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Circular Economy Model in Forest Industry

Opportunities and Challenges from a Legal System Perspective

Li Yuan
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<p>This Master thesis belongs to the project of the HELSUS Co-creation Lab. The project topic is about the circular economy and the challenge given by a HELSUS partner UPM-Kymmene Corporation to find opportunities for the circular economy business model from a legal perspective. As an international forest industry company, UPM has developed innovative ways to reduce its waste and to reuse its side in new products, and to use resources sustainably. Circular economy principles already applied in UPM, and develop and implement the technology and innovation of using wood in various new products. However, UPM wants to know what challenges and possibilities the regulations pose in creating new circular business opportunities?</p> <p>At the same time, this thesis chooses Germany and China for comparative research. Both countries have promulgated special circular economy legislation, established the 3R principles of reduce, reuse and recycle, stipulated extended producer responsibility systems, established waste recycling systems, and so on, aim to promote waste treatment and resource recycling legal system. However, the circular economy legal system of these two countries have apparent differences in legislative models, legislative purposes, and institutional arrangements. So, there are two purposes for writing this essay. First, explaining the historical evolution of the circular economy legal system in Germany and China, the objective is to understand the historical evolution of the circular economy law in two counties. Second, evaluative whether they are under circular economic aims in comparative research, the purpose of the comparison is not to determine which country's laws are more suitable for creating new business opportunities. It is to find out the challenges and possibilities of creating new circular business opportunities for UPM.</p> <p>Therefore, the research question is about:</p> <p><i>What are the challenges and possibilities of creating new business opportunities for UPM when compares the circular economy legal system between Germany and China?</i></p>			
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LIST OF ABBREVIATIONS

CE	Circular Economy
CEA	Circular Economy Act
CEPL	Circular Economy Promotion Law
DSD	Dual System Deutschland
EPR	Extended Producer Responsibility
EU	European Union
NGOs	Non-governmental organizations
NDRC	National Development and Reform Commission

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1 INTRODUCTION

1.1 Background of Research

The traditional industrial economy is a linear economy with a one-way material flow composed of “resources-products-waste discharge.” The sustainable development of this economic operation mode based on two premises. One is that natural resources must be inexhaustible and cheap. Another one is that the environmental pollution and ecological destruction caused by economic and social development will never exceed the self-purification capacity of the natural ecosystem, and it does not affect the survival and growth of human beings.¹

Since the development of human society in the mid-18th century, these two premises are meaningless. The industrial revolution propelled human society into the era of the industrial economy. With the deepening of industrialization, economic activities do not consider ecological value, which led to the over-exploitation and excessive utilization of environmental resources.² Energy shortages, resource shortages, environmental degradation, and population expansion have seriously threatened the survival and development of humanity. How can we coordinate the relationship between man and nature, and minimize damage to the environment and waste of resources?³ The theory of circular economy came into being under this background.

The emergence of circular economy theory, on the one hand, is the innovation of economic development models and concepts, on the other hand, it is an urgent need to alleviate the shortage of resources and environmental pollution.⁴ The circular economy theory as a business model, which is based on the efficient use of resources and recycling, and the principle of “reduction, reuse, and recycling” to form a resource recycling model of “resources-products-waste-renewable resources.”⁵ It would change economic logic because it replaces production with sufficiency: reuse what it can, recycle what it cannot reuse, repair what it breaks, remanufacture what it cannot fix.⁶

¹ Ministry of Commerce of the People’s Republic of China, Department of Market Operation and Consumption Promotion. Available at: <http://scyxs.mofcom.gov.cn/article/c/200405/20040500227651.shtml>

² Tang et al. 2020, p.2.

³ Yang 2006, pp.29-31.

⁴ Ibid.

⁵ Guo 2008, pp.9-13.

⁶ Walter 2016, p.435.

So the fundamental goal of the circular economy is to avoid and reduce waste in the economic process. Reuse and recycling should adequately resource reductions in industrial processes.⁷

Germany is the first country to develop a circular economy and the first country in the world to legislate for a circular economy specifically.⁸ The United States, Switzerland, and many countries in the European Union, such as Sweden, Finland, France, Denmark, Spain, Portugal, etc., have also begun to develop a circular economy model and established the legal system of the circular economy. Furthermore, Japan has become the country with the most comprehensive circular economy legislation because of its high scarcity of resources.⁹ The Chinese government for retaining competitiveness to implement circular economy on a large scale.¹⁰ In 2009, China had legislated a circular economy and built a “resource-saving and environment-friendly society”¹¹ and “ecological civilization.”¹²

This Master thesis belongs to the project of the HELSUS Co-creation Lab.¹³ It does not replace traditional research seminars but adds to them by introducing a co-creative approach to the research process. The project brings people from various backgrounds together to explore challenges and solutions regarding common interests. Participation companies can get new insights, ideas, and possible solutions to their sustainability challenges. This year’s topic is about the circular economy and the challenge given by a HELSUS partner UPM-Kymmene Corporation (UPM) to find opportunities for the circular economy business model from a legal perspective.¹⁴ As an international forest industry company, UPM has developed innovative ways to reduce its waste and to reuse its side in new products, and to use resources sustainably.¹⁵ Circular economy principles already applied in UPM, and develop and implement the technology and innovation of using wood in various new products. However, UPM wants to know what challenges

⁷ Deng et al. 2003, pp.9-13.

⁸ Heshmati 2015, p.2.

⁹ Wang 2009, p.22.

¹⁰ Heshmati 2015, p.3.

¹¹ State Council 2005; McDowall et al. 2017, p.3.

¹² State Council 2013; McDowall et al. 2017, p.3.

¹³ Source: <https://www.helsinki.fi/en/helsinki-institute-of-sustainability-science/helsus-co-creation-lab>

¹⁴ Source: <https://www.helsinki.fi/en/news/sustainability-news/exploring-circular-economy-together-with-master-students-from-the-university-of-helsinki>

¹⁵ UPM report 2019, p.223.

and possibilities the regulations pose in creating new circular business opportunities?¹⁶

1.2 Research Purposes and Question

This thesis chooses Germany and China for comparative research, and the main reasons are as follows:

Firstly, Germany was the first country in the world to formulate a legal system for a circular economy.¹⁷ At that time, there was no experience from other countries to learn. Germany first formulated special laws in specialized fields and then formulated basic laws to complete the construction of a circular economy legal system.¹⁸ Therefore, there are many experiences in the German legal system for us to learn.

Secondly, as the second-largest economy in the world, China has the fastest-growing consumer market in the world.¹⁹ Then the rapid economic development is accompanied by severe environmental problems. China's environmental governance had been upgraded to the ecological cycle with resources and ecology as the core.²⁰ In 2018, the Chinese government revised the Circular Economy Promotion Law, hoping to decouple economic growth from the negative consequences of resource depletion and environmental degradation.²¹ So this thesis studies Chinese Circular Economy Promotion Law and observes its impact on creating new circular business opportunities.

Thirdly, both China and Germany have formulated the basic law of circular economy based on their development status. Therefore, we can compare two laws at the same legal level.

Both countries have promulgated special circular economy legislation, established the 3R principles of reduce, reuse and recycle, stipulated extended producer responsibility systems, established waste recycling systems, and so on, aim to promote waste

¹⁶ Source: <https://www.helsinki.fi/en/news/sustainability-news/exploring-circular-economy-together-with-master-students-from-the-university-of-helsinki>

¹⁷ Heshmati 2015, p.2.

¹⁸ Li 2016, p.15.

¹⁹ UPM Biofore Magazine 2019, p.39. Available at: <https://user-fudicvo.cld.bz/UPM-Biofore-Magazine-1-2019/39/#zoom=z>

²⁰ Tang et al. 2020, p.2.

²¹ Murray et al. 2017; Babbitt et al. 2018; Hofmann 2019; Morseletto 2020, p.1.

treatment and resource recycling legal system. However, the circular economy legal system of these two countries have apparent differences in legislative models, legislative purposes, and institutional arrangements.²² So there are two purposes for writing this essay. First, explaining the historical evolution of the circular economy legal system in Germany and China, the objective is to understand the historical evolution of the circular economy law in two counties. Second, evaluative whether they are under circular economic aims in comparative research, the purpose of the comparison is not to determine which country's laws are more suitable for creating new business opportunities. It is to find out the challenges and possibilities of creating new circular business opportunities for UPM.

Therefore, the research question is about:

What are the challenges and possibilities of creating new business opportunities for UPM when compares the circular economy legal system between Germany and China?

1.3 Methodology of Research

To achieve this research purpose, mainly use the method of historical, legal hermeneutical, and comparative research in this Master thesis.

The way of historical research, that is, the study of laws and legal systems in history, is also commonly used in legal analysis. This thesis uses this method to study the emergence, development, and evolution of the circular economy and circular economy legal system.²³

The method of legal hermeneutical includes narrow legal interpretation methods and broad legal interpretation methods.²⁴ A hermeneutical process is aiming to discover unknown facts from the known facts of every cause.²⁵ This thesis uses this method to interpret the content, constituent elements, scope of application, and legal effects of the

²² Qu 2017, pp.29-37.

²³ Liang 2006, p.78.

²⁴ Ibid.

²⁵ Van et al. 2011, p.196.

Circular Economy Law.²⁶

The comparative method is one variant form of legal research²⁷, which refers to the comparison of different legal systems, laws or legal systems of different countries, and discovering their similarities and differences and their respective advantages and disadvantages.²⁸ This thesis uses this method to compare the circular economy legal systems in Germany and China in the aspect of the responsibility sharing system, the planning system, the information disclosure system, the extended producer responsibility system, and the public participation system, in order to find the impact of the legal regulations on creating new business opportunities for UPM. In comparing two legal systems, a double interpretation is going on and discovering their similarities and differences.²⁹

1.4 Sources and Structure

The main sources in this research include primary sources and secondary sources. The primary source consists of the German Circular Economy Act (2012), China's Circular Economy Promotion Law (2018), and some relevant regulations and policies. The primary source obtained from the legislative websites, for example, China's Circular Economy Promotion Law of the People's Republic of China 2018 by ChinalawInfo (PKULAW)³⁰ and MOJ,³¹ Germany's Circular Economy Act 2012 by BMU.³²

The second source includes relevant books, law journals, reports, and dissertations. The secondary sources obtained from the legal search engines, for example, Helka,³³ google

²⁶ Liang 2006, p.77.

²⁷ Van et al. 2011, p.167.

²⁸ Liang 2006, p.78.

²⁹ Van et al. 2011, p.171.

³⁰ ChinaLawInfo (PKULAW) provides access to legal news, laws & regulations, judicial cases, law journals, international treaties, white papers, legal glossary and guides to world law. There is also an English translations version which enables comparison with the original Chinese text. Available at :

https://www.pkulaw.com/en_law/86e0348ef0b62b74bdfb.html

³¹ Ministry of Justice of P.R. China. Available at: <http://www.moj.gov.cn/>

³² Federal Ministry for Environment, Nature Conservation and Nuclear Safety. Available at:

<https://www.bmu.de/en/>

³³ Helka is University of Helsinki online library and provides search service for book, journal and databases.

Available at: <https://helka.finna.fi/>

scholar,³⁴ HeinOnline,³⁵ Researchgate,³⁶ ChinalawInfo (PKULAW), Faxin,³⁷ Policies and Laws of China (Wanfang),³⁸ and Iolaw.³⁹

When we research the comparison between the German and Chinese circular economy basic law and find the impact of necessary legal regulations on creating new circular business opportunities for UPM, it is essential to clarify the historical evolution of the circular economy legal system. To explain the historical development of the circular economy legal system, we must first understand and grasp the core concept of the circular economy and circular economy business model. So, this thesis consists of seven parts, and the structure is as follow:

The first chapter consists of the research background, research purpose, research question, methodology of research, and literature sources. The second chapter provides a short overview of the historical evolution and concept of the circular economy. The third chapter expounds on the circular economy business model. The fourth chapter deals shortly with the profile of the company of UPM. The fifth chapter comprises the brief history of the circular economy legal systems, legislation purpose, and legislation model in Germany and China. The sixth chapter adopts a comparative perspective in Germany and China, examine similarities and differences in the underlying legal systems, and find the legal impact on creating new business opportunities for UPM. Conclusions are present in the last chapter.

³⁴ Google Scholar is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines. Available at: <https://scholar.google.com/>

³⁵ Heinonline is a source for traditional legal materials (reported cases, statutes, government regulations, academic law reviews, commercially produced law journals and magazines, and classic treatises), historical, governmental, and political documents, legislative debates, legislative and executive branch reports, world constitutions, international treaties, and reports and other documents of international organizations. Available at: <https://heinonline-org.libproxy.helsinki.fi/HOL/Welcome?>

³⁶ ResearchGate is a European commercial social networking site for scientists and researchers to share papers, ask and answer questions, and find collaborators. Available at: <https://www.researchgate.net/>

³⁷ Faxin provides database content includes Chinese law, case and consultations. Available at: <http://faxin.cn.resources.asiaportal.info/>

³⁸ Policies and Laws of China (PLOC) provides information on Chinese jurisdiction, legislature, and business laws. Available at: <http://c.wanfangdata.com.cn/resources.asiaportal.info/claw>

³⁹ Iolaw is an important research center of international law in China and provides the database of China laws. Available at: <http://iolaw.cssn.cn/>

2 CIRCULAR ECONOMY

The traditional industrial economy is a linear model, which is a “take-make-waste” approach⁴⁰ that extracts raw materials into products, and consumers discard them after use. The linear economic model is unsustainable, and it presents a negative impact on the environment. Because traditional manufacturing is wasteful,⁴¹ the more produced, and the more waste generation.

