

BUILDING CIRCULAR ECONOMY: LESSONS FROM AROUND THE WORLD AND PROPOSED SOLUTIONS FOR VIETNAM

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Abstract: In today's world, the development of a circular economy has become an increasingly crucial trend, particularly in the context of alarmingly depleting global resources. In recent years, several countries such as Sweden, the Netherlands, France, Germany, Canada, the United States, China, Japan, South Korea, and Singapore have been resolutely implementing policies aimed at promoting the transition from a traditional economic model to a circular economy. This article explores the policies promoting circular economic development in various countries around the world and extracts valuable lessons that can benefit Vietnam in fostering this trend.

1. Overview of the Circular Economy

The circular economy is an economic model and resource management system designed to optimize the use and reuse of resources in the process of production and consumption. In this model, resources are not consumed once and then discarded; instead, they are designed to circulate and be reused multiple times before losing their value.

The concept of the circular economy began to take shape in the 1970s and gained academic attention in the 1980s. The circular economy focuses on the utilization phase of resources, with two main objectives: managing assets and maintaining their value while building a restorative and waste-processing industry (Ghosh, 2020). Economic growth in the circular economy is measured by an increase in the quality and quantity of all components. The circular economy is considered sustainable because it separates the creation of wealth (value) from the consumption of resources (Stahel, 2020). In terms of ideas, the circular economy is not entirely new, as it is based on the principles of biogeochemical cycles or material-energy cycles in the natural system applied to the economic-social system to guide human economic activities.

In the circular economy, material resources, energy resources, and waste are comprehensively utilized to achieve the best resource extraction efficiency, high utilization, and low emissions. The practical application of the circular economy has been evident in the economic geography theory regarding industrial territorial organization, agriculture with the concept of PSS (Production Territory Combinations), and the concept of APS (Agriculture-Production System) in the sense of designing production sectors on suitable territories according to geographical conditions, where the output of one sector becomes the input of another sector. In terms of terminology, circular economy researchers argue that it is fundamentally different

from a linear economy. While the traditional economy is seen as a process of converting natural resources into products and generating waste, the excessive generation of waste from traditional economic models has led to resource depletion and environmental pollution, due to: 1) Separating natural capital from the environment (through unsustainable exploitation/harvesting); and 2) Reducing the value of natural capital due to pollution from waste. Thus, the linear economy has completely disrupted natural biogeochemical cycles.

Scholars of the circular economy also argue that in the traditional economy, the flow of material and energy is a one-way flow created by the accumulation of pollution, products, and natural resource extraction. In this economy, human needs are limitless, leading to an ever-increasing supply of products, resulting in increased resource and energy consumption, as well as the accumulation of waste and pollution during production, processing, and consumption. If this continues, there will be a shortage of resources and increasing environmental pollution. In contrast, the circular economy is an economy that does not impact the environment and, furthermore, restores any damage during resource extraction while ensuring minimal waste is generated during production and throughout a product's lifecycle. While the circular economy supports a closed-loop material flow within the human economic system. Materials are organized into a circular flow of resources, products, and renewable resources to enable a comprehensive economic system (including production and consumption) to use fewer resources or generate less environmental pollution. The circular economy also changes the relationship between resource utilization efficiency and environmental efficiency through the analysis of alternative material flow (Murray et al., 2015). Therefore, the development of the circular economy will help improve the efficiency of resource use, directly promote energy conservation, protect the environment, and reduce the conflict between human development and the environment.

In general, the circular economy is based on three fundamental principles, also known as the 3R principles: reduce, reuse, and recycle. Worldwide, there is still no universally accepted definition of the circular economy due to different perspectives and approaches by various entities. Preston (2012) defines the circular economy as a resource transformation approach in the economy. Waste from factories becomes valuable input for another process, and used products can be repaired, reused, or upgraded instead of being discarded. This definition speaks to the transformation of resource functions, where waste becomes valuable input for another process, repair, reuse, or upgrade instead of disposal.

MacArthur (2013) describes the circular economy as "an industrial system that is restorative or regenerative by design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, and aims to eliminate waste through superior design of materials, products, systems, and business models." The overarching goal is to "create conditions where materials, energy, labor, and information can be used more efficiently so that natural and social capital can be rebuilt." This definition addresses a system that restores or regenerates industrial systems by design, restoring natural systems,

redefining growth, focusing on positive benefits for society as a whole, separating economic activities from the consumption of finite resources.

