

Theory Study and Practice Analysis of Circular Economy in China

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Abstract

Circle economy is a new philosophy and practice which is from the industrial sustainable development into the stage of economic and social sustainable development in the Western industrialized countries, as one of the two major themes of sustainable development, circle economy has become a global development trends and issues of common concern of mankind. On the basis of briefly describing the theoretical of circular economy, this article combined with the development of circle economy of China's corporate status, analysis circle economy constraints of the development from the conditions of the business, the development of circular economy within the region, market mechanisms and government regulations. In response to these issues, the corresponding measures were promoted, and reference and basis were provided to promote the development of circular economy of China's, which analysis will help to improve environment of China.

Key words: Analysis; Theory and practice; Circular economy; Environment and development

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INTRODUCTION

Since the 1990s, facing of the serious situation of global population growth, resources dropped, environmental

pollution and ecological deterioration, the development of circular economy and achieving sustainable economic social development has become a national consensus. Enterprises are cells of socio-economic; the development of circular economy and achieving sustainable development cannot without the cooperation and support of enterprises. Only achieving the sustainable development of modern enterprises, we will have the whole of modern economic and social sustainable development (WANG & HU, 2006).

1. THE THEORY OF CIRCULAR ECONOMY

Circular economy of the mankind was born in 1960s in the United States. "Circular economy", raised by the American economist K· Paulding firstly, primarily refers to, in the large system of people, natural resources and science and technology, in the whole process of the allocation of resources, enterprise production, product consumption and disposal, turn the economy of linear growth relying on consumption of traditional resource into economy relying on a cycle of ecological resources.

Circular economy means that are the closed-loop material flow-based economy is in large system of human, natural resources and science and technology, in the process of the allocation of resources, production, product consumption and disposal, turn the economy of linear growth relying on consumption of traditional resource into economy relying on a cycle of ecological resources (LAN & SHI, 2007).

Traditional economy is one-way linear process of the "resources-products-waste". More wealth is created, more resources are consumed and waste is generated, and more negative impact is put on the environment resources. Circular economy places the economic cycle resource consumption and environmental costs as low as possible to acquire the economic and social benefits as

great as possible, so this will make the material cycle of economic system and the natural-eco system in harmony, and promote sustainable use of resources. Therefore, the circular economy is the fundamental transformation of the traditional economic model of the “mass production, mass consumption and mass waste”. Circular economy is aimed at efficient and recycling use of resources and put “reduce, reuse and recycle” as principle (i.e., 3R principle). It is embodied on three important aspects in the main economic activity, namely through the use of 3R principle to achieve substance closed-loop flow in three levels: According to the concept of eco-efficiency, promote cleaner production, reduce material and energy use in products and service, and achieve the minimum emissions quantification. In accordance with the principles of industrial ecology, through the inter-firm material integration, energy integration and information integration, to format the inter-firm industrial metabolism and symbiotic relationship, establish eco-industrial Park. Through the recycling of waste materials, achieving material and energy cycle consumer during and after the consumer process, then forming the most optimal allocation of resources to improve the overall economic growth quality, establishing of recycling-based society (HE, 2008).

2. IMPORTANCE OF BUSINESS DEVELOPMENT OF CIRCULAR ECONOMY

In this age, circular economy is the industrial revolution that turns the market-driven product-oriented industries to green industries based on the criterion of ecological industrial. Enterprise is base unit of modern national economy and the cell of modern society. Only achieve the sustainable development of modern enterprises, just can have the sustainable development of whole modern economic society. Therefore, the business development of circular economy and social development is of great significance.

Firstly, the business development of circular economy is the business to adapt, and adapt to the environment changing strategic is the product of the environment, business, modern enterprise is the result of human society technological changes and the initiatives changes, and these changes also closed with the natural environment for the survival and development of human society (CHEN, 2004). The so-called survival of the fittest, enterprises' survival and development should be able to adapt to environmental changes. According to the traditional production processes of end of the treatment paradigm, enterprises (especially the private enterprises) almost just have economic responsibility, and mainly for the property owner interests. As environmental issues become more prominent, companies not only to bear the financial responsibility, but also the social responsibility and environmental responsibility. Only businesses that bared the

three aspects of corporate responsibility of economic, social and environmental in the same time are good businesses.

Secondly, the business development of circular economy can improve sustainable business viability. Business is the direct provider of product and service, and direct discharge of pollutants, too. In the process of an agricultural society turning to industrial society, enterprises, especially industrial enterprises, as the main organizer of industrial economic activity, are driven by the purpose of maximizing the profit, at the cost of the cost of resources and the environment, cause and deepen social contradictions of economic development and resources, environmental carrying capacity. Currently, this contradiction intensifies increasingly, not only threatens their own survival, but also threatens human survival and development. Only establish the concept of circular economy, do the institutional and technological innovation to promote the development of circular economy, to adapt to the changing environment, mitigate of these conflicts, and achieve sustained viability (LIANG & LI, 2007).

