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Analysis on The Business Model of Waste Market-Oriented Operation and Management in China's JX Region Based on the Perspective of Circular Economy

Abstract. Since 2000, China's JX region has been actively promoting pilot work on waste separation and treatment. Although some goals have been achieved, progress is slow and generally unsatisfactory. A new waste classification and disposal method that is suitable for a commercial marketing operation in the JX region of China is the problem to be solved in this paper. The purpose of the study is to analyze the business model of market-oriented activities and waste management based on the cyclical perspective of the economy in the JX region of China. In this work, the characteristics, current situation and strategic environment of the functioning of the waste market were investigated and analyzed using the method of system analysis. The application of the theory of joint management and the theory of circular economy, waste classification, ways of waste disposal, waste collection, processing, analysis of the difficulties of waste management in China's JX region, found that the waste management industry in this region (JX) is facing a market situation that is not optimistic. It is in the short-term perspective that the scale of the problem, the lack of funding and technical support, and the quality of practitioners must be improved. According to the existing problems, the practical value of this article is to provide a list of measures from the successful experience of managing the operation of the waste market in advanced countries and developed regions of China, as well as to suggest reasonable countermeasures

Keywords: sustainable development, waste management, classified collection, comprehensive utilization, analysis and countermeasures

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INTRODUCTION

American scholar K.N. Townsend put forward the concept of "circular economy" in the 1960s. Balding advocated the establishment of a circular economy that would neither deplete resources nor cause environmental pollution and ecological damage. Thus, circular economy will replace the single-program economy of the past. The circular economy proposed by him is an economic model that operates in accordance with the natural ecological material circulation. It requires following the laws of ecology, rationally utilizing natural resources and environmental capacity, and developing the economy on the basis of continuous

recycling of materials, so that the economic system can function in a harmonic way. It is incorporated into the material circulation process of the natural ecosystem to realize the ecologicalization of economic activities [1]. Practically, the circular economy follows the "3R" principle, that is, the principle of reduction, reuse, and recycling. Among them, the principle of recycling requires that the produced products can be turned into usable resources instead of irrecoverable garbage after completing their functions.

Therefore, cyclic economy advocates a model of economic development in harmony with the environment, the

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whole process of processing mode, reduce the amount of material into the production process, in order to achieve repeated use some items in different ways and waste recycling purpose, achieve from “eliminate waste” to “purify waste” to “using waste” process, so that all the material, energy in this sustainable cycle can be reasonable and sustainable utilization, so as to achieve as small as possible resource consumption and environmental costs, to obtain as large as possible economic, environmental and social benefits. All countries in the world are discussing the recycling of garbage, especially the comprehensive utilization of household garbage. China’s environmental protection theorists have also been exploring the development mode of domestic waste management and recycling in line with the national conditions. This paper only takes the development of waste management and recycling disposal industry in JX region of China as an example to analyze and discuss. Therefore, the aim of this article is the strict analysis on the business model of waste market-oriented operation and management in China’s JX Region based on the perspective of circular economy.

LITERATURE REVIEW

At present, there are not many articles about waste management in foreign countries, but a few articles about solid waste can be seen in some environmental philosophy literature. American scholar B. Commoner had realized the importance of garbage sorting a long time ago. According to him, garbage is not waste, because if used in the right way, it can become a source of prosperity [2]. B. Piatt, C. Doherty, A.C. Broughton and D. Morris believe that the producers of environmental pollution are human beings, who are driven by goals and interests, but their attitude is indifferent [3]. C.E. Murphy studied garbage, “flood” is their metaphor for garbage, to make people realize the seriousness of the garbage problem. C.E. Murphy, who came up with the “Ten Commandments”, still insists that the root of the garbage problem is sorting [4]. M. Liikanen, O. Sahimaa, M. Hupponen, J. Havukainen, J. Sorvari and M. Horttanainen proposed that the use of mandatory ways to ask people to conduct garbage classification is helpful to improve the effect of garbage classification [5].

Compared with China, the international academic circle has paid attention to the research of waste management for a long time. In early 1960s, some scholars began to study the market-oriented operation of waste. Through the literature research on the established topic, the current study is divided into the following elements:

1. *Research on garbage classification.* When people think of garbage classification, the first country that comes to mind is Japan, whose waste classification has reached an extreme level of refinement. This kind of extreme garbage sorting makes the streets of Japanese cities clean, and the presence of garbage is minimal. Some cities in developed countries, based on the actual situation, wisely plan garbage classification, and the literature on this particular topic in the international academia mainly includes the following types:

First, study the methods of garbage classification. The authors of work [4] took solid waste as the main research object, and they divided the waste into six categories, namely wood, plastic, waste paper, food, textile and rubber. However, through the experiment, it was found that

garbage classification should not be limited to these six categories, but also should have more detailed classification standards. M. Liikanen, O. Sahimaa et al. also believe that waste classification standards should be refined to avoid the waste of resources [5].

Second, study the factors that affect garbage classification. M. Liikanen, O. Sahimaa believe that the classification of garbage is closely related to the generation of garbage, which is positively tied to the level of urbanization and the density of population [5]. The authors of work [6] show that garbage mixing is the main cause of pollution. Therefore, a systematic method of garbage classification is needed to avoid mixing garbage.

In general, the international community provides a solid amount of researches in the sphere of garbage classification. There is no clear definition of specific standards for garbage classification in academic circles.

2. *Study on waste marketization operation.* On the analysis of waste marketization operation management business model based on the perspective of circular economy, in the past 10 years the authors of work [1; 7] and other scientists and experts conducted research on the development of this process and the market-oriented operation and management of waste, the regional and general situation in China. In general, in terms of the research on waste marketization operation, almost all of the works written by these scholars pay attention to the development trend of waste marketization operation management business model from the perspective of circular economy, and believe that the main source of this major problem is related to the beginning of the global integration path.

