relatively simple, and there are relatively few studies on the factors of economic growth.

3. Methods for the Collaborative Development of Innovative Public Management and Economic Growth Based on the Internet of Things

As the Internet of Things grows and advances, everything and every industry imaginable is becoming smarter: smart homes and cities, smart manufacturing machinery, connected cars, connected health, and more. Countless things capable of collecting and exchanging data are forming a whole new network—the Internet of Things—a network of physical objects that can collect data, transmit data, and perform user tasks in the cloud.

The Internet of Things is mainly responsible for the real-time exchange of products or objects through the Internet. Based on the Internet and its platform, it realizes the exchange and circulation services of customer network information and realizes the identification and communication of information between objects [8].

In today's rapid development of the Internet of Things technology, business flow, logistics, and information flow are inseparable. The innovation and development of enterprises also need to build a public information network. As shown in Figure 1, the Internet of Things collects public information, first of all to establish an information network, through the collection of information to achieve data, electronic and innovative, and second, through the application of computer network, real-time understanding, and monitoring of knowledge of network information, with the progress of human understanding and the use of e-commerce to achieve collaborative communication of common information [9]. Its functional goal is to realize data sharing between multicore heterogeneous networks by collecting, storing, processing, and managing IoT data.

The rapid development and wide application of the Internet of Things technology provides scientific solutions and key technical support for modern logistics to achieve information collaboration [10]. The Internet of Things is a highly integrated and comprehensive application of a new generation of information and communication technology (ICT) and a next-generation network (NGN) technology. It uses the real-time interconnection between information networks and everything to provide information services and information solutions for traditional industrial applications and regional economic development, so as to realize the informatization and intelligentization of traditional industry and regional economic development on the basis of the realization of enterprise supply chain information coordination [11]. As shown in Figure 2, the Internet of Things can be divided into three parts in the architecture. The perception layer uses fusion information technology, automation technology, and sensor network technology to complete comprehensive real-time acquisition of multisource information. The network layer transmits the data and information collected by the perception layer to the data processing center through the sensor network, telecommunication network, or the Internet to complete the real-time transmission, integration, and processing of data. The service application layer combines information resources with industry needs and uses modern information technologies such as big data and cloud computing to achieve information collaboration and extensive intelligence [12].

The Internet of Things, a huge network that combines various information detection equipment with the Internet, has the following three characteristics:

Sensor characteristics: faced with different types of data, there are different types of sensors that collect different types of content as information sources

Internet features: the application of M2M communication technology, which realizes the establishment of

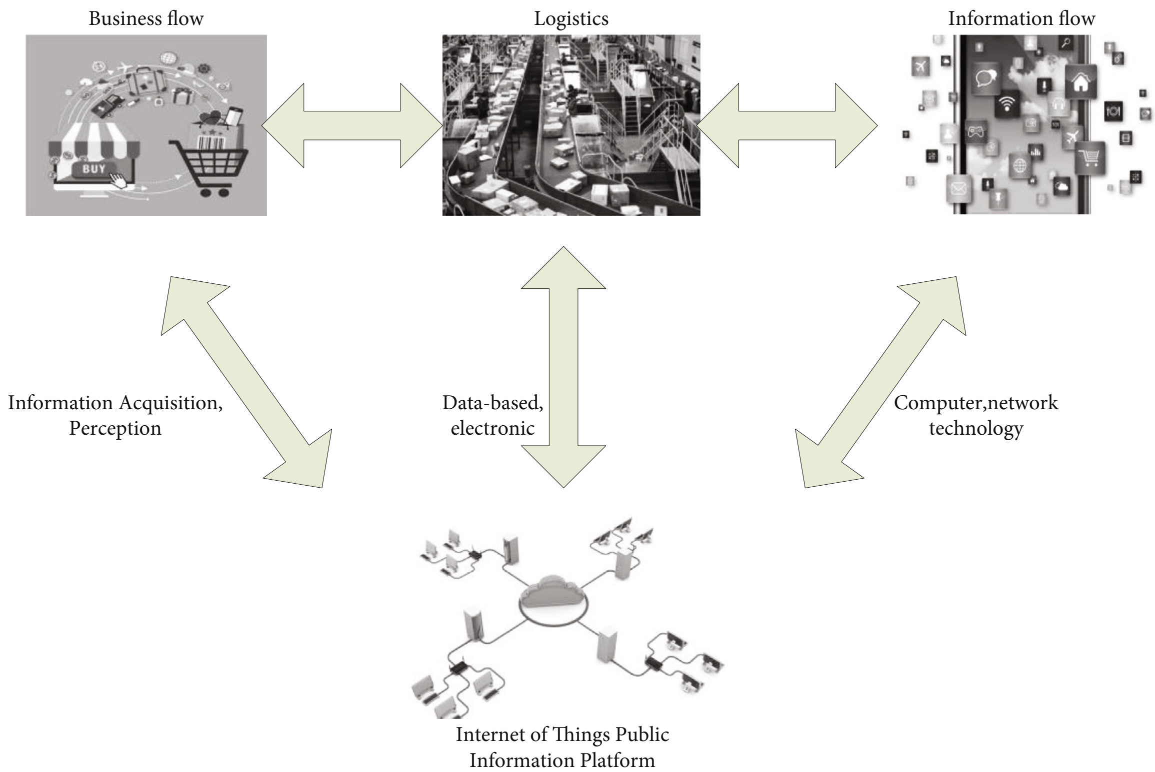

Figure 1: The Internet of Things public information platform.

