ATLANTIS PRESS
Advances in Social Science, Education and Humanities Research, volume 309
1st International Symposium on Management and Social Sciences (ISMSS 2019)

Research on Specific Ways of Recycling Waste and Used Materials under "Internet +"

Lu Cao*, Gongzhuo Xu
Wuhan Technology and Business University, WTBU
Hubei Business Service Research Development Center
Wuhan, P. R. China

***Abstract*—With the rapid development of Internet technology, renewable resource recovery enterprises should use modern information technology such as the Internet to establish a convenient and efficient renewable resource recovery trading service platform to improve the efficiency of recovery. In view of the current situation of recycling and utilization of waste materials, combined with "Internet +" information technology, this paper puts forward a "Internet +" lower platform framework for urban community waste materials recycling logistics consortium, and specific ways and suggestions for recycling waste materials are given, so as to optimize the recycling efficiency of waste materials and realize the economy, ecological and social benefits brought about by the recycling of waste materials.**

Keywords*— *Internet; waste materials; recycling; economic benefits

I. INTRODUCTION

In May 2017, the National Development and Reform Commission, together with other 14 departments jointly issued the Circular on Issuing the Leading Action of Circular Development, proposed to improve the recycling system of renewable resources, promoted traditional sales enterprises, e-commerce and logistics companies to use the distribution network to establish reverse logistics system, and supported renewable resources enterprises to use the Internet and Internet of Things technology to promote recycling machines according to local conditions [1]. Recycling methods such as recycling supermarkets, establishing online and offline integration recovery network, encourage enterprises of renewable resources to cooperate with various waste and production enterprises, and establish a recycling model suitable for industrial characteristics.

Renewable resources, commonly known as waste materials, refer to the materials that can be recycled and discarded in human production and life. Despite the loss or partial loss of use value of waste materials, after collection and processing, new physical and chemical labor and living labor have been injected, and the value and use value of commodities have been added [2]. Recycling and utilization of renewable resources is an important part of comprehensive utilization of resources and environmental protection industry. It is also an important measure to rationally utilize resources, protecting the environment and promoting sustainable economic development. Therefore, researching new ways of recycling waste materials is particularly important.

Supported by —Research on waste material recovery logistics operation model of Hubei Province based on sustainable development strategy, Hubei Business Service Research Development Center Open Fund Project (2017Y008).

II. MAIN PROBLEMS IN RECYCLING AND UTILIZATION OF WASTE MATERIALS

Due to the rapid development of urban economy and the rapid increasing of urban population, as well as the substantial improvement of material and cultural life of urban residents, the production of municipal solid waste will continue to grow, which will pose an increasingly serious threat to urban development and environmental quality. In 2017, the National Development and Reform Commission (NDRC) successively promulgated such policies as "the Implementation Plan of the Domestic Waste Classification System", "the Reform Implementation Plan of the Import Management System for Prohibiting Foreign Waste and Promoting the Import of Solid Waste", "the Cleaning and Rectification Work Program for Recycling Industries as Electronic Waste, Waste Tires, Waste Plastics, Waste Clothes, Dismantling Waste Household Appliances", etc. All the policies created a good environment for the standardized development of recycling enterprises [3]. However, there are still some problems in the recycling and utilization of waste materials, mainly in the following aspects:

A. Low recovery rate of low-value recycled waste materials

Low-value renewable resources such as waste glasses, waste plastics, waste woods and waste conforming to packaging account for about 30% of the total amount of garbage. The low profit and high cost of low value renewable resources lead to the low enthusiasm of sellers and recycles to collect and sell. Need the government to give the low-value renewable resources recovery certain funds and policy support.

B. Lack of pertinence in market planning, inaccurate positioning and unreasonable industry management

The lack of access policy and certain standards in the recycling of waste materials and materials leads to a bad situation in the recycling industry. Due to the lack of effective control and management, the waste recycling industry hides illegal and criminal activities such as stolen goods, theft and destruction [4]. With the development of urban construction, the establishment of waste market should be integrated into urban planning, scientific and rational layout, in accordance with the principle of establishing a certain network in a certain region, to serve the needs of society and the

community.

C. The general public's awareness of waste classification is weak

On December 21, 2016, General Secretary Xi Jinping pointed out at the 14th meeting of the Central Leading Group of Finance and Economics that the universal implementation of the waste classification system is related to the improvement of living environment of more than 1.3 billion people and the reduction, resource utilization and harmless disposal of garbage; and that "the establishment of garbage disposal systems for classified delivery, collection, transportation and treatment should be accelerated so as to form a rule of law" [5]. Based on the garbage classification system, which is promoted by the government, participated by the whole people, coordinated urban and rural development, and adapted to local conditions, efforts should be made to improve the coverage of the garbage classification system [6].

