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Discussion on Macao (China) Water and Solid Waste Pollution Prevention Law and its Impact on Circular Economy Development

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Abstract: *The development of circular economy is inseparable from the establishment of legal system. The Macao (China) SAR Government has achieved certain results in a series of environmental legislation and administrative regulations, including the Water Pollution Prevention and Control Law and the Solid Waste Pollution Prevention and Control Law, and continues to formulate policies to promote the recovery and recycling of resources. A comprehensive evaluation model for the development of Macao's circular economy is constructed, to objectively analyze the development status of Macao's circular economy, clarifies the development direction of the circular economy in Macao, and proposes countermeasures and suggestions for Macao to formulate a circular economy development strategy and establish a legal system for the circular economy. It is recommended that Macao SAR Government considers to build a legal system from various dimensions, such as the planning system of the circular economy, the evaluation and assessment system for circular economy, the market access system of the circular economy, the environmental safety management system of the circular economy and the incentive system of the circular economy, to form a legal system of the circular economy with Macao characteristics.*

Keywords: *Macao Water Pollution Prevention and Control Law, Macao Solid Waste Pollution Prevention and Control Law, circular economy legislation, comprehensive assessment*

1. Introduction

Circular economy is an economic development model that integrates conservation of resources and recycling into a harmonious relationship with the natural environment. Some foreign developed countries such as the United States, Japan and Germany have been practicing this for many years. These countries ensure the good development of the circular economy and form a circular economy and society by formulating systematic laws and regulations on the circular economy. Therefore, legislation on the circular economy has become a global trend in legislation in advanced countries around the world.

As a Special Administrative Region of China, Macao (China) has significant internationalization characteristics. In recent years, with the rapid development of social economy, the Macao Special Administrative Region (SAR) Government has actively promoted environmental protection works in the field of sewage and solid waste recycling, and formulated relevant environmental pollution prevention and control regulations, in order to promote the implementation and development of Macao's recycling economy system, so as to maximize the use of resources in order to maximize the benefits of the economy, society and the environment. However, from the current actual situation, Macao is still in the initial stage of developing the legislation on circular economy, and the environmental protection legal system related to resource recycling and energy saving is still not perfect and sound. Therefore, it is of great significance to explore the issue of Macao's current legislation on environmental pollution prevention and control regulations and the comprehensive evaluation of Macao's model of circular economy development, which provides important insights and reference value not only for Macao itself, but also for the development of circular economy and the legislation of circular economy in other urban areas in China.

This research method constructs a comprehensive evaluation model (statistical analysis method) for the development of Macao's circular economy, so as to explore the impact of Macao's legislative work on the water and solid waste prevention and control to the development of circular economy. To analyze and summarize the development trend of Macao's circular economy, and make suggestions on the

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establishment of a legal system for Macao's circular economy.

2. Literature Review

2.1. Definition and Concept of Circular Economy

Circular economy is an economic system that follows ecological and economic laws. It is also called a material closed-loop flow economy. In this regenerative system, resources can be redistributed or utilized with restorative or regenerative. The system focuses on the efficient utilization and recycling of resources as the core, to meet the needs of continuous economic development while reducing damage to the environment.

Through this green economic development model, the circular economy is harmonized with the ecological and environmental systems to achieve a sustainable green economic development model and a sustainable socio-economic system.

2.2. Literatures Review on the Legal System of Circular Economy

Japan promulgated six important circular economy regulations around 2000, which constitute the legal system of Japan's circular society. These regulations include the "Circular Economy Promotion Law", the "Resource Recycling Utilization Law", etc., which aim to achieve the goals of efficient use of resources and reducing environmental pollution by regulating and promoting the development of the circular economy.[1]

China's current laws related to the development of circular economy mainly include the "Cleaner Production Promotion Law", the "Law on the Prevention and Control of Environmental Pollution by Solid Wastes" and the "Energy Conservation Law", etc. These laws have played a certain role in practicing the development of circular economy, but there are still some institutional gaps. For example, there are no legal provisions on tax preferential policies, special funds for circular economy, loan interest subsidies, government green procurement and other measures necessary to ensure the development of circular economy, making the work of developing circular economy without legal protection.[2]