3. *Research on garbage disposal.* The literature on waste disposal is mainly technical. Incineration, as opposed to landfilling, which became popular in the United States in 1904, developed in the middle and late stages of waste disposal [1]. Nowadays, the world is in a period of rapid development, and has entered the electronic era, the technology is increasingly mature, incineration based waste disposal is gradually popular. Composting technology developed in the late stage, although it appeared later, but its development momentum cannot be underestimated. Some scholars argue that to control garbage, one must start from the source, such as preventing excessive packaging, reducing the use of disposable packaging and so on.

In some developed countries, energy and land resources are scarce, and waste incineration requires a large amount of land resources. Most of the agricultural developing countries still use compost as the main method, and landfill is the final disposal method of waste, which always accounts for a large proportion in the waste disposal method [8]. Some developed countries have also introduced relevant laws and regulations. For example, European and American developed countries are good at using financial means to improve environmental problems. In the mid-1990s, Germany implemented the Law on the Disposal of Waste to Promote the Closed Cycle Management of Waste and Ensure Environmental Compatibility, which indicates the reduction, recycling and harmlessness of waste [1; 2]. This law promotes the recycling of waste.

4. *Research on waste management strategies.* Waste management has been a subject of current academic research, for example, N. Reznikova, I. Zvarych, A. Kryso-

vatty, [9-11] and other scholars, in terms of how to overcome the global waste in global circulation chain, the development of the circular economy globalization, inclusive circulation economy analysis research on the impact of globalization, the economic environment as the prerequisite of the development of international development under the background of the tax environment, increase the green taxes and subsidies to phase out harmful to the environment, and fiscal incentives, VAT reductions and tax relief measures to provide the perfect conditions for the transition to a circular economy [11; 12]. Thus, promoting a circular economy in the context of the formation of circular electronic chains as a solution to overcome global waste. Dialysis out will be the new alternative models of the world economy as a new stage of economic transformation process, guiding demand more attention in the future according to the division of global waste composition and global waste, one of the key focuses on material recycling, and through service and intelligent solution to create additional value, this makes the circular economy of a kind of new economic model.

5. *Research review.* To sum up, developed countries strictly control waste management through the system and deeply understand the details of waste classification. For example, cities in the United States, Japan and Germany have clear rules and regulations on waste classification, and each city has a relatively detailed waste classification standard. Compared with China, especially in JX region of China, the main reasons for the remarkable effect of waste management in developed countries are their higher level of economic development, greater government investment and corresponding policy support. Although there have been many researches on the economic optimization of municipal waste disposal in China, there are few literatures on the waste management of some economically underdeveloped provincial capitals (such as JX region in China).

MATERIALS AND METHODS

1. *System analysis method.* This paper studies and analyzes the characteristics, current situation and strategic environment of the waste market operation management business model in JX region of China by means of systematic analysis and combining theoretical elaboration with realistic analysis. Next, from theory to reality, a basic research idea of this paper is: on the premise of China's current laws and systems, combined with the actual situation of China's JX region and the theory of circular economy, through risk analysis and evaluation, put forward a theory suitable for the waste market operation management business model in China's JX region. Through the study of the specific operation scheme, this paper describes the market-oriented waste operation management policy that can be implemented in JX region of China at the present stage, and tries to evaluate and analyze its feasibility. At the end of this paper, the paper suggests the operation ideas of the market-oriented business model of waste management and the development countermeasures of recycling in JX region of China [13; 14].

2. *Use of technology.* Quantitative and qualitative techniques are combined. For management science, qualitative research is a common method for raising, analyzing and solving problems. However, if the lack of quantitative analysis and research on the problem, it will often lead to the phenomenon of only theoretical explanation but lack

of practical application, especially authors cannot reveal the root of the problem. In this article, therefore, based on the complex adaptive system theory point of view of import controls on the basis of qualitative research, quantitative research using a variety of technologies, such as fuzzy comprehensive evaluation method, grey forecasting method, technology, life cycle methods of input-output model, to study the various problems in the process of put forward the concrete scheme of qualitative research, It provides a scientific basis for revealing the root of the problem and combining theoretical research with practice better.

3. *Technical route studied in this paper.* Develop detailed research outline → data collection → theoretical research → key research → empirical research → first draft → perfection and finalization of the paper.

RESULTS AND DISCUSSION

Core Concepts

1. *Recycling.* Recycling refers to the recycling of resources. As early as the 1960s, some scholars put forward the hypothesis of "spaceship theory", which compares the world people live in to a spaceship. In order to maintain sustainable economic development, people living in the spaceship must ensure that the environment is not polluted, and the leftovers after consumption must be recycled to realize the recycling of resources.

There are three basic principles in the recycling of resources, namely reduction, reuse and recycling [15; 16]. Among them, reduction refers to the reduction of waste production in the process of survival; reuse means that the goods that have been used can be reused after being processed by technology; resourcing means to maximize the use of resources, that is, to make full use of resources and avoid unnecessary waste [12; 17; 18].

In this paper, recycling refers to the classification of life and other wastes, the recyclables are recovered, and then reproduced by relevant enterprises, so that the recyclables in the garbage can play their residual value and fully realize the full utilization of resources.

