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Research Article

Role of Internet of Things Technology in Promoting the Circulation Industry in the Transformation of a Resource-Based Economy

Dongqing Zhu,[1,2] Ting Li [iD],[3] Can Zhang,[3] Ying Ren,[2] Huan Wang,[2] and Xia Duan[2]

[1]School of Economics, Yunnan University of Finance and Economics, Kunming, 650221 Yunnan, China
[2]Lancang-Mekong International Vocational Institute, Yunnan Minzu University, Kunming, 650504 Yunnan, China
[3]School of Logistics, Yunnan University of Finance and Economics, Kunming, 650221 Yunnan, China

Correspondence should be addressed to Ting Li; holly@ynufe.edu.cn

In recent years, the business scale of my country's circulation industry has continued to expand, and the output value has continued to increase. The leading role in guiding the transformation of the industrial economy has become more and more important. Based on this, this article discusses the research on the promotion of the Internet of Things technology to the circulation industry in the transformation of the resource-based economy. The application of RFID technology and wireless sensor technology in the Internet of Things in the circulation industry can greatly improve work efficiency and information transmission accuracy. This article establishes the circulation industry based on the principles of science, system, safety, and relative independence. The evaluation index system analyzes the role of the circulation industry in the transformation of the resource-based economy in terms of circulation scale, circulation structure, circulation efficiency, circulation innovation, etc., and uses the analytic hierarchy process and entropy method to analyze the collected data. With the support of RFID technology, the output value of the circulation industry in Province Y has reached 140.508 billion yuan in 2019, accounting for about 27% of the tertiary industry, and the number of employees in the circulation industry has also increased to 57.88%, which is a strong boost to the economy of Province Y. It has a greater contribution to the total economic volume. The research of this article has realized the economic transformation of resource-based cities in the circulation industry and has a certain reference effect for the transformation and upgrading of similar cities.

1. Introduction

Resource-based cities played a huge role in the initial stage of my country's development. However, due to limited resources, traditional resource-based cities had to undergo economic transformation and thus develop into a new economy. The application of Internet of Things technology in the circulation industry can effectively promote the development of the circulation industry and solve the problems faced by the circulation industry from the source.

The circulation industry can effectively increase social employment, stimulate residents' consumption, and optimize the industrial structure. As the proportion of the circulation industry in economic growth continues to rise, the main body is becoming more and more diversified, the development of the circulation industry has received more and more attention, and its contribution to economic development has gradually increased. The development status of the circulation industry directly affects the development of other industries. The development of the circulation industry is fast, and the development of industry and agriculture is fast; on the contrary, the development of the circulation industry is slow, and the development of industry and agriculture is slow. It can be said that the circulation industry is the vanguard of economic development, the propellant of economic development, and the source of sustained economic development.

As more and more resource-based cities have the need for transformation, there are more and more researches on it. Taking Huainan, a typical coal resource city, as an example, Zhang et al. constructed a multidimensional index system of "economic, social and ecological." The entropy weight method, the coupled coordinated development model, and the gray correlation coefficient method are used to investigate the development of the system from 2002 to 2016. It analyzes the coordinated development of Huainan's multidimensional relations from a macro perspective. The results show that the ecological subsystem has the largest weight, and the overall development level is U-shaped, which first decreases and then increases, which has a significant impact on the comprehensive development level. The ternary coupling system is generally on the rise, and the absolute level of coupling is relatively low. As the pressure on the ecosystem increases, the development of the ecosystem will restrict economic and social development and offset the level of coordinated development. Economic development and economic vitality have a positive impact on social and ecological development, while social development has a greater impact on the ecological subsystem. The improvement of environmental status has a supporting effect on economic and social development. In the process of Huainan's transformation, it is necessary to maintain stable and rapid economic development, increase investment in social development and environmental pollution control, pay attention to ecological support capabilities, and avoid restricting social and economic development. But his research experiment did not carry out more experimental parameter settings [1]. Yongshi and Mingxing aim to conduct an empirical study on the correlation between the distribution industry in Fujian Province and regional economic growth. The results show that the circulation industry has a positive correlation with regional economic growth, and the circulation industry is the main reason for regional economic growth. Further study the dynamic mechanism of the circulation industry to promote regional economic growth and found that the circulation industry has the correlation effect, diffusion effect, and spillover effect on the regional economic growth, and it is the leading industry and basic industry of the regional economy. However, his correlation study considered fewer factors and did not consider multiple factors [2]. Ni et al. integrate fog computing into the Internet of Things, extending computing, storage, and network resources to the edge of the network. Unfortunately, it faces various security and privacy risks, which brings serious concerns to users. In this review, they reviewed the architecture and characteristics of fog computing and studied the key roles of fog nodes, including real-time services, instantaneous storage, data distribution, and decentralized computing. They also studied fog-assisted IoT applications based on different roles of fog nodes. Then, they raised the security and privacy threats of IoT applications. However, the combined application of the Internet of Things and fog computing has yet to be resolved [3].

The innovations of this article are (1) in-depth thinking about the development bottleneck of resource-based cities and innovatively put forward the idea of using the development of the circulation industry in economic transformation; (2) ingeniously integrating the Internet of Things RFID and infinite sensor technology. In the process of application in the circulation industry, it has solved the technical support problems in the circulation industry.