The circular economy is a new economic development model that overcomes the shortcomings of the traditional economic development model. Unlike the conventional one-way linear model, the circular economy relies on a closed-loop development model.⁴² In the process of circular economy activities, aim to reduces the consumption of virgin materials and control the generation of waste⁴³ while focusing on the recycling and reuse of waste, integrate human economy activities into the natural circulation, and maintain the natural ecological balance.⁴⁴

2.1 Origins of Circular Economy

In 1966, economist Kenneth Boulding had used for the first time the term “circular economy.” He hatched the idea of “a stable, closed-cycle, high-level technology” in his seminal paper “The economics of the coming spaceship Earth.”⁴⁵ He assumed that the earth is like a spaceship that flies in space and relies on a constant drain on its limited resources to survive.⁴⁶ The ever-increasing population and economy will eventually deplete all the resources in this spacecraft, and the wastes discharged during human production and consumption will also pollute all the cabins and ultimately lead to destruction. We must rely on continuous regeneration and recycling of our limited resources to maintain sustainable survival and development.⁴⁷ Boulding established a

⁴⁰ McDonough et al. 2002; Jackson et al. 2014, pp.516-543.

⁴¹ Geng et al. 2019, p.153.

⁴² Zhang 2007, pp.75-78.

⁴³ Mathews 2016, p.441.

⁴⁴ Zhang 2007, pp.75-78.

⁴⁵ Kiser 2016, p.443.

⁴⁶ Barber 1983.

⁴⁷ Boulding 1966. The economics of the coming spaceship earth. *Environmental quality in a growing economy*. Available at: <http://www.ub.edu/prometheus21/articulos/obsprometheus/BOULDING.pdf>

developing economic model based on continual reuse of the materials and designed an economy ecosystem follow the procedures of “resource – produce – new resources” and “production – consuming – recycling – reproduce – re-consuming.”⁴⁸

The 1970s saw significant practical developments. In 1976 Swiss architect Walter Stahel and Genevieve Reday sketched the vision of a circular economy and its impact on creating job, economic competitiveness, resource conservation, and waste prevention⁴⁹ in their research report “*The Potential for Substituting Manpower for Energy*”⁵⁰ for Commission of the European Communities (today the European Commission).⁵¹

British environmental economists have further modeled the circular economy in the late 1980s.⁵² David W. Pearce and R. Kerry Turner pointed out that a traditional linear economy developed without an inherent tendency to recycle, which reflected by treating the environment as a waste reservoir.⁵³

In the 1990s, British ecological economist Tim Jackson began to gather scientific evidence for this new industrial production method in his book “*Clean Production Strategies*.”⁵⁴ He established a pioneered the concept of preventive environmental management in his book “*Material Concerns: Pollution, Profit and Quality of Life*”⁵⁵ and moving industrial production away from an extractive linear system towards a more circular economy.

German chemist Michael Braungart and America architect William McDonough (who had collaborated with Lyle) established the product and system certification Cradle to Cradle, which treats industrial flows as metabolic and wastes as nutrients. Their book *Cradle to Cradle: Remaking the way we make things* published in 2002.⁵⁶

⁴⁸ Ibid.

⁴⁹ Source: <https://www.innovation.ara.at/events/workshop-exploiting-business-models-performance-economy/>

⁵⁰ Source: <https://www.triplepundit.com/story/2012/how-sustainable-taxation-can-create-circular-economy/68391>

⁵¹ Source: <http://www.product-life.org/en/cradle-to-cradle>

⁵² Turner et al. 1990.

⁵³ Su et al. 2012, pp.215–227.

⁵⁴ Jackson 1993.

⁵⁵ Jackson 1996.

⁵⁶ Kiser 2016, p.443.

From the new century, the circular economy research pays attention to the industry of the fields and waste resource utilization. More theories such as “clean production,” “eco-industrial park,” “zero emissions,” and “waste minimization” concepts begin to appear.⁵⁷ In 2013, a report released entitled “*Towards the Circular Economy: Economic and Business Rationale for an Accelerated Transition*” by The Ellen MacArthur Foundation, which was the first of its kind to consider the economic and business opportunity for the transition to a restorative, circular model.⁵⁸

2.2 Concept of Circular Economy

The most widely accepted definition by the Ellen MacArthur Foundation, which describes a circular economy as “one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles.”⁵⁹ A circular economy redefines growth, to fully mobilize all the positive factors of the whole society to invest in the circular economy, not only just conserve resources and reduce pollution in the production field, but also focusing on positive society-wide benefits.⁶⁰

Compared with the traditional economy, the new characteristics of the circular economy are as follows: firstly, the system of the circular economy is an extensive system composed of people, ecological environment, natural resources, and science and technology. Secondly, the circular economy should consider not only the carrying capacity of the project but also the environmental carrying capacity when guiding economic production. Save natural resources as much as possible, continuously improve the utilization efficiency of natural resources, recycle supplies, and create good social wealth. Thirdly, when applying new technologies, the circular economy needs to fully consider its ability to maintain and repair ecosystems, making it an environmentally friendly technology. Fourthly, the circular economy promotes the modest consumption of materials. Establish the concept of circular production and

⁵⁷ Yoshida et al. 2007.

⁵⁸ Source: http://self.gutenberg.org/articles/eng/Circular_economy

⁵⁹ Ellen MacArthur Foundation 2015, p.20.

⁶⁰ Source: <https://www.ellenmacarthurfoundation.org/circular-economy/concept>

consumption. At the same time of use, consider the recycling of waste.⁶¹

The development of the circular economy on the laws of natural ecology, modeling the model of the ecosystem, and reorganizing economic activities into a “resource-product-waste-renewable resource” cycle process and “low input, high utilization, low emissions” material utilization system. This process solves the problem of resource shortage at the source, fundamentally reduces environmental pollution and ecological damage, and thus realizes the ecologicalization of economic activities.⁶² Therefore, the circular economy is essentially the ecologicalization of economic, which simulates the operation of the natural ecosystem. Furthermore, transform the traditional economic growth model from a linear model of “resources-products-waste discharge” to a closed-loop model of “resources-products-waste- renewable resources” to achieve the sustainable use and high utilization of specific resources.⁶³

The ecological economy refers to the whole process of production, use, and disposal of the entire product form a completely closed cycle like an ecosystem, and ultimately achieve zero input of external resources and zero emissions of waste.⁶⁴ In this economic form, the production system can make self-sustainment and can truly achieve sustainable development. The goal is to replace the traditional industrial economy based on fossil fuels or carbon with ecological economics based on solar or hydrogen energy.⁶⁵ We can see that the purely ecological economy is just an ideal state of sustainable development. The circular economy is an economic that imitating ecology, and its essence is to realize the ecologicalization of commercial activities.⁶⁶ Emphasizing the closed-loop flow of materials in economic activities while using the “3R” (Reduce, Reuse, and Recycle) principle to achieve resource conservation and environmental protection, so the circular economy is the most effective way to make sustainable development.⁶⁷

The circular economy aims to get the maximum value from resources and minimizing

⁶¹ Legal Thoughts on the Development Model of Circular Economy 2005. Available at: <https://www.pkulaw.com/specialtopic/19dbe79ce33075098069d1a2500fff0dbdfb.html>

⁶² Sheng 2016, p.115.

⁶³ Yang 2006, pp.29-31.

⁶⁴ Yu et al. 2012, pp.130-136.

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Ibid.

waste and pollution,⁶⁸ with roots in the “3R” principle.⁶⁹ The three principles present a growing relationship, control harmful environmental resources into economic activities, reduce waste generation, strengthen the multiple-use and repeated use of products, and only allow waste to dispose of when recycling is impossible.⁷⁰ So, the circular economy has the potential to lead to sustainable development while decoupling economic growth from the negative consequences of resource depletion and environmental degradation.⁷¹

Germany is the forerunner in implementing a circular economy. In developing a circular economy, China has undoubtedly learned from the experiences of Germany,⁷² but the model has distinctively Chinese characteristics. Germany’s circular economy is seeking to enhance resource efficiency and focus on waste and opportunities for the industry.⁷³ Whereas China’s circular economy is a broader systemic policy,⁷⁴ which includes a prominent role for pollution concerns, as well as the need to build a “resource-saving and environment-friendly society”⁷⁵ and “ecological civilization.”⁷⁶ As the national strategy, China promoting circular economy in three circles: Micro-level, Meso-level, and Macro-level.⁷⁷

The first circle is at the micro-level, circular economy focuses on eco-design of manufacturing plants, waste minimization, carry out cleaner production and environmental management systems. The second circle is at the meso-level, where eco-industrial parks and networks have been encouraged to capitalize on the trading of industrial by-products such as heat energy, wastewater, and manufacturing wastes. The third circle of the circular economy is at the macro-level, where promotes both sustainable production and consumption activities and aims to create a recycling-oriented society.⁷⁸

⁶⁸ The Waste and Resources Action 2019.

⁶⁹ Pearce et al. 1990; Hartley et al. 2020, p.1.

⁷⁰ Zhang 2007, pp. 75-78.

⁷¹ Murray et al. 2017; Babbitt et al. 2018; Hofmann 2019; Morseletto 2020, p.1.

⁷² Su et al. 2005, pp.15-20.

⁷³ McDowall et al. 2017, p.3.

⁷⁴ Geng et al. 2012a, pp.216-224.

⁷⁵ State Council 2005; McDowall et al. 2017, p.3.

⁷⁶ State Council 2013; McDowall et al. 2017, p.3.

⁷⁷ Yuan et al. 2006, pp.4-8; Park et al. 2010, pp.1494-1501.

⁷⁸ Li et al. 2009, pp.4273-4281.

3 CIRCULAR ECONOMY BUSINESS MODEL

In the previous chapter, we have introduced the concept of the circular economy. This chapter transforms the circular economy from an abstract concept to an easy-to-understand business model through the introduction of the five circular economy business model, so that it is better to understand the possibilities of circular economy in creating new business opportunities.

A business model represents an organization's way to create, deliver, and capture value.⁷⁹ It is a comprehensive understanding of how a company does business and how the value created.⁸⁰ Circular economy business models can define as business models that are closing, narrowing, slowing, intensifying, and dematerializing loops, minimizing the resource inputs into and the waste and emission leakage out of the organizational system.⁸¹ In the circular economy business model, matter, and energy flow in a closed-loop, any substance will be regarded as a useful resource to be cherished and effectively used. No material discarded because it is worthless. The waste here is used as a resource to be reproduced there, thereby significantly reducing production costs and improving economic benefits.⁸² Therefore, the circular economy business model different from the traditional business model. It focuses on creating value for a broader range of stakeholders and considers the benefits of the whole society and ecological, environmental perspectives.⁸³

In order to strengthen the transformation of companies, industries, and the entire economy to adapt to and successfully apply the circular economy, it is usually necessary to innovate across the entire system and change the entire value creation process.⁸⁴ The entire transition to a circular economy sets challenges for established companies. It may even destroy the usefulness of their existing functions, networks, and business models.⁸⁵ Is this change worthwhile? Will it bring economic benefits and create new business opportunities for enterprises? Therefore, we need to understand how the circular economy business model works and creates value before answering these

⁷⁹ Osterwalder et al. 2010, p.6.

⁸⁰ Timmermans 2015, p.28.

⁸¹ Geissdoerfer et al. 2018, pp.712–721.

⁸² Antikainen et al. 2016, source: <https://timreview.ca/article/1000>

⁸³ Ibid.

⁸⁴ Ibid; EMF 2012.

⁸⁵ Ibid.

questions.

