

Frontiers in South and Southeast Asian Development Research

Almas Heshmati
Pham Khanh Nam *Editors*

Circular Economy and its Implementations in Southeast Asia

 Springer

Frontiers in South and Southeast Asian Development Research

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Circular Economy and its Implementations in Southeast Asia

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Circular Economy and Its Implementations in the Southeast Asia



Almas Heshmati and Pham Khanh Nam

Abstract This edited volume consists of a collection of contributions to the circular economy (CE) and its implementations in Southeast Asia. The focus is on waste management and recycling, regulatory, monetary, and financial policies and CE transition and its implications for sustainable development. It provides a comprehensive overview of the application of CE from various perspectives. The volume links environmental theory and practice and offers practitioners a deeper understanding of the topic and challenges in its implementation. It looks at the macro, meso, and micro context of the circular economy implementations, from the environmental, societal, and government views across countries in Southeast Asia. It presents approaches and practical examples of how to shape environmental policy to successfully implement a CE locally, regionally, and nationally. It provides analysis of deficiencies of current environmental policies and regulations and suggests integrated environmental policies for a circular economy supported by empirical evidence at the regional level. Thus, the manuscript is a timely and practical guide for sustainability researchers and policymakers in Asia in their progress to achieve circular economy and sustainable development goals in the fast-growing economies in Southeast Asia.

Keywords Circular economy · Sustainable development · Southeast Asia · Environmental policies and practices · Waste management and recycling · Regulatory and financial policies · Implementation of circular economy

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1 Introduction, Summary, and Policy Recommendations

1.1 Introduction and Summary

Almas Heshmati and Pham Khanh Nam

This edited volume consists of an introduction to and a summary of the contributions to the circular economy (CE) and its implementations in Southeast Asia and ten contributed chapters. The research is divided into three parts of contributed chapters on (1) waste management and recycling; (2) regulatory, monetary, and financial policies; and (3) circular economy transition and its implications for sustainable development. The applications are diverse and cover several countries in Southeast Asia including Malaysia, Vietnam, and regions of the Association of Southeast Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC) in comparison with the European Union (EU)—the leader in environmental economics and sustainable development.

The circular economy and its implementations include studies of the transition from the linear economy, and it explores examples of the circular economy implementation in Southeast Asia which is a densely populated region with significant share of the world production. Unlike other books which majority of them provide narrow perspectives of wide-ranging aspects of circular economy, such as recycling, businesses models, waste management, and supply chains, this collected volume provides a comprehensive overview of the application of circular economy from various perspectives and different parts of Southeast Asia. Its unique and empirical insights into the approaches, methods, laws, and policies that enable countries to make the transformation to a circular economy show how recent research, trends, and attitudes mature to be practiced in actual policies that are oriented to achieve the common sustainable development.

Global consumption of some raw materials is currently exceeding the Earth's regenerative capacity. Circular economy offers a more sustainable model to raw material use, both depletable and renewable materials, and it provides new business opportunities and employment generation in green areas. A circular economy is rebuilding different forms of capital to reduce, reuse, and recycle material offering opportunities and solutions to recovery of nature and many problems faced by humans. This book is edited and written by editors and authors experienced in the field and with potential use by practitioners of sustainable development in Asia. It contains practical examples and case studies with real data that are used to evaluate implementation of circular economy.

The volume links environmental theory and practice and offers practitioners a deeper understanding of the topic and challenges in its implementation. It looks at the macro, meso, and micro context of the circular economy implementations, from the environmental, societal, and government views across countries. It presents approaches and practical examples of how to shape environmental policy to successfully implement a circular economy locally, regionally, and nationally. It provides analysis of deficiencies of current environmental policies and regulations and

suggests integrated environmental policies for a circular economy supported by empirical evidence at the regional level. Thus, the manuscript is a timely and practical guide for sustainability researchers and policymakers in Asia in their progress to achieve a circular economy and sustainable development goals.

This book offers an up-to-date picture of the environment in the fast-growing economies in Southeast Asia. The countries in the region have invested heavily in development infrastructure and cooperate to develop in an environmentally sustainable way. This edited volume is written by professionals with good insights into the features of the region's economies and their development potential. The chapters provide an up-to-date empirical research-based picture of the recent trends in the region's economic development. The target audience are educators, undergraduate and graduate students, domestic and foreign investors, government agencies, provincial and industrial sector decision-makers, trade partners, libraries, and individual researchers, as well as professional and practitioners of environmental policy, circular economy, natural resource management, and sustainable development. This book helps to fill the gap in knowledge about the Southeast Asian economies and their environmental conditions and development potential.