The formulation of a law on the circular economy and the promotion of its development is an inevitable choice for the implementation of a sustainable development strategy. According to China's resource utilization, it is necessary to clearly define the objectives that need to be adjusted in the formulation of a circular economy law, and the focus should be on areas such as production, construction, circulation and consumption. Therefore, when designing the management system of the circular economy law, it should follow the principle guidance of the general principles, and determine its structure based on the key links in the operation of the circular economy practice, such as production, construction, circulation, consumption and reuse.[3]

The circular economy law should be based on the Basic Law on Circular Economy, which consists of comprehensive laws, special laws and local regulations. The Basic Law on Circular Economy will set out the basic principles and objectives of the circular economy, clarify the responsibilities and duties of the government, as well as the obligations and rights of enterprises and individuals in the circular economy. Comprehensive laws will involve various fields related to circular economy, special laws will regulate specific fields of circular economy, and local laws and regulations will be formulated according to the actual local conditions to adapt to the development needs of the circular economy in different regions.[4]

In the process of promoting legislation on circular economy, the government's incentive system plays a key role. By formulating relevant policies and regulations, the government can provide certain economic, tax, financial and other support and preferences to enterprises and individuals who practice circular economy by formulating relevant policies and regulations. For example, tax exemptions, subsidy incentives, loan concessions and other measures are provided to encourage enterprises and individuals to participate in circular economy activities.[5]

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3. Prevention and Control of Water Pollution and Solid Waste Pollution Law in Macao

3.1. History of Legislation on Prevention and Control of Water Pollution in Macao

The environmental legal system of Macao (China) still follows some environmental decrees from the Macao- Portuguese Government period. Macao's laws and regulations on water pollution prevention, environmental protection and administration can be broadly categorized into three phases since the mid-1970s.

In the first stage, from 1970 to 1990, the Governor of Macao implemented measures related to the prevention of air and noise pollution in his policy, including encouraging industrial enterprises to install pollution prevention equipment by issuing subsidies (Article 11, paragraph 2, item c of Decree No 49/85/M of 15 June 1985, "Establishes General Principles of the Participation of the Administrative Authorities in the Industrial Sector and its Relations with Economic Practitioners in Industrial Activities"), but there was no systematic legislation for the prevention and control of water pollution and other environmental pollution.

In the second stage, from 1991 to 1999, the Macao-Portuguese Government promulgated Law No 2/91/M, the "Basic Law of the Environment" of March 11 1991, which stipulates that wastewater generated by factories and institutions must be treated, and prohibits the introduction of wastewater into the air, water body or soil by dumping, placing or any other means. This law was the first programmatic legislation on environmental protection in Macao, and has been used since the establishment of the Macao SAR as Macao's current environmental protection law. Subsequently, Article 268 of the "Criminal Code", approved by Decree No 8/95/M on 14 November 1995, stipulates the criminal penalties for the violation of pollution of water, soil and air. Decree No 35/97/M of 25 August 1997, the "Regulates the Prohibition of Launching or Dumping Harmful Substances in Areas of Maritime jurisdiction" stipulates regulations to prevent pollution of the public waters and the surrounding waters of the Macao region. Decree No 11/99/M of 22 March 1999, the "Legal Regime for Industrial Licensing" regulates industrial activities. The decree stipulates that when a factory applies for a license, the administrative authority shall establish rules that the factory must comply with regarding the treatment of wastewater and solid waste and its final disposal site. Penalties for non-compliance include warnings, suspension of the foreign trade operator's card related to the site, suspension of subsidies or other financial incentives, and revocation of the license.[6]

In the third stage, since Macao was returned to China on 20 December 1999, Macao has introduced a number of international treaties, protocols and conventions applicable to Macao. Administrative Law No 28/2004 of 16 August 2004, established the "Approves the General Regulations for Public Spaces", which prohibits the discharge of wastewater or any polluting liquids into public places or t allowing them to flow into such places, and imposes fines on the perpetrators of the aforementioned administrative violations. In addition, Law No 7/2018 of 23 July 2018, the "Basic Law for the Management of Maritime Areas", formulates environmental protection measures for the marine environment of the Macao SAR and prepares emergency response and prevention plans for major marine pollution incidents.