In 2015, Peter Lacy⁸⁶ proposed the theory of five circular economy models in his book “*Waste to Wealth: The Circular Economy Advantage*,” and he described the five main circular economy business models could help companies enhance the differentiation, reduce the cost to serve and own, generate new revenue and reduce risk.⁸⁷ He has defined five business models⁸⁸ that boost the development of the circular economy and present in Figure 1. These are Circular Supply-Chain, Recovery & Recycling, Product Life Extension, Sharing Platform, and Product as a Service.⁸⁹ The details are as follows:

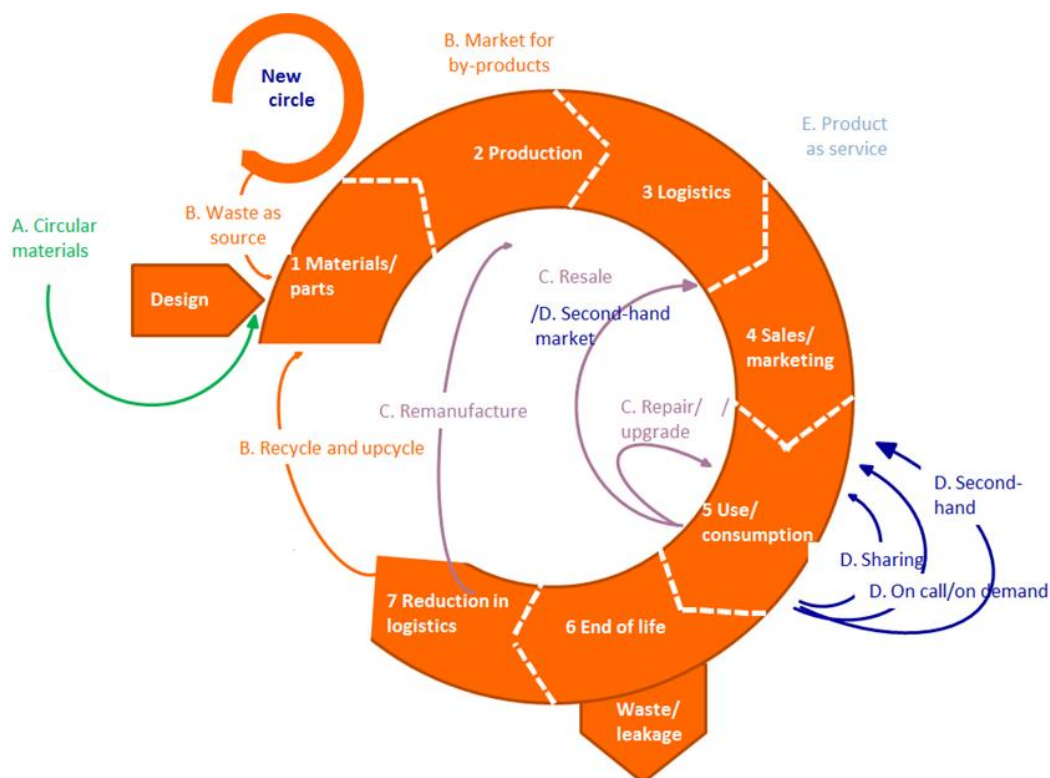


Figure 1: The Five Circular Economy Business Models⁹⁰

A) *Circular Supply-Chain Model*. When a company needs resources that are scarce or environmentally destructive, it can either pay more or find alternative

⁸⁶ Peter Lacy is senior managing director for Europe as well as for UK and Ireland within Accenture Strategy. Available at: <https://www.accenture.com/us-en/about/leadership/peter-lacy>

⁸⁷ Lacy 2015. Available at: <https://thecirculars.org/content/resources/Accenture-Waste-Wealth-Exec-Sum-FINAL.pdf>

⁸⁸ Ibid.

⁸⁹ Ibid.

⁹⁰ Hans 2015. Available at: <https://economics.rabobank.com/publications/2015/july/the-potential-of-the-circular-economy/#publicationTitle>

resources.⁹¹ The circular suppliers provide virgin resources with bio-based, renewable, or recovered materials replacing single-lifecycle material, reduce demand for a scarce resource, and removing inefficiencies. The earnings model exists because alternative materials are more affordable or better than traditional materials.⁹²

B) *Recovery & Recycling Model*. Companies recover end-of-life products from recapturing and reusing valuable material, energy, and components, but also they reclaim waste and by-products from a production process.⁹³ An earnings model achieved through the creation of a market for garbage: turning a cost item into a profitable business. It can lead to residue from one production process becoming useful as a material for another industrial production process or as regenerative resources for nature.⁹⁴ It is a valuable model for businesses with sizeable waste flows or where residual waste from products can process into new materials.⁹⁵

C) *Product Life-Extension Model*. Consumers discard products because the products are broken, out of fashion, or no longer needed. However, many of these products still hold considerable value. Extends the use period of existing products, improved by repairing, upgrading, remanufacturing, or remarketing products to reduce waste generation.⁹⁶ The earnings model concerns services (repair, replacement, updating), and it concerns the fact that the residual value used again commercially.⁹⁷

D) *Sharing Platform Model*. Creating new relationships and business opportunities for consumers and companies, who rent, share, swap, or lend their idle goods.⁹⁸ It enables an increased utilization rate of products with underutilization. The earnings model sometimes includes an intermediary function (combining

⁹¹ Lacy 2015.

⁹² Hans 2015.

⁹³ Lacy 2015.

⁹⁴ Source:

[https://en.wikipedia.org/wiki/Circular_economy#:~:text=A%20circular%20economy%20\(often%20referred,the%20continual%20use%20of%20resources.](https://en.wikipedia.org/wiki/Circular_economy#:~:text=A%20circular%20economy%20(often%20referred,the%20continual%20use%20of%20resources.)

⁹⁵ Hans 2015.

⁹⁶ Lacy 2015.

⁹⁷ Hans 2015.

⁹⁸ Lacy 2015.

supply and demand for payment), sometimes including the residual value of the goods, including the provision of new or existing services in order to use existing products more effectively.⁹⁹

E) *Product as a Service Model*. Where services rather than products are markets, aim to more efficient product use. We use the products by one or many customers through a lease or pay-for-use arrangement, promoting a more sparing use of natural resources.¹⁰⁰ The market for this model is significant because the cost of leasing or leasing is lower than the cost of purchasing. At the same time, this concept is more attractive to businesses, because of the residual value after commercial use is still high, so the depreciation is relatively low.¹⁰¹

All these circular economy business models add social value and monetary value, which are sustainable business models.¹⁰² The significance of the circular economy business models is not only to reduce production costs to make the economy more profitable but also to reduce the absolute value of resource requirements and waste reduction by the closed-loop flow of energy. So compared with traditional business models, environmental friendliness is the fundamental feature of the circular economy business models.¹⁰³ The transformation of companies to adapt to the circular economy business model is valuable. The circular economy business model can create new business opportunities and bring competitive advantages to enterprises.

⁹⁹ Hans 2015.

¹⁰⁰ Lacy 2015.

¹⁰¹ Hans 2015.

¹⁰² Ibid.

¹⁰³ Ibid.

4 CASE COMPANY UPM

This research aims to study the challenges and possibilities of creating new circular business opportunities from a legal perspective. In order to achieve the purpose of the research, this chapter gives a brief introduction to the case company.

UPM-Kymmene Corporation is a Finnish forest industry company. UPM was formed by the merger of Kymmene Corporation with Repola Oy and its subsidiary United Paper Mills Ltd in 1996.¹⁰⁴ In 2009, UPM created the term “Biofore” to describe the new forest industry. “Bio” stands for sustainable solutions and environmental performance. “Fore” holds for forest and the company's position at the forefront of the development.¹⁰⁵ The Biofore term is also used in the company's slogan: “*UPM - The Biofore Company.*”¹⁰⁶ The Group employs around 18,700 people work in 46 countries. With a head office in Finland, the most important markets are in Europe, Asia, and North America.¹⁰⁷

As a pioneer in the integration of the biological and forest industries, UPM is committed to building a sustainable, innovation-driven, and exciting future beyond fossils. UPM delivers renewable and responsible solutions to the growing global consumer demand across six business areas: UPM Biorefining, UPM Energy, UPM Raflatac, UPM Specialty Papers, UPM Communication Papers, and UPM Plywood.¹⁰⁸

UPM aims to reduce the use of fossil raw materials through recycling and reuse and to replace them with renewable alternatives.¹⁰⁹ UPM also aims to resource efficiency, which means reusing or recycling most of their production waste and use it, whether as a raw material or for energy production. Therefore, the environmental benefits are ensuring a lower carbon footprint, and the business benefits are through reusing waste or residues in innovative products to improving UPM’s competitiveness.¹¹⁰

¹⁰⁴ Source: <https://web.archive.org/web/20150809140714/http://www.upm.com/EN/ABOUT-UPM/Our-Company/History/Pages/default.aspx>

¹⁰⁵ Source: <https://www.upm.com/about-us/this-is-biofore/>

¹⁰⁶ Ibid.

¹⁰⁷ UPM Annual Report 2019, p.35.

¹⁰⁸ Ibid.

¹⁰⁹ Source: <https://www.upm.com/news-and-stories/articles/2019/06/the-circular-economy--a-pillar-of-eu-economic-policy/>

¹¹⁰ Source: <https://www.upmtimber.com/whats-new/2019/10/upm-drives-towards-a-circular-economy/>

UPM Timber and UPM Plywood's Finnish mills became the first UPM businesses to achieve its Zero Solid Waste project's recycling targets in 2017. The rest of the UPM business areas set their sights on making the Zero Solid Process Waste to Landfill goal by 2030. It means all business areas of UPM will not depositing any waste in landfill sites or incinerating waste without energy recovery in the future. To meet this ambitious goal, UPM will harness innovative new technologies, improve waste utilization, and reuse material to create a truly circular economy.¹¹¹

Resource efficiency and circular economy are an essential part of UPM's sustainable development.¹¹² Resource efficiency is the core strategy for UPM's business, which means use valuable and renewable forest biomass as efficiently as possible. UPM's circular approach comes down to three words: More with Biofore. It says: Reuse or recycle virtually all production waste, recycle materials and products several times, and create added value through smart solutions. The final goal is to minimize waste and maximize reuse. UPM see the circular economy as the cornerstone of a sustainable future, and make every effort to create economic, social, and environmental values for stakeholders and society.¹¹³

Circular economy principles already applied in UPM, and UPM has developed innovative ways to reduce its waste and to reuse its side stream in new products, and to use resources sustainably.¹¹⁴ However, UPM wants to know what challenges and possibilities the regulations pose in creating new circular business opportunities?¹¹⁵ So the following chapter five and chapter six will go to compare the circular economy legal system of Germany and China and explore the impact of basic legal systems on creating new business opportunities for UPM.

¹¹¹ Ibid.

¹¹² Source: <https://www.upm.com/news-and-stories/articles/2016/05/upm-pursues-zero-solid-waste-to-landfill-status-by-2030/>

¹¹³ Source: <https://www.upm.com/responsibility/circulareconomy/>

¹¹⁴ UPM report 2019, p.223.

¹¹⁵ Source: <https://www.helsinki.fi/en/news/sustainability-news/exploring-circular-economy-together-with-master-students-from-the-university-of-helsinki>

5 CIRCULAR ECONOMY LEGAL SYSTEM

The circular economy legal system refers to the network formed by various laws, regulations, and other legal normative documents related to a circular economy. Among them, circular economy law is the fundamental law of this legal system. The Circular Economy Law is a law that coordinates the protection of environmental resources and economic development and is the intersection and integration of environmental protection laws and commercial laws.¹¹⁶

5.1 Background and Brief History

5.1.1 Circular Economy Legal System in Germany

Germany is the first country in the world to implement a circular economy, and its legal construction of circular economy is also at the forefront of the world.¹¹⁷ From 1972 to the present, the constitutional development of the German circular economy can divide into two stages:

The first stage was between 1972 and 1996. During this period, it mainly started with the end treatment of waste, and gradually developed into a circular economy development model and legislation.¹¹⁸

In the early 1970s, there were 50,000 garbage dumps in Germany. Because of poor management, most of the dumps caused secondary pollution. The German government enacted the Waste Disposal Act to protect the environment from further degradation in 1972.¹¹⁹ However, the goal of the legislation was only to treat the waste generated in the production and consumption process, and it still belonged to the end treatment of environmental problems. Therefore, it cannot belong to the legislation of a circular economy and cannot solve the problem from the source.¹²⁰ In 1986, the new Waste

¹¹⁶ Xie et al. 2006, pp.88-92.

¹¹⁷ Heshmati 2015, p.2.

¹¹⁸ Yu 2008, pp.86-92.

¹¹⁹ Pang 2012, p.11.

¹²⁰ Ibid.

Avoidance and Management Act¹²¹, instead of the Waste Disposal Act and its primary principle, was avoidance and recycling of waste were to be given precedence over waste disposal, and responsibilities of producers are regulated.¹²²

In 1991, the Parliament took the historic step of adopting the Ordinance on the Avoidance and Recovery of Packaging Wastes (Packing Ordinance), which required producers to take back and recycle the packaging from their products.¹²³ The Packing Ordinance reflected the Waste hierarchy of goals, calling for packaging waste to primarily avoided, then reused or recycled,¹²⁴ and disposed of landfilling or incineration only as a last resort.¹²⁵ At the same time, the producers can also choose to delegate the recycling responsibility to a recycling company that specializes in recycling, and the Dual System Deutschland (DSD)¹²⁶ came into being.¹²⁷ In 1994, a model of sustainable development incorporated into the German constitution, the government's commitment to save natural resources, protect the environment, reduce soil sealing, conserve biological diversity, and promote sustainable use of resources.¹²⁸ It provided the legal basis for the shift towards circularity.