2. *Garbage (waste) treatment.* In the academic circle, there is no unified definition of garbage (waste) management. When discussing the problem of garbage (waste) management, scholars have interpreted it. With the aggravation of the phenomenon of "garbage (waste) siege", the role of governance theory in guiding the garbage (waste) problem is prominent, and the term garbage (waste) governance comes into being. Garbage (waste) management is mainly a combination of government and society, as far as possible to reduce garbage (waste), resources, reuse the direction of development. In general, the process of garbage (waste) treatment is extremely complex, involving not only the treatment of the source, but also cleaning, recycling, processing and other links. Garbage (waste) treatment mainly refers to urban garbage (waste) treatment and rural life garbage (waste) treatment. The purpose of garbage (waste) management is to avoid waste and effectively maximize the use of resources. The research on garbage (waste) treatment is not only helpful to recycle old materials, but also can promote the sustainable development of economy, motivate the development of regional industries, and more conducive to mobilizing the enthusiasm of multiple subjects to participate in the creation of a beautiful home. The

treatment of household garbage (waste) is mainly the treatment of all kinds of waste, including recycling, utilization, reprocessing, etc., and the ultimate goal is to achieve the harmless treatment of garbage, and to explore the “treasure” from garbage (waste) as far as possible [6; 19]. Garbage (waste) management and garbage (waste) treatment is a word difference, but the connotation is very different, such as their focus is not the same. Garbage (waste) treatment mainly deals with garbage from the technical level, while garbage (waste) treatment focuses on management [20].

The garbage (waste) management in this paper focuses on management, mainly taking the government as the leader, and guiding multiple social organizations to participate in the activities such as the source reduction and classification of household garbage (waste). Finally, with the efforts of various groups, harmless disposal of garbage (waste) is achieved.

Basic Theory

1. Collaborative governance theory. In the process of promoting the improvement of national governance capacity, there is no doubt that government departments are the top priority of the governance system. The unipolar model of government can no longer deal with the chaos of public affairs. In this kind of environment, the theory of collaborative governance comes into play and becomes a hot research topic of Chinese scholars. Therefore, promoting and studying the cooperative governance theory of socialism with Chinese characteristics not only meets the realistic needs, but also has important value of The Times.

In the early 1990s, the theory of collaborative governance gradually rose and became the choice of many countries for reform. So far, Chinese scholars have not unified the definition of collaborative governance. They generally refer to collaborative governance as “cooperative governance”. In general, collaborative governance requires policy coordination among various parties, such as governments at all levels, various types of enterprises and social organizations. Each body represents a certain group interest, but also has various parts of the supporters. The organizational logic of different systems is different, so it is difficult to coordinate. If all parties involved in collaboration use independent and incompatible information communi-

cation systems, information asymmetry will be aggravated, and the effect of collaborative governance can be imagined.

2. Circular economy theory. In the 1960s, some scholars put forward the theory of circular economy. Originally, the circular economy was mainly aimed at the efficient disposal of waste as an idea. In the middle and late period, sustainable development strategy became a household term, “environmental protection”, “green” and other words have also become people’s word of mouth, circular economy emerged from this. The “3R” principle is the main principle in circular economy, namely reduction, reuse and recycling.

Basically, circular economy is a form of ecological economy, so it is also adapted to ecological laws, and to guide people’s life. Circular economy is different from traditional economy, which is mainly a linear economy characterized by “two high and one low”, that is, high emission, low utilization and high exploitation. This kind of economic emission is extensive, easy to form pollution to the environment. The difference is that the circular economy advocates the concept of sustainable development, characterized by “two low and one high”, that is, low emissions, high utilization and low exploitation. Circular economy has a circular process, namely resource – product – renewable resources. In this economic circulation system, all substances must be reasonably and fully used in order to reduce the adverse impact on the natural environment [21].

Status Quo of Waste Management in JX Region of China. The way waste is classified and recycled has a profound impact on the utilization rate of various types of waste. Those treatment methods that do not undergo strict screening of waste classification and recycling, such as landfill and waste incineration, are still the main methods of waste and garbage disposal in China’s JX region. This not only has a negative impact on the environment, but also leads to inefficiencies in the reuse of recyclable resources. In addition, the recovery rate of major renewable resources in China is less than 60%, which is still a significant gap with developed countries [22]. China pays special attention to waste management and utilization, especially in waste classification and recycling. From the central government to local governments, many policies on waste classification and recycling have been issued. See Table 1 and Table 2.

Table 1. List of relevant policies promulgated by the central government of China

Promulgation time	Promulgating unit	Announce policy
March 18, 2017	State Department	“Notice on Forwarding the Implementation Plan of the Domestic Waste Classification System of the National Development and Reform Commission and the Ministry of Housing and Urban-Rural Development” [23]
March 30, 2017	National Development and Reform Commission and Ministry of Housing and Urban-Rural Development	“Implementation Plan of Domestic Waste Classification System” [24]
October 18, 2017	State Organ Affairs Administration, Ministry of Housing and Urban-Rural Development, National Development and Reform Commission, Central Propaganda Department, Central Administration	“Notice on Promoting Domestic Waste Classification in Party and Government Organs and Other Public Institutions” [25]
December 20, 2017	Ministry of Housing and Urban-Rural Development	“Notice on Accelerating the Promotion of Domestic Waste Classification in Some Key Cities” [26]

Source: completed by authors

Table 2. List of relevant policies promulgated by local governments in China

Local government	Promulgation time	Announce policy
Southern China (e.g., Guangdong Province)	September 25, 2015	“Guangdong Province Urban and Rural Domestic Waste Disposal Regulations” [16]
	March 29, 2017	“Guidelines for the Classification and Treatment of Rural Domestic Waste in Guangdong Province” [16]
China (e.g., Chongqing)	November 3, 2017	“Notice on Printing and Distributing the Implementation Plan of Chongqing Municipal Solid Waste Classification System” [16]
Northeast China (e.g., Liaoning Province)	August 25, 2017	“Notice on the Implementation Plan of the Four-Year Rolling Plan for the Classification of Urban and Rural Domestic Waste in Liaoning Province (2017-2020)” [16]
North China (e.g., Beijing)	October 30, 2017	“Opinions on Accelerating the Promotion of Domestic Waste Classification” [16]
East China (e.g., Shanghai)	April 10, 2014	“Measures of Shanghai Municipality for Promoting the Classification and Reduction of Domestic Waste” [16]