2. Internet of Things Technology Promotes the Research Method of the Circulation Industry in the Transformation of the Resource-Based Economy

2.1. Internet of Things

2.1.1. RFID. The RFID system is generally composed of three parts: an electronic tag, a reader, and an information processing system [4]. Tag: also called a transponder, the tag is equipped with an antenna and a chip. The antenna is mainly used to communicate with the radio frequency antenna, and the chip is mainly used to store the ID sequence that uniquely identifies the product information [5, 6]. According to the internal power supply, it is mainly divided into two types: active and passive. Active tags obtain energy from their own power sources, and their identification distance is much longer than passive tags, but the price and power consumption will be relatively much higher. Reader: the reader can identify the information stored in the tag without contact and send it to the information system for data processing [7, 8]. Antenna: the electronic tag and the reader are equipped with an antenna. The antenna mainly realizes the radio frequency signal propagation between the two and establishes a wireless communication connection between the two.

The working principle of RFID technology: first, after the reader receives the read instruction, it sends the signal to the antenna and then interrogates the tag through the antenna, and finally, the antenna transmits the obtained tag data to the information processing system for processing [9, 10].

2.1.2. Technical Application. Because RFID identification technology can realize the functions of wireless noncontact identification, multitag identification, and information networkability, it gradually replaces several other identification technologies [11]. Several developed countries in the United States, Japan, and South Korea have widely applied radio frequency identification technology to logistics management, traffic management, industrial automation, retail, and other related fields [12]. In our country, due to its high cost and limited research and development technology, the application of radio frequency identification technology is currently mainly concentrated in the field of intelligent transportation and the second-generation ID card of residents. However, due to the gradual expansion of production scale and the increasingly sophisticated integrated circuit technology, the production cost of radio frequency identification technology will also continue to decline, which can gradually expand the application of RFID in my country [13]. The following briefly introduces several main application areas of RFID technology.

(1) Traffic Management. Mainly used for car entry and exit registration, no parking fees, thereby avoiding traffic jams due to parking during peak periods and improving the efficiency and capacity of transportation.

(2) Food Safety. The use of RFID electronic tags can record the entire process information of food raw materials, production, processing, circulation, and sales in time, so as to ensure the safety of all aspects of food [14, 15]. The specific process is the producer uses the radio frequency identification technology to mark the agricultural products, and then the distributors and sellers scan the code to record the product flow, so that the agricultural product manufacturer can track the sales of each bottle of pesticide through the background management system [16, 17]. At the same time, consumers can also scan the code to enter the client to trace the specific production information of the product.

(3) Library Management. The library collects and recognizes readers' various certificate information by installing different readers on self-service borrowing and returning equipment and realizes the function of readers' self-service borrowing and returning [18, 19]; by installing RFID at the entrance of each library, the security door of the tag reader can not only automatically identify the effective information carried by the reader and ensure the safety of mobile personnel but also effectively identify whether the book carried by the reader has a borrowing record, so as to ensure the safety of the book; in addition to this, the application of RFID technology in the library can also realize the functions of visual navigation of books, book positioning, and automatic inventory of books, which greatly improves the efficiency of book borrowing, return, and sorting, while also ensuring the security of library management [20, 21].

(4) Logistics Management. With the increasing expansion of the online shopping industry, enterprises' demand for logistics is also increasing. Large-scale quantities of goods and complex supply chains are undoubtedly a big problem for traditional logistics management. It not only consumes a lot of labor to manually count the goods but also greatly reduces work efficiency and cannot guarantee data processing [22, 23]. The application of RFID technology in the logistics management system can not only accurately process the entry and exit of goods and inventory data in universities but also monitor all the information of the goods in real-time, thereby reducing labor costs and improving the accuracy and efficiency of data processing bring greater benefits [24–26]. Figure 1 is a diagram of the application of RFID technology to product circulation mode.

2.2. Resource-Based Economic Transformation. Resource-based economic development cities refer to cities developed based on local resources. Resource-based cities are closely related to resource reserves and even the rise and fall of cities. It can generally be classified according to two types of methods. First, it is classified according to resource storage. The reserves of specific resources have an absolute advantage, and their mining volume accounts for more than 50% of the total industrial output value, which is called depletion. Second, it is divided according to the proportion of urban employed population [27]. 40% of the urban population is engaged in specific resource development, processing, management, and other activities, which can be called a resource city.

Chinese resource-based cities are mainly distributed in the central and western regions and the northeastern region, for example, Inner Mongolia, Guizhou, Gansu, Shanxi, Xinjiang, Jilin, Heilongjiang, and Liaoning. Since it takes a long time for these cities to export resources, most cities face the same problem, that is, how to convert depleted resources [28]. It must be emphasized that some cities are constantly increasing resources, funds, and development, and their development and prosperity depend on convenient transportation systems, advanced technology, strong economic strength, and high-level information. Therefore, such a city cannot be said to be a resource-based city like Japan. Japan is an island country with limited resources, and the steel and automobile industries are very competitive countries. Shanghai Baosteel is also a self-produced steel company based on large amounts of Australian iron ore and high-quality internal carbon fiber. These are not actual cities based on mineral resources. The resource-based cities we want to investigate refer to regions rich in resources, but if the mining time is long, the resources will almost be exhausted, but the comparative advantages of other regions cannot be used. Such exhausted urban resources have long relied on their own resource advantages, which have gradually formed a stable development model. When resources are exhausted, its development will inevitably face serious problems. Therefore, these cities must complete economic transformation and change before resources are exhausted.

