

# Circular Economy Policies of Some Asian Countries and Recommendations for Vietnam

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## Abstract

*In recent years, facing the challenges of climate change, resource depletion, and environmental degradation, many countries around the world are gradually transitioning from a linear economy to a circular economy. Currently, circular economy is considered the best way to address the tradeoffs between economic growth and adverse environmental impacts. Specifically, the circular economy promotes economic development, while reducing resource extraction and minimizing waste disposal. Therefore, the circular economy is regarded as an inevitable transitional trend, which is already taking place in many countries around the world. In fact, the Circular Economy is implemented by Governments through many different policies, but it is all built on the same philosophy, the philosophy of regeneration and restoration.*

## Research purpose:

*The goal of this study is to understand the policies that have been implemented by China, Japan, and South Korea to develop a circular economy model for Vietnam. Several assessments are made to show the key policies and their achieved results. Based on the three pioneer Asian countries' policies, the author suggests a number of policies for Vietnam to effectively implement this sustainable economic model.*

## Research motivation:

*In Vietnam, climate change, resource depletion and increasing waste are now major challenges. After many years of extraction, natural resources are on the verge of exhaustion, turning Vietnam into a net importer of coal. In addition, industrialization is taking place strongly, creating the huge amount of waste, especially solid waste. These problems have been creating great pressures on Vietnam's economy, calling for the needs to change the development model.*

## Research design, approach and method:

*The previous literature has been systematically investigated and here is the summary of the process of studying Circular Economic research: Formulating the research question; Determining search methods; Identifying keywords; Running the search; Reading all articles'; Analyzing data. Following the development of the research question, electronic databases including Web of Science, Scopus and Google Scholar were identified as data sources. In addition, government databases were also included. Keywords such as "circular economy", "waste disposal", "resource efficiency", and "circular economy policies" were used to find relevant studies. For instance, more than 200,000 thousand published articles (from 2000 to 2021) on Google Scholar were generated by the search entry "circular economy" and "China". Several criteria were then determined in order to collate relevant and current data on CE and waste management in China, Japan and South of Korea. Relevant articles were subsequently downloaded and re-test. We then use a narrative synthesis approach to analyze the data.*

## Main findings:

*Based on the study's findings, the circular economy model is developed in four stages: Design, production, consumption, and waste management. The policies adopted by the countries aiming to achieve sustainable development have both similarities and differences. The common implementation approach for circular economy is the top-down approach and the method is similar across the three pioneering countries. Enabling policies and regulations as well as collaboration and support from all stakeholders (government, entrepreneurs, and consumers) are essential for the successful implementation of the circular economy. This study serves as a guide for Vietnam to implement the circular economy in various economic sectors.*

## Practical/managerial implications:

*For Vietnam, building a circular economy has been identified as one of the country's development orientations in the 2021-2030 periods. To deploy an effective circular economy model, studies show that governments need to develop appropriate policies and plans for each specific period. After systematically studying the circular economy policies of China, Japan and Korea, some recommendations are proposed to the Government of Vietnam. These recommendations go into the core activities that the three pioneering countries mentioned above have carried out effectively in implementing the circular economy model.*

**Keywords:** Circular economy, sustainable economy, policy, Asian countries, Vietnam

## 1. INTRODUCTION

The outbreak of the industrial revolutions has delivered breakthrough development to the world's economy. On the one hand, the achievements of revolutions have improved people's quality of life. On the other hand, they have stimulated population growth and the ever-growing consumption of natural resources. According to a United Nations' report, the world's population has doubled since 1970. Population growth, urbanization and industrialization have led to a considerable rise in the extraction of natural resources, bringing about environmental pollution and climate change. For example, over the last fifty years, global resource extraction has tripled, from 27 billion tons in 1970 to 92 billion tons in 2017. Besides, according to a study by the Global Footprint Network in 2018, it was estimated that humanity was using natural resources 1.75 times faster than the ecosystems could regenerate as of 2019. In other words, humanity has spent 1.75 Earths. In addition, the amount of waste generated is enormous. Specifically, according to a World Bank study in 2016, the total volume of municipal solid waste produced globally was about 2 billion tons, in which the largest amount was recorded in the East Asia-Pacific region with 468 million tons (23%) while the Middle East and North Africa accounted for the lowest proportion with 129 million tons (6%). Municipal solid waste is projected to grow to 2.59 tons in 2030 and 3.4 billion tons in 2050. The rapid growth in natural resource extraction coupled with the impact of the growth in waste is the major contributor to climate change, environmental pollution and biodiversity loss on the global scale.