Mitchell (2015) presents the essence of the circular economy as an alternative to the traditional linear economy (make, use, dispose), where resources are used as long as possible, maximizing the value of resources by recycling and reusing products and materials. This definition emphasizes that, as a replacement for the linear economy, the resource lifecycle will be extended, maximizing the value of resources through restoration and reuse.

In 2015, the European Commission provided a definition of the circular economy as an economy "where the value of products, materials, and resources is maintained in the economy for as long as possible, and the generation of waste is minimized." The transition to a circular economy will create "a crucial contribution to EU efforts to develop a sustainable, low-carbon, resource-efficient, and competitive economy." This definition emphasizes the value of maintaining products, materials, and resources for long-term use and minimizing waste.

Ghosh (2020) describes the circular economy as a systemic approach to economic development and a transition from the traditional linear economic model of "extract-produce-consume-dispose" to a higher level of non-waste by conserving resources through the concept of process design and material selection for a longer lifecycle, preserving all types of resources, recovering materials, energy in all processes at the end of the lifecycle for a specific use of the product, still suitable for use as input for a new production process in a closed-loop material cycle to improve resource efficiency, resource productivity, and provide benefits to businesses and society, create employment opportunities, and achieve environmental sustainability. This definition speaks to a shift in the model, resource preservation, process redesign, material selection, energy and material recovery, and the use of waste from the first process as input for the second process, a closed-loop material cycle, generational employment, business models, resource efficiency, and sustainable environment. Although various definitions of the circular economy approach it from different perspectives, it can be seen that these definitions are all related to the three basic principles of the circular economy, including: (1) Regeneration of natural systems: Conservation and regeneration of natural capital (land, water, etc.) through the rational control of non-renewable resources and balanced use of renewable resources, limiting the use of fossil energy, and increasing the use of renewable energy; (2) Keeping products and materials in use: Optimizing resource benefits by maximizing the reuse of products and materials in technical and biological cycles; (3) Waste and pollution design: Enhancing the overall efficiency of the entire system by identifying and even advancing higher levels of negative externalities (waste design, pollution design). In this process, waste management plays a central role (Schally, 2020).

In other words, the circular economy model is a closed-loop production cycle, where waste materials are returned and transformed into raw materials for production, thereby reducing negative environmental impacts, safeguarding ecosystems, and human health. The development

of a circular economy is considered a solution that can help countries around the world adapt and progress in an environmentally friendly manner.

Today, the circular economy is becoming an essential trend in the context of increasingly depleted and scarce resources, environmental pollution, and severe climate change. Global agreements on the environment, climate change, and sustainable development, as well as new-generation free trade agreements, introduce many regulations regarding emission and waste standards. These will serve as a premise to promote the transition to a circular economy model.

For nations, the development of a circular economy reflects their responsibility in addressing global challenges related to environmental pollution and climate change, while also enhancing the capacity and competitiveness of their economies. A circular economy helps make use of used materials instead of incurring the cost of disposal; it minimizes the exploitation of natural resources and maximizes resource value; it limits waste and emissions into the environment.

For society, a circular economy helps reduce social costs in managing and protecting the environment and coping with climate change; it creates new markets, new job opportunities, and improves the health of the population.

For businesses, a circular economy contributes to reducing risks related to overproduction crises and resource scarcity; it provides incentives for investment, technological innovation, production cost reduction, and supply chain enhancement.

According to calculations by environmental experts, if countries successfully implement the circular economy, it can promote the use of high-tech products and services to optimize resource utilization. This application will help reduce business operating costs, increase competitiveness, and lead to global development opportunities worth up to \$4.5 trillion by 2030.

2. The Role of Government in the Development of the Circular Economy in Some Countries Worldwide

2.1. Experiences in Several European Region Countries

a) Sweden

Sweden is a world leader in waste management and recycling. Since the mid-1990s, the country has successfully balanced economic growth with environmental protection. The Swedish government has changed the perception of its citizens and businesses, along with establishing a clear legal framework that links economic development and environmental protection by imposing high taxes on various types of waste. They have also provided incentives for the use of renewable energy sources such as hydropower and biofuels. As a result, Sweden recycles 53% of consumer plastic materials, 50% of construction waste, and turns 99% of waste into energy.