2.3. Circulation Industry

2.3.1. Connotation of the Circulation Industry. Before analyzing the connotation of the circulation industry, it is necessary to analyze the meaning of circulation and industry, respectively. The concept of circulation has three levels: the first level is circulation in a broad sense, that is, the continuous transfer process of matter. The second level is the circulation from the perspective of economics. It mainly refers to the circulation of commodities. It is generally defined as the exchange of commodities with currency as the medium. It includes the three behaviors and processes of commodity "purchase," "transfer," and "sell." The third level is based on the existence of social division of labor. Commodities transfer from the field of production to the field of consumption, and finally reach the series of processes experienced by consumers. This does not include the circulation of tangible goods, currency, services, etc. The circulation discussed in this article is defined as the circulation under the second-level economics perspective, that is, the circulation of tangible goods, services, funds, etc. [29, 30]. An industry is defined as the collection of interrelationships in the same market between a group of companies that produce similar products (or services) and their substitutes (or services). This article adopts the definition of this industry.
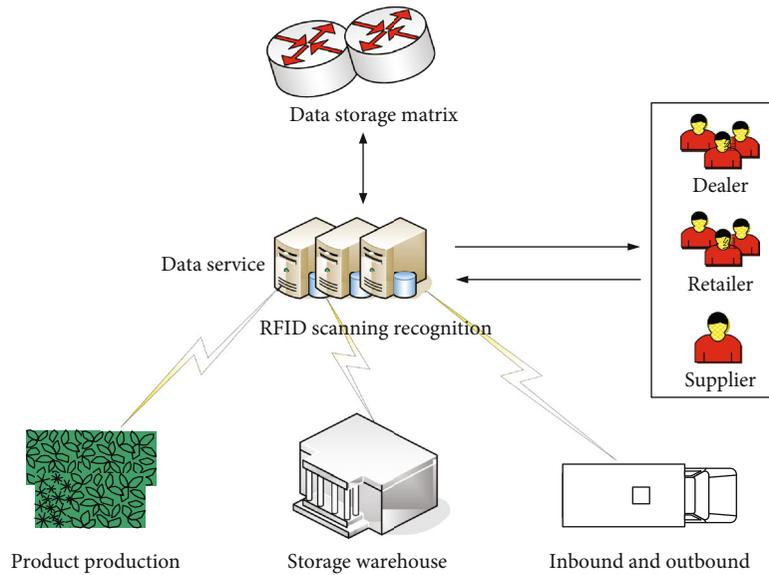
FIGURE 1: RFID technology applied to product circulation pattern diagram.

The definition of the connotation of the circulation industry must be based on circulation and industry as a constraint. The circulation industry is the carrier that carries the transfer process and exchange function and is a collection of enterprise groups that provide services for tangible goods, services, and funds. Therefore, according to the classification of the three industries, the circulation industry belongs to the tertiary industry. To be precise, the circulation industry belongs to the service industry. The circulation industry specifically includes the wholesale industry, retail industry, accommodation and catering industry, and logistics industry. The wholesale industry and retail industry are the main parts of the circulation industry, and the extension part of the circulation industry is the logistics industry. Generally, in the formulation of government policies, it is generally not considered the accommodation industry and the catering industry are two types of life service industries.

2.3.2. Related Theories about the Development of the Circulation Industry. The development of the circulation industry is driven by a variety of factors, and many theories of economics are involved in the development process. This chapter selects the theory of division of labor, the theory of transaction costs, the theory of industrial organization and industrial structure, and its relevance to the development of the circulation industry. Make a brief analysis and provide theoretical support for subsequent research work.

(1) The Theory of Division of Labor. The division of labor divides the process into several parts, and each part is completed by a different person. This concept includes social division of labor, factory or manufacturing division of labor, and natural division of labor. As early as the 17th century, classical economics advocated free trade and believed that exchange was the result of specialized division of labor, and foreign trade was the true source of wealth. Adam Smith (1776) advocated free trade and believed that the

division of labor resulted from the ability of exchange, and exchange made various specialized production possible. In short, the division of labor is to constantly weigh the high efficiency brought about by the division of labor and the increase in coordination costs, and the increase in coordination costs provides space for the generation and development of the circulation industry. Circulators will first be formed in a better location and then continuously improve transaction efficiency and expand the scope of the market, thereby promoting social division of labor. Therefore, the social division of labor is the basic condition for the formation of the circulation industry, and the circulation industry will in turn promote the continuous deepening of the social division of labor and form a benign interaction and coordinated development.

(2) Theory of Industrial Organization. The founders of industrial organization theory, Marshall, Chamberlain, etc., based on price theory, expounded the basic principles of industrial organization theory, namely, the relationship and contradiction between competition and monopoly among enterprises in the industry. The New Austrian School put forward an extreme liberalism theory, advocating full competition in the free market and denying antimonopoly and regulatory policies. The theory of industrial organization believes that the nature of an industrial market competition and economies of scale determine the level of industrial economic benefits. It can be seen that the circulation industry organization has played a certain role in promoting the development of the circulation industry.

(3) Industrial Structure Theory. Industrial structure refers to the configuration and composition of various factors of production among various industrial sectors. Industrial structure theory is an economic theory that studies the law of industrial structure evolution, and its ideas originated from William Petty's discussion of the phenomenon of

resource flow between industries. Then, Clark, Hoffman, Kuzkintz, and others analyzed the internal change law of each industry and the change trend of the economic promotion effect and believed that the continuous optimization of the industrial structure can promote economic development.

The circulation industry is the foundation and leading industry of the national economy, and its status and role are becoming more and more obvious. Under the guidance of industrial policy theory, research the current situation of the circulation industry in a certain province, analyze the environmental factors that affect the development of the circulation industry, and make targeted suggestions.