In Vietnam, climate change, resource depletion and increasing waste are now major challenges. According to the General Statistics Office of Vietnam, Vietnam's coal reserves ranked first in Southeast Asia in 2011 with an estimation of around 5 billion tons. However, after many years of extraction, natural resources are on the verge of exhaustion, turning Vietnam into a net importer of coal. Along with that, Vietnam also has to import a lot of diverse materials and fuels such as crude oil, iron, steel, textile auxiliary materials, plastic raw materials... to serve the industrialization process of the country. Moreover, waste in general and solid waste, in particular are being discarded in soaring volumes. According to the National Environment Report by the Ministry of Natural Resources and Environment (MONRE) in Vietnam, in 2018, the amount of domestic waste created was 25.5 million tons, where municipal domestic solid waste was 38,000 tons/day and domestic solid waste in rural areas stood roughly at 32,000 tons/day. Domestic solid waste in urban areas currently makes up more than 50% of the country's total domestic solid waste. According to the World Bank, it is forecast that the amount of domestic solid waste in Vietnam will surge to 54 million tons by 2030 (IRP, 2019). These problems have been creating great pressures on Vietnam's economy, calling for the need to change the development pattern.

Against this backdrop, the circular economy is

considered the best way to break the tie between economic growth and adverse environmental impacts. Specifically, the circular economy promotes economic development, while reducing resource extraction and minimizing waste into the environment. Therefore, the circular economy is regarded as an unavoidable transitional trend, which is already taking place many countries around the world.

## 2. THEORETICAL BASIC OF CIRCULAR ECONOMY

The circular economy, the concept of which is no longer new to us nowadays, is a completely different economic model from the linear economic model.

The linear economy, which depends on the extraction of resources to create products that meet consumer needs, is the approach that has brought about the growth of the global economy and raised people's living standards over the past years. This model usually ranges from natural resource extraction (Take), through Production (Make), through Consumption (Use) and finally Disposal (Dispose). To put it simpler, this is the process of turning resources into waste, so the Linear Economic model is very much likely to result in resource depletion and environmental pollution. However, in the context of economies continuously expanding and resources being gradually exhausted, this is not a sustainable development model. Furthermore, the environmental degradation caused by rising waste leads to negative effects on human quality, thus offsetting achievements of economic growth. Therefore, many countries are now embracing the trend of shifting to the Circular Economy with the core principle of recovery and regeneration, thereby reducing amounts of resources extracted and limiting waste generated into the environment.

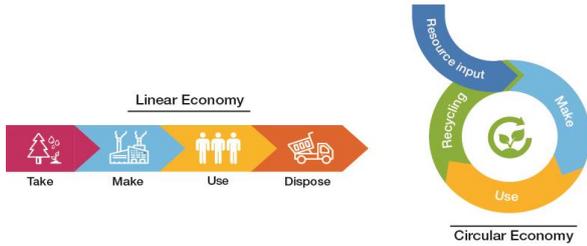
The concept of a circular economy was first used formally to point to a new economic model based on the fundamental principle of "everything is an input to something else", rather than running along a straight line as in the linear economic model (Pearce and Turner, 1990).

Since then, several scholars and practitioners have adopted multiple definitions for circularity.

According to Ellen MacArthur Foundation in World Economic Forum 2014, a definition of a circular economy was mentioned "a system that is renewable and restorative through proactive planning and design replaces the concept of 'end of life' of materials with the concept of 'recovery and shifting towards use of renewable energy, abandonment of the use of chemicals that are harmful to reuse and aiming towards waste reduction through the design of materials, products, engineering systems and business models within its scope".

In agreement with that point of view, the United Nations Industrial Development Organization (UNIDO) in 2017 also stated that the circular economy is a closed production cycle, in which waste is returned and used as materials for production, thereby lessening any

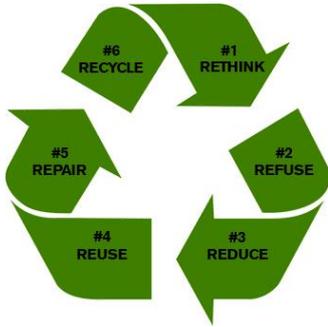
undesirable implications for the environment, ecosystems and human health.