D. Recycling logistics technology lags behind for waste materials

At present, China's waste material recovery technology is relatively backward, whether compared with foreign countries, or with the demand of the logistics market, there is a clear lag [7]. The improper disposal of waste recycling technology, serious lag of equipment and disorderly disposal of waste seriously damage the appearance of the city, at the same time, it also has a great impact on environmental health [8].

III. PLATFORM CONSTRUCTION OF WASTE MATERIALS RECYCLING UNDER "INTERNET +"

With the rapid development of Internet technology, renewable resources recovery enterprises should use modern information technology such as the Internet to establish a convenient and efficient renewable resources recovery trading service platform. Therefore, this paper proposes a "Internet +" information platform framework for urban community waste materials recycling logistics consortium, which is divided into three levels, namely, the perception layer, the network layer and the application layer, which are used to sense data, transmit data and provide concrete application services for the waste material recycling logistics, as shown in Figure 1.

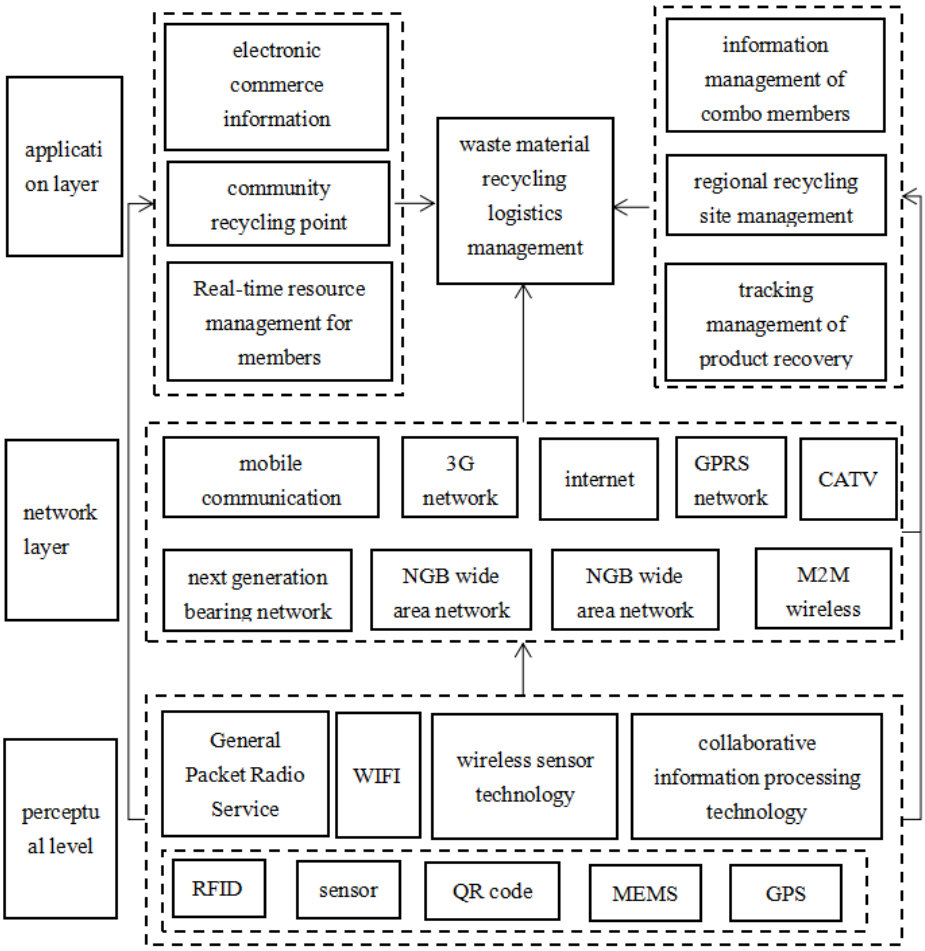

Fig. 1 Information Platform of Waste Material Recycling Logistics Consortium in Urban Community

The network layer transmits the information acquired by the perception layer through various existing networks, and realizes the real-time sharing of information among the members of the consortium.

According to the different roles of the members of the consortium, the application layer can be subdivided into waste material recovery logistics management center information platform, e-commerce information management platform,

community recycling station management information platform, member implementation resource management information platform, product recovery tracking management information platform and so on. Through a unified data interface, the information platform is interconnected with online vendor information platform, product manufacturer information platform, electronic waste recycling network information platform and the original information platform of the consortium members to share information in real time. The specific operation flow is shown in Figure 2, 3 and 4.