From 2011 to the present, Sweden has managed to process and recycle up to 99% of its waste, with less than 1% of household waste ending up in landfills. Sweden's per capita greenhouse gas emissions are among the lowest in the EU and among OECD countries. In 2013,

Sweden's greenhouse gas emissions (GHG) were only 55.8 million tons of CO₂, compared to 71.8 million tons in 1990, representing a 22% reduction.

b) Netherlands

The Netherlands embarked on its journey towards a circular economy in 1979 with the adoption of Ad Lansink's waste management policy proposal, known as the Lansink Ladder. This system prioritizes waste prevention and reduction, promotes reuse and recycling, and includes waste incineration before considering landfill disposal as a last resort. In 2013, the Dutch government launched a series of programs and projects to make the Netherlands a "circular hub" in Europe. Their program, "Circular Economy in the Netherlands by 2050," focuses on five priority sectors: bio-based fuels and food, plastics, manufacturing (with a focus on metals and hazardous chemicals), construction (with an emphasis on recycling construction materials and developing the recycled materials market), and consumer goods.

The circular economy model in the Netherlands is expected to create over 50,000 jobs, reduce environmental waste by 10%, save 20% of industrial water usage, reduce imports of raw materials by 25%, and contribute €7 billion to the economy. The Dutch government also committed to legal reforms, intellectual property market incentives, financial support, and knowledge enhancement to promote international cooperation and sustainable development.

c) France

The French government has announced a roadmap for developing a circular economy model, aiming to turn waste into raw materials for production. Paris, the capital city, has set a goal to reduce waste by 50% before 2025, maximizing the use of discarded materials to create new products. The government plans to create 300,000 jobs in the next 7 years through this new production model. According to research by the Environmental and Energy Management Agency (ADEME), 70% of waste in France comes from the construction industry, equivalent to 247 million tons. Each year, households generate about 30 million tons of waste, while companies, excluding the construction sector, produce 64 tons. Therefore, the key issue is for the French government to encourage businesses to transition to more environmentally friendly production models. The French roadmap for the development of the circular economy includes 50 measures focused on two main areas: encouraging manufacturers to provide durable products that are easily repairable when broken, and promoting recycling and reuse of materials from items before they are discarded.

d) Germany

Germany began its journey towards a circular economy relatively early, implementing circular economy strategies in 1996. In recent decades, Germany has developed ambitious policies in the areas of energy, industry, and the environment at both the national and European levels. The German government has set goals for saving natural resources to comprehensively protect the environment, including reducing landfilling, preserving biodiversity, and promoting sustainable resource use. Germany made a commitment to reduce greenhouse gas emissions by

40% if other EU member states agreed to the EU's 30% reduction target by 2020. This framework for a holistic approach to the entire economy is called Germany's Integrated Energy and Climate Program and outlines policy measures for the energy sector. Some key policies to achieve these goals include the Renewable Energy Act (Erneuerbare-Energiene-Gesetz, EEG) and ecological tax reforms.

The circular economy in Germany primarily focuses on waste management (Ogunmakide, 2019). In the past, Germany witnessed significant oil crises and economic downturns from 1974 to 1978, which exacerbated environmental issues. To prevent further environmental degradation, Germany enacted waste laws and regulations in 1972 (Nelles et al., 2020). In 1971, the Federal Government developed a comprehensive action plan and environmental program with guiding principles on environmental protection, prevention, responsibility, and cooperation, ultimately leading to the Waste Management Act of 1972. Effective waste management, including methods of collection, sorting, and recycling, was considered a sensitive issue from 1978 through the late 1980s. Although Germany's waste management was effective, transitioning to a circular economy model was deemed necessary as it incorporates all principles of sustainable development.

The concept of sustainable development was enshrined in Germany's constitution in 1994 and was further developed in regional planning laws and construction regulations in 1998. This commitment by the German government aimed to conserve natural resources, protect the environment, reduce land sealing, preserve biodiversity, and promote the sustainable use of resources. Included in the sustainable development model are specialized nature conservation laws, regulations on renewable energy and energy conservation, and environmental information laws. These laws laid the groundwork for transitioning towards a circular economy.

The German Parliament passed the Circular Economy Law ("kreislaufwirtschaft") in 1996. This law attempted to reduce land required for waste processing based on a hierarchy system that prioritized waste prevention and closed-loop recycling. It also shifted product responsibility to manufacturers, meaning their products had to be designed for minimal waste, ensuring waste recovery and reuse in both production and usage. Building on this policy, Germany can be seen as a model for resource recovery (Ogunmakide, 2019).