The second stage is from 1996 to the present, and the circular economy model has widely implemented. Germany is the forerunner of the circular economy due to its early adoption of the Closed Substance Cycle and Waste Management Act in 1996.¹²⁹ The Act, which replaces the Federal Waste Management Act, strengthens the polluter-pays principle by emphasizing product responsibility of the producer and shifts public-sector waste management system from a command and control approach towards a more cooperative and market-oriented approach.¹³⁰ The law provides a framework for implementing closed-cycle waste management and ensures environmentally

¹²¹ Mccrea 2011, p.8.

¹²² Zhang et al. 2010, p.922.

¹²³ Mccrea 2011, p.8.

¹²⁴ Ibid.

¹²⁵ Ibid.

¹²⁶ In order to liberate industrial firms and retailers from their individual take-back and recovery obligations under the German Packaging Ordinance, Der Grüne Punkt established a second (dual) disposal system besides the public-sector waste disposal service. As the first system of its kind worldwide, it has since 1991 been providing nationwide collection of used sales packages and obtains raw materials from them for the closed-cycle economy. Source: <https://www.gruener-punkt.de/en/company/about-us.html>

¹²⁷ Yu 2008, pp.86-92

¹²⁸ Geng et al. 2009, pp.996–1002; Ogunmakinde 2019, p.6.

¹²⁹ Heck 2006.

¹³⁰ Giesberts 1996, p.494.

compatible waste disposal¹³¹ to create a recycling-oriented society.¹³² The law became the general outline for the development of a circular economy in Germany.¹³³

Since then, Germany has promulgated the Regulations on the Disposal of Used Cars and Regulations on the Disposal of Waste Batteries in 1998. In 1999, enacted the Garbage Act, the Federal Soil and Water Conservation, Old Waste Act, and the Electronic Waste and Electronic Equipment Disposal Regulations. In 2001, the Community Garbage Environmentally Safe Placement and Garbage Disposal Order adopted. In 2002, the Law on Continued Promotion of Ecological Tax Reform, the Forest Dissemination Material Law, and the Regulations on Waste Wood Disposal formulated to promote a circular economy. The Renewable Energy Law revised in 2003. In 2005, the Electrical and Electronic Equipment Law was promulgated, which made precise requirements for a series of links from design to the recycling of electronic and electrical equipment.¹³⁴

In 2012 implementing European Union's guidelines and the EU Waste Directive No. 2008/98, Closed Substance Cycle and Waste Management Act were revised.¹³⁵ The reorganizing of the law on the Closed Cycle and Waste Management Act name as Circular Economy Act, which aimed to turn the waste management into resource management.¹³⁶ So the Circular Economy Act stipulates a five-level waste grade sequence (prevention - preparing for reuse - recycling - another recovery – disposal)¹³⁷ and present in figure 2, also the distinction between waste and by-product concepts.¹³⁸ In 2017, the Renewable Energies Act revised.¹³⁹

To sum up, the German circular economy legislation system has three levels: laws, policies, and regulations.¹⁴⁰ In terms of legislative methods, Germany usually adopts legislation in specific areas at first and then formulates a unified and standardized legal

¹³¹ Heshmati 2015, p.2.

¹³² Wang et al. 2018a, p.876.

¹³³ Yi 2008, p.8.

¹³⁴ Yu 2008, pp.86-92.

¹³⁵ Heck 2006; Lehmann et al. 2014; Ogunmakinde 2019, p.27.

¹³⁶ Nelles et al. 2016, p.7.

¹³⁷ German Circular Economy Act, Section 6 Waste hierarchy. Available at:

https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Abfallwirtschaft/kreislaufwirtschaftsgesetz_en_bf.pdf

¹³⁸ Zhai 2015, p.46.

¹³⁹ Ogunmakinde 2019, p.27.

¹⁴⁰ Ibid.

approach.¹⁴¹ It can see from this that Germany's circular economy has strict laws and a complete system.

The Waste Hierarchy

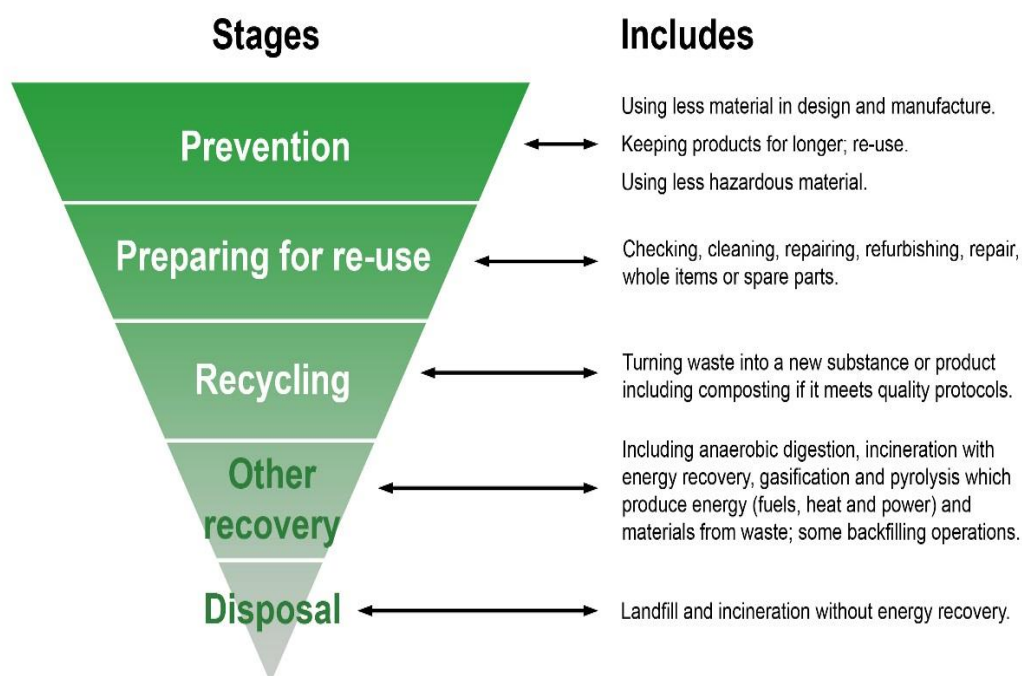


Figure 2: The Five-level Waste Management Hierarchy¹⁴²

5.1.2 Circular Economy Legal System in China

The concept of the circular economy in China introduced in the 1990s and origins in cleaner production and eco-industrial.¹⁴³ The earliest law related to the circular economy was the Energy Conservation Law of 1997.¹⁴⁴ Then the Cleaner Production Promotion Law and enacted in 2002.¹⁴⁵ The implementation of this law is the beginning of circular economy legislation, marking the beginning of China's development of a circular economy toward legalization.¹⁴⁶ The legislative purpose of the law is to transform end prevention into source governance and focusing on the production field,

¹⁴¹ He 2005, pp.121-124.

¹⁴² Source: https://calderdale.objective.co.uk/events/30957/popimage_d222231e20809.html

¹⁴³ McDowall et al. 2017, pp.651-661.

¹⁴⁴ Ogunmakinde 2019, p.27.

¹⁴⁵ Geng et al. 2010b; Negny et al. 2012; Peng et al. 2005; Almas 2015, p.7.

¹⁴⁶ Wu 2006, pp.23-30.

which is only the initial stage of the development of a circular economy.¹⁴⁷ In 2004 the Law on Pollution Prevention and Control of Solid Waste was revised.¹⁴⁸ In 2005, the Chinese State Council Issued the Opinions of State Council on Accelerating the Development of Circular Economy, showing the circular economy as the alternative development model.¹⁴⁹

In 2006, China issued an “Outline of the 11th Five-Year Plan for National Economic and Social Development (2006-2010)”, and the circular economy incorporated into national development strategies.¹⁵⁰ Renewable Energy Development was implemented in 2006 and revised in 2009. Since 2007, the concept of ecological civilization has become the long-term goal of the Chinese Communist Party for sustainable development,¹⁵¹ and the circular economy is one of the underlying principles of both ecological civilization¹⁵² and harmonious development.¹⁵³ In mid-2008, the Chinese People’s Congress passed a national-level framework for pursuing a circular economy, and the law is the Circular Economy Promotion Law, which came into force in 2009.¹⁵⁴ The law aims to promote the rapid development of the national circular economy from three dimensions (Micro, Meso, and Macro).¹⁵⁵

In 2011, the “Outline of the Twelfth Five-Year Plan for National Economic and Social Development (2011-2015)” further developed the essential component of green development.¹⁵⁶ The same year, the Cleaner Production Promotion Law of the People’s Republic of China was revised. The law aims to “promote cleaner production, raise the efficiency of utilization of resources, reduce and avoid the generation of pollutants, protect and improve the environment, protect human health, and promote the sustainable development of the economy and society.”¹⁵⁷ In 2013, the State Council Issued the Circular Economy Development Strategy and Immediate Action Plan, which is the first strategic plan for the development of the circular economy in China.¹⁵⁸ Next

¹⁴⁷ Hicks et al. 2007; Almas 2015, p.7.

¹⁴⁸ Ogunmakinde 2019, p.27.

¹⁴⁹ Li et al. 2016, p. 98.

¹⁵⁰ China Association of Circular Economy report 2017.

¹⁵¹ Geall 2015b; Geng et al. 2016c; McDowall et al. 2017, p.3.

¹⁵² Geall 2015a; McDowall et al. 2017, p.3.

¹⁵³ Naustdalslid 2014; McDowall et al. 2017, p.3.

¹⁵⁴ National People’s Congress 2008; McDowall et al. 2017, p.3.

¹⁵⁵ Chen et al. 2019, p.7.

¹⁵⁶ Su et al. 2013, pp.215–227; Murray et al. 2017, pp.369–380.

¹⁵⁷ Cleaner Production Promotion Law of the People’s Republic of China (2012 Amendment).

Available at: https://www-pkulaw-com.resources.asiaportal.info/en_law/dc78e14fe2bdc104bdfb.html

¹⁵⁸ Wang et al. 2018a, p.877.

year, the Environmental Protection Law of the People's Republic of China was revised. This law developed to protect and improve the environment, to prevent and to control pollution and other public nuisances, safeguarding public health, promoting ecological civilization, and enhancing sustainable economic and social development.¹⁵⁹

In 2016, the “Outline of the Twelfth Five-Year Plan for National Economic and Social Development (2011-2015)”, it was pointed out that great importance was attached to the development of the circular economy.¹⁶⁰ In 2017, the Circular Development Leading Action¹⁶¹ was promulgated, creating a unified overall arrangement for the development of China's circular economy during the 13th Five-Year Plan period (2016-2020). Its appearance showed that China's environmental governance had been upgraded to the ecological cycle with resources and ecology as the core.¹⁶² In order to promote the development of a circular economy, China amended three relevant laws. They are the Water Pollution Prevention and Control Law of the People's Republic of China revised in 2017,¹⁶³ the Circular Economy Promotion Law amended in 2018,¹⁶⁴ and the Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes revised in 2020.¹⁶⁵

In the past 20 years of legislation, from cleaner production (emphasis on the cleanliness of the production process) to solid wastes prevention (focus on the reduction), to the comprehensive legal concept of the circular economy, China is continuously improving the legislation of the circular economy legal system.¹⁶⁶ The current circular economy legal system mainly based on the Circular Economy Promotion Law.¹⁶⁷

¹⁵⁹ Environmental Protection Law of the People's Republic of China (2014 Revision).

Available at: https://www-pkulaw-com.resources.asiaportal.info/en_law/c24f71752129d23dbdfb.html

¹⁶⁰ The 13th Five Year Plan. For economic and social development of the people's republic of China (2016-2020).

Available at: https://en.ndrc.gov.cn/policyrelease_8233/201612/P020191101482242850325.pdf

¹⁶¹ Wang et al. 2018b, p.876–887.

¹⁶² Tang et al. 2020, p.2.

¹⁶³ Water Pollution Prevention and Control Law of the People's Republic of China (2017 Revision). Available at:

https://www-pkulaw-com.resources.asiaportal.info/en_law/029b95a88a65e9d6bdfb.html

¹⁶⁴ Circular Economy Promotion Law of the People's Republic of China (2018 Amendment). Available at:

https://www-pkulaw-com.resources.asiaportal.info/en_law/86e0348ef0b62b74bdfb.html

¹⁶⁵ Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (2020 Revision).

Available at: https://www-pkulaw-com.resources.asiaportal.info/en_law/38e38019d3cd06adbdfb.html

¹⁶⁶ Yu 2019, pp.130-140.

¹⁶⁷ Han 2018, pp.145-157.