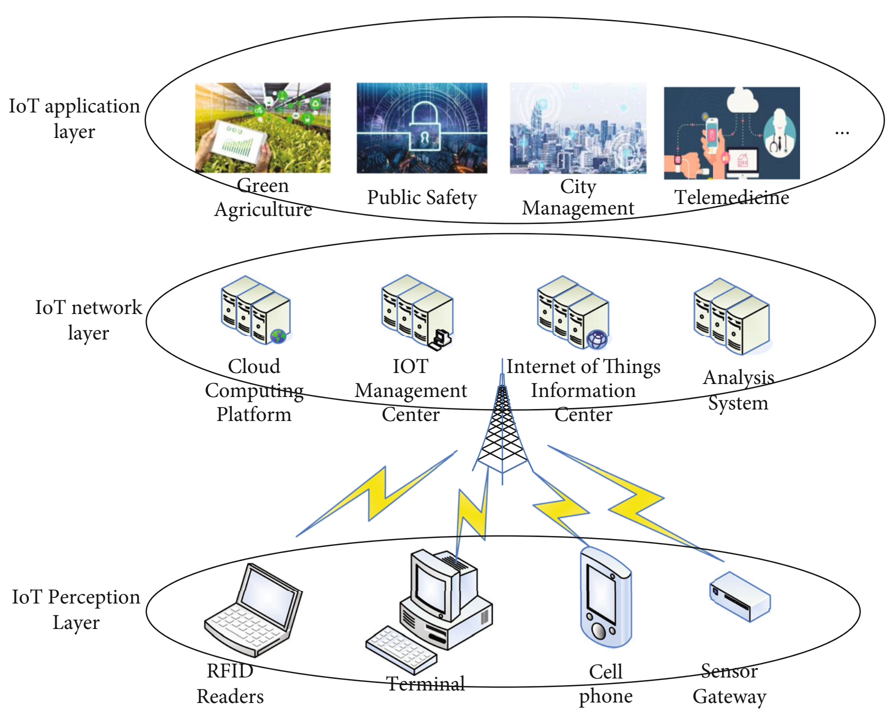

Figure 2: IoT architecture.

communication connections between people, machines, and systems, and interactive communication.

Intelligent features: using various intelligent technologies such as databases to achieve automation, self-feedback, and intelligent control [13].

In the wireless sensor network based on the Internet of Things technology, the hardware platform is composed of many tiny sensor nodes. Each tiny node device includes the following components: an embedded sensor, a data communication microprocessor, a remote data transmission

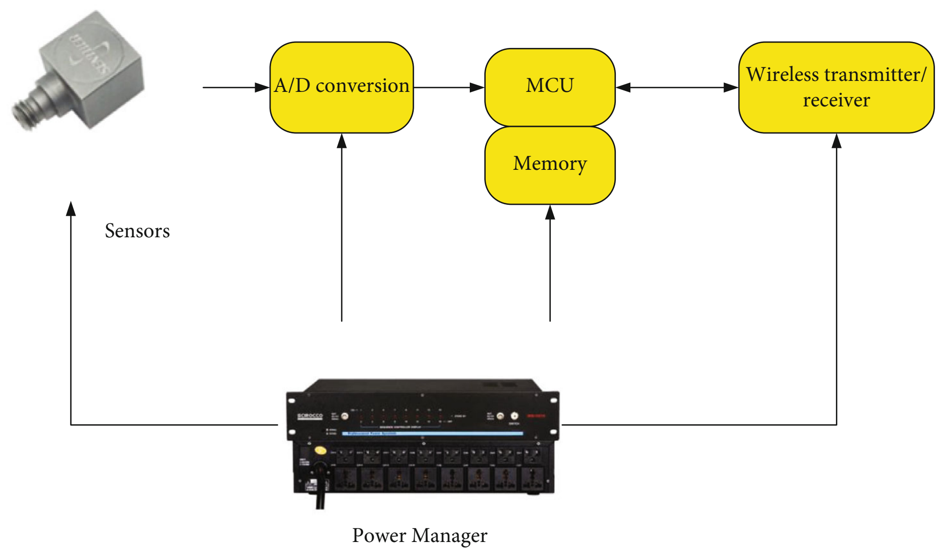

Figure 3: Structure of a wireless sensor node.

device, and a backup power module. In order to achieve seamless data transmission and dissemination, each sensor node collects raw data and then performs simple digital processing in a specific format before sending it. Although the data collected by each node is not necessarily accurate, sensor network is generally composed of numerous sensor nodes, and the accuracy rate will be greatly improved. The structure of the wireless sensor node is shown in Figure 3.

Federated learning is a distributed machine learning technology that trains algorithms on multiple distributed edge devices and servers without exchanging data samples to achieve secure joint modeling on the basis of "available but not visible" data. In simple terms, joint learning means crowdfunding and collaboration, and the system built has aggregation function, which can unleash more data kinetic energy in promoting data integration and solving the problem of "data silos." For the social economy, in addition to the private domain data, it can also use the multidimensional external data as a reference and make more accurate decisions based on it. Currently, federated learning has been applied in areas such as the Internet of Things and the financial economy. In addition, federal learning has made progress in some key areas of the economic industry, such as joint anti-money laundering modeling, joint equity pricing modeling, and joint item value modeling. However, there are fewer algorithms for joint learning modeling aspects.

For how to apply IoT Big Data, first of all, there are various ways to get benefits from IoT Big Data: in some cases, a quick analysis is enough to get benefits, while some valuable results can only be obtained after a deeper data processing. Real-time monitoring of data, data analysis, process control and optimization, and predictive response are all challenges we face today. In addition, there are challenges related to data collection, processing, and storage. While big data is never 100% accurate, before analyzing the data, it is important to ensure that the sensors are working properly and that the quality of the data used for analysis is reliable and not affected by various factors (e.g., unfavorable mechanical operating environment, sensor failure). Regular or streaming transmission of data from external sensors is critical for real-time data processing and management. The data is then sent to the gateway, ensuring that initial data filtering and preprocessing reduces the amount of data transmitted to the next block of the IoT system. It makes sense to perform data filtering and preprocessing to select the most relevant data needed for certain tasks before proceeding to in-depth data analysis. In addition, this phase ensures that real-time analysis can quickly identify useful patterns previously discovered through deep analysis in the cloud. One of the cloud gateways allows for basic protocol translation and communication between different data protocols. It also supports data compression and protects the data transfer between the field gateway and the central IoT server. And a machine learning module will also be introduced to generate models based on previously accumulated historical data. These models are updated periodically (e.g., once a month) with new data streams. Incoming data is accumulated and applied for training and creation of new models. When these models are tested and approved by experts, they can be used in a control application that sends commands or alerts in response to new sensor data.

The data-driven closed loop is shown in Figure 4. Data-driven decision-making requires credibility and validity thinking. Credibility refers to the reliability of a data or indicator itself, and validity refers to the generation of a data or indicator that needs to fit the thing it is meant to measure, i.e., the change in the indicator can represent the change in the thing. Only when both reliability and validity are met is a data indicator of value. In the process of data analysis, we often need to find the balance between things, and the balance is often about the economic operation of the big issues, such as the supply and demand of the market.