**Fig. 1:** The model of linear economy and circular economy

(Source: Author's Synthesis, 2021)

Currently, there are a number of Circular Economy models that have been implemented with a simple approach such as the 3R model or the 6R+ model (Chalmers, 2019). Whereas 3R model only focuses on 3 activities Reduce (Reduce the use of goods and resource consumption), Reuse (Reuse products and resources) and Recycle (Recycle and Circulate resources), 6R+ model is approached in a more comprehensive and detailed way through activities including:



**Fig. 2:** 6R+Model of the Circular Economy

(Source: Chalmers, 2019)

- (1) Rethink: Is there a better way to solve this problem that is less harmful to the environment?
- (2) Refuse: Not accepting things that are not the best option for the environment.
- (3) Reduce: Is it possible to reduce the amount of material used to help protect valuable resources?
- (4) Reuse: Can the product have another use? Can its parts be used in other products?
- (5) Repair: Is the product easy to repair?
- (6) Recycle: Can materials in the product be recycled and used again?

It can be seen that the circular economy is an economic system that is regenerative and restorative by changing the way goods and services are designed, produced and consumed; thereby extending the lifespan of materials, transferring waste from the end of the production or consumption cycle back to the beginning, minimizing adverse implications for the environment. While the linear economic model is only concerned with resource extraction, production and disposal after use, leading to the creation of huge amounts of waste, the circular

economy focuses on management and regeneration of resources in a closed loop in order to avoid creating waste. Circular business models can be as profitable as linear models, while still simultaneously enabling consumers to use similar products and services.

### 3. CIRCULAR ECONOMY POLICIES OF SOME ASIAN COUNTRIES

The circular economy is operated on the principle of "Recycling - Diversity – Use of green energy - Bio-based foundation". In Asia, many countries have paid attention to this economic pattern. In this study, we, the authors, mention three pioneering countries in framing and implementing policies to develop the circular economy, namely China, Japan, and Korea.

#### 3.1. China's policies

The process of industrialization and modernization along with rapid economic growth over a long period of time has made China confront severe environmental pollution and become one of the countries discharging the most amount of waste in the world. In 2011, to produce 46% of the world's aluminum, 50% of iron and 60% of cement, China consumed 25.2 billion tons of raw materials, which was more than the 34 countries of the Organization for Economic Cooperation and Development (OECD) combined while the country's efficiency in resource use remained at a low level. For example, China needed 2.5 kg of raw material to generate 1 USD of gross domestic product (GDP), while the OECD countries only required 0.54 kg. In 2014, China generated 3.2 billion tons of industrial solid waste, where only 2 billion tons were recycled. Meanwhile, enterprises and households in the 28 European Union countries created 2.5 billion tons of waste in 2012, in which 1 billion tons were recycled or used as energy. By 2050, China is projected to generate roughly a quarter of the world's municipal solid waste (Mathews and Tan, 2011). Such a level of waste causes various natural and social impacts, influencing China into seeking a development pattern that is resource efficient and environmentally beneficial. Taking that into consideration, China has formulated and finalized the management institution to implement the circular economy model towards the goal of sustainable growth. Since the 1990s, China has also begun to pay attention to the development of a circular economy. The Circular Economy concept was promoted by the State Environmental Protection Administration (SEPA) in 2002 with specific guidelines on development, planning and operation. In 2004, the State Council appointed the National Development and Reform Commission (NDRC) to take over the implementation and promotion of this policy. To implement development strategies, eight initiatives of the NDRC have been introduced to facilitate the implementation of the circular economy, including: administrative procedures, pilot projects, application of economic tools, research and development (R&D), industrial restructuring, performance indicators, financial mechanisms and mechanisms of education and training". In 2005, the NDRC along with other agencies promulgated the

principles of the circular economy and promoted industrial symbiosis models. In addition, China conducts tax and financial policies and formed a support fund to boost circular economy development. China's 11th Five-Year Plan (2006-2010) dedicated a whole chapter to the circular economy. In 2008, a law on protection of the circular economy was introduced, which required state agencies at the local level to consider relevant issues related to investment and development strategies aimed at targeted sectors such as coal, iron, electronics, chemicals and petroleum.

The Law for the Promotion of the Circular Economy took effect on January 1, 2009. The goal of this legislation is to promote the development of the circular economy, improve resource use efficiency, protect and improve the environment, and realize sustainable development. China has provided support including tax incentives, credit incentives and subsidies to convert enterprises from the traditional economy to the circular economy, specifically as follows:

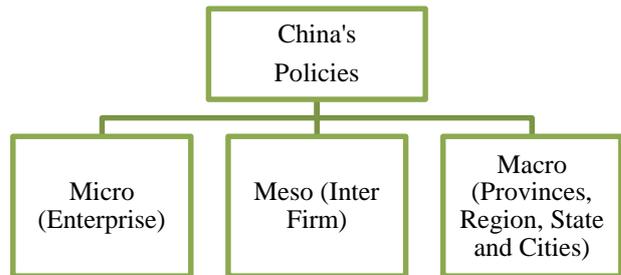
- (1) Tax policy: China provides tax incentives for industrial activities that promote the development of a circular economy and encourages the import of energy-saving machinery and materials. Specifically:
  - For value-added tax, eligible enterprises can be exempted from or refunded with input value-added tax with a certain percentage. For corporate income tax, if an enterprise buys and uses equipment in the specified list for the purpose of environmental protection, energy saving and safe production, the cost of purchasing equipment can be deducted 10% income tax. As for enterprises that use wastewater, emissions and solid waste as main input production materials, income tax can be reduced or exempted from for a certain period of time such as tax exemption for 3 years and 50% reduction for the 3 following years for enterprises dealing with community wastewater or community waste treatment or enterprises innovating technology in energy conservation and emission reduction.
  - Regarding consumption tax, enterprises that produce biodiesel containing animal waste and vegetable oil are exempt from consumption tax.
- (2) Credit policy: For projects for saving of energy, water, land, materials, etc., financial institutions will provide credit support such as loan incentives and proactively provide financial services.
- (3) Policy for Support of Conversion costs: Enterprises converting from the traditional economic model to the circular economy model are supported with 10% of the conversion cost. As of 2019, there were about 109 Chinese enterprises benefiting from the policy of production model conversion, showing the remarkable success of China's conversion support policies. The initial support helps enterprises navigate difficulties and costs in the early stages of transition to a circular

economy, thereby creating differentiation, generating new revenues and minimizing business risks.

- (4) Pricing policy: The purpose of the policy is to guide organizations and individuals in saving and rationally using resources. Accordingly, the competent authorities apply restrictive pricing policies for resource-intensive products.
- (5) Science and Technology Fund: The Science and Technology Fund aims to encourage individuals and organizations to propose initiatives and solutions for creating environmentally sound products. Besides, it is also a form of propaganda to raise awareness about circular economy in the community.

Next, the circular economy was elevated by China as a national development strategy in the 12th Five-Year Plan (2011-2015) with specific goals: by 2015 increase the efficiency of energy use (GDP per unit of energy) by 18.5% from the 2010 level; improve water use efficiency by 43%; enhance the output of the recycling industry to reach 180,000 yuan (\$276 billion) from 10 thousand yuan in 2010. China has achieved many remarkable results in implementing this plan.

In 2017, the Circular Economy Policy Program was approved by the Chinese Government to raise the responsibility of manufacturing enterprises in saving energy and using renewable raw materials. To ensure the successful implementation of the circular economy model, China established the Organization for Supervision of Circular Economy Model Implementation with 3 levels: the small (micro) cycle implemented at the factory scale; the medium (meso) cycle occurring at the industrial park scale and the large (macro) cycle happening across the entire economy.



**Fig. 3:** China's Policies of Circular Economy  
(Source: Chinese Government, 2017)

At the micro level, factories apply eco-design principles in the early stages of product design to lessen energy consumption throughout the product's lifecycle. The eco-design principles applied at this level include design for reuse and recycling, design for disassembly, design for maintainability, design for energy efficiency and design for flexibility. The core purpose of implementing the circular economy at this level is cleaner production.

At the meso level, industrial parks will strengthen resource reuse and recycling. Factories in industrial parks will connect with each other to form a symbiotic ecosystem, in which waste from this factory will

become raw materials or a part of raw materials for other factories. Numerous industrial parks in China have successfully applied this method such as: *Tianjin economic development area, Suzhou industrial park, Xi'an high-tech park, etc.* (Shi, H.; Chertow, M.; Song, Y.Y., 2010)

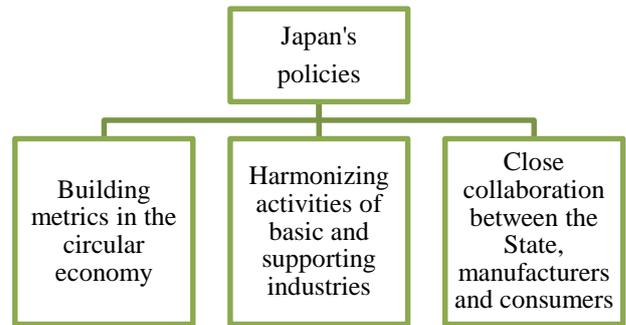
At the macro level, provinces will develop environmentally friendly product distribution systems and energy-saving consumption systems. Concretely, China builds a "low-carbon city" model towards green growth. China reinforces its institutional framework by promulgating the "Sustainable Consumption Law" and the "Green Procurement Law", to spur research on consumption-related carbon emission standards. Consumers of green products will receive financial support. Quite a few community education activities have been executed at enterprises and schools. National awards such as "green enterprise", "green community" or "green school" will be awarded to organizations concerned with environmental protection and energy saving.