The German government implemented laws, policies, and regulations to ensure material flows. For instance, all old electrical and electronic equipment had to be returned, and manufacturers were obligated to take them back free of charge, starting in March 2006. Similarly, the government also issued a landfill ban in 2005 to encourage the complete elimination of landfills by 2020 and to improve waste recycling and reuse. As a result, approximately 50% of waste is recycled, and no urban waste has been sent to landfills for treatment since 2009.

To fulfill the European Union's guidelines, which encompass improving the environment, climate, and resource protection, Germany's circular economy and waste laws were amended and

further developed in 2012. Currently, Germany's Circular Economy Law and Waste Law have been updated to promote closed-loop circulation and environmentally compatible waste management (Kreislaufwirtschaftsgesetz - KrWG) and is the core regulation of waste management (Nelles et al., 2020).

The KrWG law builds on the Waste Management Act, retaining essential structural elements of waste management and the closed-loop cycle (KrWAbfG). Specific product waste regulations can also be found in the End-of-Life Vehicle Ordinance (AltfahrzeugV), Battery Act (BatterieG), and Electrical and Electronic Equipment Act (ElektroG).

In 2012, Germany's Waste Law, based on the KrWG Act, became effective and fulfills the requirements of the EU Waste Law. The law's purpose is to promote closed-loop recycling to conserve natural resources, ensure human and environmental protection in waste generation and management. A central principle of the law is the five-level waste hierarchy: (1) Avoid or reduce waste; (2) Prepare for reuse of waste; (3) Recycle waste; (4) Recover other waste (energy recovery, remediation of excavated or mined land, etc.); and (5) Dispose of waste. Based on these principles, the most suitable waste management measures to protect human and environmental health are chosen, considering technical, economic, and social aspects (Nelles et al., 2020).

With a few exceptions, there is a ban on mixing hazardous waste. Mixing waste to reduce its hazardous content and, therefore, comply with limits is prohibited. However, Germany's current policies do not fully focus on efforts to shift from the traditional model to a circular model. Like many European countries, Germany is constrained within a system where many valuable materials with high environmental and social costs are still directed towards landfills or incineration plants with no secondary raw materials market in operation (Pietikäinen, 2020).

2.2. Experience of some North American countries

a) Canada

Canada approaches the circular economy through the establishment of the National Zero Waste Council. This initiative is considered a leadership effort bringing together government, businesses, and non-governmental organizations to promote waste reduction and transition to a circular economy in Canada. On November 28, 2018, based on the principles and direction set by the Council, the National Strategy on Zero Plastic Waste was released by the Canadian Ministry of Environment and Climate Change and the Canadian Ministry of Health at a workshop with various stakeholders on Canada's Chemicals Management Plan in Ottawa. The vision is to keep all plastics in the economy and out of the environment by employing a circular economic approach.

While past waste management programs were in place in Canada, over 89% of plastics were still landfilled or incinerated. To improve this situation, the new strategy introduces an integrated system comprising three areas of activity: prevention, cleanup recovery, and value recovery. This system will be supported by enabling activities, including raising awareness and

education, research and innovation, regulations, and market-based tools. The design of plastic products will become a priority action contributing to the overall goal of achieving 100% plastic recycling and reuse. Canada also has plans to reduce the export of electronic waste plastics to other countries for more domestic recycling.

b) United States

In the United States, the circular economy is built on market-based approaches. Market-Based Approaches (MBAs) are based on the idea that, beyond the state, other market actors such as businesses and legal entities are free to engage in business and provide goods and services (including environmental and resource management goods and services, climate change adaptation) according to market supply and demand rules. The electronic waste market in the state of Colorado (USA) is a prime example of a market-based approach to building a circular economy. In 2013, landfilling of electronic waste was banned in the state of Colorado. Shortly after, businesses emerged to collect and recycle electronic waste. The emergence of similar markets has continuously formed a dynamic and profitable sector for investors in the United States, making waste collection and processing a lucrative field, leading to the rise of prominent waste billionaires like Wayne Huizenga of Waste Management and Maria Rios of National Waste.

2.3. Experiences of Some Countries in the Asian Region

a) China

In China, the government has taken significant steps towards promoting a circular economy with the goal of optimizing resource utilization, protecting and improving the environment, and fostering sustainable development. According to calculations, the application of circular economy principles can result in more affordable goods and services for urban residents, reduce greenhouse gas emissions by 23%, and alleviate traffic congestion by 47% by 2040.