3.2. History of Legislation on Prevention and Control of Solid Waste Pollution in Macao

After reviewing Macao's (China) laws, regulations and administrative measures related to solid waste pollution prevention and environmental protection, it can be roughly divided into three stages.

In the first stage, the Macao-Portuguese Government promulgated Law No 2/91/M, the "Basic Law of the Environment" of March 11 1991. Article 19 stipulates that solid residues can be reused as a source of raw materials and energy, and adopts preventive technologies target the recycling and reuse of products as raw materials, as well as the use of tax and fiscal instruments to encourage the recycling and use of residues.

In the second stage, in 2004, in order to strengthen the management of solid waste, the provisions of the "Solid Waste and Cleaning Policy of the City of Macao", which had previously been in force since 1987 was abolished by the "Approves the General Regulations for Public Spaces" promulgated by Administrative Regulation No 28/2004 of 16 August 2004. The "Approves the General Regulations for Public Spaces" made specific provisions on the management of solid matter in the Macao SAR, including the methods of waste collection and disposal, solid waste classification, recycling and garbage monitoring.

In the third stage, to strengthen the regulation of non-biodegradable materials and waste reduction

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measures at source, the Macao SAR Government promulgated Law No 16/2019 of 19 August 2019, the "Restriction on the Provision of Plastic Bags", which stipulates that in retail activities, retailers must charge customers a corresponding amount for each plastic bag provided, and fines shall be imposed on retailers for the above administrative violations. In addition, the Macao SAR Government promulgated Administrative Regulation No 22/2020 of July 20 2020, the "Construction Waste Management System", which regulates the use of construction waste landfill and the charging system, and strengthens the monitoring and penalization mechanism against illegal dumping of construction waste, and encourages waste producers to reduce the generation of construction waste from the source through economic means. Meanwhile, in order to prohibit the entry of non-biodegradable plastic products into Macao, the Macao SAR Government has sequentially launched plastic reduction measures and promulgated a series of laws and regulations, such as through the Chief Executive's Order No 222/2020 "Prohibition of the Import and Transshipment of Disposable Styrofoam Tableware into the Macao SAR", the Chief Executive's Order No 122/2021 "Prohibition of the Import and Transshipment of Disposable Tableware Straws and Disposable Beverage Stirrers Made of Non-degradable Plastic into the Macao SAR", etc.

4. Evaluation and Analysis of the Current Development of Macao's Circular Economy

4.1. Comprehensive Evaluation Methodology and Model for Macao's Circular Economy Development

In order to investigate the development of circular economy in Macao (China), to evaluate the impact of the implementation of environmental protection laws on water pollution and solid waste pollution prevention on the development of circular economy, and to provide a scientific basis for the relevant governmental departments in terms of legislation and decision-making on the circular economy. This study constructs a comprehensive evaluation index to conduct a comprehensive and systematic evaluation of the development level and trend of circular economy in Macao.

(1) Establishment of Comprehensive Evaluation Index System for Circular Economy Development

The comprehensive evaluation index system for circular economy development includes three levels: overall objective layer, system control layer and basic indicator layer.[7] According to the connotation of circular economy, the principle of resource recycling and reduction of environmental damage, the development of circular economy should give priority to the objectives of waste reduction at source, classified recycling, harmless treatment of wastewater and solid wastes, and saving resource consumption. Therefore, a control layer with four subsystems is adopted in this paper, including "reduction of resource consumption", "harmless treatment of pollutants", "reuse of resources" and "economic and social development". These subsystems are further subdivided into 9 basic indicator groups to fully assess the impact of the Macao (China) SAR Government's environmental protection and regulatory work in the areas of water pollution prevention and control, solid waste pollution prevention and control and resource reuse on the development of circular economy. The main indicators of the comprehensive evaluation index system for the development of circular economy in Macao are shown in Table 1.