It can be seen clearly that over the past two decades, the Chinese government has continuously introduced policies to implement the Circular Economy in order to optimize use of resources, protect and improve the environment, and promote sustainable development. According to the State Council's projections, the application of the principles of the circular economy could create goods and services more affordable for urban dwellers and reduce greenhouse gas emissions and traffic congestion by 23% and 47% respectively by 2040.

**3.2. Japan's policies**

In the 1960s of the 20th century, not long after the war, Japan was flooded with garbage as industrialization and modernization were growing at breakneck speed. Factories and workshops were mushrooming nationwide. In the 1990s, dioxin levels in the air in some parts of Japan rose to record levels as a result of incineration of waste (Tran Thi Van Anh, 2018). Meanwhile, Japan has a high population density and limited landfill space, partly due to the country's volcanic and island topography. The temporary solution that was adopted at the time is to burn garbage. Waste collection and treatment centres become incinerators. Although the amount of garbage dropped, the air was seriously polluted, which was a factor leading to a surge in lung diseases and skin diseases. Besides, Japan is a large industrialized country, but has very limited stocks of domestic mineral resources, leading to the fact that majority of the resources and industrial raw materials have to be imported. Facing exacerbated environmental degradation and accelerated resource depletion and a heavy dependence on imports, since 1870, Japan has begun to implement the circular economy model to ensure sustainable economic growth in the future.

Since then, Japan has issued many laws to promote waste recycling and develop a green economy, including: *Waste disposal law (1970), Resource efficient law (1991), Environmental law (1993), The law of separate collection and recycling of container and packaging (1995), Special household machine cycle law (1998), Sound material cycle society law (2000), Building construct recycling law (2000), Polychlorinated biphenyl waste properly handle special measures law (2001), Vehicle recycling law (2002), Recycling based society law (2002), Revision of the waste management act (2010), Small home appliance recycling act (2013)*... Among these legal documents, a typical law is *The Recycling based society law*, which is accompanied by the *Basic Plan for the Promotion of a Recycling-Based Society*, entered into force in 2002. These laws provide a legal framework for the transition to a circular economy. The legal documents manifestly stipulate the roles of state agencies, local authorities, businesses, non-governmental organizations (NGOs) and citizens... in carrying out activities towards building a circular economy.



**Fig. 4:** Japan's Policies of Circular Economy  
(Source: Japanese Government, 2002)

*First, Japan develops indicators to evaluate the circular economy.*

For the purpose of assessing the efforts of actors in building and developing a circular economy, Japan has developed three basic national-level indicators, including: the index of effective resource utilization rate per GDP unit, the index of material reuse over total materials consumed in the economy, and the index that measures the amount of waste ending up in landfills. In addition to these national indicators, Japan added a range of industry-specific indicators such as indicators of rental market size and quantity of rented goods, the amount of reused packaging, which is sold on the market, the amount of waste collection fees in the localities, etc.

*Second, Japan harmonizes the activities of basic industries and supporting industries.*

Japan's circular economy model can be divided into two main industry groups, namely "basic industries" and "supporting industries. Accordingly, the first group includes industries that are involved in the extraction of raw materials for production, distribution, consumption

and discharge into the environment. The second group is concerned with collecting, transporting, decomposing, recycling and safely treating waste. Thus, for the basic industries, the main task is to deal with the industries' environmental issues, specifically focusing on minimizing the discharge of pollutants into the environment through the development of cleaner production processes to provide more environmentally friendly products. Meanwhile, the main responsibility of the supporting industries is to develop waste treatment and enterprises specializing in recycling and reuse activities. The harmonious combination between the two groups of industries mentioned above will form a comprehensive solution for Japan to be able to rationally use natural resources and address environmental problems.