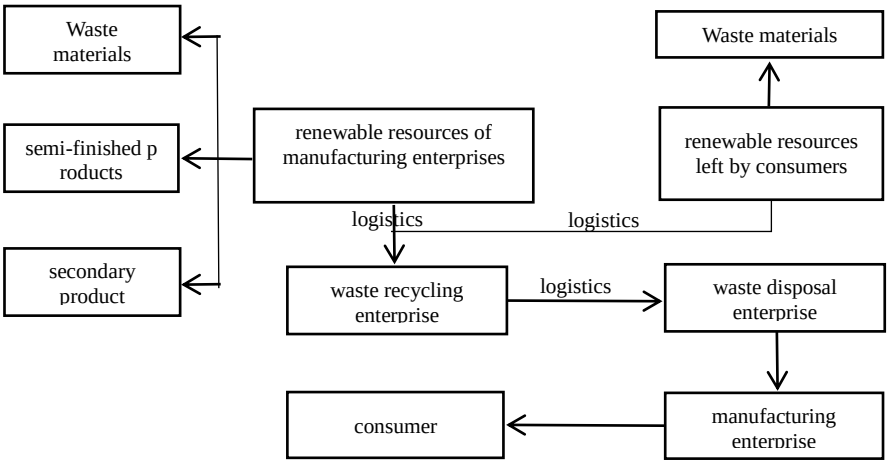

Fig. 2 Classification of Waste

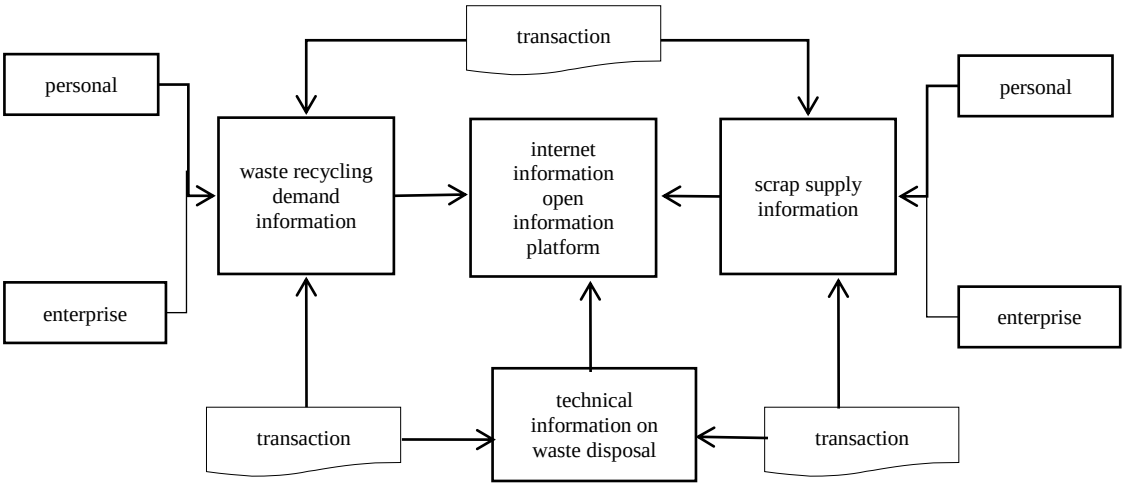

Fig. 3 Quick Trading of Waste Material

Figure 2 illustrates that the waste left by enterprises and consumers enters waste recovery enterprises through logistics, and then classifies and classifies them, and then enters different waste treatment enterprises with different types of waste logistics. All kinds of waste disposal enterprises use the corresponding technology to technically dispose of waste, and then logistics into production enterprises, become important production raw materials, and finally become the final product of consumer consumption.

Figure 3 illustrates that based on the “Internet +” information platform, the supply and demand information of waste material recycling logistics can be quickly disclosed, and promote the rapid transaction of old waste. The waste left by enterprises’ production and personal consumption can publish information on the Internet platform. Based on the Internet platform, individuals and enterprises can find waste recycling enterprises with higher prices and closer recycling distance to trade, and reach long-term cooperation agreements to form a stable trading relationship. In addition, waste recycling enterprises can also actively seek transactions through the waste supply information provided by individuals and enterprises, so as to improve the possibility and efficiency of transaction.