Table 1: Framework of comprehensive evaluation index system for circular economy development in Macao

Objective Layer (A)	Control Layer (B)	Indicator Layer (C)	Unit	Indicator property
Comprehensive Evaluation Index of Circular Economy Development	Reduction of resource consumption (B1)	Electricity consumption per 10K yuan of GDP (C1)	kWh/10K yuan	Negative
		Water consumption per 10K yuan of GDP (C2)	m^3/10K yuan	Negative
	Harmless treatment of pollutants (B2)	Quantity of wastewater treatment per 10K yuan of GDP (C3)	m^3/10K yuan	Positive
		Quantity of solid waste disposal per 10K yuan of GDP (C4)	Ton/10K yuan	Positive
		Quantity of construction waste disposal per 10K yuan of GDP (C5)	m^3/10K yuan	Positive
	Reuse of resources (B3)	Quantity of waste resource recovery (C6)	Ton	Positive
	Economic and social development (B4)	GDP per capita (C7)	10K yuan / person	Positive
		Urban public green space per capita (C8)	m^2/person	Positive
		Proportion of tertiary industry in GDP (C9)	%	Positive

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(2) Standardization of indicator values

Since the data of each indicator layer in Table 1 have different dimensions, range and trends, it is necessary to normalize and homogenize the data of the indicator layer. In this paper, the raw data of the indicator layer are dimensionless using the range method, with the aim of normalizing the actual values of all indicators to a unit interval [0, 1].[8] The formulas for the dimensionless processing of the raw data of the indicator layer are formulas (1) and (2), respectively:

Positive indicator normalization formula:

$$y_i = \frac{x_i - minx_i}{maxx_i - minx_i} \tag{1}$$

Negative indicator normalization formula:

$$y_i = \frac{maxx_i - x_i}{maxx_i - minx_i} \tag{2}$$

Where y_i is the standardized indicator value, x_i is the raw data for each indicator, $maxx_i$ and $minx_i$ are the maximum and minimum values in the selected data column, respectively.

(3) Combined weighting method to determining indicator weight coefficient

In the comprehensive evaluation of Macao's circular economy system, nine basic indicators are set under the control layer of the four subsystems in the comprehensive evaluation index system of Macao's circular economy development. Since the degree of contribution and influence effect of each basic indicator to the comprehensive evaluation index of Macao's circular economy development are different, therefore, determining the weights of each indicator can measure their contribution to the objective when comprehensively evaluating the development of the circular economy, and the rationality of these indicator weights directly affects the scientificity and accuracy of the evaluation results.

Weighting methods include subjective weighting and objective weighting method. A large number of literature on circular economy evaluation adopts Analytic Hierarchy Process (AHP) as the subjective weighting method. However, this method cannot guarantee the consistency between subjective scores and objective quantification, thus affecting the accuracy and applicability of indicator weights. To take into account the advantages of both subjective and objective weighting methods, this study adopts a combined weighting method that combines subjective and objective methods to weight the evaluation indicators, combining the AHP method in the subjective weighting method with the entropy method in the objective weighting method.[9] This method can not only comprehensively consider various factors, but also avoids the bias that may be caused by using subjective or objective methods alone, and improves the accuracy and reliability of the weights of each indicator in the model. In this paper, the formula (3) for determining the weight coefficients in the combined weighting method using the multiplication synthesis method is as follows:

$$w_j = \frac{p_j \times q_j}{\sum_{j=1}^{n} p_j \times q_j} \tag{3}$$

Where w_j is the weight coefficient determined by the combined weighting method, p_j is the weight coefficient determined by the subjective weighting method and q_j is the weight coefficient determined by the objective weighting method.

4.2. Macao's Circular Economy Development Indicator System and Indicator Data

Based on the data of the Report on the State of the Environment of Macao (China) published by the Macao Environmental Protection Bureau of Macao (2018 to 2023) and the relevant information on the website of the Macao Statistics and Census Service, a database of comprehensive evaluation indicator for the development of Macao's recycling economy was established. The raw data is shown in Table 2.

The data in Table 2 reflect the vertical development of Macao's circular economy. The overall trend of Macao's circular economy development during the period from 2018 to 2023 is favorable, with more significant achievements in the harmless treatment of pollutants and resource recycling. The centralized harmless treatment of domestic wastewater and domestic waste has improved the coastal water environment situation, environmental hygiene and pollution problems. The entry into force of the administrative regulation on the Construction Waste Management System has strengthened the penalty mechanism for illegal disposal of construction waste, and encouraged waste producers to reduce the generation of construction waste at source through economic means. The recycling quantity of three-

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color resources (paper, plastic and metal), food waste, waste batteries, and electronic and electrical equipment has continued to increase, reflecting that the Macao Environmental Protection Bureau has achieved a certain success in promoting solid waste resource management and waste reduction at source. On the other hand, Macao's water consumption per 10,000 yuan of GDP and electricity consumption per 10,000 yuan of GDP are still relatively high, the Environmental Protection Bureau still needs to continue to strengthen publicity and education in terms of resource consumption reduction to raise people's awareness of energy conservation and environmental protection.