*Third, the development of the circular economy in Japan is supported by effective collaboration between the State, consumers and manufacturers.*

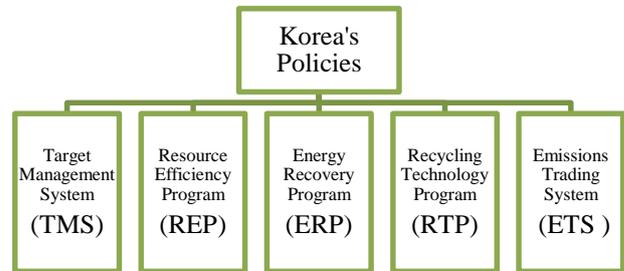
Consumers play important role in separating recycling sources, manufacturers have a role in recycling waste and producing products with a long-life cycle, while that of the State is to create legal corridors for and encourage recycling of materials. In addition, in order to make sustainable use of limited resources, Japan has made efforts to mitigate negative impacts on the environment in all areas, including encouraging a shift in demand to environmentally friendly goods. As a result, the Act on Promoting Green Procurement was enacted in 2000, which is applied to the Government, local authorities and agencies, enterprises and citizens. In addition, Japan also encourages the issuance of green bonds to promote development environmental projects. The first green bond was issued in 2014 by the Japan Development Bank and since then, the total quantity issued has risen. In 2017, the Ministry of Environment published the Green Bond Principles to ensure consistency with the Green Bond Principles issued by the ICMA Auditing Organization. Green bonds are also allowed to be traded on the stock market exchange.

The promulgation of appropriate policies has allowed Japan to become one of countries with the highest recycling rate in the world. Typically, in 2007, only 5% of Japan's waste had to be landfilled, as compared with 48% in the UK in 2008. Since 2010, the recycling rate for metals has come up to 98%. Japan's Equipment Recycling Law ensures that over 50% of electronic products are recycled, compared with 30%-40% in Europe. Most importantly, about 74-89% of the materials contained in these devices are recovered to return to the production process of similar products, which saves costs and reduces dependence on resource extraction. The development of a circular economy model allows Japan to overcome resource constraints, improve resource utilization and reduce production costs to continue to maintain its position and competitiveness on the international market.

### 3.3. South Korea's policies

Rapid industrialization has remarkably increased the amount of greenhouse gas emissions that South Korea generates. Between 1990 and 2012, the country's greenhouse gas emissions more than doubled, from 295.5 million tons' level to 688.3 million tons of CO<sub>2</sub>. Though still dwarfed by those of its neighbours China and Japan, South Korea's rapid economic expansion over the past few decades has left it with a significant carbon footprint. It was the world's 13th largest greenhouse gas emitter in 2015 (Josh Gabbatiss, 2020). Against this backdrop, Korea has turned to a circular economy model to achieve sustainability in economic development.

Korea has implemented a number of different policies to realize the transition from a linear economy to a circular economy. The policies of the Korean Government are classified into groups, namely: *Target Management System (TMS)*, *Resource Efficiency Program (REP)*, *Energy Recovery Program (ERP)*, *Recycling Technology Program (RTP)* and *Emissions Trading System (ETS)*. (Tcyrempilova Serzhena (2019)



**Fig. 5:** Korea's Policies of Circular Economy  
(Source: Tcyrempilova Serzhena, 2019)

The *Target Management System (TMS)* is concerned with the cutbacks in greenhouse gas emissions. In the TMS, around 600 large-scale facilities, which are responsible for more than 60% of Korea's total emissions, are identified as the subjects at which the setting of greenhouse gas reduction and energy saving targets is directed. The TMS workflow is regulated by the Basic Law on Low Carbon Growth and the Target Management Framework. First, companies operating in sectors that account for the majority of emissions are required to report amounts of emissions to monitoring departments. Monitoring departments and the Greenhouse Gas Inventory and Research Center of Korea (GIR) will review these reports. The center will set greenhouse gas emission targets for specific facilities. Facilities will be controlled and must submit annual emission reduction reports. The inspection of the report will be performed by a third party. By setting targets to reduce greenhouse gas emissions, Korea has managed to control emissions generated into the environment. Results have shown that in 2012 roughly 434 units contributed to the reduction of 21.3 million tons of CO<sub>2</sub>, equivalent to 3.8% of their total emissions; and more than 90% of participating units attained their goals. This figure was 2.7 times higher than the target

which was originally set by the government for the same year, which was 8 million tons of CO<sub>2</sub>.

*The Resource Efficiency Program (REP)* is a program aimed at decreasing the use of resources so as to cut down on greenhouse gas emissions. For this goal to be realized, the REP is making an effort to implement a more efficient manufacturing and resource recycling process. The REP seeks to create favorable conditions for products with less resource inputs. The REP provides incentives for manufacturers to enhance the efficiency of their products. Besides, the REP also encourages consumers to buy more energy-efficient products in the market. For example, Repaper Inc. is a Korean company, specializing in the design and development of paper cups. In 2018, the company invented a new recyclable paper cup. While ordinary paper cups are not recyclable and non-biodegradable because they are coated with a polyethylene resin, thereby eventually resulting in enormous volumes of waste generated into the environment.