Source: completed by authors

The central government and local governments have focused on the classification and recycling of waste and garbage, and the policy scope covers a wide range. From the perspectives of the government, public institutions and citizens, the classification and recycling of various types of waste and garbage has been clearly stipulated. For example, in the municipal solid waste management system, the government undertakes the important functions of construction, operation, maintenance and supervision, and plays the role of decision-making and guidance. Also, the government provides economic incentives in the source classification of domestic waste, and provides extensive publicity in the recycling and utilization of resources. With the emergence of the three principles of “reduction”, “recycling” and “harmless” in garbage recycling and disposal, China has gradually built a relatively complete basic framework for garbage classification and recycling. China introduced the PPP model (“Public-Private Partnership”), namely “public-private partnership”. The government uses the 3P model to provide waste treatment projects for waste recycling and processing enterprises. With the help of the advanced technology and management experience of the enterprises, it not only relieves the financial pressure of the government, but also provides a profit point for the waste processing enterprises. Due to the gradual saturation of the industry market in China’s JX region, small and medium-sized enterprises are gradually eliminated by the market, leading to the lack of market vitality of enterprises and industries in China’s JX region. Therefore, it is imperative to find a more appropriate market-oriented business model if more enterprises and funds are to enter the waste sorting and recycling industry and stimulate the market vitality.

Analysis of the operation mode of waste sorting and recycling companies in developed countries. Many developed countries have established a complete recycling and processing mechanism in waste classification and treatment. In Japan, the recycling rate of plastic waste has reached more than 60%; the United States has strict rules and regulations for waste sorting and recycling, and the supporting facilities for waste sorting are very well specified.

1. US industry situation. There is a complete set of disposal methods for waste in the United States. Including collection, recycling and disposal, processing and sale. American municipal waste is collected and sorted by a company specializing in waste collection. Garbage collection

companies basically set up two trash cans at each recycling point: one for recyclables and one for non-recyclables. Some garbage collection companies transport non-recyclable waste to a nearby landfill for direct disposal. Specifically, the income of garbage disposal companies generally has two parts: one part comes from the garbage disposal fees handed in by residents, and the other part comes from the recycling and sales profits of waste products. Residents hand over the waste disposal fee to the municipal management department, and the municipal department signs an agreement with the relevant waste recycling company. Garbage disposal companies can collect landfill fees from other companies from time to time, and profit from the sale of recycled items such as paper, metal, and glass.

2. American Waste Management Corporation WM business. WM is the largest waste management company in the United States. It has the entire industrial chain of solid waste from collection to treatment, and has implemented a large-scale business layout of garbage collection, recycling and treatment. Garbage collection business is the core business of the company, accounting for more than 50%, mainly by signing agreements with customers or municipal departments to collect and transport waste and recyclable materials to the disposal site for fees. Landfilling is the company’s main method of disposing of waste, and the business also brings in a substantial amount of revenue. Other main businesses of the company include transshipment, recycling of recyclable materials, etc. The company’s business model: The company was founded in 1971, and after that, it continued to carry out large and small mergers and acquisitions to promote the company’s rapid development and consolidate its market position. The company is committed to increasing profits rather than increasing the scale of waste treatment. By stripping off unprofitable peripheral industries, consolidating core businesses and maximizing profits. For example, in 2014, the company sold part of its European overseas business and part of the stake in China’s Shanghai Environment Group. At the same time, by stripping marginal industries, optimizing the industrial structure, and retaining high-quality industries, the number of employees can be reduced, thereby reducing labor costs. The high-quality operating capacity and the way of share repurchase drive the stock price to rise, thus ensuring the company’s ability to acquire mergers and acquisitions and forming a positive cycle.

3. Japanese waste disposal. Due to the scarcity of natural resources in Japan caused by geographical factors, Japan gives importance to the reuse of renewable resources. Effective garbage classification in Japan is an important prerequisite for the recycling of waste recycling management [23]. In Japan, household waste is mainly divided into four parts: combustible waste, reusable waste, ceramic waste, and large discarded household appliances. The municipal departments are mainly responsible for the collection of household garbage, and the recyclable garbage is uniformly handed over to the recycling company for disposal. At a certain time, the staff of the municipal department will collect the garbage from each recycling station in a unified manner. Thus, the municipal department will not charge a fee for a small amount of daily household waste, but when discarding large devices, an application to the municipal department should be submitted and handed in the disposal fee, and the staff of the municipal department will collect it at the appointed time. Meanwhile, the government will impose severe penalties on those who illegally dump garbage in accordance with the law. Domestic waste disposal methods in Japan include landfill, recycling, and waste incineration. Due to the reduction of available land in Japan, the country mainly uses waste incineration to dispose of waste, accounting for as high as 75%. In order to reduce the serious air pollution caused by the incineration of waste, Japan is constantly improving the waste classification method, introducing advanced technology from Germany, and transporting the solid combustion waste from villages and towns to large incineration plants in nearby cities for unified incineration. The heat generated by incineration can be used to supply heat or generate electricity to nearby public places. Landfill treatment accounts for a small proportion of the total waste treatment in Japan. Combustible incineration residues and some items that are not suitable for incineration are directly landfilled. The effective classification of various types of garbage in Japan is for better reuse, which not only reduces the burden on the environment, but also saves resources to achieve the maximum utilization of resources. Commonly, the ash after waste incineration is used as an auxiliary material for new cement, and some food waste is used as a raw material for fertilizer or feed. The use of waste incineration plants to generate electricity is also a new type of high-efficiency generation method, which not only reduces the use of coal, but also reasonably solves the heat waste of waste incineration.