Table 2: Raw data of comprehensive evaluation indicator for circular economy development in Macao (2018-2023)

Control Layer (B)	Indicator Layer (C)	Unit	Year					
			2018	2019	2020	2021	2022	2023
Reduction of resource consumption (B1)	Electricity consumption per 10K yuan of GDP (C1)	kWh/ 10K yuan	119.618	127.653	264.284	224.826	269.520	163.162
	Water consumption per 10K yuan of GDP (C2)	m^3/ 10K yuan	2.26	2.32	4.54	3.82	4.63	2.76
Harmless treatment of pollutants (B2)	Quantity of wastewater treatment per 10K yuan of GDP (C3)	m^3/ 10K yuan	1.833	1.875	3.725	3.059	4.172	2.380
	Quantity of solid waste disposal per 10K yuan of GDP (C4)	Ton/ 10K yuan	0.012	0.013	0.022	0.019	0.023	0.014
	Quantity of construction waste disposal per 10K yuan of GDP (C5)	m^3/ 10K yuan	0.0378	0.0450	0.1080	0.0620	0.0820	0.0286
Reuse of resources (B3)	Quantity of waste resource recovery [a] (C6)	Ton	3597.10	3711.02	3625.20	5443.55	5868.30	9476.60
Economic and social development (B4)	GDP per capita (C7)	10K yuan / person	67.479	66.005	29.716	36.292	29.102	55.950
	Urban public green space per capita (C8)	m^2/ person	10.6	10.5	10.5	11.4	11.6	11.5
	Proportion of tertiary industry in GDP (C9)	%	95.8	95.7	91.3	92.2	90.5	93.2[b]

a. Quantity of waste resource recovery: including recycling of three-color resources (paper, plastic and metal), food waste recycling, waste batteries, and recycling of electronic and electrical equipment. In 2018, the quantity of recycling of electronic and electrical equipment was 39,648 pieces, which was estimated at1kg per piece.
b. Forecast value.

4.3. Weights of comprehensive evaluation indicators for circular economy development in Macao

In this paper, the data of each indicator of the comprehensive evaluation of the development of circular economy in Macao from 2018 to 2023 are processed according to AHP and entropy method, which results in the weights of each subsystem in the control layer and the combined weight of each indicator group in the indicator layer (w_j). The results are shown in Table 3. According to the AHP method, the AHP weight of the subsystem in the control layer are determined as follows: Reuse of resources (37.062%) > Harmless treatment of pollutants (31.851%) > Reduction of resource consumption (17.11%) > Economic and social development (13.977%). The above weight results are tested for consistency, the consistency index C. I. = 0.055 is obtained. By checking the average consistency index R.I. = 0.89, and the consistency ratio C.R.=C.I./R.I.=0.062< 0.01 is calculated, which shows that that the consistency test result of the matrix is acceptable. The AHP method is applied to determine the AHP weight (p_j) of each indicator group in the indicator layer, the above-obtained weight results are tested for consistency. By calculating the consistency index C.I. = 0.125, checking the average consistency index R.I. = 1.46, and the consistency ratio C.R. = C.I. / R.I. = 0.085<0.01, it can be concluded that the

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consistency test result of the matrix is acceptable.[10]

Table 3: Weights of Macao's Comprehensive Evaluation Indicator System for Circular Economy Development