When building an IoT data management platform, in order to solve the problem of data access, it is first necessary

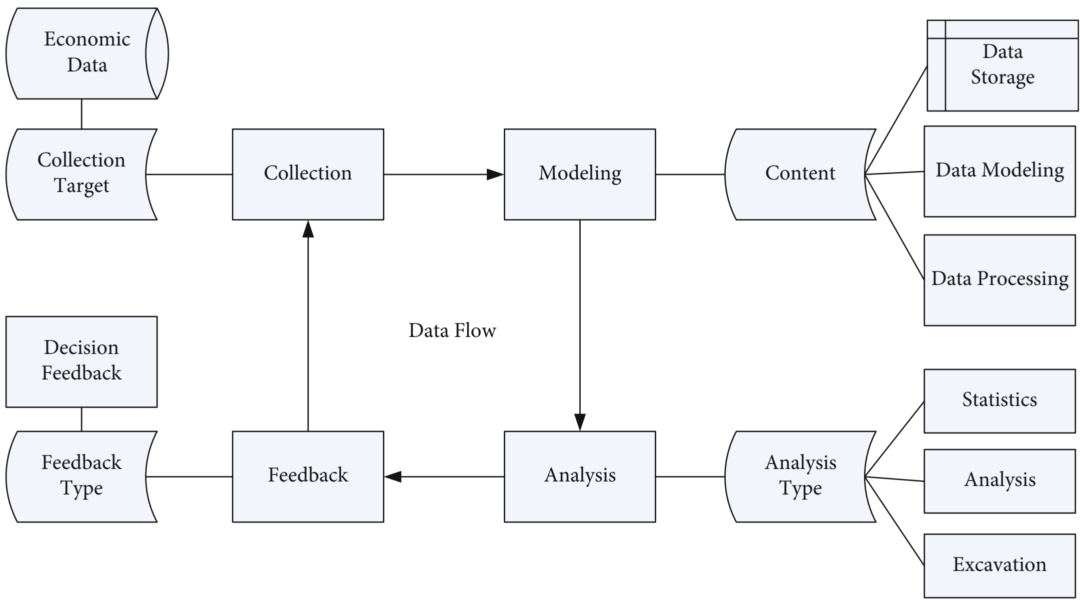

Figure 4: Data-driven closed loop.

to classify the data collected at the bottom layer. According to the changes in the information of the sensing object over a period of time, the collected data information can be divided into static data and dynamic data [14]. Static data mainly refers to the intrinsic properties of perceived objects, which generally do not change with time within a certain period of time, such as the production location, shelf life, and main components of the product, as well as the license plate number, vehicle model, and vehicle owner information. Such data is usually written into corresponding sensing devices (such as bar codes, ID cards, or RFID cards) before being sensed or may have been registered in the relevant back-end database in advance. Dynamic data mainly includes data information such as temperature and humidity, pressure, flow, and liquid level, which will change over time. The collection methods of this type of data are divided into continuous and discrete types according to specific monitoring requirements [15]. In the field of intelligent buildings, discrete collection methods are generally used, which has the advantage of reducing the transmission load and reducing the amount of data storage.

As shown in Figure 5, two different types of data need to pass through the corresponding sensing technology. Obviously, the data collection of the economic development monitoring system belongs to the discrete collection of dynamic data, so corresponding static data should be added when the Internet of Things data access is carried out to provide comprehensive information of the underlying equipment for the construction of a "smart city" [16].

In the environment of the Internet of Things, the distributed data service system is oriented to the massive multi-source heterogeneous data acquired by the perception layer of the Internet of Things. An information service system with data storage and management functions is formed by connecting widely distributed data storage nodes through a network. Because the resources involved in public management are diverse, large in quantity, and widely distributed, to realize the economic coordination of production based on information integration and sharing in the Internet of Things environment, it is necessary to have intelligent and efficient information manufacturing resource storage and scheduling technology as support. The resource scheduling optimization technology of differentiated distributed storage systems can greatly improve the utilization efficiency of system resources and ensure the stability of resource allocation [17]. Figure 6 is a structural diagram of the Internet of Things public management system.

In the resource optimization scheduling of a differential distributed storage system, the directed acyclic graph of all six-tuples of tasks in the system is represented by $F(T, E, W, C, R, D)$; T represents the task set, E represents the priority constraint relationship set, W represents the execution time set, C represents the communication time, R represents the CPU and memory that need to be provided to the task t_i, and D represents the deadline set, supposing $R(V, L)$ is an undirected graph of a finite virtual machine. Define the node set represented by V as a set of virtual machines, and define edge set B as the set of two-way communication links between virtual machines v_i and v_j, and $w(v_i)$ represents the node weight, then

$$d = \frac{R(V, L) \times \left(v_i, v_j\right) \times a}{F(T, E, W, C, R, D)} \cdot v_i \frac{w\left(b_i\right) \times w\left(b_{i,j}\right)}{b_{i,j}}. \quad (1)$$

In the formula, the larger the value of d is, the greater the difference in virtual machine computing performance in the distributed storage system will be; on the contrary, the difference will be smaller.

$$\lambda = \frac{w\left(b_i\right) \times w\left(b_{i,j}\right)}{w\left(b_{i,j}\right) \times R(V, L)} \times b_{i,j} \frac{v_i}{w\left(b_{i,j}\right)}. \quad (2)$$

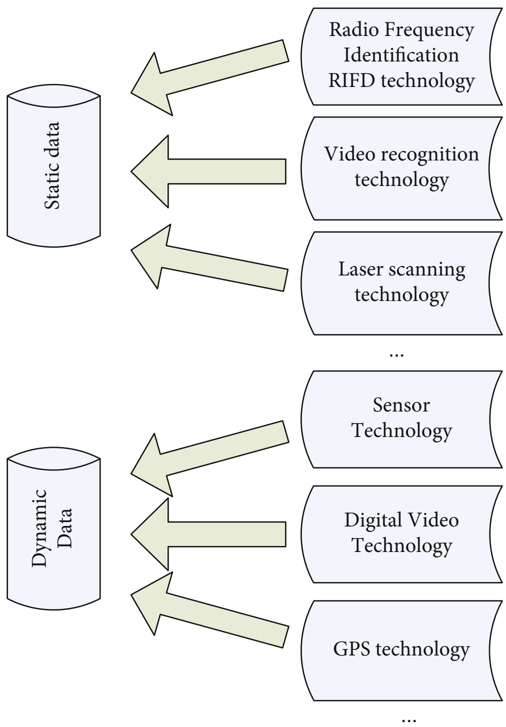

Figure 5: Data acquisition techniques corresponding to two types of data.

