Green Economy, Circular Economy And Sustainable Economic Development Index: Some Theoretical Analysis From Current Approaches

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ABSTRACT: In recent years, research approaches on green growth, green economy and circular economy have attracted both developed and developing countries. The study of how the world approaches in recent years has a practical significance in building indicators of sustainable economic development. Analyzing articles regarding the above issues recommend some lessons for nations, especially in building measuring tool. Firstly, in terms of green growth, increasing renewable products such as wind power, marine microalgae and other fuels may contribute to greening growth and green economy. Building a hierarchical material management system based on principles of circular economy is recommended.

KEYWORDS: Circular economy; Development; Green; Index; Sustainable.

1. INTRODUCTION

Sustainable economic development is a long-term approach for producing and business activities of a country. Sustainable development is associated with environmental issues, social welfare and rational use of resources and materials. For example, (Aksoy & Bayram Arlı, 2020) check the hypothesis whether aspects of sustainable development have an impact on sustainable happiness, well-being and life satisfaction. At the same time, does economic freedom also lead to higher happiness levels? Do environmental influences have a direct effect on happiness and the impact on human health? Does social sustainability create life satisfaction in society? According to the analysis results, the environmental aspect of sustainable development has a positive correlation with sustainable happiness. Furthermore, another finding is that improvements in social sustainability have a positive impact on sustainable happiness.

Firstly, it is essential to assess and understand the quality of economic growth to create a scientific and sustainable strategy. As a helpful complement to traditional economic indicators, the Genuine Progressive Index (GPI) may be a good indicator for assessing environmental and social costs. (Long & Ji, 2019) estimate the GPI for all 31 provinces in China from 1997 to 2016. The results show that the GPI per capita has recently decreased in some regions, presenting a threat to social welfare and sustainability. Secondly, natural resource consumption and environmental pollution, especially water pollution and carbon emissions, will cause significant welfare losses. Thus, the environment, economic development and social welfare are closely related.

Consequently, it can be said that sustainable development in a nation has a close and positive relationship with general economic development activities, including each enterprise's production and business activities. In recent years, research approaches to green growth, green economy and circular economy have interested both developed and developing countries. Studying main approaches to related issues in recent years has great practical significance. As a result, this study will focus on research trends on green growth, green economy and circular economy worldwide. On this basis, some lessons for developing countries are suggested, especially regarding sustainable economic development and building indicators.

2. MODERN TRENDS IN SUSTAINABLE DEVELOPMENT

Green growth and green economy

There are conflicting views on economic development, sustainable development and green growth. Some scholars defend that green growth can be achieved without harming economic growth. Others argue that preserving sustainability by consuming goods in a way that promotes economic growth at all costs is impossible. (Fernandes et al., 2021) analyze aggregated country-level data from OECD, including statistics on national, population and environmental accounts including patents from 1990 to 2013 of 32 countries with 591 observations. Using a quantitative model, the authors confirm that sustainable technological transformation and sustainable innovation will promote green growth, which positively impacts economic growth. The authors have added more insight to the

debate on green growth, economic growth and sustainable development. From there, they have also provided some political and regulatory implications.

Also related to green growth, greening the economy has been widely discussed as a new strategy to reduce environmental pressures while promoting economic growth and improving social welfare. Indicators are a tool that can be used to describe the evolution of green growth. (Lyytimäki et al., 2018) present and evaluate the process of efforts to develop a set of critical indicators of green growth in line with policy for Finland. It is said that both the experts preparing the indicators and the potential users will benefit from a collaborative process. It is because it aims not only to build a shared awareness of the critical issues of green growth but also to foster a realistic understanding of the strengths and weaknesses of the indicator approach. The indicator is essential in measuring green growth which can be applied to other developing countries.

Regarding carbon emissions, (Zhang, 2015) assesses China's efforts and impacts on low-carbon green growth (LCGG) and explores the policy implications of reforming China's LCGG strategy. The author firstly evaluates China's actions in four key areas - reducing carbon, building the market, promoting green industries, and managing the negative impacts of the LCGG. Then the author evaluates China's LCGG and low-carbon effects on growth. The results show that an increasingly stringent low-carbon policy has not slowed the country's economic growth as some had predicted. Instead, this policy has promoted green industries and brought impressive quality improvements, including structural change and increased employment. According to the author, China must reform its LCGG strategy by strengthening existing LCGG efforts and rethinking the development's purpose to tackle global climate change and seize green growth opportunities. The nation should shift from a high GDP development model to a well-being-oriented development model.

It is widely recognized that the benefits of "going green" and "going clean" have not been studied that focus on the impact of green strategies on business growth. Using panel data from 732 companies in the four major industrialized economies (US, Germany, France and the UK), (Lartey et al., 2020) find that lean green strategy is positively related to business growth. This relationship is further enhanced when there are competition and family ties. Similarly, (Tan et al., 2016) again explore the concept of consumers' green perceptions (CGP), including current perceptions of consumers about green products, green consumers, green consumption practices and green marketing communication. The authors hypothesized that CGP could influence their consumption behaviour and willingness to be green. The authors do a survey in Australia and New Zealand to test the hypothesis made in the exploratory study. The authors have identified five aspects that underlie CGP, including "product awareness", "difficulty to become green", "green stigma", "responsibility", and "willingness to become green". Their findings are the background for further studies on green perception.