Objective Layer (A)	Control Layer (B)	AHP weight	Indicator Layer (C)	AHP weight p_j	Entropy weight q_j	combination weight w_j
Comprehensive Evaluation Index of Circular Economy Development	Reduction of resource consumption (B1)	0.17110	Electricity consumption per 10K yuan of GDP (C1)	0.0121	0.1001	0.0388
			Water consumption per 10K yuan of GDP (C2)	0.0138	0.0968	0.0428
	Harmless treatment of pollutants (B2)	0.31851	Quantity of wastewater treatment per 10K yuan of GDP (C3)	0.0427	0.1099	0.1504
			Quantity of solid waste disposal per 10K yuan of GDP (C4)	0.0492	0.0996	0.1571
			Quantity of construction waste disposal per 10K yuan of GDP (C5)	0.0367	0.093	0.1094
	Reuse of resources (B3)	0.37062	Quantity of waste resource recovery (C6)	0.0696	0.1688	0.3765
	Economic and social development (B4)	0.13977	GDP per capita (C7)	0.0139	0.1154	0.0514
			Urban public green space per capita (C8)	0.0093	0.1333	0.0397
			Proportion of tertiary industry in GDP (C9)	0.0127	0.0832	0.0339

4.4. Analysis on the comprehensive evaluation results for circular economy development in Macao

Using the combined weight results of the nine indicator groups in the above indicator layer and the constructed comprehensive evaluation system of Macao's (China) circular economy development, the raw data of each indicator group is standardized using formula (1) and formula (2) to calculate the comprehensive evaluation index of Macao's circular economy development from 2018 to 2023. The results are shown in Table 4. The comprehensive evaluation index of Macao's circular economy development has gradually increased every year, with a more significant increase since 2020. In 2023, the comprehensive evaluation index of circular economy development reached its highest value of 0.591, which is an increase of 53.5% compared to 2020. The trend of change of each indicator values in the indicator layer shows that the amount of wastewater treatment, solid waste disposal and recycling of waste resources have continued to increase in recent years, indicating that the Macao SAR Government has made outstanding achievements in the prevention and control of water pollution, the prevention and control of solid waste pollution and the promotion of policies on recycling and reuse of resources in recent years.

Table 4: Comprehensive Evaluation Index of Macao's Circular Economy Development (2018-2023)

Year	2018	2019	2020	2021	2022	2023
Comprehensive Evaluation Index of Circular Economy Development	0.183	0.208	0.385	0.422	0.566	0.591

5. Recommendations for the Setting of the Legal System of Circular Economy in Macao

Based on the circular economy model of waste reduction and resource utilization implemented in Macao (China) in recent years, and the indicator system for evaluating the development level of various aspects of the circular economy using scientific methods. It objectively provides valuable reference and inspiration for legislation on the circular economy of Macao. For the establishment of a circular economy legal system in Macao, it is recommended to consider it from different dimensions, which include planning system of circular economy, evaluation and assessment system for circular economy, market access system of circular economy, environmental safety management system of circular economy and incentive system of circular economy. Through the establishment of these legal systems, the development

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of the circular economy in Macao can be promoted.

5.1. Planning Systems for Circular Economy

Circular economy planning is a kind of national plan, which is formulated by government departments at all levels to promote the comprehensive and long-term development of the circular economy. Based on the circular economy development plan formulated by China, and the economic development and social development plan of Macao (China), the Macao SAR Government and other relevant departments jointly formulate the circular economy plan of Macao, actively promote the implementation of a comprehensive circular economy and to achieve the sustainable development of the green economy.

5.2. Evaluation and Assessment System for Circular Economy

Circular economy law should stipulate evaluation and assessment procedures of the circular economy, the development of a quantitative indicator system and the scope of legal effects. The establishment of a circular economy assessment and assessment system could effectively supervise and manage the development of the circular economy in society and enterprises, in order to monitor whether the relevant entities fulfill their statutory duties or obligations. The relevant administrative authorities of Macao (China) may formulate circular economy indicators applicable to the province, including energy conservation indicators, resource recycling and reuse indicators, waste treatment and emission indicators, and production indicators of key industries, etc., to evaluate and assess the situation of enterprises in the development of the circular economy, and formulate corresponding reward and penalty system. At the same time, they shall proactively disclose information on the results of the evaluation and assessment to the society to accept supervision by all sectors of the society.

5.3. Market Access System for Circular Economy

The Macao (China) SAR Government could issue a circular economy law, which stipulates a market access system for the circular economy, including a restrictive market access system and a market priority access system. Restrictive market access is mainly through the implementation of a high-standard market system and the implementation of a negative list system for market access to restrict the entry of high-pollution, high-energy-consuming, high-resource consumption and other industries, so as to promote the formation of more efficient and standardized market access thresholds and standards. On the other hand, market priority access allows resource-saving and environmentally friendly technologies and recycled products to enter the market with higher priority.