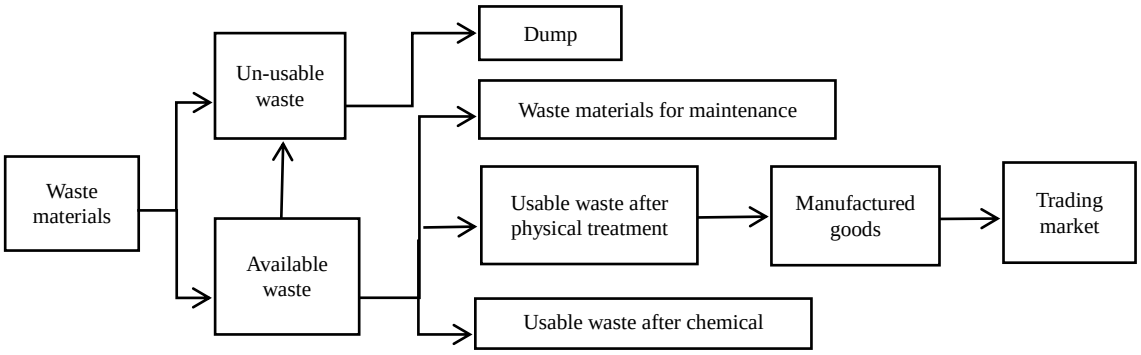

Fig. 4 Waste material disposal

Figure 4 illustrates the mode in which waste materials are classified. The waste produced by enterprises and consumers can be divided into two categories: one is the resource that can be reused; the other is the waste that cannot be reused because it belongs to garbage. Waste recycling is a resource that can be reused, and its value can be restored through different treatment methods. After disposal, the waste material becomes a valuable resource, enters the production enterprise, becomes a valuable commodity, and enters the market for trading.

Therefore, recycling logistics of waste materials is no longer just to treat waste as a kind of waste, but to put waste recycling and reverse logistics into the market by means of industrialization development mode, trade through market mechanism, and regulate the information of waste supply and demand of enterprises and consumers through market mechanism. This is not only conducive to enterprises and individuals to find waste recycling enterprises quickly, but also to improve the speed of information acquisition and transaction efficiency of waste recycling enterprises on the waste market supply. In addition, waste disposal enterprises and recycling enterprises are also a kind of market transactions. Both can achieve relatively fair and fast transactions based on market information.

IV. SPECIFIC WAYS TO RECYCLE WASTE MATERIALS UNDER "INTERNET +"

A. *Establishment of technical and industrial standards for recycling and disposal of waste materials*

Standards are important support to ensure the orderly market of waste recycling and disposal, and also an important basis for government supervision. In order to further develop waste material recycling logistics, it is necessary to formulate perfect technical and industrial standards. With the continuous development of economy, there are more and more kinds of commodities, more and more high technical content of commodities, and the speed of upgrading and upgrading of commodities is very fast. This requires that technology and industry standards must meet the changing needs of commodities. Different standards must be formulated according to different types of commodities and different technological levels to form a set of standardized and scientific standard system in order to improve standards applicability. At the same time, technology and industry standards should be related to relevant laws and regulations, enhance the legal effect of standards, and enhance the binding force on enterprises and individuals.

B. *Constructing a Network Resource Recovery Platform*

For the traditional resource recovery mode, the opacity of resource transaction information is the short board of resource recovery, and the multilevel of resource recovery channels is the main factor affecting the low efficiency of resource recovery. By improving the management mode of waste material recovery, the intensive management of enterprises can be strengthened [9]. With the development of mobile Internet and smart phone, the "Internet +" industry is coming into being. The construction of resource recovery network platform makes recycling channels more direct, and recycling prices are more transparent, and recycling carriers are more abundant.

C. *Combining Internet of Things Technology*

Combining resource recovery with "Internet +", we can combine resource recovery with the Internet of things, make full use of existing offline resources, and establish an Internet of Things platform, which is specially designed for renewable resource recovery system. The process of resource recovery can be simplified and clarified, and resources can be located and tracked, so as to ensure that the recovered resources can reach the processing point and get proper access. Handle it properly so as to ensure the full utilization of resources. Combined with the Internet of Things technology, it is mainly used in the recycling service point, the recycling service desk and the recycling service mobile station. Through the construction of information management system, the recycled materials are quantitatively counted and unified classified management, so that the dynamic storage positioning of materials is clearer and the dynamic change of storage is updated.