$w'(t_i)$ represents the new weight of the task node.

$$w'(t_i) = \frac{w(t_i) \times \lambda}{d \times \min\left[w(b_j)\right] + (1-d) \times \max\left[w(b_j)\right]}. \quad (3)$$

The new weight of the directed edge is expressed as $w'(s(t_i, t_j))$.

$$w'\left[s(t_i, t_j)\right] = \frac{w'(t_i)}{d \times \min\left[w(b_{i,j})\right] + (1-d) \times \max\left[w(b_{i,j})\right]}. \quad (4)$$

In the formula, $w(t_i)$ represents the weight vector of the task node, and the resource scheduling path set represented by $r[Q]$ is formed, and the value of each path in $r[Q]$ is calculated. The expression is

$$\begin{aligned} r[Q_a] &= \sum\left\{w'(t_i) + [P(t_i, v_m)]\right\}, \\ P(t_i, v_m) &= S(t_i, v_m) + \frac{w(t_i)}{w(v_i)}, \\ S(t_i, v_m) &= \max\left\{T(t_i, v_m)\left[\frac{w(t_i)}{w'\left[s(t_i, t_j)\right]}\right]\right\}. \end{aligned} \quad (5)$$

$S(t_i, v_m)$ is the earliest time when task t_i starts to execute on virtual machine v_m, $P(t_i, v_m)$ is the earliest completion time of the task, and $T(t_i, v_m)$ represents the available time of virtual machine v_m to t_i.

The fusion genetic algorithm builds the following task completion time estimation model:

$$TE = \sum_{j=1}^{N} \frac{\left(TR_j + RW_j + DT_j\right)}{r[Q_a]}. \quad (6)$$

In the formula, TR_j represents the task running time, RW_j represents the read and write data time of resource scheduling, and DT_j represents the data transmission time of resource scheduling.

Based on genetic algorithm, with the shortest task completion time as the optimization goal, assuming that the fitness function of individual M_a and the probability of being selected in the tth generation are

$$f(M_a) = \frac{a}{\lg(TE = 1)}, \quad (7)$$

$$p_s(M_a^t) = \frac{f(M_a) \times TE}{\sum_{j=1} e^{\left[f(M_a^t) - \mu\right]^2 / 2\sigma^2}}. \quad (8)$$

In formula (7), EC represents the time efficiency of the resource scheduling scheme corresponding to individual M_a. In formula (8), μ represents the average fitness of the t th generation population, and σ^2 represents the variance of the individual fitness of the individual population [18]. According to $p_w(M_a^t)$ and $p_m(M_a^t)$ to optimize the resource scheduling of the differential distributed storage system, the expressions are, respectively

$$\begin{aligned} p_w(M_a^t) &= a_c\left(1 - \sqrt{\frac{t}{t_{\max}}}\right) p_s(M_a^t), \\ p_m(M_a^t) &= a_m\left(1 - \sqrt{\frac{t}{t_{\max}}}\right) p_w(M_a^t). \end{aligned} \quad (9)$$

In the formula, a_c and a_m represent the crossover coefficient and the coefficient of variation, respectively, t represents the number of iterations of the current resource scheduling, and $t_{\max}$ represents the maximum number of iterations.

Defining p_w and p_m as the adaptive adjustment function of the optimization model can be adjusted independently according to the size of individual fitness and the dispersion of the group. While ensuring the diversity of the group, it improves the convergence and optimization performance of the algorithm [19]; p_w and p_m are described as follows, respectively:

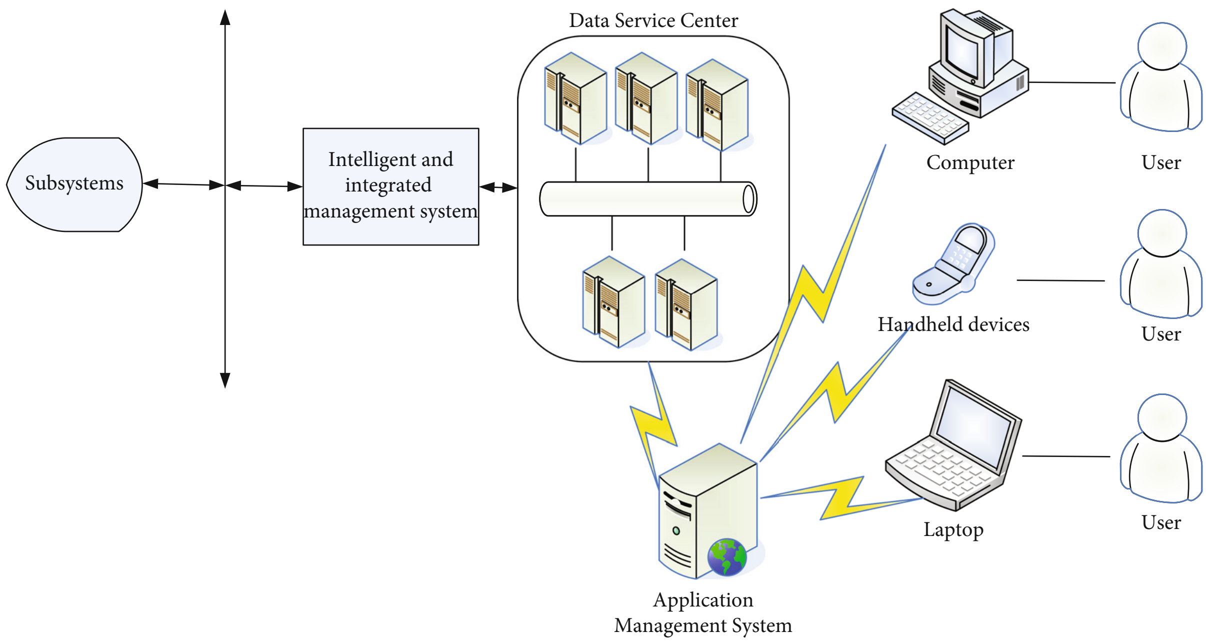

FIGURE 6: IoT public management system structure diagram.

$$p_w = \begin{cases} a_1 \dfrac{f_{\max} - f'}{f_{\max} - f_{avg}}, f' \geq f_{avg} \\ a_2, f' < f_{avg} \end{cases},$$
$$p_m = \begin{cases} a_3 \dfrac{f_{\max} - f}{f_{\max} - f_{avg}}, f \geq f_{avg} \\ a_4, f < f_{avg} \end{cases}. \quad (10)$$

In the above formula, $f_{\max}$ and f_{avg} are the maximum fitness value and the average fitness value in the population, f' is the larger fitness value of the two individuals to be crossed, and f is the fitness value of the variant individual. a_1, a_2, a_3, and a_4 are all adaptive control parameters that take fixed values in the interval (0, 1) [20].