5.2 Legislative Model and Competent Authority of CE Law

Both Germany and China belong to the single legislative model. The model refers to the state promulgated special laws and regulations related to the circular economy, thus forming a systematic legal system.¹⁶⁸

The German circular economy legal system takes waste management as the starting point. It develops from source reduction to end disposal, covering the entire cycle of materials in the economic system. So, the disposition and utilization of waste included in a law,¹⁶⁹ which is the Circular Economy Act (Kreislaufwirtschaftsgesetz – KrWG). China's circular economy legislation based on a policy system for comprehensive utilization of resources, and draw on the circular economy legislative experience of Germany and Japan.¹⁷⁰ China's Circular Economy Promotion Law is different from the German Circular Economy Act, which not include the waste management part of the law. For waste management part, refer to another Law, which is the Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes.¹⁷¹

The German circular economy legislation is mainly related to waste management. So, the German circular economy legislation stipulates that the environmental department (Federal Ministry for Environment, Nature Conservation, and Nuclear Safety)¹⁷² is the competent authority of the circular economy. China's circular economy legislation covers a broader scope, including the cognitive development and efficient use of resources, total control use of water and land, the promotion of circular production methods, and industrial structure adjustments.¹⁷³ Therefore, China's circular economy legislation stipulates that the administrative department of circular economy development under the State Council (National Development and Reform Commission)¹⁷⁴ shall take charge of coordinating and supervising the development of

¹⁶⁸ Yi 2008.

¹⁶⁹ Qu 2017, pp.29-37.

¹⁷⁰ Ibid.

¹⁷¹ Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes (2020 Revision). Available at:

<https://www.pkulaw-com.resources.asiaportal.info/chl/38e38019d3cd06adbdfb.html>

¹⁷² Source: <https://www.bmu.de/en/>

¹⁷³ Qu 2017, pp.29-37.

¹⁷⁴ National Development and Reform Commission (NDRC). ormerly State Planning Commission and State Development Planning Commission, is a macroeconomic management agency under the State Council, which has broad administrative and planning control over the economy of Mainland China. Available at:

the circular economy of the whole nation.¹⁷⁵ At the same time, there are other competent authorities in the process of enforcing a circular economy. For example, the competent authority for resource recovery and reuse is the Ministry of Commerce; the competent authority for environmental protection is the Ministry of Environmental Protection; the Environmental Health Department is responsible for the reduction and management of domestic waste.¹⁷⁶

5.3 Legislative Purpose and Definitions of CE Law

5.3.1 Circular Economy Act in Germany

The idea of the German circular economy legislation is mainly to waste management, and detailed regulations have been formulated from product development and processing to waste removal.¹⁷⁷ The Circular Economy Act¹⁷⁸ (CEA) stipulates: “the purpose of this Act is to promote a circular economy to conserve natural resources and to ensure the protection of human health and the environment in the generation and management of waste.”¹⁷⁹

The other’s purpose of the legislation includes implementation of EU law because Germany as a member, must implement the EU Waste Directive No. 2008/98; Strengthen the construction of circular economy for resources, climate, and environmental protection.¹⁸⁰ Section 8 subsection 1 of the Act provides, “priority shall give in meeting the recovery obligation under section 7 subsection (2) first sentence to the recovery operations designated in section 6 subsection (1) numbers 2 to 4 which best guarantees the protection of human health and the environment by the type and nature of the waste.”¹⁸¹ That means the recovery of waste operation (reuse, recycling, and recovery) must make priority choices to protect human health and the environment.

<https://en.ndrc.gov.cn/>

¹⁷⁵ China’s Circular Economy Promotion Law 2018, Article 5, p.2.

¹⁷⁶ Nie 2013, pp.144-150.

¹⁷⁷ Ibid.

¹⁷⁸ Circular Economy Act – (Kreislaufwirtschaftsgesetz – KrWG) 2012. Available at:

https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Abfallwirtschaft/kreislaufwirtschaftsgesetz_en_bf.pdf

¹⁷⁹ German Circular Economy Act 2012, Section 1, p.4.

¹⁸⁰ Heck 2006; Lehmann et al. 2014; Ogunmakinde 2019, p.27.

¹⁸¹ German Circular Economy Act 2012, p.11.

It is directly reflecting the goals of strengthening resources and environmental protection.

The German CEA provides, “the operator of a landfill shall be obliged to provide to the competent authority with information regarding the nature, quantity and geographical and chronological distribution of the emissions produced by the installation within a specified period, as well as regarding the emissions conditions (emissions declaration).”¹⁸² The regulation reflects the goal of strengthening climate and environmental protection in the form of additional obligations.¹⁸³

The concept of the German circular economy includes by reuse of waste as material to prevent misuse and by reused of waste as energy or material in production to recovery waste.¹⁸⁴ The German CEA defines the specific meaning of the circular economy concept, and Section 3 subsection (19) of the Act stipulates that “circular economy refers to prevention and recovery of waste.”¹⁸⁵ Section 3 also provides a comprehensive definition of prevention and recovery, subsection (20): “prevention within the meaning of this act shall be any measure taken before a substance, material or product has become waste, and that serves to reduce the quantity of waste, the adverse effects of waste on human health and the environment or the content of harmful substances in materials and products.”¹⁸⁶ Subsection (23) of this section provides, “recovery within the meaning of this act shall be any operation the principal result of which is waste within the plant or in the wider economy serving a useful purpose, either by replacing other materials which would otherwise have been used to fulfill a particular function, or waste being prepared to fulfill that function.”¹⁸⁷

5.3.2 Circular Economy Promotion Law in China

The Circular Economy Promotion Law (CEPL) is the fundamental law in China's circular economy legal system. The principle of this law refers to “reduction in priority.”¹⁸⁸ The purpose of the legislation is to focus on the priority to solve the

¹⁸² German Circular Economy Act 2012, Section 41, p.36.

¹⁸³ Zhai 2015, pp.46-52.

¹⁸⁴ Ibid.

¹⁸⁵ German Circular Economy Act 2012, p.8.

¹⁸⁶ Ibid.

¹⁸⁷ Ibid.

¹⁸⁸ China's Circular Economy Promotion Law 2018, Article 4, p.2.

problems of high energy consumption and environmental pollution.¹⁸⁹

China's CEPL states, "the purpose is promoting the development of the circular economy, improving the resource utilization efficiency, protecting and improving the environment, and realizing sustainable development."¹⁹⁰ Specifically, it includes three items: first, the direct purpose of circular economy legislation is improving the resource utilization efficiency, which aimed to achieve the highest economic output and the least waste discharge with the least resource consumption; second, protecting and enhancing the environment through source reduction, process control, and end governance; third, the higher purpose of circular economy legislation is realizing sustainable development, which aimed to achieve the unification of economic, environmental and social benefits, and to build resource-saving and environment-friendly society.¹⁹¹

The circular economy defined "the circular economy as mentioned in these measures is a generic term for the reducing, reusing and recycling activities conducted in the process of production, circulation, and consumption."¹⁹² During implementing the Cleaner Production Promotion Law in the early 21st century, it mainly used to the production link of the national economy. At the same time, the CEPL included all aspects of the national economy, such as production, circulation, and consumption. The process has provisions for many special links, such as raw material selection, recycling of industrial waste, construction industry, agriculture, service enterprises, and resource conservation of state organs.¹⁹³ Article 2 also reflects that the circular economy based on the 3R principle (Reduce, Reuse, and Recycle).

The term "reducing as mentioned in these Measures refers to reducing the consumption of resources and the production of wastes in the process of production, circulation, and consumption."¹⁹⁴ The principle of reducing aimed at the input, requiring fewer resources and energy to achieve the intended production and consumption goals, save resources from the source, and reduce pollutant emissions. The principle of reducing requires that the design of legal rules help promote the miniaturization of product

¹⁸⁹ Nie 2013, pp.144-150.

¹⁹⁰ China's Circular Economy Promotion Law 2018, Article 1, p.2.

¹⁹¹ Analysis About People's Republic of China Circular Economy Promotion Law 2009. Available at: http://pkulaw.cn/fulltext_form.aspx?Gid=1510092598&Db=qikan

¹⁹² China's Circular Economy Promotion Law 2018, Article 2, p.2.

¹⁹³ Analysis About People's Republic of China Circular Economy Promotion Law 2009. Available at: http://pkulaw.cn/fulltext_form.aspx?Gid=1510092598&Db=qikan

¹⁹⁴ China's Circular Economy Promotion Law 2018, Article 2, p.2.

volume, the light-weighting of product quality, and the simplification of product packaging to reduce waste emissions.¹⁹⁵

The term “reusing as mentioned in these measures, refers to using wastes as products directly, using wastes after repair, renewal or reproduction or using part or all wastes as components of other products.”¹⁹⁶ It belongs to a procedural method. The purpose is to improve the efficiency of the use of products and services, require products and packaging to be used repeatedly in the original form, require manufacturers to extend the life of products, resist one-time consumption, and avoid items becoming garbage prematurely, and maximize the utility of raw materials and products in repeated use.¹⁹⁷

The term “recycling as mentioned in these measures, refers to using wastes as raw materials directly or after regeneration.”¹⁹⁸ It belongs to the output method, which requires products that can turn into regenerate resources and energy instead of garbage after completing their functions.¹⁹⁹

China's economy is in a stage of industrialization, with high energy consumption, dangerous waste of resources, and low utilization of renewable resources. Therefore, China has chosen the principle of “reduction in priority” when developing a circular economy.²⁰⁰ It stated in CEPL: “the development of a circular economy shall follow the principle of giving priority to reduction under the precondition of being technically workable, economically rational and good for saving resources.”²⁰¹ Resources can divide into renewable resources and non-renewable resources; renewable resources are inexhaustible. From an economic point of view, only large-scale utilization of renewable resources can better reduce financial costs. So, reducing resource consumption refers to non-renewable resources. For the use of renewable resources, waste generated in the production and consumption process can recycle as resources.²⁰²

¹⁹⁵ Li 2011, pp.37-41.

¹⁹⁶ China's Circular Economy Promotion Law 2018, Article 2, p.2.

¹⁹⁷ Deng et al. 2003, pp.9-13.

¹⁹⁸ China's Circular Economy Promotion Law 2018, Article 2, p.2.

¹⁹⁹ Wang 2009, p.4.

²⁰⁰ Analysis About People's Republic of China Circular Economy Promotion Law 2009.

Available at: http://pkulaw.cn/fulltext_form.aspx?Gid=1510092598&Db=qikan

²⁰¹ China's Circular Economy Promotion Law 2018, Article 4, p.2.

²⁰² Source: https://www.sohu.com/a/195960554_671251

6 COMPARISON OF CE BASIC SYSTEM

Form a “resource-saving, and environment-friendly society”²⁰³ depends on not only the change of people’s consciousness, but also the specific behaviors of all members of society in the process of production, circulation, and consumption must meet the requirements of the circular economy. Voluntary performance of obligations is uncertain, so the legal systems of the circular economy are the guarantee for promoting the development of the circular economy and implementing the circular economic fundamental law.²⁰⁴ This chapter adopts a comparative perspective in Germany and China, examines similarities and differences in the underlying legal systems, and finds the legal impact on creating new circular business opportunities for UPM.

6.1 Responsibility Sharing System

Through legislation to define the legal responsibilities of the government, enterprises and the public in the construction and promotion of circular economy, to ensure the orderly operation of the circular economy legal system and promote the development of the circular economy.²⁰⁵

6.1.1 Responsibility Sharing System in German CEA

The German Circular Economy Act (CEA) provides an individual chapter on the responsibility of various subjects and divides the duties of government, enterprises, and public explicitly.

The government responsibilities include: “The *Länder* shall prepare waste management plans”²⁰⁶ under section 30 subsection (1); “the Federation shall draw up a waste prevention program”²⁰⁷ under section 33 paragraph (1); “supervision of waste prevention and waste management”²⁰⁸ under section 47 subsection (1); “monitor at

²⁰³ State Council 2005; McDowall et al. 2017, p.3.

²⁰⁴ Xu 2008, p.36

²⁰⁵ Li 2016, p.28.

²⁰⁶ Germany’s Circular Economy Act 2012, p.28.

²⁰⁷ Ibid, p.31.

²⁰⁸ Ibid, p.40.

regular intervals and to suitable degree producers of hazardous waste, installations and enterprises which carry out waste treatment, as well as collectors, transporters, waste brokers and waste dealers,”²⁰⁹ and “supervision of the activities of waste collectors and waste transporters”²¹⁰ in Section 47 subsection (2).

The enterprises’ responsibilities include: “Parties who develop, manufacture, process, treat or sell products shall bear product responsibility concerning the achievement of the objectives of the circular economy. Products must design that waste generation within their production and use is reduced, and that environmentally compatible recovery and disposal of the waste resulting from their use is ensured”²¹¹ under section 23 subsection (1); “the development, production and marketing of products that can be reused, that are technically durable and that are suitable, after use, for proper, safe and high-quality recovery and environmentally compatible disposal”,²¹² “priority for use of recoverable waste or secondary raw materials in the production of products”,²¹³ “labelling of products containing pollutants in order to ensure environmentally compatible recovery or disposal of the waste remaining after their use”,²¹⁴ “provision of information concerning possibilities or obligations for return, reuse and recovery, and concerning deposit payment arrangements, through product labelling”,²¹⁵ and “acceptance of returned goods and of the waste remaining after their use, as well as the subsequent environmentally compatible recovery or disposal of such products and waste”²¹⁶ by section 23 subsection (2) number 1, number 2, number 3, number 4 and number 5.