2.3.3. Current Problems in the Circulation Industry. At present, the development of the circulation industry is not perfect, and there are some problems that need to be solved: (1) the development of the circulation scale is lagging: the development scale of the circulation industry is very large, and its contribution to the regional economy is high, but the circulation scale is developing in the regional economy as a whole. It is relatively slow and does not play its due role; (2) the degree of circulation organization is not high: at present, the circulation industry operators are mainly self-employed and some small wholesale retailers. Generally, they have not formed large-scale, and there is no unified standard and plan. The overall level of specialization is not high; 3) there are few modern circulation formats: most of them maintain the traditional circulation form, there is no complete product information system, the quality of the product cannot be guaranteed, and the communication efficiency between users and merchants is extremely low, which affects commercial circulation; (4) the low degree of information circulation: for commodity information and commodity accounting, most of them use visual and manual accounting methods, lack of information communication, and insufficient information about commodities; (5) the circulation infrastructure is backward: in most areas, the circulation infrastructure has not been constructed, the transportation is backward, the network density is low, there is no advanced technology and financial support, and the overall circulation service level is not high.

3. Model of the Role of Internet of Things Technology in Promoting the Circulation Industry in the Transformation of a Resource-Based Economy

This chapter mainly aims to build an evaluation index system for the development level of the circulation industry in Province Y to objectively evaluate the circulation industry in Province Y from the perspectives of circulation scale, circulation structure, efficiency, contribution, and innovation value, and adopt the RFID technology in the Internet of Things. It is to understand its promotion and effects on the circulation industry in the transformation of the resource-based economy, so as to provide reference and

guidance for other cities in the transformation and development of the resource-based economy.

3.1. Principles of Establishing an Evaluation Index System. Whether the design of the evaluation index system is reasonable is directly related to the quality of the evaluation. Therefore, when establishing an evaluation index system based on the development level of the circulation industry, the following basic principles need to be considered: (1) scientific principles. The established indicator system can truly reflect the development of the circulation industry in the region. By analyzing the development level of the circulation industry in Province Y, specific development level indicators can be obtained. (2) System principles. When designing the index system, in terms of the macroeconomic market environment of economic development and the particularity of the development of the circulation industry, not only the specific political, economic, and cultural history but also the region must be investigated in detail. (3) Functional principle. The functions of data collection and data processing need to be fully considered. During the data collection period, the relevant data collected by the questionnaire survey and related service departments are classified as receiving the indicator data of this chapter. In the data processing stage, the index data needs to be arranged in the form of recognizable and executable index data to realize the established index system. (4) The principle of relative independence. It shows that there is often duplication of information among indicators of the development of the circulation industry. Therefore, when selecting indicators, in order to improve the scientificity and accuracy of the evaluation, it is necessary to fully consider the relative independence of the indicators. (5) Target directionality. In order to measure and evaluate the development level of the circulation sector, on the one hand, a detailed analysis of the development of the circulation sector is needed.

3.2. Construction of the Index System. Table 1 shows the indicator system for measuring the development level of the circulation industry. On the one hand, the construction of the indicator system should consider the real situation in Province Y. On the other hand, it is also based on the basic indicators, selecting indicators with regional characteristics for data acquisition, processing, and analysis.

3.3. Model Construction

3.3.1. Empirical Analysis Method. Empirical evaluation of the development level of the circulation industry is a comprehensive, dynamic, and comprehensive process. This article first selects the multiplicative synthesis normalization method. The purpose of this method is to multiply each weight by normalization to obtain the combined weight. The calculation formula is

$$E_j = \begin{cases} \chi_{ij} \cdot \delta_{ij} \\ \sum_{i=1}^{n} \chi_{ij} \cdot \delta_{ij} \end{cases} (j = 1, 2, \cdots, m). \tag{1}$$

TABLE 1: Index system for measuring the development level of circulation industry.

First-level index	Secondary measure	Index code	Index unit
Circulation scale	Added value of circulation industry	X1	100 million yuan
	The total retail sales of social consumer goods	X2	100 million yuan
	Number of employees in the circulation industry	X3	People
	Cargo transportation turnover	X4	Whole society cargo transportation volume/transport mileage
Circulation structure	Employee ratio in the circulation industry	X5	Number of employees in the circulation industry/number of employees in the tertiary industry
	Retail sales ratio of foreign-funded enterprises in the circulation industry	X6	Retail sales of foreign-funded enterprises above designated size/total retail sales
	Ratio of total retail sales above designated size	X7	Net operating income/ending balance of total assets
	Turnover rate of total assets	X8	Net operating income/ending balance of total assets
Circulation efficiency	Batch to retail ratio of wholesale and retail enterprises above designated size	X9	Wholesale sales/retail sales above designated size
	Profit margin of wholesale and retail income above the limit	X10	Total sales profit/total income of wholesale and retail businesses above designated size
	Economic contribution rate of the circulation industry	X11	Value added of the circulation industry/gross regional product
Circulation contribution	Employment contribution rate of the circulation industry	X12	Employees in the circulation industry/employees in the whole society
	Tax contribution rate of the circulation industry	X13	Total tax revenue of the circulation industry/total tax revenue of the whole society
Circulation innovation	Information management level	X14	Commodity online transaction value/circulation industry added value
	Logistics distribution degree	X15	Increase in commodity transportation/increase in circulation industry

Among them, the subjective weight is χ_{ij}, the objective weight is δ_{ij}, and the equation on the left is the comprehensive weight.

3.3.2. AHP. Then, we use the analytic hierarchy process to quantify the indicators to solve more complex logic and decision-making problems. First, judge the matrix according to the column normalization method:

$$c_{ij} = \begin{cases} \dfrac{c_{ij}}{\sum\limits_{k=1}^{n} c_{kj}} \end{cases} (i, j = 1, 2, \cdots, n). \quad (2)$$

Assign c_{ij} values to the criterion layer.