Before the 2000s, under the dominance of the "pollute first, clean later" ideology and many economic development policies that overlooked environmental protection, China achieved significant economic growth but also suffered severe environmental consequences. As the "world's factory," China exported a large volume of products but consumed natural resources and left a significant amount of pollution within the country. Consequently, China became the largest contributor of sulfur oxides and CFCs to the atmosphere (Zeng and Li, 2020). This depleted China's resources rapidly, and environmental pollution worsened.

To address resource and environmental issues, China identified a circular economy as a crucial strategy to transition its economic growth model and mitigate or solve resource and environmental problems (Wang and Li, 2006). Since the 1980s, China has continuously enacted a series of laws and regulations, comprehensive policies, industrial policies, economic policies, and environmental policies related to the circular economy. Legal frameworks and regulations were established to support the development of the circular economy, including the Law on

Promoting Cleaner Production, the Energy Conservation Law, the Circular Economy Promotion Law, and more. The Circular Economy Promotion Law focuses on development plans, expanding responsibilities for key energy-consuming enterprises, and implementing monitoring systems for enterprises with high energy and water consumption. This law proposes various requirements for circular economic development, including production techniques, equipment, resource utilization, recycling, and other aspects. Accordingly, the government encourages the circular economy through special funds, technical support, tax incentives, investment, finance, pricing, government procurement, and other aspects (Li and Lin, 2016). The Chinese government simultaneously implemented four main policy groups: first, comprehensive policies that serve as overarching guidance and include plans, action programs, and initiatives such as the Promotion of Cleaner Production, the Social Orientation Preservation Plan of the State Council, the Promotion of Economic Circular Letters, the Comprehensive Energy Conservation Program, and the State Council's Announcement on the Release of the Circular Economy Development Strategy and Action Plan; second, environmental policies that primarily promote the development of the circular economy through reverse pressure mechanisms. For instance, China's Ministry of Environmental Protection has developed emission standards for various industries. These industries must treat pollutants to meet emission standards before releasing them into the environment, requiring companies to develop strategies for low-resource consumption and low emissions; third, industrial economic policies aimed at promoting the development of the circular economy. Economic policies can be categorized into tax, financial, monetary, and pricing policies; fourth, policies related to the circular economy primarily encompass measures for controlling orders, taxes, finance, and pricing. These policies focus on upgrading industrial structures, promoting cleaner production, recycling, comprehensive utilization of waste materials, and resource and energy utilization. Initially, the Chinese government imposed many requirements on inputs to protect the environment. China's economy, characterized by high pollution and low efficiency in its industrial sector, is gradually shifting toward a circular economic philosophy by applying the principles of "reduce, reuse, and recycle" (or "3R"), reusing waste from one process as a resource in another. In 2005, the Chinese State Council proposed the need to promote the circular economy and issued the Outline of the National Program for Mid- and Long-Term Scientific and Technological Development (2006-2020). Subsequently, China enacted the Circular Economy Promotion Law in August 2008. It appears that there is a consensus that implementing the circular economy can address economic growth and resource shortages.

To reinforce the construction of an ecological civilization, China enacted a new Environmental Protection Law in 2015. This was the nation's first effort to integrate economic and social development with environmental protection. The new law is recognized as the most progressive and stringent regulation in China's environmental history. It contains detailed penalties for environmental violations, including counterfeiting and distorting information,

surreptitiously discharging pollutants, and evading government supervision. It includes numerous provisions for addressing pollution, raising community awareness, and protecting whistleblowers of violations. This law not only places more responsibilities on local governments and law enforcement agencies but also sets higher standards for businesses, from producers to recyclers. To date, over 100 environmental regulations and policies have been issued to cover the entire supply chain. At the industrial level, industrial parks are one of the main targets for large-scale circular economic development as part of the 12th Five-Year Plan of the National Development and Reform Commission (NDRC). It includes seven main tasks to transform industries with high resource and energy consumption into highly efficient and low-pollution processes. By 2017, 129 industrial parks had been approved by the NDRC for conversion to circularity. The results indicate that promoting the circular economy reduces the pressure on the national resource demand. In China, the circular economy is implemented by individual companies, industry alliances, and at the regional level (Wang and Li, 2006). Supporting factors for promoting the circular economy include legislation, economic policies, and planning. Some support measures and incentives for the circular economy in China include:

Cleaner Production: China's strategy identifies ten cities, three rivers, three lakes, and five priority industrial sectors. Furthermore, guidelines outlining cleaner production methods have been published in Chinese. These guidelines have been highly beneficial for companies and include the "Handbook of Cleaner Production Audits for Enterprises" and "Guidelines for Cleaner Production" in the paper and pulp industry, beer production, organic chemical materials, electroplating, silk dyeing, and printing industries (Qian and Lao, 2004).