Finally, the business development of circular economy gets sustained profitability of enterprises, enhance their own competitiveness. Enterprises in the neo-classical economics are seen as the production function, and it must use minimal investment to obtain the maximum output. Raw materials and energy is a major component of businesses to invest in. In the case of certain production scale, production costs depend not only on the number of inputs, but also on the prices of inputs. With the resources, especially non-renewable resources are becoming scarce increasingly, resource prices are rising, the market competitiveness of enterprises is increasingly constrained by the input-output ratio of resources. In the face of strong resource constraints, business development of circular economy is not only a social and environmental benefit without economic benefits, not only costs without profit contribution of public investment. According to statistics, China's energy of industrial products and consumption of raw materials accounts for about 75% of the cost, if reduced by one percentage point, more than 100 billion Yuan will be able to obtained. Therefore, the business development of circular economy can make the enterprise achieve sustained profitability and enhance their competitive advantage, realize economic, social and environmental sustainable development.

3. PRESENT SITUATION OF CHINA'S DEVELOPMENT OF CIRCULAR ECONOMY

In 1990s, the development of circular economy became into an international social trends. Circular economy development at the enterprise level can be divided into two kinds: Firstly, the internal recycling of resources, such as the United States, DuPont Chemical Company;

secondly, eco-industrial chain is formed through sharing waste between companies, such as a typical representative of Denmark's Kalundborg eco-industry. In the process of development of circular economy, some enterprises in China combining with its own characteristics and advantages of the industry, take bold attempt, enhance their competitiveness and at the same time make important contributions for promoting the development of circular economy (PENG & LI, 2008).

China is one of the countries that implement circular economy earlier. Guigang national eco-industrial park was built in 1999, the park's core business--sugar companies (Group) Co., Ltd., in the cane fields system, sugar systems, alcohol systems, paper systems, cogeneration systems, integrated processing environment systems, have their own product output within the systems. Systems link each other by mutual exchange of waste products and medium products, thus achieve optimal allocation of resources and effective use of the waste within the park, and turn negative benefits of environmental pollution to positive benefits of resources. Then, Tianjin Economic and Technological Development Zone, Suzhou New District and other eco-industrial park in five countries were built. In 2002, "circular economy provinces" pilot in Liaoning Province was carried out. Some of China's business take practices into the content of development of circular economy, such as Baosteel Group, water recycling rate raised to 97.35%, reaching the world advanced level by developing wastewater treatment and recycling technologies; Wuhu cement and hollow block, they use bio-ash that is from coal manufacturing companies which use coal as fuel to manufacture new wall materials such as hollow blocks (LIU, 2008).

4. PROBLEMS IN BUSINESS DEVELOPMENT OF CHINA'S CIRCLE ECONOMY

4.1 Constraints of the Business Conditions

There are difference consciousnesses on development of circular economy. Circular economy is aimed at efficient and recycling use of resources and put "reduce, reuse and recycle" as principle (i.e., 3R principle). The enterprise is a place where resource is consumed and products are formed, so the implementation of circular economy must start from each business. Firstly, in the Current time, the vast majority of enterprises have not yet recognized the importance of the development of circular economy, the development ideas still remain in the stage of "laying stress on growing number, neglecting quality of growth", strategic significance of developing a circular economy have not rising to a new height of sustainable economic and social development. Secondly, connotation and extension of the economic cycle have

not been recognized correctly by many companies; even take a single clean production behavior within company's equivalent to circular economy, so it is not conducive to long-term development and in-depth promotion of circular economy. The above phenomenon is due to the knowledge of circular economy have not yet been universal, and propaganda is not enough, the concept of business-cycle economy, the necessity and urgency are not understood clearly, resource awareness, conservation awareness and environmental awareness is also poor. A considerable portion of companies have a vague understanding of what is "circular economy" and "How to develop a circular economy", so they are often lack of active participation in consciousness of resource conservation, utilization, efficient use. There is understanding deviation in cycle economy among many companies, either to simplify the comprehensive utilization into waste circular economy, clean production, environmental protection, or equal the sustainable development to circular economy, we cannot put into practice.