After normalization by line addition:

$$E_i = \sum_{i=1}^{n} c_{ij}(i, j = 1, 2, \cdots, n). \quad (3)$$

The equation on the left is the weight ratio between two objects.

Normalize the vector:

$$E = [E1, E2, \cdots, En]^T. \quad (4)$$

The largest characteristic root is calculated as:

$$\vartheta_{\max} = \sum_{i=1}^{n} \frac{(BM)_i}{nM_i}, \quad (5)$$

where I is each vector component.

Multiply the rank normalization formula to get objective weight:

$$E_j = \frac{\chi_{ij} \cdot \delta_{ij}}{\sum\limits_{i=1}^{n} \chi_{ij} \cdot \delta_{ij}} (j = 1, 2, \cdots, m). \quad (6)$$

3.3.3. Entropy Method. The entropy method is usually used to determine the objective weight value. Generally, the entropy value is the smaller, the greater the degree of indicator variation and the greater the weight.

Data standardization:

$$Q_{ij} = \frac{Y_{ij}}{\sum\limits_{i=1}^{n} Y_{ij}}. \quad (7)$$

Among them, Y_{ij} refers to the value of the j-th evaluation index in the i-th year, and n is the index value.

Calculate the information entropy of the data:

$$R_j = -\ln (n)^{-1} \sum_{i=1}^{n} q_{ij} \ln q_i. \tag{8}$$

Among them,

$$q_{ij} = \frac{\gamma_{ij}}{\sum_{i=1}^{n} \gamma_{ij}}. \tag{9}$$

If $q_{ij} = 0$, define

$$\lim q_{ij} \ln q_{ij} = 0. \tag{10}$$

Calculate the weight value of each indicator:

$$E_i = \frac{1 - R_i}{l - \sum R_i} \; (i = 1, 2, \cdots, l). \tag{11}$$

In the formula, R_{ij} represents the number of evaluation indexes for the jth item in the i-th year.

Composite index:

$$T = \sum_{i=1}^{5} B_i \times Q_i. \tag{12}$$

In the formula, B_i is the index value, and Q_i is the corresponding index weight. The larger the T value, the higher the development level of the circulation industry. The larger the comprehensive index value, the higher the development level of the circulation industry.

3.4. Data Source and Preprocessing. In order to evaluate the development of the circulation industry of resource-based cities in the economic transformation, this paper selects Y Province as the research sample and organizes statistical data to compare and analyze the promotion and effects brought by the Internet of Things technology. Data is reviewed repeatedly, and empirical analysis is performed after data processing.

4. Role of Internet of Things Technology in Promoting the Circulation Industry in the Transformation of a Resource-Based Economy

4.1. Necessity of Economic Transformation of Resource-Based Cities. Resource-based cities have played an important role in the process of national economic development. However, as the amount of resource extraction increases year by year, cities with resource-based economic development must also face the results of economic transformation. Resource-based

industries need to go through the following stages: exploration period-mining period-stable production period-decline period, and then resource-based cities will either face a period of exhaustion and decline, or choose to transform and develop. The same is true for the urban economic development process. After the prosperity period, there will inevitably be a period of recession or transformation and revitalization.

Figure 2 shows the life cycle theory of resource-based cities. Therefore, in summary, if resource-based economic cities want to further promote the development of the city, they must carry out economic transformation. From the perspective of Internet of Things technology, it is feasible and practical to conduct research on the circulation industry.

4.2. Current Status of the Distribution Industry in Province Y. The scale of the circulation industry in Province Y is shown in Figure 3, showing an expanding form. In recent years, with the steady increase in the disposable income of urban and rural residents in Y Province, the consumption demand of residents has continued to expand, and the circulation industry has also developed rapidly. The added value of the circulation industry in Province Y increased from 36.65 billion yuan in 2010 to 108.935 billion yuan in 2016, breaking through the 100 billion mark, with an average annual growth rate of about 19.96%. In 2020, it will develop rapidly, and the circulation industry will increase throughout the year. The value was 193.582 billion yuan, an increase of 7.81% over the previous year. Among them, the total retail sales of consumer goods increased from 338.76 billion to 171.515 billion yuan, with an average annual growth rate of 17.65%; the transportation and postal storage industry increased from 2.885 billion yuan to 21.877 billion yuan, with an average annual growth rate of 22.89%.