*The Energy Recovery Program (ERP)* is a program that encourages the use of energy from waste. Korea is a resource-constrained country with 94% of its energy consumption depending on imports from abroad, yet ranks ninth among the world's largest energy consumers. As a result, the supply and demand of energy is hugely vulnerable to external fluctuations. Faced with this challenge, the Korean Government prioritizes the development of renewable energy to replace fossil energy such as coal, oil, etc. and one of the renewable energy sources on which the Korean government focuses investment for research and development is energy from waste.

*The Recycling Technology Program (RTP)* aims to reduce the share of the resource-intensive industries by directing the attention to the development of advanced recycling technologies. Korea's economy is largely reliant on industries deploying large amounts of resources such as steel, petrochemicals, and cement. Therefore, the amount of waste discharged into the environment is very huge, especially waste coming from electrical and electronic equipment. Rare metals found in discarded electronic devices can bring about potential environmental impacts related to hazardous chemicals. For that reason, the RTP is a necessary program to recover resources from electronic devices based on the promotion of recycling technology.

*The Emissions Trading System (ETS)*, simply understood as a "limit and trade" system, stipulates that the emissions of all participating facilities are controlled within certain limits; and facilities under control are allowed to buy and sell quotas on demand through regulated marketplaces. The fundamental difference between the ETS and the TMS is the "trading ability" of emission quotas. Unlike the TMS, ETS-controlled facilities can generate profits or suffer losses from

selling or buying emissions quotas on the transaction market. The buying and selling are conducted on the "Korea Climate Exchange". The ETS enables these facilities to achieve their greenhouse gas emissions targets in a cost-effective manner.

Apart from enterprise policies, the Korean government also carries out activities in order to boost public awareness. Typically, the Green Start Campaign is a nationwide campaign launched to engage the public in the reduction of greenhouse gas emissions in the non-industrial sector. The Green Start campaign mobilizes the community's engagement in activities of value, whether large or small, such as choosing public transport or walking rather than using private means of transport and switching from the use of hard copies to electronic files.

Korea's experience has provided valuable lessons for those countries seeking to implement the circular economy as a national policy. Having turned from a developing country into a developed one in such a short time, Korea's growth lessons can be valuable for other developing countries, including Vietnam.

#### 4. DISCUSSIONS

This study examined some of the typical policies adopted by China, Japan and South Korea – three pioneering countries in the implementation of the circular economy. Although each country has different specific policy packages, all the policies are aimed at sustainable economic growth, efficient use of resources, and reduction of environmental degradation. Policies for application of circular economy in these countries are often implemented at the following phases: design, production, consumption and waste management.

*At the design phase*, in China, environmentally friendly eco-design is done at the product design stage. Products are designed to be removable, maintainable and energy efficient. Meanwhile, in Japan, manufacturers are encouraged to use high-tech designs for repairing, reusing and recycling. Whereas in Korea, manufacturers are encouraged to minimize the use of resources as input materials for the production process.

*At the manufacturing stage*, China seeks to build eco-industrial parks and low-carbon cities. Regarding Japan, an emphasis is placed on the parallel development of basic and supporting industries. Concretely, the basic industries focus on minimizing the discharge of pollutants into the environment while the supporting industries concentrate on promoting waste treatment activities and enterprises specializing in recycling and reuse.

*At the consumption stage*, consumers play an important role in alleviating pollution and recycling used products. Chinese consumers are encouraged to live a low-carbon lifestyle through shopping for green, recyclable products. Likewise, Japan implements policies to raise people's awareness of waste management and

classification. Besides, Korea also employs policies to raise people's awareness through "green awareness" building campaigns and programs. With respect to Korea's case, at the production stage, the emphasis is on setting targets and monitoring greenhouse gas emission reduction activities of manufacturers. The common points of the three countries are to encourage enterprises to use energy-saving input materials and invest in renewable energy research.

*At the waste management stage*, apart from building a symbiotic ecosystem as mentioned above, China also implements preferential policies for enterprises which use wastewater, emissions and solid waste as input materials for production. For cumulative wastewater treatment enterprises, income tax can be reduced or exempted from for a period of 3 years and even reduced by 50% for the next 3 years. Meanwhile, Japan develops a set of indicators to evaluate the efforts made by facilities in waste management. In Korea, the government establishes target systems to control the emissions of each facility. As for domestic waste, all three countries pay attention to waste collecting, sorting and recycling technologies to decrease landfilling.

From this study, it can be seen that the circular economy cannot be successfully implemented without the government's policies, legal frameworks and guiding documents. Thus, it is shown that the government policies play a decisive role in executing the circular economy model.