Analysis of the existing business models of market-oriented waste sorting and recycling in China's JX region. For the existing market-oriented business models of waste sorting and recycling in China's JX region, the business models of existing companies in the market that can be summarized as the model of Internet + garbage sorting and recycling are reviewed. The Internet + waste sorting and recycling model is developed based on the currently available mobile network. The waste recycling company first creates its own garbage sorting and recycling APP or establishes a similar network platform, and attracts a large number of users through some incentives and garbage sorting and recycling reward mechanisms to achieve the purpose of sorting and recycling garbage. Garbage sorting and recycling companies then recycle these wastes to make profits.

At present, in China's waste sorting and recycling industry, there are two main types of front-end collection of waste: one is to rely on smart devices to enable users to independently classify and put waste, such as smart waste recycling cabinets, and companies generally can only recycle waste. The cabinet is placed in the residential area, and the user only needs to follow the instructions to classify the waste and put it in. The other is to rely on the on-site recycling of the staff. Users can book on-site services online according to their needs, and the online workers will directly pack and transport them back to the waste disposal station for waste sorting and recycling. In order to attract users, in addition to the promotion of copywriting advertisements, major platforms will also use incentives such as exchange of points and credit for money, allowing users to recycle accumulated points or credit through waste sorting in exchange for some daily necessities or cash red envelopes.

In recent years, the industry situation of waste sorting and recycling companies in the market is not optimistic. The waste classification and recycling industry generally needs to achieve a certain scale in order to bring profit. The domestic waste separation and recycling industry is still in its infancy, so it is difficult to reach the scale in a short period of time. In the early stage, the company needs a lot of material resources. Without financial support from the government or large enterprises, it is hard for the company to develop. Secondly, in the waste classification and recycling market, the problem of industry homogeneity is serious. The main focus is on the waste classification and recycling process, in a relatively simple form, mainly in the form of intelligent recycling bins. Category on waste recycling, almost all the rubbish classification recycling companies in the industry are mainly recycled plastic bottles and waste paper recycling in kind, due to its high efficiency waste garbage for, mining solid waste, industrial waste, kitchen waste, etc., often neglected, because interest on one hand, on the other hand is also restricted by technology.

In addition, the whole online-to-offline business model (Online to Offline, abbreviated as O2O) has problems in waste recycling that cannot be ignored. The most important existing problems are the low qualification of staff and poor efficiency, these two factors deeply limit the development of O2O waste recycling. Part of the qualification of staff is related to the nature of the industry, some high-quality talent can produce because of its industry related to scrap into the line resistance, and a part of its professional knowledge related to sight, O2O waste recycling is a complex process involving various aspects, requires a wide range of knowledge, and also needs a certain degree of knowledge accuracy beyond general competence. The main reason for low efficiency is that in the process of waste recycling, mechanization and automation need huge financial support and maintenance, which may fail to achieve comprehensive mechanization and automation, so it is limited by certain efficiency. In addition, O2O waste recycling related enterprises need certain financing requirements to grow bigger and stronger.

Thoughts on the operation of the market-oriented business model of waste management in China's JX region and the development countermeasures for recycling.

1. *Operational ideas of waste management market-oriented business model in China's JX region.* In the past five

years (2017-2022), China's JX region has introduced and implemented some waste management measures, gradually bringing waste management into the track of legal management. For example, in 2018, JX Provincial Department of Housing and Construction and Provincial Development and Reform Commission jointly issued the "Notice on Accelerating the Work of Household Garbage Classification in the Province". According to the implementation opinions, JX Province plans to establish a garbage sorting and recycling system, accelerate the construction of a system for the removal and transportation of household garbage and the recycling and utilization of renewable resources, promote the standardized and professional treatment of renewable resources, and promote recycling. Draw lessons from the advanced countries and regions, combined with China's national conditions, China's marketization of JX region waste management business model and two perfect a train of thought, that is: first, should perfect the management system, from produce to the disposal of the whole process of management mechanism, to achieve waste reduction, harmless, industrialization of recycling of the goal. Secondly, the introduction of foreign advanced technology, according to different specific characteristics, the development of suitable for local hazardous waste treatment and disposal of practical technology and equipment, promote the development of hazardous waste management, treatment, disposal of alternative technology. Thirdly, people should accelerate the improvement of the hazardous waste exchange market, reform the operation mechanism of waste disposal, promote the industrialization of hazardous waste recycling, formulate relevant economic policies to introduce competition mechanism, and use a variety of channels to establish regional centralized waste recycling facilities, so as to achieve scale efficiency.

2. Development Countermeasures of Waste Management and Recycling in China's JX Region. According to the three principles of recycling economy resource utilization, reduction and reuse, strengthening the comprehensive utilization of waste products is an important support for the development of circular economy. Circular economy is a solid manifestation of the development path of green economy. Through the combination and supplement of different products and industries, it promotes the rational adjustment and optimization of the structure, makes full use of resources and energy, and minimizes the generation and discharge of pollutants. It is important to implement the whole process control, reduce the social and economic costs of economic development and environmental protection, and achieve a "win-win" environment and economic development [27; 28].