Green growth based on input

Green growth is not only related to outputs but also plays an essential role in inputs. For instance, environmental innovation's impact may be based on direct and raw materials inputs. One analysis was conducted in European countries from 1990-2012, using panel data showing that the results differ across occupations (Wendler, 2019). The first finding is innovative works in the input sector with direct materials and raw material inputs. Thus, it can be seen that technological innovation has helped the environment to be better and save more raw materials. Technological innovation will involve input materials, so some natural ingredients will be included in the production process. For example, microalgae are gradually becoming a sustainable and growing natural green source for high-demand market products (Forján et al., 2015). Research looks at promising outstanding applications of microalgae among which are the production of biofuels from the fatty acids present in biomass, functional foods enriched with microalgae healthy bioactive molecules, and greenhouse gas mitigation (CO_2 consuming) based on high cell density microalgae cultures technology. Besides, other traditional microalgae applications are increasing in competitiveness in the growing market demand for green biomass. Microalgae applications are widely recognized as a healthy, sustainable, and biological renewable resource. Among the applications, microalgae is being used to improve the nutritional quality of animal feeds, especially in aquaculture. In addition, microalgae also have a function in wastewater treatment, preventing heavy metals and other pollutants.

Circular economy

In 2015, the EU launched a circular economy roadmap (CE), followed by a concrete action plan. In line with global trends, Taiwan has also promoted the CE concept. In 2016, Taiwan's president announced that the country was looking to transition to a circular economy and initiated several measures to implement this plan. Taiwan's electronics industry plays a vital role in the local economy

and represents several resource-intensive sectors. The nation relies heavily on imports in the context of limited natural resources. Because Taiwan's industrial sectors have integrated closely into the global electronics supply chain, the transition to a circular economy could benefit the domestic industry and the environment and create changes in the global electronics industry. By studying the case in Taiwan, the author (Ibitz, 2020) find the initially positive steps toward CE. The author also suggests that Taiwan will need to take a comprehensive policy approach to overcome obstacles and reap the benefits of the CE platform.

Studying circular economy from a different view, according to (Ibrahim & Shirazi, 2021), Qatar's per capita water and energy consumption is among the highest in the world. Reducing energy and water use and its environmental impact is essential. The CE background ensures that economic growth does not necessarily lead to more resource consumption. The study explores the relationship between the energy-water-environment and how Qatar can leverage this to transition to CE. The study recommends the nation raise public awareness of the transition from a linear to a circular economic model. Moreover, the country should develop a comprehensive policy on the circular economy approach and towards Vision 2030.

Approaching circular economy (CE) in terms of efficiency and material utilization again, a study in the United States clearly shows the superiority of applying the circular economy model (Richa et al., 2017). A waste management hierarchy derived from the (CE) has been used for the end-of-life lithium-ion batteries of electric vehicles (EVs). Accordingly, based on the CE hierarchy, eco-efficiency metrics are applied to assess the environmental and economic benefits of managing 1,000 end-of-life EV battery packs in the United States. The results indicate that if technology and the market support reuse of batteries in electric vehicles, these benefits are magnified almost tenfold. When retired EV LIBs are cascaded in a second use for stationary energy storage, thereby replacing the need to produce and use less-efficient lead-acid batteries. Reuse and cascaded services can also provide EV owners and the utility sector with cost savings. However, the magnitude of future economic benefits is uncertain, given that future prices of battery systems are still unknown. The results indicate that direct and cascaded reuse, followed by recycling, can reduce eco-toxicity burdens much more than landfill bans alone.

And regarding the utilization of fuel, for example, when studying the case of a Europe country, according to (Savini & Giezen, 2020), the anchovy canning industry is essential in the Cantabria Region (Northern Spain) in terms of economy, society and tourism. Cantabrian canned anchovies are world famous for their traditional and artisanal production. The canning process generates a large amount of food waste. Proper food waste management can contribute to the environment and the economy, closing the product's life cycle. For example, the system may utilize fish heads and bones to produce fishmeal and fish oil and determine anchovy meat to create anchovy meals. Fuel oil production is a solution to fish heads and bones, so several improvements have been made. And the final step is producing polymers and glass for packaging, and even it is the least eco-friendly aspect of the process. Obviously, it is a better fuel utilization when compared to other alternatives such as incineration and landfill. Thus, any systematic approach is helpful for a circular economy, but it depends on the manager's decision.

Using raw materials will be more effective if science and technology are applied. (Shojaei et al., 2021) explore blockchain as a promising technology to facilitate CE in the built environment. The results show the feasibility of blockchain as a CE support tool in the construction environment. With blockchain, the current state of each material and component can be tracked, making proactive planning for their reusability easier and more realistic. The findings from the case study suggest that blockchain can provide energy and material traceability fairly specific, allowing users to make predictions about the recycling and reuse of materials and goods used in the construction environment. Blockchain is also a viable and novel approach to using CE concepts in construction.

3. CONCLUSION

Developing a set of indicators based on green growth and circular economy principles is necessary because these indicators will play a role in reflecting the health situation of an economy. These green indicators can include indexes at the provincial level with an assessment of low carbon access, and they will give provinces more tools to ensure sustainable development goals. In terms of green growth, increasing usage of renewable products such as wind power, marine microalgae and other fuels can contribute effectively to greening growth and the economy. In addition, to the basics of circular economy, a developing nation should build a hierarchical material management system with circular economy principles. This system will help them use all available materials without affecting the living environment. Moreover, applying science and technology and information technology such as big data or blockchain to support the operation of the circular economy is suggested in this nation. This application will bring high efficiency to the production and business process and ensure that people's living environment is always natural and fresh.

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