Industrial Ecology Parks: China's State Environmental Protection Administration (SEPA) has increasingly emphasized the development of Eco-Industrial Parks (EIPs) since 2001. SEPA has supported the establishment of 14 EIPs in China from 2001 to 2005. Guitang Group, a state-owned sugar company, is a leading example of an enterprise promoting circularity in China. To cope with the high emissions and low profitability of sugar production, the company created a cluster of facilities to reuse and recycle its by-products, thus efficiently reducing economic pollution. The cluster includes an alcohol plant, a pulp and paper mill, a sanitary paper mill, a calcium carbonate plant, a cement plant, and a power plant.

Regional Circular Economy Planning: Regional circular economy planning is the most distinctive supporting factor in China. In 2004, the central government directed local governments to incorporate the concept of the circular economy into regional economic development plans (2005–2010). According to the central government's requirements, local governments need to make the circular economy a crucial guiding concept in regional economic development plans (including economic development and city development plans), resource and energy planning, and more. Therefore, regional circular economy planning will have long-term effects on the development of the circular economy in China. As a result, the central and local

governments must shift their economic development models to meet the requirements of sustainable economic development.

Legal Frameworks: In China, legislation plays a significant role in the development of the circular economy. Since 1996, China's legislative bodies have enacted various laws related to the circular economy, including the Promotion of Cleaner Production, Energy Conservation Law, and Circular Economy Promotion Law. The first legislative initiative occurred in the early 1990s when the concept of cleaner production was incorporated into the revised Environmental Protection Law. The Circular Economy Promotion Law provides a systematic and comprehensive legal framework for promoting the circular economy in China. It covers all key issues related to the circular economy, such as development plans, technical standards, technical criteria, enterprise responsibility, and financial incentives.

Regulations and Standards: The China National Development and Reform Commission (NDRC), which is the primary government agency responsible for drafting and enacting laws and regulations, has issued several policies and standards to support the development of the circular economy. Examples include the Circular Economy Development Strategy and Action Plan, Implementation Measures of the Circular Economy Promotion Law, Circular Economy Pilot Regions, and other related documents. Many circular economic standards and assessment methods have been established. These documents emphasize the importance of the circular economy in improving resource efficiency, reducing pollution, and promoting sustainable development (Li and Lin, 2016).

Statistics show that from 1990 to 2020, the scale of China's economy expanded approximately 20 times, while energy consumption only increased 5 times. This is one of the positive achievements that continue to drive the world's most populous country to further economic development and circular growth in the future.

b) Japan

The Japanese government has established a comprehensive legal framework to steer the country towards a recycling-based society. The Basic Law for Establishing a Recycling-Based Society, effective in 2002, provides quantitative targets for recycling and non-materialization in the long term for Japanese society. As a result, Japan's recycling rate is truly remarkable: the country recycles up to 98% of metals (Government of Japan, 2010), and in 2017, less than 2% of Japan's waste had to be disposed of through landfill methods.

c) Singapore

In the Asian region, Singapore has become a prime example of promoting circular economy early on. Being an island nation with very limited natural resources, Singapore began developing technology to convert waste into energy as early as the 1980s by constructing four waste-to-energy plants, processing 90% of the nation's waste with a capacity of up to 1,000 tons of waste per day. With the remaining 10% of waste, Singapore creatively transformed it into an artificial waste island called Semakau - the world's first "waste island."

d) South Korea

The South Korean government enacted a law on food waste disposal in 2013, specifying the collection standards for waste disposal. Food waste is either placed in biodegradable bags or directly into metal containers equipped with radio frequency identification (RFID) frequency readers. This law also stipulates that citizens will have to pay extra if their waste exceeds the allowed weight limit, and 60% of that additional fee is used by the government to cover the costs of waste collection and processing.