With the rapid development of China's national economy, major changes have taken place in the economic development model, market structure, and resource allocation, leading to the backwardness of China's population management system and deviation from the direction of economic development [21]. Therefore, based on the analysis of China's public management system, according to the practice of public management in some countries, China's public management system should strengthen innovation in the direction and goals of current economic development innovation, so as to improve the quality of China's economic development [22].

The Public Financial Management tools are as follows:

(1) Government Integrated Financial Management Information System (GIFMIS)

(2) Treasury Single Account (TSA)

(3) Chart of Accounts

(4) E-Commerce

A study was conducted to examine the impact of Government Integrated Financial Management Information System (GIFMIS) on economic development in Nigeria. The results of the empirical study revealed that GIFMIS has had a positive impact on economic development in Nigeria. The study concluded that the GIFMIS adopted by the Federal Government of Nigeria (FGN) has positively impacted on its economic development through budgeting and budgeting system, payroll management system, cash management reforms, and spending cap on MDAs in Nigeria during the period under review. The Treasury Single Account is an account that centralizes all government funds including budgetary and extra-budgetary funds in one bank, i.e., the Treasury Deposit Account opened by the finance department in the People's Bank, while all fiscal expenditures including budgetary and extra-budgetary expenditures can be made through this account. A Chart of Accounts is a collection of accounting accounts that account for the specific content of accounting elements in accordance with the content of economic operations and the requirements of economic management. E-commerce brings more people into the tax net through online transactions and generates more revenue for the government. A variety of public financial management tools are needed to help manage and innovate public management and promote synergy with the economy.

To a large extent, the innovation of the public management system is developed and created by neoliberal ideas, driven by the development of private sector management systems and commercial enterprises, based on emerging information technology, and it has always been progressing during the development process. This process of obtaining economic, technical, and other advice is desirable. Learning the supervision and competition process of public management in the private sector improves the performance of everyone's work [23]. Specific definitions include as follows: advocates of new social governance modify the existing governance system, incorporate it into the work management system, and adopt a wide range of successful private sector management systems and expertise. For example, clearly implementing workplace management and emphasizing cost-benefit analysis, human resource management, and comprehensive quality control can improve employee productivity and make the organization more flexible, innovative, and more efficient [24]. Second, treat citizens as "customers" and make persistent efforts to establish new trust-based service objectives. The public management system emphasizes the operating characteristics of public services, regards citizens as customers of the government, and believes that the government uses public power to meet the needs of consumers. Advocating the concept of "small government, big society" and thinking that the government's role in leading the process of transparency and competition in public administration is very important will help improve the quality of public services [25].

The so-called "self-organization" in synergetics theory is an open system with a phase change process. In the process of system evolution, order parameters organize everything regularly, and order parameters dominate other factors when constructing a self-organizing system. According to the concept of order parameters and the principle of dominance in synergetics theory, the process of system structure formation seems to inevitably move in the same direction, making part of an unstable system function in a stable state, and its behavior will also be controlled [26]. Upgrading the system from an unstable state to a stable and orderly state is an important way for the system itself to prepare for the development of a new orderly structure [27].

The classic method of evaluating the degree of economic synergy is the grey relational analysis method. The main idea of the gray correlation analysis method is to compare the geometric similarity between the data column to be analyzed and the reference data column and then to determine the degree of correlation between multiple elements in the system. When evaluating multiple target schemes by using the gray correlation method, first use the existing information to construct an evaluation system for the alternative schemes. After determining the gray value of the evaluation factor feature index corresponding to each alternative, determine the reference sequence, then measure the correlation between each alternative and the reference sequence, and rank the pros and cons according to the degree of relevance. For a decision problem with q alternatives, each with p indicators, the specific calculation process is as follows:

3.1. Determining the Reference Series and Comparison Series. Let x_{ij} denote the jth evaluation index of the ith scheme, and e_{ij} denote the value of this index, and then the comparison sequence $X_i = (x_{i1}, x_{i2}, \cdots, x_{im})$ of the ith scheme takes the value $E_i = (e_{i1}, e_{i2}, \cdots, e_{im})$. The matrix X composed of all comparison sequences, and its value matrix E are as follows:

$$X = \begin{vmatrix} x_{11} & x_{12} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ x_{n1} & x_{n2} & \cdots & x_{nm} \end{vmatrix}, \quad E = \begin{vmatrix} e_{11} & e_{12} & \cdots & e_{1m} \\ e_{21} & e_{22} & \cdots & e_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ e_{n1} & e_{n2} & \cdots & e_{nm} \end{vmatrix}. \tag{11}$$

The so-called reference sequence refers to the sequence formed by selecting the optimal value of each evaluation index from the p evaluation indexes of each plan. That is, in the E matrix, the maximum value of the positive (high-excellent) evaluation index and the minimum of the negative (low-excellent) evaluation index are selected. For index j, its value is as follows:

$$k' = \begin{cases} \max\left(e_{1j}, e_{2j}, \cdots, e_{nj}\right), \text{Positive indicators} \\ \min\left(e_{1j}, e_{2j}, \cdots, e_{nj}\right), \text{Negative indicators} \end{cases}. \tag{12}$$

The final reference sequence is

$$K = \left(k_1, k_2, \cdots, k_p\right). \tag{13}$$

3.2. Dimensionless Processing. Dimensionless processing is performed on the original sequence to solve the problems caused by the differences in statistical units of various indicators. Taking the polarization transformation as an example, the calculation method is as follows:

$$f_{ij} = \begin{cases} \dfrac{a_{ij} - \min\left(a_{ij}\right)}{\max\left(a_{ij}\right) - \min\left(a_{ij}\right)}, \text{Positive indicators} \\ \dfrac{\max\left(a_{ij}\right) - a_{ij}}{\max\left(a_{ij}\right) - \min\left(a_{ij}\right)}, \text{Negative indicators} \end{cases}. \tag{14}$$

3.3. Calculating the Correlation Coefficient. The calculation formula of the correlation coefficient is as follows:

$$\lambda_{ij} = \frac{\min_i \min_j \left|k_j - f_{ij}\right| + \rho \max_i \max_j \left|k_j - f_{ij}\right|}{\left|k_j - f_{ij}\right| + \rho \max_i \max_j \left|k_j - f_{ij}\right|}. \tag{15}$$

Among them, $|k_j - f_{ij}|$ represents the absolute difference between the reference sequence K and X_i at point j, denoted as Δ_{ij}, and $\min_i \min_j |k_j - f_{ij}|$ is the minimum difference between the reference sequence K and X_i. $\max_i \max_j |k_j - f_{ij}$

Table 1: Forecast of sources of economic growth in 4 industrialized countries (%).