It can be seen from Figure 4 that the degree of organization of circulation in Province Y has increased. The added value of the wholesale and retail industry in Province Y has increased from 29.666 billion yuan in 2010 to 139.867 billion yuan in 2020, with an average annual growth rate of 17.17%. At the same time, the number of corporate enterprises above the designated size in the wholesale and retail industry continues to grow. In 2020, the added value of the accommodation and catering industry above the designated size is 4.337 billion yuan, with an average annual growth rate of 20.69%. The growth trend of the commodity trading market of more than 100 million yuan in Province Y is obvious, and the wholesale transaction volume accounts for 82.54% of the total transaction volume. From this, it can be seen that the wholesale of Province Y takes up a large proportion, and the retail terminal needs to continue to develop. At the same time, in order to improve the degree of organization of circulation, the Y provincial government has increased its support for circulation organizations such as circulation cooperative organizations, supply and marketing cooperatives, large agricultural product circulation enterprises, and circulation associations. A total of 46 large agricultural product circulation enterprises and 79 supply and marketing organizations have been built. The professional level of cooperative organizations, circulation
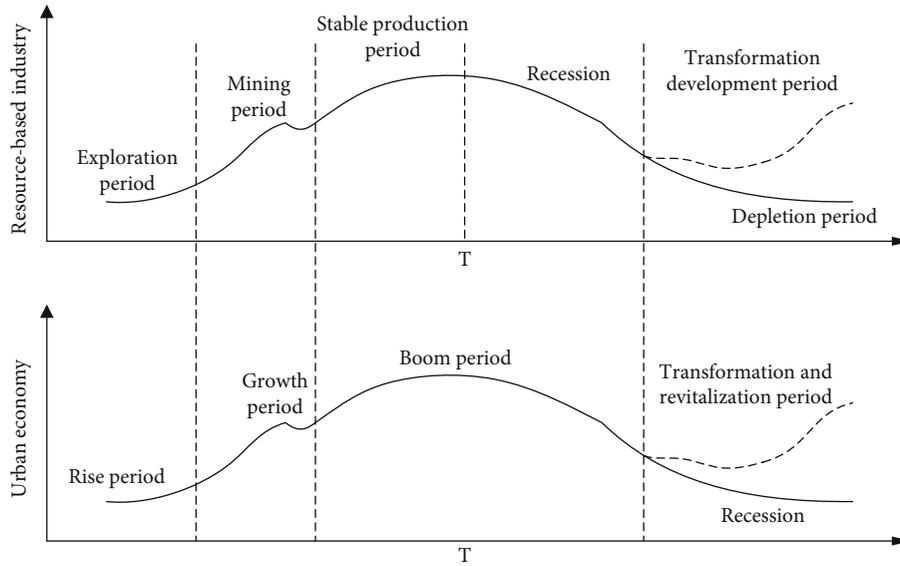
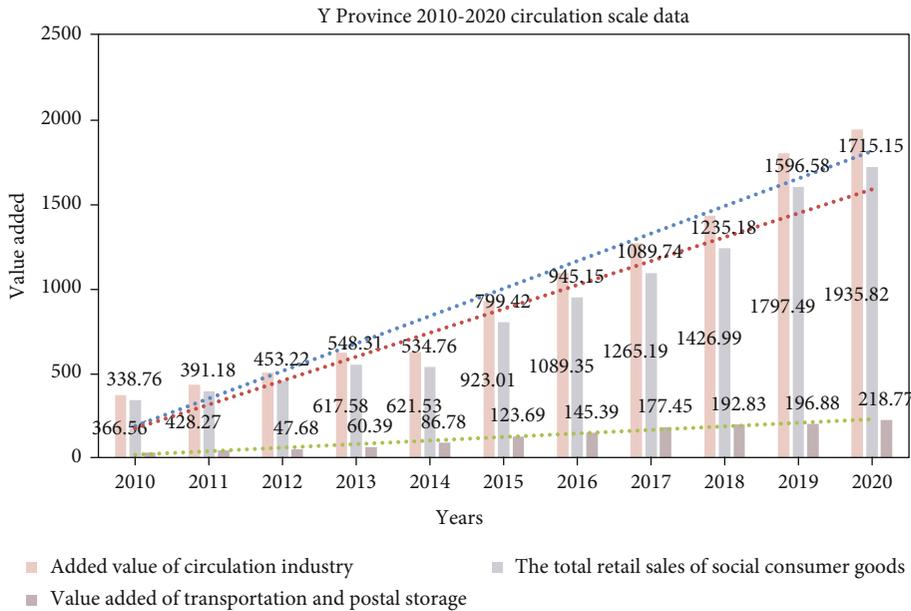Figure 2: Resource-based city life cycle diagram.

Figure 3: Y Province 2010-2020 circulation scale data.

cooperative organizations, and circulation associations has been continuously strengthened, thus, accelerating the process of circulation organization.

It can be seen from Table 2 that the opening of circulation in Province Y has accelerated, and the development of circulation foreign-funded enterprises has been relatively rapid. Due to the relatively backward economy in Province Y, few local companies can develop and grow independently. In order to promote the development of the circulation industry, the local government actively introduces foreign-funded enterprises with various preferential policies, and the number of foreign-invested circulation enterprises is rapidly increasing. It is specifically embodied in first, the increase in investment projects and investment amount. According to preliminary statistics from the Hunan Department of Commerce, for the whole year of 2020, the number of newly approved foreign-invested wholesale and retail contract projects in Y Province will exceed 100, and the contractual use of foreign capital will exceed 10 billion. The second is the preemption of circulation formats. 38% of large-scale comprehensive supermarkets and large-scale logistics markets in Y Province are foreign investment. Large-scale foreign investment has accelerated the development of circulation enterprises in Province Y and improved the overall level of the local circulation industry. At the same time, it has also intensified competition in the circulation market.
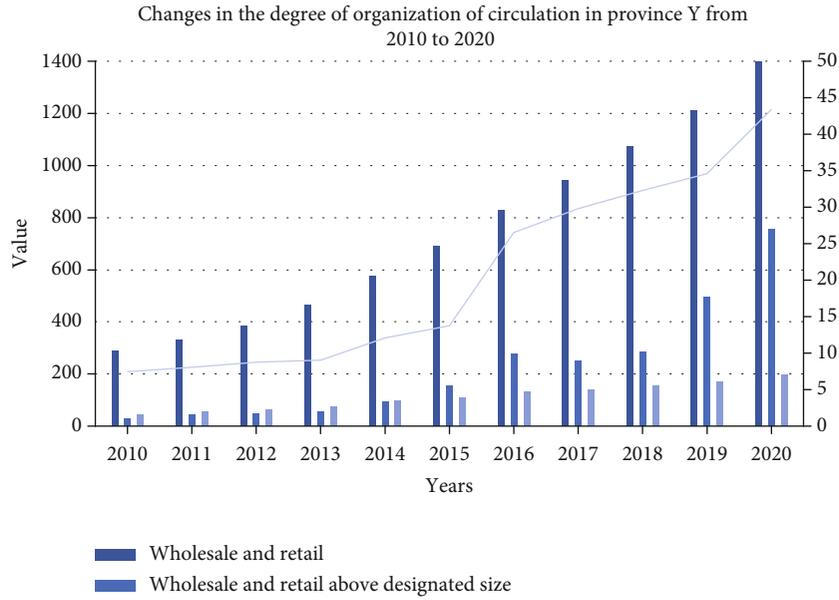
FIGURE 4: Changes in the degree of organization of circulation in Province Y from 2010 to 2020.