5.4. Environmental Safety Management System for Circular Economy

In promoting the development of circular economy, and to effectively prevent the waste recycling and reuse process from causing pollution to the surrounding environment, the environmental protection authority in Macao (China) needs to formulate measures such as management methods, technical guidelines, technical standards and operating regulations for prevention and control of environmental pollution. These measures could prevent secondary pollution of the environment from waste resources such as hazardous solid waste, dismantling and recycling of waste electric appliances and batteries, etc.

5.5. Incentive System for Circular Economy

The circular economy law will also establish a series of economic incentive policies that are conducive to the development of the circular economy. These policies include special support funds for the circular economy, tax exemptions and reductions, loan concessions for enterprises and investment tilting policies for low-carbon industries such as resource recycling. The finance department of Macao (China) SAR Government will increase its investment in the circular economy, intensify efforts in implementing key circular economy projects, and provide financial support to implement preferential tax policies in energy conservation and emission reduction, resource recycling and recycling.

6. Conclusion

The development of national regional circular economy needs to be guaranteed by appropriate

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policies, laws, regulations and institutions, while the development of local circular economy must also rely on the establishment and implementation of local-level circular economy laws, which are an indispensable and important part of the construction of the national circular economy law system. This paper discusses Macao's (China) existing environmental pollution prevention and control laws and regulations and the indicator system for evaluating the development level of Macao's circular economy in various aspects in scientific methods. The empirical evaluation results show that the development level of Macao's circular economy has been improving year by year. The Macao SAR Government has achieved a certain success in a series of environmental protection legislations and regulatory works in the prevention and control of water pollution and solid waste pollution, and has continued to formulate policies to promote the utilization of wastewater resources, solid waste recovery and recycling, and developed a circular economy model that reduces and recycles waste from the source.. By establishing a comprehensive evaluation model to study the development of circular economy in Macao and verifying it through empirical analysis, it can objectively provide guidance and countermeasure suggestions for Macao to formulate the development strategy and legislation of circular economy. For the construction of Macao's legal system of circular economy, it is suggested to consider from the dimensions of the planning system of circular economy, the evaluation and assessment system for circular economy, the market access system of circular economy, the environmental safety management system of circular economy and the incentive system of circular economy, so as to further promote the development of circular economy and circular economy legislation in Macao.

References

[1] Wang Jinnan, Li Na. (2003) Advancing the Legal System for the Establishment of a Recycling Society in Japan. China Development, 1, 9-13.
[2] Sun Youhai. (2008) Study on Circular Economy Legislation and its Impact on China's Economy and Society. Gansu Social Science, 1, 15-22.
[3] CHEN De-min. (2008) Problems Concerning China's Recycling Economy Legislation. Modern Law Science, 2, 80-87.
[4] TANG Ying-ying, CHEN Xing-yan. (2008) Ecological Civilization and the Legislation of Circular Economy. Contemporary Law Review, 3, 111-114.
[5] ZHOU Hongge. (2010) On a Basic Incentive System of Circular Economy Legislation: Based on Human Nature. Ecological Economy, 5, 68-74.
[6] Huang Mingjian, Tam Pei Man. (2006) Preliminary Study of Macao's Legislation on Water Pollution Prevention and Circular Economy. Journal of Asia (Macao) International Open University, 7,105-111.
[7] CAO Xiao-lin, YAN Yong-gang, JING Xing-rong. (2018) Measurement Indicator System, Evaluation Method and Empirical Research on Regional Recycling Economy: A Case Study of Chongqing. Journal of Chongqing University (Social Science Edition),3, 30-35.
[8] CHEN Ling-feng. (2019) The Further Discussion of the Range Method in the Type A Evaluation of Standard Uncertainty. Acta Metrologica Sinica, 2, 347-352.
[9] CHEN Wei, XIA Jian-hua. (2007) An Optimal Weights Combination Method Considering both Subjective and Objective Weight Information. Mathematics in Practice and Theory, 1, 17-22.
[10] HAN Li, MEI Qiang, LU Yu-mei. (2004) Analysis and Study on AHP-Fuzzy Comprehensive Evaluation. China Safety Science Journal, 7, 86-89.