Country	Canada	France	Germany	Italy
Capital	32.0	42.8	27.2	39.8
Workforce	18.6	3.2	-1.9	-5.2
Human capital	2.4	2.1	15.8	14.9
R&D capital	10.1	14.2	5.9	8.3
Technological Progress	36.9	37.7	53.0	42.1

| is the maximum difference between the reference sequence K and X_i, and ρ is the resolution coefficient, $\rho \in (0, 1]$; the larger the ρ it represents, the larger the resolution, generally $\rho = 0.5$.

3.4. Calculating the Degree of Relevance. The content of the correlation degree includes the absolute value correlation degree and the rate correlation degree. The following takes the absolute value correlation degree as an example, and the calculation formula is

$$\phi_i = \frac{\sum_{j=1}^{m} \lambda_{ij}}{n}, i = 1, 2, \cdots, n. \tag{16}$$

4. Coordinated Development of Economic Growth

When certain conditions of the economic and social system undergo a sudden change, the original equilibrium will be broken, and under the synergy of the economic and social system, a new state of coordination will be gradually reached. In this way, the cycle continues and spirals upwards, and the economic and social system develops to a higher level. The goal of the system innovation of public management is to improve the government's functions, make the government's production functions conform to the social ecology, and meet the needs of economic development. Institutional innovation has brought new changes to the concept, organization, and attitude of the government. On the basis of industrial development strategy, human resource strategy, and regional coordination strategy, focus on the development of science and technology and high-performance industries.

4.1. The Synergy of Technological Progress and Economic Growth in Developed Countries. The scientific contribution of economic development and the level of technological progress are directly related to a country's economic quality and economic development potential. At present, all developed countries focus their project development on high-tech industries and regard high-tech and industrialization development as the basis of their development strategies. Table 1 lists the measurement results of the sources of economic growth in the four major Western industrialized countries and further takes the sources and influencing factors of economic growth.

It can be seen from Table 1 that among the factors that affect economic development, science and technology have made a significant contribution to this, indicating that the country's scientific and technological progress can effectively promote economic development and that scientific and technological progress and economic growth have achieved synergy.

4.2. Synergy between China's Technological Progress and Economic Growth. Over the past 40 years of reform and opening up, China's economy has achieved considerable development and achievements that have attracted worldwide attention. The GDP from 2014 to 2020 is shown in Figure 7.

Table 2 shows the state of China's scientific and technological research and development (R&D) funding. It can be seen from Table 2 that the total expenditure per capita for scientific research and experimental development in China from 2014 to 2020 has shown an increasing trend.

As shown in Table 3, China's investment in science and technology has been increasing in recent years, from 645.45 billion yuan in 2014 to 109.5 billion yuan in 2020, accounting for a large proportion of the state budget expenditures that year.

The total value of human resources in science and technology reflects the current situation of human resources in science and technology and the potential for investment in science and technology resources in the future. Table 4 shows the total number of human resources in science and technology in China.

As shown in Table 4, since 2014, the total number of scientific and technological talents in the country has continued to increase; in 2018, the total number of scientific and technological talents in China reached 101.545 million, of which 42.31 million had a bachelor degree or above.

R&D personnel are the key force in building a strong and prosperous country. Increasing the scale of the R&D team is the key to achieving China's R&D development goals, and it is also an important step taken by the Chinese government. The total number of R&D personnel and the trend of scientists and engineers are shown in Figure 8.

Since 2014, the number and quality of R&D personnel in China have increased significantly, and the total number of R&D personnel has maintained a rapid growth trend. The annual R&D personnel in China increased from 3.711 million in 2014 to 4.801 million in 2019, an increase of 29.4%.

According to the online conference on fiscal revenues and fiscal expenditures held by the Ministry of Finance of China, we can learn about China's fiscal revenues and fiscal expenditures in recent years. Figure 9 shows the general government budget revenue for 2016-2020. Figure 10 shows the general government budget expenditures for 2016-2020. Figure 11 shows the main tax revenue data.

It can be seen from Figures 9 and 10 that in 2016, the gross domestic product (GDP) reached 1.5952 billion yuan, an increase of 4.5% year-on-year, which was lower than the growth rate of 5.8% in 2015 and was the lowest income growth rate since China's fiscal deficit in the past ten years. In 2020, the national general government budget revenue will be reduced by 3.9%, which is better than expected. The central and local budgets have performed better.

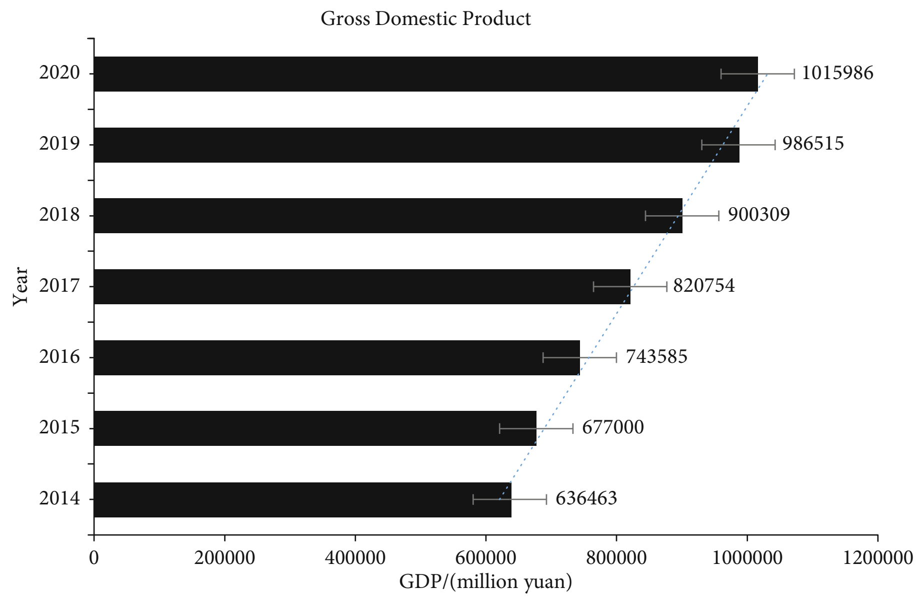

Figure 7: Gross domestic product, 2014-2020.