The public has a responsibility to participate in connection with waste management plans. Section 32 subsection (1) of the CEA provided that “the public to participate in the preparation or modification of waste management plans, including special chapters, or separate sub-plans, especially referring to the treatment of hazardous waste, used batteries and accumulators or packaging and packing waste.”²¹⁷ The public has another responsibility to participate in drawing up or altering waste prevention programmes.

²⁰⁹ Ibid.

²¹⁰ Ibid.

²¹¹ Ibid, p.23.

²¹² Ibid.

²¹³ Ibid.

²¹⁴ Ibid.

²¹⁵ Ibid.

²¹⁶ Ibid.

²¹⁷ Germany’s Circular Economy Act 2012, p.30.

Section 33 subsection (5) of the CEA provided that “when drawing up or altering waste prevention programmes, the public shall be involved by the competent authority under section 32 subsections (1) to (4).”²¹⁸

6.1.2 Responsibility Sharing System in Chinese CEPL

China's Circular Economy Promotion Law (CEPL) stipulates that the circular economy responsibilities of government, enterprises, and the public are not systematic. It is just scattered and interspersed provisions in some articles and chapters.

The government responsibilities includes: “work out a national circular economy development plan”²¹⁹ under article 12; “the people's governments at or above the county level shall set up an objective responsibility system for the development of circular economy”²²⁰ under article 8; “work out a circular economy evaluation indicator system”²²¹ under article 14; set up “the catalogue of products and packages subject to compulsory recycle”²²² under article 15; “adopts a key supervision and administration system to key enterprises in the high energy or water consuming industries”²²³ under article 16; “set up a circular economy statistical system and publish the major statistical indicators to the public on a regular basis”²²⁴ and “set up a system of labeling the resource consumption level of products”²²⁵ under article 17; “issue a catalogue of the encouraged, restricted and eliminated techniques, equipment, materials and products on a regular basis”²²⁶ under article 18; “the people's governments at or above the county level shall make overall plans on the geographical distribution of the different sectors of the economy in their respective regions, reasonably readjust the industrial structure and compel enterprises to cooperate in such areas as the comprehensive utilization of resources to realize the efficient utilization and recycling of resources”²²⁷ under article 29. When the actions of the government and the enterprise jointly cause environmental pollution or damage. The government, as the overall planner of the society, should bear

²¹⁸ Ibid, p.31.

²¹⁹ China's Circular Economy Promotion Law 2018, p.4.

²²⁰ Ibid, p.3.

²²¹ Ibid, p.5.

²²² Ibid.

²²³ Ibid, p.6.

²²⁴ Ibid.

²²⁵ Ibid.

²²⁶ Ibid.

²²⁷ Ibid, p.10.

more responsibility than the enterprise.²²⁸

The enterprises have the responsibility to “set up management systems and take measures to reduce the consumption of resources, reduce the production and discharge of wastes and improve the utilization and recycling level of wastes”²²⁹ under article 9. Furthermore, article 15 stipulates that “enterprises producing products or packages listed in the catalog of articles subject to compulsory recycle must be responsible for recycling deserted products or packages. For those usable, the producers thereof shall be responsible for using them, while for those products which are inappropriate for reutilization due to the absence of technical or economic conditions, the producers shall make them harmless”,²³⁰ “the design of products, equipment, products and packages shall give preference to the materials which are recyclable, dismountable, degradable, innocuous, harmless or slightly harmful or poisonous”²³¹ under article 19; “work out and implement water-saving plans, strengthen water-saving management and exercise control over the use of water in the whole process of production”²³² under article 20; “make comprehensive utilization of the fly ash, coal slack, tailings, mullock, waste materials, waste gas and other industrial wastes generated in the production process”²³³ in accordance with article 30; “use advanced technologies, techniques and equipment for the circulatory use of the waste water generated in the production process”²³⁴ under article 31; “make comprehensive utilization of the waste heat and pressure generated in the production process”²³⁵ under article 32; “forestry producers and relevant enterprises to use timber-saving technologies and timber-replacing technologies, and make comprehensive utilization of forestry wastes, wood castoffs, small firewood and desert bush so as to improve the comprehensive utilization rate of wood”²³⁶ under article 35. For industries with high risk, high energy consumption, and high pollution, once they cause environmental pollution or losses, they shall bear more senior responsibilities than ordinary industries.²³⁷

²²⁸ Zhong 2011, pp.785-788.

²²⁹ China's Circular Economy Promotion Law 2018, p.3.

²³⁰ Ibid, p.5.

²³¹ Ibid, p.7.

²³² Ibid.

²³³ Ibid, p.11.

²³⁴ Ibid.

²³⁵ Ibid.

²³⁶ Ibid, p.12.

²³⁷ Zhong 2011, pp.785-788.

Citizens have the responsibility to “enhance their awareness of resources conservation and protecting the environment, reasonably consume resources, and save resources.”²³⁸ Moreover, “citizens have the right to report acts of wasting resources and damaging the environment and have the right to access to government information about the development of circular economy and propose their opinions and suggestions”²³⁹ under article 10. Furthermore, “for products or packages listed in the catalog of articles subject to compulsory recycle, consumers have the responsibility to deliver the deserted ones to the producers or the distributors or other organizations entrusted by the producers for recycling”²⁴⁰ under Article 15.

6.1.3 Comparison Results

There is a difference between China and Germany in the design of the responsibility sharing system. In developing a circular economy, China has paid more attention to the leading role of the government, giving the government more legal responsibilities. The legal duty to China’s enterprises is heavier than Germany in terms of system design, and less responsibility for the public.

Both governments have essential responsibilities in the construction of a circular economy legal system and the development of circular economy, mainly formulate a circular economy development plan and supervision of waste generation and recycling. At the same time, state agencies are the largest consumers, and they also bear consumer responsibilities, especially the law-abiding behaviors of state agencies that have an exemplary effect on other members of society. Therefore, governments are also necessary to fulfill the obligation of resource conservation and green consumption in government procurement activities.²⁴¹ In German CEA, Section 45, subsection (1), stipulates that the government procurement needs to give priority to adopting or purchasing products that are durable, easy to repair, reusable, renewable, and less polluting, or products made of recycled materials that meet the requirements of a circular economy.²⁴² In China’s CEPL, Article 47, “the state adopts a government procurement policy that is good for the development of a circular economy. Entities and

²³⁸ China’s Circular Economy Promotion Law 2018, p.3.

²³⁹ Ibid, p.4.

²⁴⁰ Ibid, p.5.

²⁴¹ Xu 2008, p.36.

²⁴² Germany’s Circular Economy Act 2012, p.39.

individuals purchasing goods with funds from the public finance shall give preference to energy-saving, water-saving, material-saving, and environment-friendly products and recycled products.”²⁴³

Both China and Germany stipulate that enterprises' production shall fall under the requirement of reducing the consumption of resources and the generation of wastes. The producer of both countries has responsible for recycling deserted products or packages, as well as accountable for recycling hazardous materials and conducting harmless treatment. Chinese enterprises carry out recycling activities according to the catalog of articles subject to compulsory recycling, German producer recycling hazardous materials, and deserted products or packages through product labeling. Chinese CEPL stipulates that enterprises' product or packaging design should give priority to environmental protection and recyclable elements. The German CEA stipulates that producer priority for the use of recoverable waste or secondary raw materials in the production of products. China's industrial pollution and waste are relatively severe, and specific regulations have made for highly polluting enterprises. E.g., comprehensive utilization of industrial waste and heat and pressure generated in the production process; develop an interconnected water use system and a circulatory water use system. Moreover, Chinese CEPL has a unique article (Article 35) stipulate that forestry producers and relevant enterprises use timber-saving technologies and timber-replacing technologies, and make comprehensive utilization of forestry wastes.²⁴⁴

In China's CEPL, the responsibility to the public is less stipulated and only have the right to access to government information about the development of circular economy and propose their opinions and suggestions.²⁴⁵ In German CEA, the public to participate in the preparation or modification of waste management plans²⁴⁶ and drawing up or altering waste prevention programmes.²⁴⁷

²⁴³ China's Circular Economy Promotion Law 2018, p.15.

²⁴⁴ Ibid, p.12.

²⁴⁵ China's Circular Economy Promotion Law 2018, p.3.

²⁴⁶ Germany's Circular Economy Act 2012, p.30.

²⁴⁷ Ibid, p.31.

6.1.4 Challenges and Possibilities for UPM

According to the theory of consumer sovereignty,²⁴⁸ the choice of consumers determines the production of producers. The consumers can influence market competition through “green consumption” behavior, thereby indirectly affecting producer behavior, which has become a major driving force for producers to improve the design and clean production beyond legal responsibility.²⁴⁹ Moreover, governments and enterprises need the participation and assistance of consumers when they are fulfilling their circular economy responsibilities. Without the assistance of consumers, it is difficult for producers to recycle deserted products or packages. However, the public shares minimal responsibilities of the circular economy under China’s CEPL. Chinese consumers have not enough awareness of green consumption. Therefore, the Chinese public responsibilities in the responsibility sharing system is a challenge to create new business opportunities for UPM.

The governments of both countries are actively using direct control and indirect incentives to encourage low-consumption and low-polluting economic activities. The introduction of financial incentives with producers as the entry point, which can ensure that the incentive policy is more smoothly spread upstream and downstream in the product chain, and better play a role in reducing waste and encouraging recycling.²⁵⁰ One of the incentive measures is the government procurement policy. State agencies, as the largest consumers, promote the green consumption consciousness of the whole society through government procurement actions. So, government responsibilities in the responsibility sharing system of the two countries are possibly creating new business opportunities for UPM.

Whether it is Germany or China promoting the development of circular economy, they have the most responsibility stipulation for producers. Because producers are best able to understand the environmental risks of products, control the environmental impact of products, and include the cost of research and development, recycling, and recycling into product prices, and transfer them to the final consumer.²⁵¹ At the same time,

²⁴⁸ Consumer sovereignty is the theory that consumer preferences determine the production of goods and services. This means consumers can use their spending power as ‘votes’ for goods. In return, producers will respond to those preferences and produce those goods. Available at: <https://www.intelligenteconomist.com/consumer-sovereignty/>

²⁴⁹ Xu 2008, p.36.

²⁵⁰ Ibid.

²⁵¹ Xu 2008, p.36.

producers can reduce the environmental impact of products at the source through product design. As a producer, UPM has the responsibility to consider the convenience of recycling and recycling and environmental protection when designing products. Therefore, enterprise responsibilities in the responsibility sharing system of the two countries are possibly creating new business opportunities for UPM.

6.2 Circular Economy Planning System

The circular economy planning system means that the government formulates a suitable circular economy development plan based on the country's circular economy development profile and development conditions, thereby ensuring the steady development of the country's circular economy.²⁵²

6.2.1 Planning System in German CEA

The German CEA has a single chapter (Division 2) stipulate that specifies the government's obligations and procedures for formulating, revising, and implementing circular economy plans. Section 30 subsection (1) stipulates that “the Länder shall prepare waste management plans for their respective areas in keeping with supraregional perspectives.”²⁵³ The plan shall cover “the aim of waste prevention and recovery,” “the existing situation,” “achieve the objectives,” and “the waste treatment installations to ensure waste disposal.”²⁵⁴ Subsection (2) provides a “description of demand must take into account future developments expected within at least ten years.”²⁵⁵ It also stipulates that “the plans shall be evaluated at least every six years and updated where necessary” in section 31 subsection (5).²⁵⁶

Section 32 subsection (1) of the CEA provided that “the competent authority shall permit the public to waste management plans, including special chapters, or separate sub-plans, especially referring to the treatment of hazardous waste, used batteries and

²⁵² Yi 2008, p.35.

²⁵³ Germany's Circular Economy Act 2012, p.28.

²⁵⁴ Ibid.

²⁵⁵ Ibid, p.29.

²⁵⁶ Ibid, p.30.

accumulators or packaging and packing waste.”²⁵⁷

6.2.2 Planning System in Chinese CEPL

Article 12 of the CEPL stipulates the circular economy planning system from the following two aspects. One is the requirement “the administrative department of circular economy development under the State Council shall work out a national circular economy development plan together with the competent department of ecology and environment and other relevant competent departments under the State Council.”²⁵⁸ Another one is the requirement “the administrative department of circular economy development at or above the level of a districted city shall work out a circular economy development plan for this administrative region together with the competent department of ecology and environment and other relevant competent departments at the same level.”²⁵⁹

Circular economy planning is the foundation for the development of circular economy in China. Article 12 provides its contents mainly include: “the objective, scope of application, major contents, major tasks and safeguard measures of the plan, and shall set such indicators as resource output capacity, waste re-utilizing rate and waste recycling rate.”²⁶⁰ Article 20 provides “industrial enterprises shall work out and implement water-saving plans.”²⁶¹ Furthermore, “mining enterprises shall make overall plans,”²⁶² according to Article 22.