D. *Establishing the Agglomeration Platform of Renewable Resources Industry*

Enterprises realize that in the complex market environment of waste material recycling and utilization, it has become difficult for enterprises to develop steadily for a long time by themselves, and the linkage relationship between enterprises and upstream and downstream has been paid more and more attention [10]. Through the recycling software for batch, large-scale classification and recycling of materials, and the use of Internet of Things technology for the information management of waste materials, the formation of

recycling resources aggregation and recycling platform, the various resources recycling departments for industrial integration, the integration of supply, production and marketing, effectively improve the recycling efficiency of waste materials, but also break the various resources recycling industry barriers to information exchange [11].

E. Constructing a Network Platform for the Utilization of Renewable Resources

The network platform of renewable resources utilization is mainly composed of distribution and utilization of renewable resources and sales process of processed products [12]. Distribution and utilization of renewable resources are mainly carried out by utilizing classification of network recycling platform and public welfare activities of resource recycling. Based on the network platform, recyclable resources (sports goods, useful books) can be entered into second-hand transactions and one-yuan snap-up platform docking communities to complete online waste resources transactions [13]. In addition, the user's charitable donation through the platform recycling public welfare activities not only enhances the residents' awareness of recycling, but also improves the utilization rate of waste materials.

V. CONCLUSION

Waste material recycling logistics is not only limited to business activities, but also closely related to the government's environmental protection policy and the daily life of the public. Therefore, it is necessary to combine the strength of enterprises, governments and consumers to carry out research and evaluation on the related fields of waste material recovery logistics, and then to plan comprehensive and applicable waste material recovery logistics activities. The construction of waste materials recycling platform based on "Internet +" not only helps enterprises and individuals to find waste materials recycling enterprises quickly, but also improves the speed of knowledge recovery and efficiency of waste materials recycling enterprises. In addition, waste disposal enterprises and recycling enterprises are also a kind of market transactions. Both can achieve relatively fair, just and fast transactions based on market information [14]. At the same time, it improves people's environmental protection concept and recycling consciousness, and through the integration of social resources, it can enhance the self-value of waste material renewable resources, and realize the economic, ecological and social benefits brought by waste materials.

REFERENCES

[1] Xia De, Fangru Wu. Towards More Sustainability: A Dynamic Recycling Framework of Discarded Products Based on SD Theory[J]. International Journal of Modern Education & Computer Science, 2011(2):43-50.

[2] Zi Xun. The Internet allows the recycling industry to fly[J]. Comprehensive Utilization of Resources in China , 2015,33 (05): 15-17 in Chinese.

[3] The Ministry of Commerce has released the report on the development of China's recycling industry [J]. Resource Regeneration, 2018 (06): 42-51 in Chinese.

[4] Lei Yingjie. Garbage sorting, from proposal to encouragement to compulsion [J]. Environmental economy, 2017 (14): 10-11 in Chinese.

[5] Zine Benotmane, Ghalem Belalem, Abdelkader Neki. A Cost Measurement System of Logistics Process[J]. International Journal of Modern Education & Computer Science, 2018(9):23-29.

[6] Vidović M, Ratković B, Bjelić N, et al. A two-echelon location-routing model for designing recycling logistics networks with profit: MILP and heuristic approach[J]. Expert Systems with Applications, 2016, 51: 34-48.

[7] Anitha P, Malini M. Patil. A Review on Data Analytics for Supply Chain Management: A Case study[J]. International Journal of Modern Education & Computer Science, 2018(9):30-39.

[8] Yang Lanchun. Market Analysis of waste material Recycling and Utilization [J]. Chinese and Foreign entrepreneurs, 2014 (13): 42-43.

[9] Cai Xun. Innovation and practice of Management and Control of waste and used Materials in New Zengcheng Rural Power Network based on Internet [J]. Enterprise Management, 2017 (S1): 282-283.

[10] Xiong Weiqing,Wei Ping,Wu Xiaoxi. Contract Design of Reverse Supply Chain under uncertainty for the quality of the waste materials[P]. Control Conference (CCC), 2014 33rd Chinese,2014.

[11] Huang Mengshi, Yao Wenwei. Construction of waste material recycling system under the background of Internet[J]. Information and computer, 2016(18): 126-128.

[12] Cheng Huiqiang. Deep analysis of Internet regenerative resources supply chain finance [J]. Resource Regeneration, 2016(3): 45-47 in Chinese.

[13] Michlowicz E, Smolińska K. Research on the flow of material in production logistics[J]. Research in Logistics & Production, 2015, 5.

[14] Kurdve M, Shahbazi S, Wendin M, et al. Waste flow mapping to improve sustainability of waste management: a case study approach[J]. Journal of Cleaner Production, 2015, 98: 304-315.