Table 2: China's scientific and technological research and experimental development (R&D) spending.

Year	Ringgit growth rate(%)	Input intensity (%)	Per capita expenditure on science and technology personnel (million yuan)
2014	20.6	1.30	39.1
2015	22.3	1.34	40.2
2016	23.4	1.35	42.8
2017	22.5	1.40	44.6
2018	24.5	1.45	47.21
2019	28.1	1.35	48.2
2020	23.4	1.33	49.8

Table 3: China's financial science and technology expenditure.

Year	Amount of financial science and technology expenditure (billion yuan)	Growth over the previous year (%)	Share of state fiscal expenditure for the year (%)
2014	6454.5	4.4	—
2015	7005.8	8.5	4.5
2016	7760.7	10.8	4.7
2017	8383.6	8	4.8
2018	9518.2	13.5	4.85
2019	10717.4	12.6	4.86
2020	10095	5.8	4.91

It can be seen from Figure 11 that in 2020, the domestic value-added tax will drop by 8.9%, and the corporate income tax will drop by 2.4%, mainly due to the return of corporate profits in the second half of the year, resulting in a decrease in total revenue. Personal income tax increased by 11.4%, mainly due to the increase in property income such as residents' income as the economy recovers. In 2020, despite the sudden emergence of the COVID-19, according to the central policy, the Ministry of Finance and relevant parties have adopted a more active taxation policy, increased tax cuts, and introduced substantial measures to support disease prevention and control and take measures to help companies in problems and companies affected by the epidemic. The Ministry of Finance, in conjunction with relevant departments, has introduced greater fiscal stimulus policies and increased tax and fee reductions and innovative measures to support supervision, epidemic prevention and control, and supply chain management to help companies in the most difficult periods of the downturn.

Table 4: Total human resources in science and technology in China.

	Total science and technology human resources (million)	Bachelor's degree and above (million)	Number of human resources in science and technology per 10,000 population
2014	7512	3170	48
2015	7915	3421	48.5
2016	8327	3687	50
2017	8705	3934	52
2018	10154.5	4231	52

5. Coordinated Development of Innovative Public Management and Economic Growth

With economic growth, the market system becomes more and more mature, and there is an urgent need for a higher-level public management system to improve the quality of the economic system environment. Public management system innovation - economic development - higher level of public

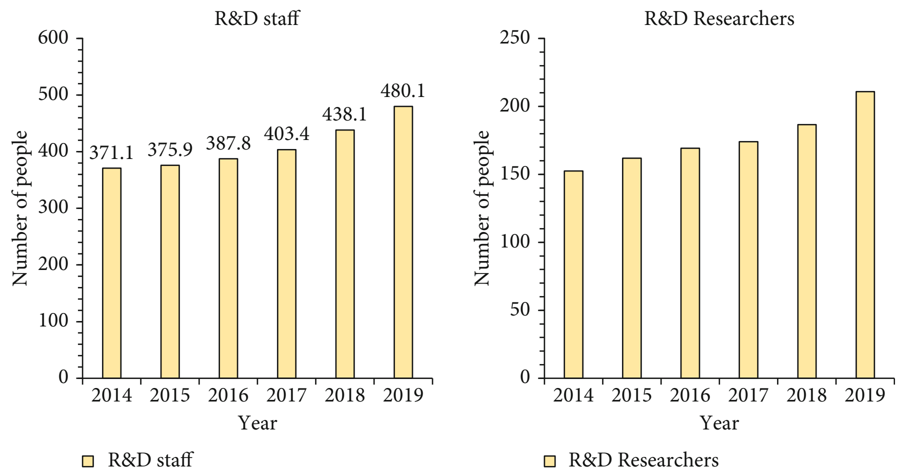

Figure 8: Trends in the total number of R&D personnel and their scientists engineers.

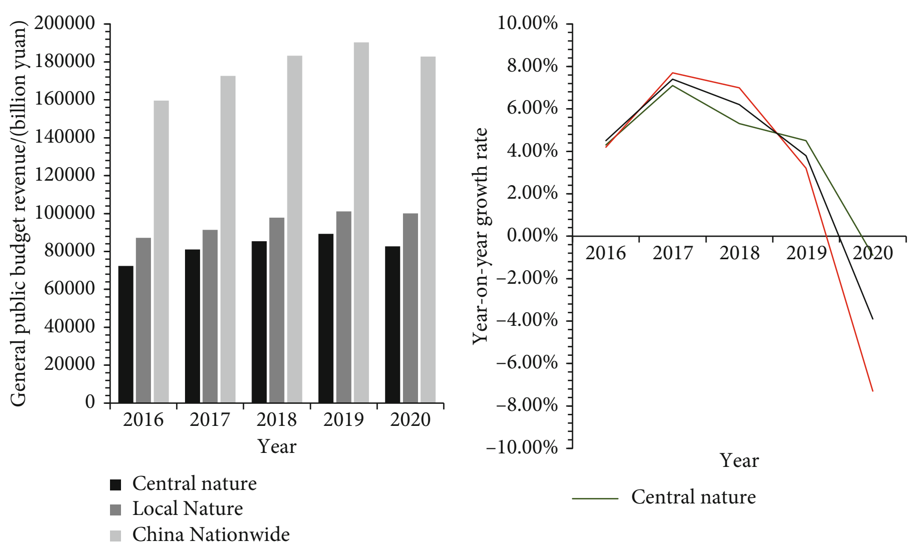

Figure 9: General public budget revenue, 2016-2020.