Cleaner production within the enterprise is not satisfied. Recycling-based production processes has two sources of: Firstly, the benefits from turning waste into products, and secondly, the benefits from saving gas and sewage costs. Although, in the long run, business development of circular economy can obtain higher yields, the development of circular economy need invest a larger and short-term invest, investment recovery period is long, so it is difficult for majority of enterprises to complete the traditional extensive production to cleaner production. International business practice has shown that there is huge development potential among renewable resources, recycling and sound disposal, but in the near future, market practitioners in China are difficult to get social average profit. Firstly, take renewable resources for example, due to the technical development lags behind. In many cases, the cost of recycling wastes and the waste products into useful resources higher than the prices to purchase new resources, which constitutes the price barrier of circular economy. Secondly, due to the current capacity of China's environment has not been as strict supervision of limited resources, businesses and general consumers pay for waste and sewage charges not only far lower than the compensation for pollution damage, and even significantly lower than the cost of pollution control, which makes cycle efficiency of production processes can not be showed, and the cost of recycling production processes is difficult to recover, resulting in cycle of economic production under difficult spontaneously in the current market economy. In addition, individual enterprises, the only economies of scale can be achieved per unit of output to minimize resource consumption, while 90% of China's enterprises are SMEs, process equipment and technology level is generally backward, their overall skill level, do not have large independent of resource recycling capacity.

There are some constraints in some industries and technical-support system. Industry constraints are mainly from the two aspects. On one hand, it is the industry's special use of the product of nature limits the development of circular economy, such as surface coatings, paints, pesticides, herbicides, fuel and other explosives and chemical products and dissipative materials, there is no way to enter large cycle basically. On the other hand is due to constraints from average profit of fully competitive international market. To face of the vagaries of the market, gaining a firm foothold in fierce competition makes profit margins of industry so exhausted that they have no time and effort to develop a circular economy. Technical support system for circular economy mainly refers to the pollution control technology, waste utilization technology, clean production technology. The principles for circular economy is to "reduce", "reuse" and "recycling", which is characterized by "low-exploitation of resources, high-use, low emission of pollutants," to achieve any goal can not without the advanced science and technology protection. Without the support of advanced technologies, the pursuit of the economic cycle economic and environmental goals will be difficult to be achieved fundamentally. In fact, from the current business and regions which are doing better on pilot of cyclical economy, all of them are based on advanced science and technology. Currently, in the aspect of technology using, business use of human resources in China R&D is not enough, technology utilization is not high, core technology in the municipal waste recycling, municipal sewage treatment and high concentration organic wastewater treatment and other important areas or some of the key products have not been develop.

4.2 Regional Economic Development Is Not Within the Ideal Cycle

Circulation within the region is the material cycle between enterprises (loop). The most typical example of Loop is the metal loop between the mechanical industry and metallurgical industry. In the process of metal processing, metal chips will be produced more or less, shipping them back to the metallurgical industry, after being re-smelt into metal, and then been brought back for the mechanical industries.

With improvement of economic development, environmental pollution and a series of serious social and economic problems continue be highlighted. China is a resource-consuming country, and even a resource-waste country, efficient use of resources is only one-third of the world's developed countries. Recycling issues of some resources and environmental issues are not obvious in a single city solution, so, in order to achieve better results, the entire region and the whole society needs to reach a consensus, take joint action. For example, problems of white garbage, excessive packaging, disposable products and other issues only be solved in certain cities are not

thorough, only the point of breakthrough, without no promotion of the surface, it can not be sustained. Only the region and the whole society act together in the long run, the actual results of the whole society could obtain in the region and even whole society.

Currently, many companies have not actively participated in the cycle economy, some companies for clean production of knowledge are still confined to discharge such a low target, ecological concepts, environmental awareness has not been translated into a general business practices. By adjusting the industrial structure, accelerating the accumulation of industry, communities of enterprises are being formatted rapidly, but, economic efficiency of development zone are being paid more attention by many high-tech industry, economic zones and other projects when they introduce new projects. For the requirements of environment, they only stay in reaching the standards of production and emissions, the project introduced based on eco-industrial chain have not been developed. Only a few industrial parks start planning at a high point, note the protection of the surrounding natural environment and ask the joint venture a "green status" of the validation and requirements of sewage treatment. However, by-products exchanging and energy cascade utilization have not been considered systematically. Secondly, the scale of enterprise in China is generally small, decentralized leads to lacking of benefits of scale and regional agglomeration; so it is difficult to form a network of recycling resources. Therefore, recycling of resources among enterprises is still relatively low.

4.3 Market Imperfections

There are still many problems among China's current market mechanism; they also pose a direct impact on circular economy development at the enterprise level.