2.1. Improve the infrastructure. To do so, the effective implementation of each procedure of front-end correct classification, mid-end sorting and collection, and terminal recycling and processing of garbage classification should be promoted, and the existing small mixed waste transfer system to connect with the waste sorting and collection system should be upgraded. The first is to build 2-3 medium-sized waste transfer stations in each area, with perishable waste inlets and one other waste outlet, perishable garbage and other garbage storage pools; the next is to promote the construction of the garbage classification and transfer center project. The terminal treatment of garbage classification can be introduced to achieve harmless treatment of gar-

bage and maximize the benefits of garbage recycling. In line with the garbage classification policy, the terminal disposal system of garbage classification should also be updated, for instance, building a new type of garbage treatment plant to classify and treat the classified garbage is advisable.

2.2. Improve the incentive mechanism for garbage classification. The actual results also prove that giving certain rewards to garbage sorting behaviors can strengthen residents' garbage sorting behaviors, such as the "green account" incentive mechanism created by Shanghai, and cities such as Hangzhou, Xiamen, Ningbo etc. are also exploring this kind of garbage sorting. Economic incentives in exchange for points and items. At present, Nanchang City, Jiangxi Province has also implemented a similar incentive policy. In order to stimulate the enthusiasm of residents for garbage collection, the staff of Taoyuan Community, Xihu District, Nanchang City, Jiangxi Province issued corresponding IC cards for each household in the community, and put them in the smart recycling box. Residents can automatically add 50 points to the IC card for every 1000g of the input and then the residents will be provided with gifts according to the points, and the value of 50 points is about 0.5 yuan. When setting incentive policies in Nanchang City, Jiangxi Province, it is necessary to consider the intensity of incentives, and to formulate some incentive measures that can attract residents. In addition to economic incentives such as small gifts and shopping certificates, incentives can also be considered public incentives, such as giving Publicly commend and set up a special commendation column on the publicity column to give information about the residents who have done well.

2.3. Improve legislation and strengthen waste supervision. First of all, it is necessary to clarify the responsibilities of the government. The government of China's JX region can formulate corresponding rules and regulations according to the general policy of the country, according to the residents' awareness of garbage classification in the region, and the lack of action. Secondly, the law must clarify the responsibilities of enterprises, formulate laws and regulations, rules and regulations to constrain the behavior of enterprises, and play a role in the supervision and restraint of laws, so that garbage classification has laws to abide by. The last is to clarify the behavior of garbage classification - the responsibilities and obligations of residents. Clarifying the responsibilities of residents through legislation can stimulate residents' consciousness and enthusiasm in garbage sorting and recycling [15]. Legislation should stipulate the obligations of residents: they are obliged to preliminarily classify and dispose of garbage, to pay garbage disposal fees, and to pay fines when disposing of garbage in violation of regulations. In short, only by clarifying the rights and responsibilities of each subject through legislation, the waste classification work can be effectively implemented. In addition to these measures, the JX region government can also strengthen the propaganda education, establish relevant government staff appraisal mechanism, under the government leading, form the combination of universal participation, social collaboration garbage classification collection mode, give full play to the Chinese government army "rubbish" JX region in the role of garbage classification collection, Through this series of means to promote the classification and collection of urban solid waste.

2.4. Use modern information management methods to improve management level. At present, some advanced cities outside the JX region of China have established information platforms for waste exchange and utilization, and have carried out real-time tracking of the whole process of waste generation, transfer and disposal. For example, in Guangzhou, China, the use of commercial platforms to supervise the transfer of hazardous wastes not only saves more than 50% of the cost compared to traditional methods, but also conducts real-time monitoring by the management department of enterprises that generate, transport and dispose of hazardous wastes, effectively improving government. The two-level safety supervision efficiency of enterprises for the transfer and transportation of hazardous wastes provides inquiry and emergency auxiliary decision-making for sudden pollution incidents [28]. China's JX region should build a waste registration and exchange center and an emergency treatment system as soon as possible. The completed registration and exchange center should have the following functions: First, the solid waste, especially the waste generating units, transportation enterprises, resource utilization enterprises, and processing and disposal enterprises, conduct online transfer and transaction management, to further improve the immediate management ability of waste flow; second, have command and coordination ability, through the construction of substations in relevant regions, form waste transportation and storage capacity in the region, and play a role in the emergency response of waste environmental accidents.

2.5. Regulate the waste management market and support the development of enterprises. To achieve the harmless recycling of waste, a complete system must be established and improved. The establishment and improvement of this system can rely neither solely on the government's administrative orders, nor just on the spontaneous formation of the market. A complete system must fully take into account the role of government departments in macro planning, policy support, supervision and management, and market mechanisms. The Circular Economy Promotion Law of the People's Republic of China came into effect in January 2009, The Act elaborates on remanufacturing six times in Articles 2, 40 and 56, indicating that remanufacturing has entered the national law [12]. With the development of circular economy, social funds continue to pour into the waste recycling industry, hoping to maximize profits. Especially in the hazardous waste industry, more and more enterprises and individuals hope to obtain waste management qualifications due to the high recycling value and more operational value than ordinary waste. In view of the particularity of waste, to establish a sound waste recycling system, the government must give full play to its due role to ensure the safe disposal of waste.