6.2.3 Comparison Results

The Chinese government is a dominant position in the planning, so enterprises and Non-governmental organizations (NGOs) in the planning system is weak.²⁶³ In terms of enterprises, it only stipulates that industrial enterprises should formulate water-saving plans. Furthermore, mining enterprises should formulate resources development and utilization plan. There is a lack of clear regulations on whether all types of enterprises should prepare their own comprehensive and long-term circular economy development

²⁵⁷ Ibid.

²⁵⁸ China’s Circular Economy Promotion Law 2018, p.4.

²⁵⁹ Ibid.

²⁶⁰ Ibid.

²⁶¹ Ibid, p.7.

²⁶² Ibid, p.8.

²⁶³ Wang 2009, p.33.

plans. The German CEA provides that the competent authority shall permit the public to participate in the preparation or modification of waste management plans.²⁶⁴

Germany takes a long-term perspective when formulating circular economy development plans. The German CEA stipulates that making the plan must consider the future development within ten years, and circular economy development plans should evaluate at least every six years. China's CEPL has neither provision on the length of development plans nor requirements on the periodic review of development plans.

6.2.4 Challenges and Possibilities for UPM

Both Chinese and German laws stipulate that the government has formulated a circular economy plan suitable for the country's development. However, China's circular economy development plan lacks provisions on the length of development plans and the lack of regulations for periodic review, which is easy to lead to the reduction of the executive power of the development plan. At the same time, it leads to the weakening of predictability and operability of the circular economy development plan in the implementation process.²⁶⁵ As a result, the public's expectations for the development of the circular economy have decreased, and the motivation to participate in the development of the circular economy is insufficient. Eventually, it will impact on the orderly development of the circular economy and even cause obstacles. So, the Chinese planning system is a challenge to create new business opportunities for UPM.

Germany has developed a complete planning system, including specific circular economy planning content and clear time goal setting. Germany's circular economy development plan stipulates the period of periodic review while formulating the period of the plan. These measures can regularly check for omissions in the circular economy plan, greatly enhance the operability and planning of the circular economy plan, and promote the efficient development of the circular economy. Therefore, the German planning system is a possibility to create new business opportunities for UPM.

²⁶⁴ Germany's Circular Economy Act 2012, p.30.

²⁶⁵ Li 2016.

6.3 Information Disclosure System

A circular economy information disclosure system can realize information exchange and information sharing among governments, enterprises, public and intermediary organizations.²⁶⁶ Ensure that enterprises gain a competitive advantage and reduce the adverse effects of business activities on the environment. Besides, the circular economy information disclosure system can also enable other institutions to learn some good practices in environmental protection and obtain information on recyclable resources, and allow policymakers to make accurate and operation decisions.²⁶⁷

6.3.1 Information Disclosure System in German CEA

The information disclosure system in German CEA is comprehensive, and the specific regulations are as follows:

Section 32 subsection (1) stipulates that “preparation or modification of waste management plans, and information regarding the participation procedure, shall be announced in an official gazette and by other suitable means.”²⁶⁸

Section 32 subsection (3) stipulates that “the competent authority shall announce the acceptance of a plan in an official gazette and on a publicly-accessible website; in doing so, a summary report shall be provided describing the course of the public participation procedure and explaining the reasons and considerations on which the decision taken is based. Once accepted, the plan shall be posted for public inspection; the public announcement in accordance with the first sentence shall call attention thereto.”²⁶⁹

Moreover, “the Länder shall inform the public of the state of waste management planning. In compliance with the existing provisions on confidentiality, the information shall contain a summary description and evaluation of the waste management plan, a comparison to the previous one, and a prognosis for the following information period”²⁷⁰ under section 32, subsection (5).

²⁶⁶ Yi 2008, p.26.

²⁶⁷ Ibid.

²⁶⁸ Germany’s Circular Economy Act 2012, p.30.

²⁶⁹ Ibid.

²⁷⁰ Ibid, p.31.

6.3.2 Information Disclosure System in Chinese CEPL

The content of the information disclosure system in CEPL is not much, it mentioned in article 17: “the state shall set up a circular economy statistical system, strengthen the statistical management of resource consumption, comprehensive utilization, and waste production, and publish the major statistical indicators to the public regularly”;²⁷¹ article 36 stipulates that “the state upholds producers and operators to set up an industrial waste information exchange system for enterprises to better exchange information about industrial wastes”;²⁷² and “support waste recycling enterprises and other organizations in the collection, storage, transport and information exchange of wastes”²⁷³ according to article 37.

6.3.3 Comparison Results

German CEA has formulated a comprehensive information disclosure system and made specific regulations on this system. At the same time, the German CEA stipulates that all states must report to the public the status of waste avoidance and waste utilization, and the state's government must ensure the safe removal of waste. The content of China's information disclosure is limited to resource consumption, utilization, waste generation, and circular economy development planning.

Both countries stipulate that the government is obliged to publish information related to the development of the circular economy to the public. However, the Chinese CEPL has limited provisions on information disclosure.

6.3.4 Challenges and Possibilities for UPM

Because the Chinese CEPL has limited regulations on the government’s information disclosure system, so UPM cannot fully grasp the latest policy information on China's circular economy, and cannot collect useful reference and guidance information for their business activities. Therefore, it is not conducive for UPM to adjust their innovation activities on time, and a challenge to creating new business opportunists for UPM.

²⁷¹ China's Circular Economy Promotion Law 2018, p.6.

²⁷² Ibid, p.12.

²⁷³ Ibid.

Germany has developed a relatively complete circular economy information disclosure system. Information published by the government provides reference and guidance for UPM to develop a circular economy and accelerates innovative activities in a circular economy. At the same time, the system guarantees the public's right to know and supervise circular economy development information, which is conducive to the smooth implementation of the circular economy legal system. So, the German information disclosure system is the possibility of creating new business opportunists for UPM.

6.4 Extended Producer Responsibility System

Extended Producer Responsibility (EPR) means manufacturers and importers of products should bear significant responsibility for the environmental impacts of products throughout the product life cycle, including the upstream influence inherent in the choice of product materials and the influence of the manufacturer. The production process itself and the downstream effects of product use and disposal. Producers take responsibility when designing products to minimize the impact of the life cycle on the environment, and when taking legal, physical, or socio-economic responsibility for environmental impacts that cannot be eliminated by design.²⁷⁴

In the traditional legal field, the producer of the product is only responsible for the quality of the product itself. The extended producer responsibility system is to extend the producer's pure product quality responsibility to the recycling, utilization, and disposal links after the merchandise are discarded and put forward higher requirements for product design and raw material selection.²⁷⁵ Achieve the goal of EPR, and the following conditions need to be met: product design that is both cost-effective and high-quality recycling; the development of a second-hand market for selling and recycling products; establishment of recycling system; all decision-makers have access to sufficient information.²⁷⁶

²⁷⁴ Fact Sheet: Extended Producer Responsibility (1994-2006). Available at: <https://www.oecd.org/env/waste/factsheetextendedproducerresponsibility.htm#:~:text=Extended%20Producer%20Responsibility%20is%20a,materials%20for%20the%20products%2C%20impacts>

²⁷⁵ Song 2008, pp.14-16.

²⁷⁶ Xu 2008, p.36.

6.4.1 EPR System in German CEA

Germany has set up an individual chapter (Part 3) in CEA to establish an extended producer responsibility system. According to section 23 subsection (1) of the German CEA, German producers have a broad meaning, “parties who develop, manufacture, process, treat or sell products shall bear product responsibility concerning the achievement of the objectives of the circular economy.”²⁷⁷ “The products must be so designed, if at all possible, that waste generation within their production and use is reduced, and that environmentally compatible recovery and disposal of the waste resulting from their use is ensured”²⁷⁸ by section 23, subsection (1). “Manufacturers or distributors may sell or put into circulation certain products only after providing a possibility for return”²⁷⁹ under section 25 subsection (1) number 1. “Manufacturers or distributors shall accept certain products when returned and shall provide for return by suitable measures, especially through establishing or participating in systems for accepting returned goods, or by levying a deposit”²⁸⁰ under section 25 subsection (1) number 2. Section 25 subsection (2) number 1 stipulate that “which party is responsible for paying the costs for acceptance, recovery, and disposal of products that must be accepted when returned.”²⁸¹ Section 26 subsection provides that “manufacturers and distributors who voluntarily accept returned products, as well as waste remaining from products following product use.”²⁸²

In terms of improving the producer responsibility extension system, section 59 subsection (1) of CEA provisions, appoint one or more waste management officer within the company.²⁸³ Section 60 subsection (1) and (2) stipulates that the rights and obligations of waste management officer mainly include: “advise the operator, and the company’s personnel on matters regard to waste prevention and waste management,”²⁸⁴ and “submit an annual written report to the operator concerning the measures taken and planned.”²⁸⁵

²⁷⁷ Germany’s Circular Economy Act 2012, p.23.

²⁷⁸ Ibid.

²⁷⁹ Ibid, p.24.

²⁸⁰ Ibid.

²⁸¹ Ibid, p.25.

²⁸² Ibid.

²⁸³ Ibid, p.51.

²⁸⁴ Ibid.

²⁸⁵ Ibid, p.52.

6.4.2 EPR system in Chinese CEPL

In China's CEPL, the extended producer responsibility extended to the recycling, utilization, and disposal links after the product is discarded and put forward higher requirements for product design and raw material selection. The specific regulations are as follows:

According to article 15 of the CEPL: “enterprises producing products or packages listed in the catalogue of articles subject to compulsory recycle must be responsible for recycling deserted products or packages. For those usable, the producers thereof shall be responsible for using them, while for those products which are inappropriate for reutilization due to the absence of technical or economic conditions, the producers shall make them harmless.”²⁸⁶ Moreover, “for the deserted products or packages as prescribed in the preceding paragraph, if the producers thereof entrust the distributors or other organizations to recycle or entrust waste using or disposing of enterprises to use or dispose of them, the entrusted parties shall recycle, use or dispose of them in accordance with the relevant laws, administrative regulations or contractual stipulations.”²⁸⁷ Furthermore, “for products or packages listed in the catalogue of articles subject to compulsory recycle, consumers shall deliver the deserted ones to the producers or the distributors or other organizations entrusted by the producers for recycling.”²⁸⁸

Regulations on enterprises product design and packaging design by article 19, “enterprises engaging in the design of products, equipment, products, and packages shall, in accordance with the requirement of reducing the consumption of resources and the generation of wastes, give preference to the materials which are recyclable, dismountable, degradable, innocuous, harmless or slightly harmful or poisonous, and the compulsory requirements in the relevant state standards shall be satisfied.”²⁸⁹

Article 30, article 31, and article 32 of CEPL stipulate that enterprises shall make comprehensive utilization of industrial wastes generated in the production process. In article 30, “enterprises shall make comprehensive utilization of the fly ash, coal slack,

²⁸⁶ China's Circular Economy Promotion Law 2018, p.5.

²⁸⁷ Ibid.

²⁸⁸ Ibid.

²⁸⁹ Ibid, p.7.

tailings, mullock, waste materials, waste gas and other industrial wastes generated in the production process.”²⁹⁰ Article 31 stipulates, “enterprises shall improve the repeated use of water and use advanced technologies for the circulatory use of the wastewater generated in the production process.”²⁹¹ “Enterprises shall use advanced or applicable recovery technologies, techniques, and equipment to make comprehensive utilization of the waste heat and pressure generated in the production process,”²⁹² according to article 32.

6.4.3 Comparison Results

China’s producers meaning are limited to production enterprises. German producers have a broad meaning, “parties who develop, manufacture, process, treat or sell products shall bear product responsibility concerning the achievement of the objectives of the circular economy.”²⁹³

Chinese CEPL stipulates that producers are responsible for recycling deserted products or packages, reuse them, and make them harmless,²⁹⁴ and mentions that consumers shall deliver deserted products and packaging to producers or the distributors entrusted by the producers.²⁹⁵ However, concerning the cost of deserted products or packages recycling, whether the producer bears all the recycling costs, or the producer and the consumer jointly bear the recycling costs, there is not regulated in the current circular economy legislation. According to article 15 of the CEPL, the producers thereof entrust the distributors to carry out recycling and utilization and does not stipulate the distributors’ recycling responsibility. It means that if the production enterprise goes bankrupt, and the producer cannot be held accountable, the distributor does not need to assume extended liability. Therefore, the extended producer responsibility in China is mainly concentrated on the production enterprises, while the role of the distributor and the consumer is minimal. German CEA has detailed regulations on the obligation to accept returns and to return certain goods for manufacturers or distributors under section 25, and manufacturers or distributors who voluntarily accept returned products

²⁹⁰ Ibid, p.11.

²⁹¹ Ibid.

²⁹² Ibid.

²⁹³ Germany’s Circular Economy Act 2012, p.23.