The resource pricing system is irrational. The prices of natural resources is low, it only considers the acquisition cost, cannot correctly reflect the relationship between supply and demand, but also can not reflect the environmental costs and opportunity costs. Materials in recycling need reuse by companies are not dominant in performance and the price, so the enterprise is difficult to develop circular economy independently.

Ownership of public resources and the environment is not clear. Externality caused by property right unidentified makes enterprises in production activities without considering the social benefit, but taking possession of social capital freely. Because some property rights of resources and environment are difficult to clearly be defined or high transaction costs needed to be paid, so that it is very difficult by defining property rights to eliminate the negative externalities of process production.

Government and enterprise are not isolated. The government and enterprise not isolated led to the prevalence of local protectionism. In some areas, in order

to pursue GDP growth, some local governments turn a blind eye for the pollutants emission behavior of enterprises or even provide “convenience”. It has brought great pressure to the country’s resources and the environment the because of lacking of their own consciousness for controlling pollution and reducing emissions.

Incomplete information. As the poor access to information and monitoring enterprise behavior need pay higher costs to complete, loopholes in the regulatory process enable enterprises to take advantage of, and random discharge of pollutants have occurred from time to time. In addition, due to lack of information on enterprises emissions and the marginal lowdown cost of emissions, it is difficult for the government to formulate a reasonable policy, lead to sewage charges, fines and other policy instruments failure.

4.4 The Effect of Government Macro-Regulation and Control Is not Ideal

Incentive mechanisms are inadequate. Incentive mechanism is the benefits drive of enterprise development of circular economy, including reducing costs and creating value, it is the internal cause of circular economy development. Therefore, we can know that environmental responsibility range of enterprise is small at present; it is limited to compliance with relevant standards and pay in the sewage. Government is lack of adequate financial subsidies and preferential tax for enterprise, so products produced by enterprise using circular economy is not corresponding to the price advantage on the market.

Legal system and supervision system is not perfect. China in the development of circular economy has a serious absence of laws and policies, management system is still not clearly established, mechanism of circular economy promoted by the external force and internal interests have not been formed, it is far from the requirements of circular economy.

On the one hand, because the legal system and monitoring system is not perfect, making us lack of enforcement in supervision and inspection in the development of circular economy in our country. For enterprise behavior of damaging environment and violating the regulations, although China has made some approach, it has been proven that the ability in handling the intensity is not enough; it cannot play an effective role in the behavior of enterprises.

On the other hand, China’s current system of making appointments on the right under the vast majority of officials, when business interests and public interests in conflict with the field of environmental protection, many more government officials prefer to maintain the interests of business rather than public interests, the direct consequence is that government supervision in the enterprise is weak. As the government failure, there is “enterprise three remix not afraid of monitor of the environmental protection department to, not afraid of the

administrative penalty, not afraid of harming the public interest” in some places, “three-no government check (do not investigate except people blocking the road or blocking the government’s doors, do not investigate the except Central instructions of State Council, do not investigate except being exposed by the central mainstream media do not,)” phenomenon.

5. STRATEGIES TO PROMOTE THE DEVELOPMENT OF CHINA’S BUSINESS CIRCULAR ECONOMY

The most effective implementation of sustainable development is the development of circular economy; therefore it has great significance to develop circular economy. According to the above analysis conclusions, we have known that the current problems in the cycle economic developments of China’s business, the following are several countermeasures aiming at these issues to propose by the writer.

5.1 To Improve Their Own Conditions

Business is the cells of social system, the creators of social wealth, the main users of natural resources and also the main producers of environmental pollution problems. It is that the enterprise ecological disturbance degree, efficient use of resources, and the level of economic development are crucial to advance China’s recycling-based economy. Circular economy requires companies to change the traditional model of economic development, and actively, timely turn the ecological transformation into eco-friendly, resource-saving economic man, carries out the eco-enterprise operation mode (CHEN & LIU, 2009).

5.2 Developing the Regional Circular Economy Vigorously

While impelling the circular economy in business, parks and cities, it is more important to carry out circular economy at the regional level. The so-called regional circular economy is the cycle economy with higher level, wider implementation in the region based on achieved circular economy in the business, parks and cities.

5.3 Establish a Sound Market Mechanism

First of all, re-building social price system can pave the way for business development of circular economy fundamentally. Secondly, improve the market competition mechanism. Finally, establish market accessing system.

5.4 Government Actively Promotes and Facilitates the Development of Circular Economy

It is developing circular economy that is not just their work, but also an important responsibility of government. The government must support and guidance to break the traditional mode of development and vigorously develop the circular economy, particularly some of the important and difficult problems in development of circular

economy, it is difficult to be solved just by relying on their own strength, and it can be achieved by depending on the government to drive and promote (LI, 2005).

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