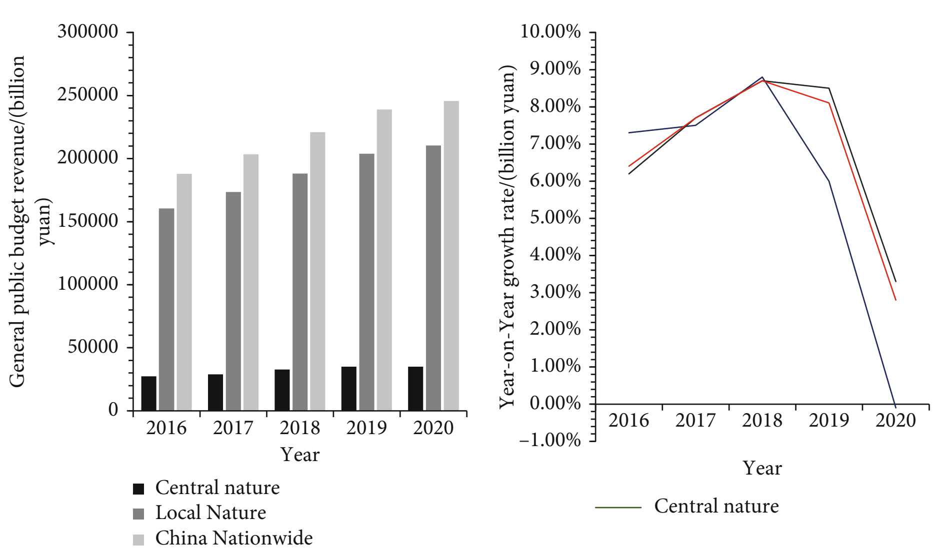

Figure 10: General public budget expenditures, 2016-2020.

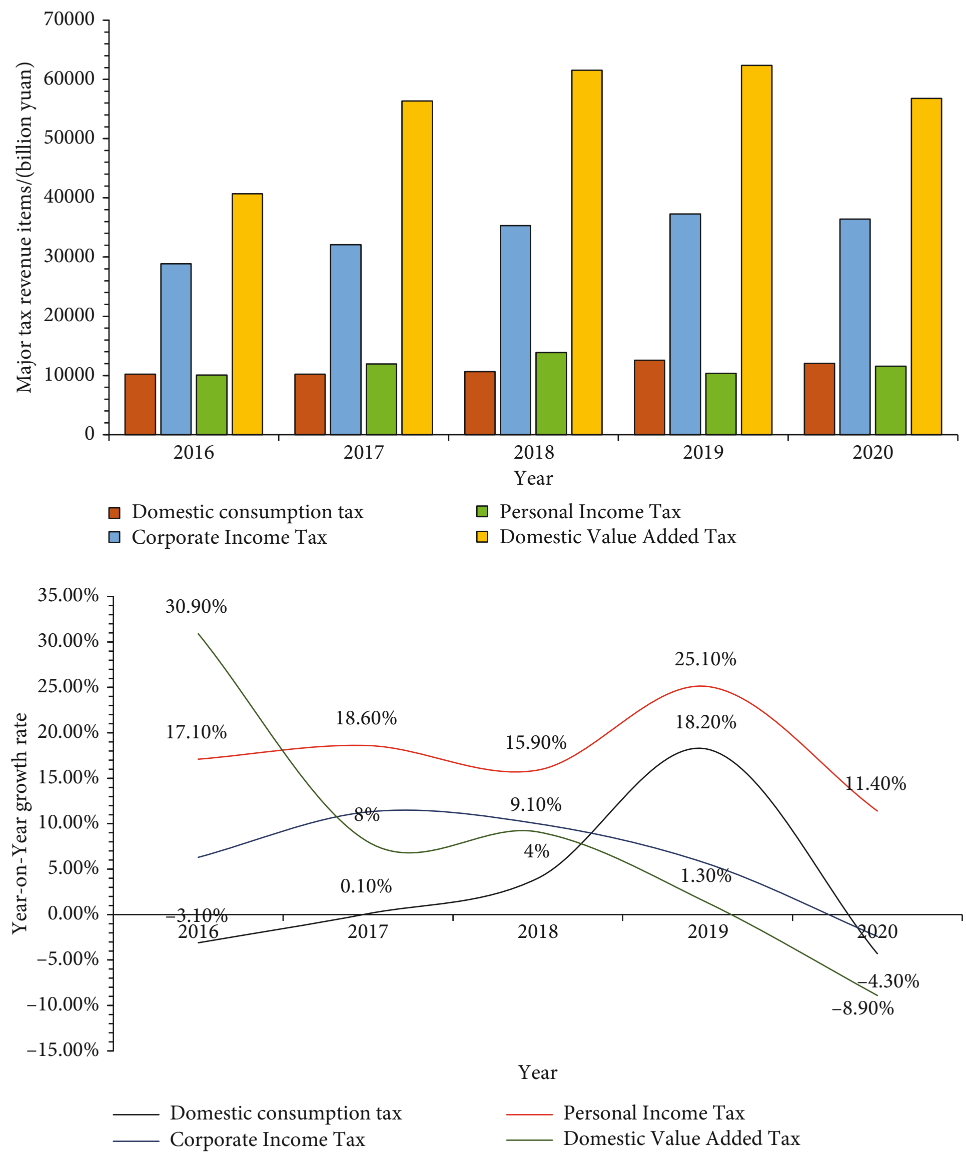

Figure 11: Major tax revenue items.

management system, forming a virtuous cycle of innovation. From the perspective of the internal driving force of public management innovation, there is a "path dependence problem" in the external dissemination of economic development experience. Public management innovation is the change of actual social relations. These relations are included in the existing institutional framework and actually regulate the operation of social and economic life. The imbalance of political, economic, and cultural development in various regions of China will affect the degree of acceptance of economic development experience by the outside world. As for the external space of public management innovation, the current division of power between the central government and local governments in China affects the potential role of local governments in public management innovation and its formal space. However, due to the complex situation of China's economic development, it inevitably limits the vitality and space for local government public management innovation. The coordinated development of China's public management and economic development is a massive project, and greater efforts are needed in public management innovation to realize a brand new course and jointly realize the good wishes of social progress.

6. Conclusion

The effective development of system construction is based on the scientific work of public management, including government agencies and many regulatory agencies, which directly control public resources in order to fully pursue the equality of social interests. Public management innovation has a positive impact on economic development. Sustainable economic development is closely related to stable social conditions. Public management is an important part of the government. It is based on the fundamental needs of the entire society and promotes sustainable economic development. As the complexity of economic development continues to proliferate, we need to understand the convergence of IoT and data analytics as a way to improve economic data analysis. China's social system and economic development are inseparable from market supervision. The basic purpose is to realize the good wish of the reasonable distribution of social resources, but this is only the most ideal state, and the innovation of public management can help the society to get closer to this good wish. Economic growth is a solid backing for public management innovation. Therefore, the realization of social equality is inseparable from the complex interaction between the various elements of the economy and society, which influence and interact with each other and ultimately operate as a whole.

Data Availability

All the data used is given in the paper.

Conflicts of Interest

There is no potential conflict of interest in our paper and all authors have seen the manuscript and approved to submit to your journal.

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