TABLE 2: New batch of foreign investment sales in wholesale and retail industries.

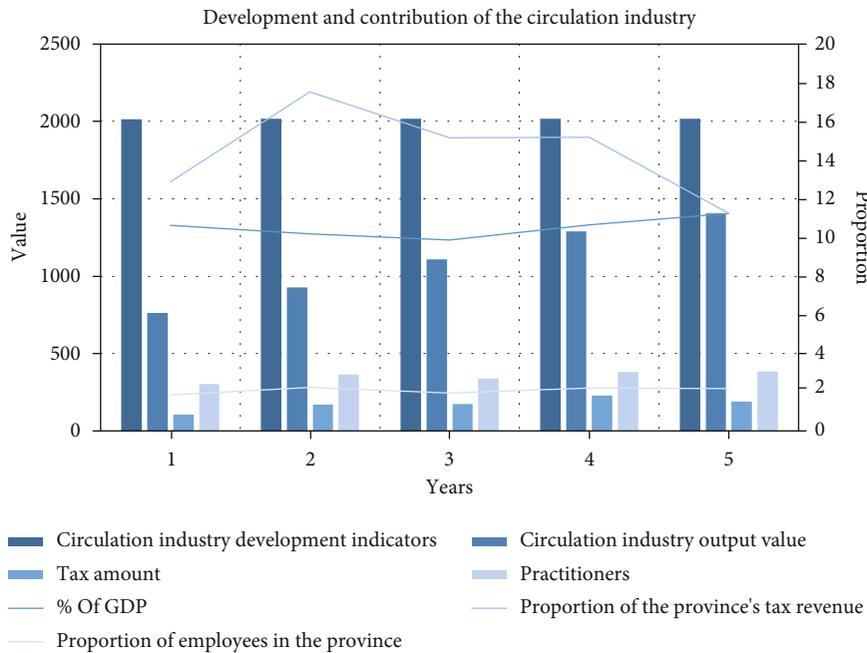| Years	Foreign-funded enterprises above designated size (units)	Contract items above quota (a)	Foreign investment (100 million yuan)
2010	17	33	105.36
2015	28	66	357.23
2020	43	108	598.51

FIGURE 5: Development and contribution of the circulation industry.

4.3. Role of RFID Technology in Promoting the Circulation Industry in the Transformation of a Resource-Based Economy. The contribution rate of the circulation industry in docking production and consumption, expanding effective demand, and improving people's quality of life is gradually increasing, as shown in Figure 5. In the past five years,
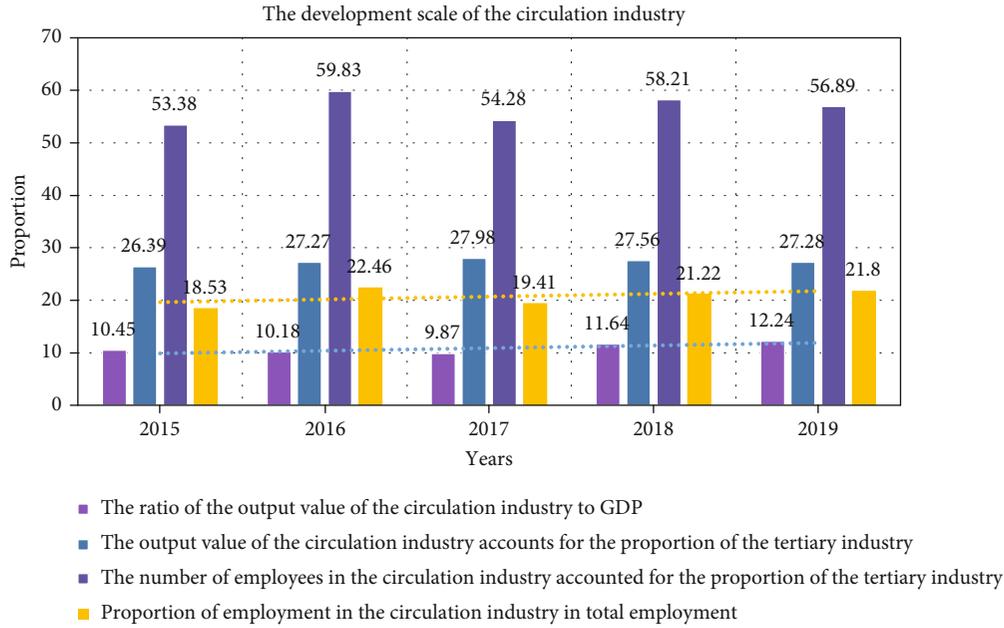
FIGURE 6: The development scale of the circulation industry.

TABLE 3: Comprehensive evaluation index data for urbanization.