Currently, up to 97% of food waste in South Korea is recycled into organic fertilizer, livestock feed, or compost, while the liquid waste extracted from waste is fermented into gas or bio-oil for use. This is a closed-loop cycle from collection, processing, to recycling of products in a "symbiotic" fashion.

3. Some Lessons Learned on the Role of the State in Circular Economy Development in Vietnam.

The issue of circular economy development in Vietnam poses several fundamental questions. Firstly, implementing a circular economy in Vietnam has some basic advantages. The orientation towards developing a circular economy was mentioned in Resolution No. 55-NQ/TW dated February 11, 2020, by the Party Central Committee on the National Energy Development Strategy of Vietnam by 2030, with a vision to 2045. It emphasizes the priority of developing renewable energy, building waste-to-energy power plants, and protecting the environment while promoting a circular economy. Resolution No. XIII of the Party Congress continues to affirm the strategy of "building a green, circular, and environmentally friendly economy" and "encouraging the development of circular economy models for comprehensive and efficient utilization of production outputs." The 2020 Environmental Law also legalized provisions on the circular economy.

Moreover, as Vietnam is in the process of perfecting its market-oriented economic system with policy innovations contributing to rapid and sustainable economic development, the country is undergoing a significant shift from a linear economy to a circular economy with various new business models based on scientific and technological innovation. The development of the Fourth Industrial Revolution, linked with advanced technology and digital transformation, will also provide significant opportunities for exploring solutions to improve resource efficiency and promote the circular economy. The circular economy will reduce the pressure of resource scarcity, environmental pollution, large volumes of waste, especially plastic waste, and minimize the release of greenhouse gases, contributing to the realization of sustainable development goals and climate change mitigation. Therefore, the development of the circular economy will receive widespread support from society.

In addition, from a business perspective, the circular economy offers a new perspective on the relationship between the market, customers, and natural resources, thereby contributing to promoting innovative business models and breakthrough technologies that enable businesses to

achieve higher growth through cost reduction, energy consumption reduction, CO2 emissions reduction, supply chain enhancement, and resource conservation.

The circular economy is a distinctly different business approach that forces companies to rethink everything, from product design and manufacturing to their relationship with customers. The advantage of the circular economy is that it not only allows businesses to thrive but also aims for a zero-emission economy while protecting the environment, thereby addressing the long-standing relationship between economic growth and negative impacts on the environment.

Secondly, implementing the circular economy in Vietnam is currently facing many difficulties and challenges. The biggest challenge is the cost of recovering resources from waste. The circular economy is a closed-loop model that uses the waste from one cycle as the input for the next cycle. In Vietnam, the amount of waste is projected to double in the next 15 years. Vietnam's recycling rate for waste is currently less than 10% of total waste, which is relatively low compared to countries that have adopted circular economy models. Plastic waste and nylon bags account for about 8-12% of household solid waste nationwide. If an average of 10% of plastic waste is not reused but disposed of completely, it would release about 2.5 million tons of plastic waste into the environment annually. High waste rates pose difficulties in managing waste collection and resource recycling.

The current economic system in Vietnam is geared toward the needs of a linear economy. Businesses make economic decisions based on market signals, without paying much attention to positive or negative external factors related to society and the environment. Circular economy business models are more challenging to develop because most investors are still following the logic of a linear economy. Many companies still focus on short-term value creation, while the circular economy is a model that creates long-term value. Another challenge comes from consumer awareness in Vietnam regarding the use of circular economy products. In many countries, consumers actively support products labeled with CE (Circular Economy), whereas in Vietnam, many products made from by-products, scrap materials, recycled materials, etc., are not certified and have limited market acceptance. Legal and infrastructure conditions for the development of the circular economy are lacking, making it difficult to implement new business models.

The circular economy requires a strategy for product design that emphasizes long-term use and plans for returning materials to the economy later. This requires significant investment in waste collection, sorting, and recycling infrastructure, while the demand for circular products and alternatives is still low. Vietnam also lacks experts with sufficient knowledge of technology to develop the circular economy. To promote the development of the circular economy in the future for sustainable national development, Vietnam needs to improve its legal framework and policies to stimulate the circular economy, reduce dependence on natural resources, and promote growth. It needs to establish a database on the circular economy linked to economic digitization and the Fourth Industrial Revolution. Promoting collaboration between economic sectors and

social organizations in building the circular economy in Vietnam, with the government taking a leading role, is essential. At the same time, public awareness should be raised to change the mindset about growth, improve the quality of life, and integrate environmental protection into production and business activities.