2.6. Accelerate the promotion of the commercial operation model of waste recycling in China's JX region

2.6.1. Accelerate the construction of a supporting system for the classification of domestic waste in cities. The first is to standardize the classification and delivery of domestic waste. In accordance with the principles of convenience, speed and safety, set up fixed recycling points or special containers for hazardous waste and store them independently. Residents are encouraged to hand over recyclables to renewable resource recycling enterprises for

recycling and disposal, establish and improve a system of reward points for the classification of domestic waste, and give full play to its incentive and guiding role. The second is to standardize the classification and collection of domestic waste. Support the construction of facilities and equipment for the classification and collection of domestic waste, optimize and improve the layout of the classification and collection and transfer sites of domestic waste, and realize the functions of classification, collection, measurement, and transfer of recyclables and various other wastes. Where conditions permit, regular and fixed-point vehicle-to-door classification collection methods can be adopted to reduce fixed trash cans and secondary pollution. The third is to standardize the classification and transportation of domestic waste. Establish a visual identification system for the classification and transportation of domestic waste, clarify vehicle painting requirements, and unify vehicle identification to facilitate social supervision. Encourage the use of government-purchased services and other methods to guide professional sanitation enterprises to extend to residential areas, and gradually replace small, scattered, and poor informal garbage collection and expenditure teams. Strict law enforcement inspections to avoid mixed transportation. Fourth, strengthen the terminal processing capacity building. Formulate plans for the construction of domestic waste classification and treatment facilities, speed up the construction of kitchen waste treatment facilities and incineration generation treatment facilities, encourage the construction of domestic waste treatment industrial parks, and coordinate various types of waste treatment. If the existing treatment facilities and process levels do not meet the standards, upgrading and transformation should be implemented as soon as possible to meet the needs of classified treatment. The construction of a recycling and utilization system for renewable resources must be accelerated, and the standardized, professional, and clean treatment and utilization of renewable resources should be promoted.

2.6.2. Actively explore and establish an operation mechanism for the classified collection and treatment of rural domestic waste in rural areas, continuously improve the level of reduction, recycling and harmlessness, further increase the rate of classified collection and comprehensive utilization of rural domestic waste, and promote a resource-saving society.

First, concerning garbage: through the classification, collection, and transfer of rural domestic garbage, perishable garbage is processed in domestic garbage reduction and recycling facilities; the classification and disposal of recyclables is linked to the urban renewable resource recycling system, a recycling catalogue of recyclables should be formulated; hazardous wastes such as medical waste and hazardous waste should be collected and processed in accordance with industry management requirements; other household wastes should be transported to County (city) domestic waste harmless treatment facilities for disposal.

Second, in the construction of sanitation facilities: each pilot county (city) can scientifically determine the reduction and recycling of perishable waste according to factors such as topography, village size, traffic location, and in accordance with the requirements of overall planning, on-site disposal, and local conditions. The technology and scale of the treatment facilities can be built in one village

or a combination of multiple villages. Each administrative village shall set up at least one sorting and stacking place for recyclables, and each natural village group shall be reasonably equipped with sorting garbage bins (buckets).

Third, in the construction of the recycling system: improve the recycling and utilization network of renewable resources, rationally distribute points, improve construction standards, clean up and ban illegal sites that illegally occupy roads, build privately and arbitrarily, and do not meet the requirements of environmental sanitation. Explore the establishment of an information platform for the recycling and utilization of renewable resources, and provide information such as recycling types, transaction prices, and recycling methods.

Fourth, in the construction of cleaning teams: according to the working methods of sorting, collecting, transporting and disposing of domestic waste, all localities should allocate cleaning staff according to the standard of 3 per 1,000 permanent residents, who also serve as sorting of recyclables and perishable waste. Transport work. Recyclable garbage shall be consigned by rural cleaners from natural villages (groups) to the recyclable domestic garbage classification and stacking place in administrative villages, and perishable garbage shall be removed and transported to domestic garbage reduction and resource treatment facilities. The purchase price of recyclable waste items can be used as a labor subsidy for rural cleaners.

2.6.3. Build a network channel linking household waste and renewable resources recycling. The combination of waste recycling and O2O marketing mode, and the close connection, recycling personnel or enterprises, will better build a link household waste and renewable resources recycling network channel. From a personal point of view, such a construction mode can achieve mutual benefit and win-win situation. First is to help potential people re-create the value of the household waste generated there; Second, enterprises can provide O2O model to realize the on-site recycling service of waste classification to facilitate the public; Third, O2O waste recycling business model can help people develop and improve the habit of garbage sorting; From the perspective of industry enterprises, it can help enterprises shape standards in the recycling industry, optimize the whole supply chain, improve efficiency and control the flow of recycled materials through automation, mechanization and information technology. So, from this aspect, proposal of waste recycling in China JX commercial operation mode, from the view of encouraging the construction of industrial park, from the standard garbage sorting transport behavior, from cultivating O2O recycling industry collaborative do big Angle actively build new mode "Internet +" resource recycling, get through life recycling and renewable resources recovery network channels.

First, the JX region of China should encourage the construction of waste disposal industrial parks, promote the construction of comprehensive disposal industrial parks that integrate incineration, fly ash landfill, kitchen waste, and hazardous waste disposal to improve the capacity of various types of waste disposal; coordinate the construction of hazardous waste terminals Treatment facilities to ensure the effective disposal of harmful domestic waste collected in a centralized manner; to speed up the construction of bulky waste treatment facilities, in principle, no new domestic waste landfill treatment facilities will be built.

Second, the JX region of China should further standardize the garbage classification and transportation. It is required that the classified domestic garbage must be sorted and transported. During the transportation process, it should not be dumped, discarded, scattered, or dripped. It is planned to strengthen the pollution control during the transportation of hazardous garbage to ensure environmental safety.

Third, China's JX region should actively cultivate the O2O waste recycling industry. With the time passing and with the expansion of scale and the formation of potential customers' personal habits, the scale effect and people's "experience curve" effect will gradually emerge, and the corresponding O2O waste recycling will also cooperate with related industries to generate synergies, such as signing a series of related contracts with the express delivery industry. These effects can accordingly reduce the overall cost of the waste recycling industry under the O2O business model, and achieve a leveraged positive effect, which is reflected in its full use of potentially renewable and recyclable waste to reduce pollution caused by garbage. The degree of environmental damage and resource consumption, thereby leveraging the improvement of the entire society and the national ecological environment and promoting the development of economic quality. For this reason, turning the waste recycling industry into an O2O "Internet +" form in China's JX region is not only a very meaningful innovation, but also a new channel to promote economic development. The O2O waste recycling industry can contribute to the integration of its industrial chain through mergers, strategic cooperation, etc., and take this opportunity to become bigger, stronger and better. It is envisaged that in the near future, driven by China's construction of an innovative society, the recycling model would be updated, the O2O perspective of the Internet would be introduced into the construction of the waste recycling system, and the implementation of "smart recycling" would definitely have huge development advantages.