Area	A	B	C	D	E	F	G
X1	53.56	84.22	59.13	64.11	46.88	55.53	51.19
X2	0.38	0.46	0.51	0.55	0.22	0.29	0.33
X3	53.27	42.56	50.17	53.78	50.73	42.25	58.78
X4	41.85	56.73	48.52	45.59	48.33	59.29	37.48
X5	1194.50	2398.94	958.73	1361.71	4754.11	8931.78	1225.53
X6	0.86	1.27	0.94	0.98	0.86	0.98	0.87
X7	22455.61	24000.42	21429.87	23238.75	22813.15	23249.61	23714.23
X8	21.91	69.87	32.53	38.81	22.26	14.31	12.26

various indicators of the development of the circulation industry have shown a significant growth trend. The output value of the industry has increased from 76.233 billion yuan at the beginning to 140.508 billion yuan in 2019. The tax revenue has doubled, showing the impact on the economy of Province Y. Strong pulling action. In terms of the number of employees, in 2015 it was 3.0299 million, accounting for 1.85% of the province's employment; in 2019, it was 3.846 million, accounting for 2.08% of the province's employment. The overall trend is increasing, highlighting the employment absorption of the circulation industry. "Reservoir" functions. Although the output value of the circulation industry has grown rapidly, the share of the circulation industry in GDP has not risen significantly. After 2015, the output value of the circulation industry accounted for about 27% of the tertiary industry, indicating that the circulation industry in Province Y has strong stability, but insufficient growth momentum, it is necessary to find growth points that promote the sustainable development of the circulation industry.

In Figure 6, from the analysis of the proportion of the output value of the circulation industry in the tertiary indus-

try and GDP, it can be concluded that the proportion has been increasing, but the growth rate of each year has not changed much. From the analysis of the proportion of employment in the circulation industry, the number of employees is increasing, and the proportion has gradually increased, from 54.37% and 19.52% in 2015 to 57.88% and 21.80% in 2019. This shows that the circulation industry in Y Province is the main channel to absorb social employment.

Table 3 shows the evaluation of the eight urbanization indicators in the A-G area. It can be seen from the table that with the support of Internet of Things technology, the circulation industry in the resource-based economic transformation of Province Y has not only obtained good economic benefits but also promoted the improvement of the level of urbanization in the region and increased. The per capita income of residents has expanded the number of employees in the circulation industry.

It can be seen from Figure 7 that, first, from the perspective of the share component of Y Province, the share component of the tertiary industry is involved in the study, so all sectors are growth sectors. It shows that the overall
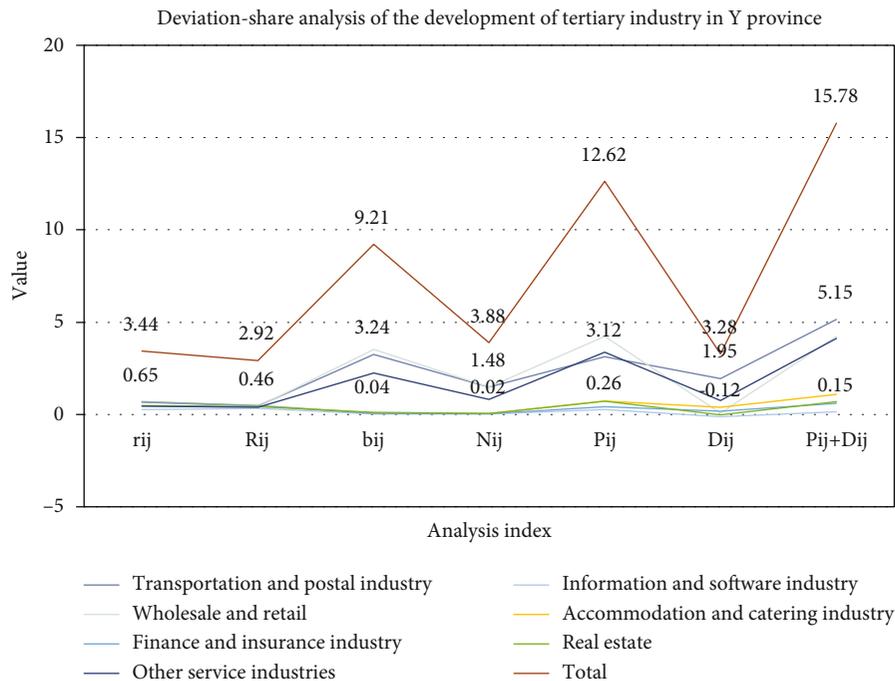
FIGURE 7: Deviation-share analysis of the development of tertiary industry in Y Province.

development speed of the tertiary industry in Y Province is higher than the average level, and the output value of the tertiary industry in Y Province has increased by 158 million yuan due to the advantage of share weight. Second, from the perspective of structural deviation, the value of the tertiary industry in Y Province is greater than the average level, of which wholesale and retail industries account for the largest proportion, followed by other service industries, transportation and postal industries, accommodation and catering industries, and real estate industries., Finance and insurance, information and software industries, indicating that these sectors have a good production base, and the existing economic structure has a greater contribution to the total economic volume.

5. Conclusion

This article mainly studies the role of Internet of Things technology in promoting the circulation industry in the transformation of a resource-based economy. The traditional circulation industry has problems such as lagging development in scale, low degree of organization, few modern circulation formats, and low degree of informatization. Most of the resource-based cities have relatively backward infrastructure and it is difficult to solve these problems. However, the RFID technology and infinite sensor technology in the Internet of Things can solve the above problems well and have a good promotion effect in terms of circulation scale, circulation structure, efficiency, contribution, etc., and can fundamentally improve the efficiency of the circulation industry and information accuracy. The research in this article is based on a combination of theoretical research and empirical research and a combination of qual-

itative research and quantitative research. The disadvantage of this article is that there are still limitations in the selection of resource-based cities, and the representativeness is not strong. However, the experimental results of this article have certain reference and reference for other resource-based cities to prepare for economic transformation.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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