## 5. RECOMMENDATIONS FOR VIETNAM

In Vietnam, over the years, the industrialization process has taken place vigorously, but has been maintained along the traditional trend, including production, use and consumption of huge amounts of resources and energy. According to the assessment of the MONRE, the average costs of raw materials and emissions in production of Vietnamese enterprises are generally much higher than the world's average levels. Therefore, although Vietnam's economy has always maintained a high growth rate, we have also started to confront many problems such as environmental pollution and ecological degradation. According to a report published by the McKinsey Global Institute (2021) due to the impacts of climate change, Vietnam will lose about 8%-13% of GDP per year until 2050. In addition, by 2025, waste volumes in our country are forecast to reach roughly 100 million tons per year, including domestic waste, industrial waste, medical waste, etc. Increasing waste is presenting a pressing issue in terms of environmental protection in our country.

Recently, the 13th National Congress (2021) of the Communist Party of Vietnam stressed the goal of Vietnam's economic development in a "rapid and sustainable" manner. This shows that Vietnam is making efforts to develop its economy in a sustainable manner, minimizing adverse environmental implications.

Nevertheless, the transition from a traditional economy

to a circular economy requires the Government to establish an appropriate legal institutional framework, promulgate detailed policies, and set up synchronized implementation plans to drive change in practice.

Building on practical experience of some Asian countries and a number of perspectives on the circular economy, in order to promote this economic model in Vietnam, this study would like to propose some recommendations to the Vietnam State agency.

*First*, it is crucial to build a legal framework for the operation of the circular economy. The legal framework will enable the actors involved in circular economy activities to understand their roles and implement the activities in an effective way. Developing a complete multi-level legal system for the development of a circular economy requires profound and time-intensive practical research. It took Japan 40 years to complete the legal system for the goal of sustainable economic growth. To shorten the required time Vietnam needs to consult policies and laws from countries that have been successful in implementing the circular economy.

*Second*, it is necessary to issue a comprehensive plan as a strategic guidance for the build-up of a circular economy. This comprehensive plan will serve as the basis for authorities at all levels and relevant organizations to set up specific plans to clearly define the scope of responsibility of these organizations. At the central level, leaders direct the review, amendment, supplement and promulgation of new mechanisms, strategies, policies and laws to promote circular economy development in tune with the Party's guidelines. Ministries, ministerial-level agencies and provincial People's Committees integrate the circular economy at the stage of developing strategies, programs and projects for development, management, reuse and recycling of waste. Waste should be considered as a valuable resource that is recyclable, reusable and able to create jobs and add value to the economy.

*Third*, the core factor in the development of the circular economy is the robust advancement of science and technology as well as the digital economy and data connection, etc. Circular economy models are associated with high technology and the 4.0 industrial revolution; thus, making it necessary to establish mechanisms and policies for the development of clean technology to reduce, reuse and recycle waste. The State also needs to conduct extensive and profound research on the development of the circular economy from a common global approach such as the principles of establishment by sector or field, model deployment, criteria of the circular economy model, then selectively apply it in practical situations and disseminate it to enterprises, people, and managers making it applicable in practice.

*Fourth*, it is necessary to build a monitoring system to manage waste disposal and recycling activities. This monitoring and evaluation system must be programmed in the medium and long term. Only with the monitoring system can the new regulatory agencies assess the effectiveness of the policies and efforts made by the

units in their commitment to the circular economy. For units that successfully accomplish their goals, there should be a rewarding policy to encourage and set an example for other units. In addition, it is also necessary to impose strict penalties against units for excessive discharge into the environment and waste of resources and energy.

Fifth, it is of great importance to promote digital transformation in propaganda and education to raise public awareness of circular economy. To achieve this goal, Vietnam continues to promote the development of e-Government, building a portal connecting Government-Business-People. For example, a software could be developed to be installed on mobile phones that instructs users to collect waste and bring it to the collection place to accumulate points. They can then use these accumulated points in place of cash to make purchases at many supermarkets and stores. This will form a new social code of ethics such as: people are responsible for sorting waste, refrain from the use of plastic waste and actively purchase recyclable and reusable products, etc.

## 6. CONCLUSION

The complicated developments of the Covid-19 pandemic have impacted all aspects of global socio-economic life, changed people's perceptions around the world, and deepened the need for changing the growth model towards sustainable development. In that context, many countries in the world, such as Asian countries namely as China, Japan, and South Korea... are energetically transitioning to the circular economy. The policies and experiences of these countries are practical lessons for to Vietnam quickly accelerate the application of this progressive economic model in the upcoming period.

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