Author Xin Tong et al. in the paper [29] develop the idea about influence of effort to build an EPR system for waste electrical and electronic equipment (WEEE) in China has created unexpected niches for innovation in business models for post-consumer recycling of e-waste as well as other recyclables in recent years. This study used action research to evaluate the performance of emerging business models for post-consumer recycling in urban China in recent years. The results reveal the dilemmas that each business model faces in balancing among all the elements and highlight the governance challenge of integrating the EPR scheme with the municipal waste management system. In the paper [30] T.A. Kurniawan et al. describe a proper implementation of digitalization-based waste recycling has contributed to an efficient cooperation between the government and private sector, increased job opportunities, and promoted the conservation of resources. It is anticipated that the work [31] not only contributes to the establishment of an integrated MSWM system in China, but also improves local MSWM through digitalization in the framework of a CE. Another case was developed by Corinna Vera Hedwig Schmidt, Bastian Kindermann, Cassian Felix Behlau, Tessa Christina Flatten in the paper [32]. Thus, all these papers developed some moments in our topic moreover we took into account concrete region of China.

CONCLUSIONS

The high growth of economic development in China's JX region is at the cost of the high increase of resource input, accompanied by the increase of total pollution emission. If the existing economic development model continues, the required resource input and pollution emission in China's JX region will increase synchronously with the economy. According to the requirements of the scientific outlook on development, it is an important and urgent task to accelerate the fundamental transformation of the economic growth mode. From the perspective of resource flow and environmental impact, the traditional growth mode is a single-program economic model, that is, a one-way linear process of "resource-product-waste". The main problems of this economic growth mode are: high input, high consumption, high emission and low circulation. That is, the more resources people consume, the more waste people produce, and the greater the negative impact on resources and environment. The modern growth mode is circular economy model, namely, the closed-loop feedback cycle process of "resource-product-waste-renewable resources", which can more effectively use resources and protect the environment, and obtain as much economic and environmental benefits as possible with as little cost as possible. Therefore, the transformation of economic growth mode in JX region of China at the present stage is to abandon the traditional economic development mode and promote the new development mode of circular economy. Therefore, this paper analyzes the current situation of waste market operation management in China's JX region from the perspective of circular economy, and puts forward the optimization path of waste market operation management in China's JX region.

Efficient waste utilization is the core idea of the circular economy model, and it is also the perfect point to maintain the high-speed economic growth in China's JX region. Today, China's economic development has entered a new stage of strategic adjustment. Due to the different economic development and environmental conditions, there is no universally applicable optimal business model for the development of waste recycling industry, which often requires China's JX region to keep in line with the Chinese central government. JX region of China needs to make corresponding mode selection according to the actual situation of the local, so as to facilitate the development of the local waste management and recycling industry. The development of circular economy is an effective means to transform the extensive economic model to the intensive economic model in JX region of China, and it is also the only way to ensure the stable economic growth in the process of economic model transformation. It is proposed to build based on circular economy under the perspective of JX China waste marketing operation management business model, which is used in various engineering methods and management measures of waste recycling behavior benefit comprehensive performance, the process of recovery from waste a lot of valuable material, is to realize the economic benefit, environmental benefit and social benefit unified effective way. China by way of JX region can follow by "Internet +" development trend, establish in China JX residents expect garbage sorting mechanism, guide the residents and enterprises to form green living and production and social practice to promote China's booming of waste recycling industry in JX, to improve the environment for JX areas of China, building "JX" beautiful China region. It is of great significance to establish China's ecological civilization and sustainable economic development.

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Аналіз бізнес-моделі ринково-орієнтованої діяльності та управління відходами в китаському регіоні JX з позиції засад циркулярної економіки

Анотація. З 2000 року китайський регіон JX активно просуває пілотну роботу з розділення та обробки відходів. Хоча деякі цілі були досягнуті, прогрес є повільним і в цілому незадовільним. Новий спосіб класифікації та утилізації відходів, який придатний для комерційної операції маркетингу в регіоні JX Китаю, є проблемою, яку потрібно вирішити в цій статті. Мета дослідження полягає в аналізі бізнес-моделі ринково-орієнтованої діяльності та управління відходами на основі циклічної перспективи економіки в регіоні JX Китаю. У цій роботі досліджено та проаналізовано характеристики, поточну ситуацію та стратегічне середовище функціонування ринку відходів за допомогою методу системного аналізу. Застосування теорії спільного управління та теорії циркулярної економіки, класифікації сміття, способів утилізації відходів, збору відходів, обробки, аналіз труднощів управління відходами у китайському регіоні JX, виявили, що галузь управління відходами у цьому регіоні (JX), стикається з ринковою ситуацією, яка не є оптимістичною. Саме у короткостроковій перспективі масштабність проблеми, відсутність фінансування та технічної підтримки, якість практиків необхідно підвищити. Відповідно до наявних проблем практична цінність даної статті полягає в тому, щоб надати перелік заходів з успішного досвіду управління функціонуванням ринку відходів у передових країнах і розвинених регіонах Китаю, а також запропонувати розумні контрзаходи

Ключові слова: сталий розвиток, управління відходами, сортування, комплексна утилізація, аналіз та протидія, циркулярна економіка