²⁹⁴ China’s Circular Economy Promotion Law 2018, p.5.

²⁹⁵ Ibid.

under section 26.

Both countries stipulate that product design requirement and to make comprehensive utilization of industrial waste generated in the production process. However, China's CEPL gives a specific requirement for enterprises to make full utilization of industrial waste. It is a guiding significance for enterprises to use by-products to develop eco-industries and conduct cleaner production. German CEA provisions that appoint one or more waste management officers within the company regard to waste prevention and waste management. Chinese CEPL does not provide for it.

6.4.4 Challenges and Possibilities for UPM

Only rely on the producers to bear the primary responsibility for the environmental impacts of their products throughout the product lifecycle is not enough. It also needs to rely on the government to guide, continue to promote, and guarantee the circular economy. At the same time, the production and sales are combining to form a reverse logistics system; and rely on consumers to fulfill their green consumption obligations, actively participate in and assist enterprises and governments in recycling activities.²⁹⁶ China's producers meaning are limited to production enterprises. So, the producer's extended responsibility is mainly concentrated on the production enterprise. At the same time, the role of sales enterprises and consumers is minimal. Therefore, only relying on the production enterprise to extend producer responsibility cannot solve all problems. It is a challenge to create new business opportunities for UPM.

“Enterprises producing products or packages listed in the catalogue of articles subject to compulsory recycle must be responsible for recycling deserted products or packages.”²⁹⁷ The catalogue and management measures were formulated and completed by the National Development and Reform Commission in 2018, but so far, the catalogue has not announced.²⁹⁸ Missing the catalogue has led to the lack of legal support and the basis for the mandatory recycling of products and packaging in specific practices, resulting in companies unable to know whether their products or packaging should be mandatory recycling. It is another challenge of creating new business

²⁹⁶ Xu 2008, pp.36-41.

²⁹⁷ China's Circular Economy Promotion Law 2018, Article 15, p.5.

²⁹⁸ Notice of the General Office of the State Council on Issuing the Implementation Plan of the Extended Producer Responsibility System 2016. Available at: http://www.gov.cn/gongbao/content/2017/content_5163453.htm

opportunities for UPM.

In Germany, strictly implement extended producer responsibility. The recycling, utilization, and disposal of waste products entirely undertaken by the producers and sellers of the products and the resulting costs converted into product prices. Therefore, for products that are difficult to effectively use after the product discarded and the cost of harmless disposal is high, they will be expelled from the market based on economic principles.²⁹⁹ The institutional arrangements of the German CEA have a great inducement for producers to implement environmentally friendly designs, suppress waste generation, and replace toxic and hazardous materials.³⁰⁰ It will promote manufacturers are moving toward reduced material-use per unit of output, reduced energy use in making and delivering each product, and improved environmental performance, as well as promote renewable and recyclable products to replace fossil-based materials. So, it is the possibility of creating new business opportunities for UPM.

6.5 Public Participation System

Public participation means that the public has the right to participate in all activities related to a circular economy through specific procedures or channels in the process of construction and realization of the circular economy so that it conforms to the vital interests of the public and is ultimately committed to sustainable development.³⁰¹

6.5.1 Public Participation System in German CEA

The German CEA attaches great importance to public participation in matters related to the development of a circular economy. The government will invite the public to participate and consultations with relevant parties when they formulate laws and regulations. Section 32 subsection (1) of the CEA provided that “the competent authority shall permit the public to waste management plans, including special chapters, or separate sub-plans, especially referring to the treatment of hazardous waste, used

²⁹⁹ Ohashi 1999, pp.27-65.

³⁰⁰ Qu 2017, pp.29-37.

³⁰¹ Li 2008, pp.83-86.

batteries and accumulators or packaging and packing waste.”³⁰² Section 33 subsection (5) of the CEA provided that “when drawing up or altering waste prevention programmes, the public shall be involved by the competent authority under section 32 subsections (1) to (4).”³⁰³

Moreover, section 68 of the CEA provided that “where the authorizations to issue statutory ordinances and general administrative provisions prescribe the consultation of the parties concerned, a selected group of representatives from the science sector, from the parties affected, from involved sectors of industry, from the highest *Land* authorities responsible for waste management, and the communities and associations of local government, shall be consulted.”³⁰⁴

6.5.2 Public Participation System in Chinese CEPL

Promoting the development of a circular economy requires the active participation and support of every citizen. Articles 10 and 11 of the CEPL set out principles for the public participation system.

Article 10 of the CEPL provided that “citizens shall enhance their awareness of resources conservation and protecting the environment, reasonably consume resources, and save resources.”³⁰⁵ Moreover, “citizens have the right to report acts of wasting resources and damaging the environment, and have the right to access to government information about the development of circular economy and propose their opinions and suggestions.”³⁰⁶

Article 11 of the CEPL provided that “the state encourages industrial associations to play the roles of technical guidance and service in the development of the circular economy.”³⁰⁷ Moreover, “the state encourages agencies, societies and other social organizations to engage in the publicity, technical promotion, and consultancy service of the circular economy to promote the development of the circular economy.”³⁰⁸

³⁰² Germany’s Circular Economy Act 2012, p.30.

³⁰³ Ibid, p.31.

³⁰⁴ Ibid, p.55.

³⁰⁵ China’s Circular Economy Promotion Law 2018, p.4.

³⁰⁶ Ibid.

³⁰⁷ Ibid.

³⁰⁸ Ibid.

6.5.3 Comparison Results

Although China's CEPL has designed a public participation system, it is not a definition of the scope of public participation and civic participation procedures.³⁰⁹ China's CEPL provided that the public have a right to access to government information about the development of circular economy and propose their opinions and suggestions,³¹⁰ but no regulation on how the public can participate in establishing the content and channels of a circular economy system. However, the competent German authority will invite the public to attend and consultations with relevant parties when formulating laws and regulations, and the competent authority should allow the public to develop waste management plans.³¹¹

Chinese citizens have the right to report acts of wasting resources and damaging the environment.³¹² However, the law does not explain how to report and which department to report. Even no regulation on how to protect the personal safety and property safety of the reporter.³¹³ Moreover, the CEPL provided that "the state encourages industrial associations to play the roles of technical guidance and service in the development of the circular economy."³¹⁴ However, there are no specific regulations on how NGOs can play a supervisory and management role in promoting the development of a circular economy.

Germany has formulated detailed supervision procedures on the system of public participation. The German CEA provides that the competent authority shall permit the public to participate in the preparation or modification of waste management plans under,³¹⁵ and the drafts of the new or modified waste management plan shall be posted for inspection for one month.³¹⁶ The competent authority shall announce the acceptance of a project in an official gazette and on a publicly accessible website. Once accepted, the plan shall be posted for public inspection.³¹⁷

³⁰⁹ Yi 2008, p.30.

³¹⁰ China's Circular Economy Promotion Law 2018, Article 10, p.4.

³¹¹ German Circular Economy Act 2012, Section 32, p. 30.

³¹² China's Circular Economy Promotion Law 2018, Article 10, p.4.

³¹³ Yi 2008, p. 31.

³¹⁴ China's Circular Economy Promotion Law 2018, Article 11, p.4.

³¹⁵ German Circular Economy Act 2012, Section 32, p.30

³¹⁶ Ibid.

³¹⁷ Ibid.

6.5.4 Challenges and Possibilities for UPM

Public participation is dividing into direct participation and indirect participation. The main ways of direct participation are:³¹⁸ firstly, the public can classify and discharge domestic garbage in daily life, consciously maintain the sanitation of the public environment, and reduce the number of disposable products. Secondly, report the pollution behavior and environmental damage behavior of surrounding enterprises, and promote the adequate supervision of the government department. Thirdly, for personal benefit, make recommendations that are conducive to environmental protection, so that the government can fully understand the information of the people and make correct decisions. The way of indirect participation means that citizens develop good consumption habits, and guide enterprises and producers to green production through green consumption concepts, save resources, reduce pollution, increase the green content of products, and enable products to be widely circulating in the market.³¹⁹

China's CEPL stipulates that citizens should increase their awareness of resource conservation and environmental protection, have the right to report acts of waste of resources and environmental damage, and have the right to access the government's development of circular economy and make comments and suggestions.³²⁰ However, the CEPL does not support regulation on how the public can participate in establishing the content and channels of a circular economy system. At the same time, the CEPL also does not provide for the relief channels of public participation system. It means that when citizens report acts of wasting resources and damaging the environment, their safety and property safety is not guaranteed. The direct consequence will cause the government and enterprises to ignore public ideas and requirements if they lack the relief channels. Besides, the public participation system of the CEPL lacks incentive mechanisms, and it will make the public lose their motivation for participating in the circular economy. So, if the public participation system of the CEPL cannot be a further improvement, it will be a challenge to create new business opportunities for UPM.

In the process of policy formulation, Germany invites environmental protection professionals, economical professionals, and ordinary people to participate in the

³¹⁸ Pang 2012, p.34.

³¹⁹ Ibid.

³²⁰ China's Circular Economy Promotion Law 2018, Article 10, p.4.

decision-making of circular economy policies by holding expert demonstration meetings and other forms. The government listened to the opinions of all parties and finally concluded the best decision-making plan.³²¹ It will help deepen the public's sense of identity with public policies, enhance the legitimacy of public policies, and thus facilitate the effective implementation of policies.³²² Therefore, the German public participation system is the possibility of creating new business opportunities for UPM.

³²¹ Zhong 2011, pp.785-788.

³²² Li 2008, pp.83-86.

7 CONCLUSIONS

This research has reviewed not only the historical evolution of the circular economy but also the historical development of the circular economy legal system in China and Germany. Because of the differences in ideology, legal culture, and political system between China and Germany, the two countries have respectively formulated basic circular economy laws suitable for their development.

The German circular economy legal system takes waste management as the starting point, then develops from source reduction to end disposal, covering the entire cycle of materials in the economic system. The German CEA includes specific regulations on the prevention, disposal, and utilization of waste. However, China's circular economy legislation basis on the comprehensive utilization of resources, it does not involve specific regulations on the management of waste. China's CEPL does not include the management of waste in the law. For the management of waste regulations, refer to another law, which is the Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes.

The German circular economy legislation stipulates that the environmental department is the competent authority of the circular economy. However, there are multiple relevant responsible departments in China's legislation. Among them, the NDRC is the primary authority, and there are some other related authorities, including the Ministry of Commerce, the Ministry of Environmental Protection, and the Environmental Health Department.

Germany has high industrialization, and its production technology and process equipment are advanced. The core logic of the development of the circular economy is to turn waste into resources. The German circular economy legislation emphasizes the prevention and recovery of waste. The purpose of the legislation is to conserve natural resources and to ensure the protection of human health and the environment in the generation and management of waste. However, China is in a stage of rapid industrialization, with high energy consumption, a severe waste of resources, and low utilization of renewable resources. China's circular economy legislative principles emphasize reducing the consumption of resources and the production of wastes. The

purpose of the legislation is to focus on improving resource utilization efficiency, protecting the environment, and realizing sustainable development.

The research also compares the underlying legal systems of circular economy in Germany and China based on the German CEA and Chinese CEPL in the aspect of the responsibility sharing system, the planning system, the information disclosure system, the extended producer responsibility system, and the public participation system. The comparison results present that the legal systems of German CEA are more systematization, which has a good guiding role for producers to implement the environmentally friendly design, prevent waste generation, use renewable resources, dispose of waste, and replace toxic and hazardous raw materials. However, the legal systems of China's CEPL are too broad and general. In many aspects, the law only regulates in principle and lack operability. The responsibility sharing system has less stipulate for public responsibility, the planning system is not comprehensive for guide enterprise, the information disclosure system has limited regulations on the government's information disclosure, the subject of legal responsibility is not clear in the extended producer responsibility system, and the public participation system still lacks incentive mechanisms. All these problems are the challenges of creating new business opportunities for UPM in China.

Some aspects which could not be discussed and are open for further research and debate include:

This research mainly conducts a comparative study on the single law of the circular economy law in Germany and China. China's CEPL is not covering the specific regulations on the management of waste. For waste management regulations, refer to another law, which is the Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes. Therefore, the comparison results have limitations in this research. For further research, if the Law on the Prevention and Control of Environment Pollution Caused by Solid Wastes adds to the comparison, the results will be more objective and comprehensive when finding out the challenges and possibilities of creating new circular business opportunities for UPM.

The development of the circular economy in Germany is market-oriented, for products that are difficult to effectively use after the product discarded and the cost of harmless

disposal is high, they will expel from the market based on economic principles. However, The Chinese government is a dominant position in the development of a circular economy, in which a circular economy legal system is giving the government more legal authority. The government's vigorous promotion of circular economy through legal tools, it will inevitably weaken the market-oriented development of the circular economy. So, the operating mode of China's circular economy has been under government intervention, not under market orientation. How to improve China's CEPL legal system, develop a circular economy through market-oriented, and avoid forcing development by legal tools with state administrative power, which requires in-depth research in the future.

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