In Vietnam, the Party and State's orientation and policies towards sustainable economic development have been affirmed. Vietnam continues to refine its socialist-oriented market economy, transitioning from a linear economy to a circular economy with many new business models based on the application of science and technology and policy innovations, contributing to rapid and sustainable economic development. On February 11, 2020, the Politburo issued Resolution No. 55-NQ/TW on "Orientation of Vietnam's National Energy Development Strategy to 2030, Vision to 2045," which prioritizes the development of renewable energy and the establishment of waste-to-energy plants to protect the environment and promote circular economy. The 2020 Environmental Protection Law officially legislates provisions on circular economy. The 13th Party Congress Resolution reaffirms the direction of "building a green and circular economy, environmentally friendly," and "developing a roadmap, mechanisms, policies, and laws to establish and operate a circular economy." In addition, many state policies have been enacted to promote sustainable economic development. In 2016, the government issued the National Action Plan on Sustainable Production and Consumption (SCP). In 2017, the Prime Minister approved the "Development Plan for Vietnam's Environmental Industry until 2025" to form the environmental industry capable of meeting the requirements of the circular economy. In 2020, the Prime Minister approved the "National Action Plan on Sustainable Production and Consumption for the period 2021-2030." On June 7, 2022, Deputy Prime Minister Le Minh Khai signed Decision No. 687/QĐ-TTg approving the "Development of Circular Economy in Vietnam" project. The specific goals of the project are to reduce greenhouse gas emissions by at least 15% by 2030 and strive to achieve net-zero emissions by 2050. At the same time, it aims to enhance the awareness and investment interest of domestic and foreign businesses and investors in the circular economy model, promoting the greening of various economic sectors. Additionally, there are several laws and policies related to this, such as the Mineral Law, Resource Law, laws on marine and island environment, Vietnam Sustainable Development Strategy 2011-2020, and the National Green Growth Strategy for the period 2021-2030. To further advance the transition to a circular economy in Vietnam, experiences from other countries have shown that the role of the State is crucial. Lessons learned from studying the experiences of governments in Europe, the Americas, and Asia include:

Firstly, in the context of sustainable development, green growth, and circular economy, one of the key goals is to develop policies that are appropriate for these objectives. It is crucial for the government to formulate such policies.

Secondly, the government should continue to build a legal framework and policies that encourage and support the development of a circular economy. Additionally, the government needs to clearly outline the roadmap for creating laws that promote the development of circular economic models.

Thirdly, the government should implement policies that encourage businesses to invest strongly in circular economic models, with a focus on investment efficiency and the promotion of corporate social responsibility in circular economic development.

Fourthly, there should be measures to encourage and promote the development of the circular economy, including:

(i) Support mechanisms for innovation in resource-efficient products and services (tax incentives, interest rate support, etc.). (ii) Promotion of consumption of such products through government procurement and VAT incentives, while imposing fees and taxes on products and services that do not promote resource efficiency. (iii) Imposing ecological standards on certain products and industries, while enhancing market monitoring capacity of state management agencies to ensure compliance with ecological standards. (iv) Improving legal mechanisms to ensure that existing regulations do not hinder the development of efficient resource products, services, or business models. (v) Eliminating environmentally harmful subsidies.

Fifthly, to build a circular economy, Vietnam and its localities should focus on several directions and solutions:

(1) Establish special incentive mechanisms (tax incentives, financial support, etc.) to encourage industrial businesses to innovate and apply green technologies, clean production, and environmentally friendly processes. (2) Emphasize the application of the circular economy within industrial zones by developing eco-industrial parks. (3) Create mechanisms for the collection, treatment, and recycling of waste. (4) Effectively address environmental pollution at sites such as landfills, fishing ports, and beaches contaminated by wastewater from business establishments. (5) Develop incentive mechanisms to attract environmentally oriented service businesses with advanced treatment technologies. (6) Promote circular economic models in agriculture, including recycling materials in the production of agricultural products, reducing resource inputs, and minimizing waste accumulation. (7) Develop integrated circular economic models that combine agriculture and industry, where large-scale, specialized agricultural production is closely linked to product processing, waste recycling, and the use of solar energy to create a circular economic approach.

These steps and strategies are aimed at fostering the development of a circular economy in Vietnam and ensuring sustainable and environmentally friendly economic growth.

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