1.2 Part 1: Waste Management and Recycling

This part consists of two chapters. The first chapter covers circular economy as an optimizer of waste management with a comparative analysis of the EU and ASEAN countries with development implications. The second chapter provides a review of e-waste estimation methods and models employed in SAARC and ASEAN member countries.

In recent decades, plastic waste has risen to the forefront of worldwide concerns, primarily due to its pervasive presence in both terrestrial and marine ecosystems. This alarming trend is attributed to the increasing consumption of raw materials, the problems associated with recycling and management of plastic material, and heightened pollution levels. Nguyen Phuong Dung and Vu Truc Hanh in second chapter conduct a comprehensive review of *Circular Economy: Optimizing Waste Management—A Comparative Analysis of the European Union and ASEAN with Development Implications*. The issue is important to the ASEAN member states. The ASEAN Community Vision 2025 aims at establishing “vibrant, sustainable and highly integrated economies.” Achieving this goal necessitates departure from the traditional linear economy characterized by wasteful consumption and disposal. Instead, it calls for a transformative shift toward a sustainable and regenerative circular economy paradigm with core principles of waste reduction, recycling, and resource efficiency. This research attempts to offer the means to address the menace of plastic waste but also a pathway to sustaining economic growth while preserving and restoring the environment. Through the adoption of a circular economy framework, ASEAN nations will have the potential to harness the dual benefits of environmental preservation and economic development. This chapter conducts a

comprehensive review and comparative analysis of the policy and regulatory frameworks governing the development and implementation of the circular economy in the European Union. It is offering valuable lessons and implications for enhancing circular economy practices in the ASEAN region.

Electronic waste (e-waste) refers to waste generated from the disposal of electrical and electronic equipment. A report titled “Global E-waste Monitor 2020” estimates total e-waste generation in the world as 53.6 million metric tons (MMt), which is expected to cross 74 MMt by 2030. Electrical and electronic equipment are of different types and kinds, some of which are reused, and some are not. In Chapter Prajyot P. Gaonkar conducts research entitled *A Systematic Review of E-Waste Estimation Methods and Models in SAARC and ASEAN Countries*. For empirical part of this study, SAARC and ASEAN member countries are considered. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISAM) guidelines are followed for this research. The methodological section includes three key stages which are identification, screening, and filtering the literature. The three broad levels of analysis are publication specific, method/model specific, and comparative analysis. Suggestions and future research issues are discussed.

1.3 Part 2: Regulatory, Monetary, and Financial Policy

This part consists of four chapters related to regulatory, monetary, and financial policy associated with circular economy and its implementation. The first chapter looks at the transmission mechanism of monetary policy and circular economy in Vietnam. The second chapter investigates the barriers of law regulation to a circular economy in SMSs and their integration in a national sustainable development strategy. The third chapter sheds light on international experience on financial policy to promote the process of collecting and recycling scrapped vehicles and draws some useful practicable lessons for Vietnam. The last chapter investigates electronic banking fraud prevention in Vietnam in the context of a circular economy.

In Chapter entitled *A Transmission Mechanism of Monetary Policy and Circular Economy in Vietnam*, Quach Duong Tu and Cao Minh Tuan examine the transmission mechanism of monetary policy and the circular economy in Vietnam. The period of study is from 2000 to 2020, utilizing a semi-structured vector autoregression (SVAR) model. The study identifies exogenous shocks to monetary policy that are beyond the control of the State Bank of Vietnam. The results indicate that monetary easing shocks lead to economic growth recovery after four quarters, but it results in a significant increase in the discount rate. Another finding is that the consumer price index initially shows no response, posing difficulties in monetary transmission. The analysis of exchange rate shocks also reveals substantial pressure on the domestic currency to depreciate. The monetary policy index closely associates changes in the State Bank’s response with innovations in the exchange rate. This research highlights the intricate dynamics of the transmission mechanism of

monetary policy shocks in Vietnam and their impact on implementation of the circular economy and its policy outcomes.

Circular economy in practice is broadly defined as a regenerative industrial economy that captures vast amounts of resources for repeated use while positively impacting the environment and natural resource capital. It has been linked to significant economic, environmental, and health benefits. The significant role of small and medium-sized enterprises (SMEs) in most economies provides a base for an empirical analysis that allows to explore the potential for implementation of the circular economy in SMEs. The implementation and barriers for the transition to circular economy are evidenced in the process to integrate in a sustainable development strategy. Chapter written by Ngoan Võ which is entitled *Barriers of Law Regulation to a Circular Economy in SMEs to Integrate in a Sustainable Development Strategy*. Based on the described scenario of challenges and opportunities, the study conducts a legal analysis and shows that companies are obliged to complying with the law system in Vietnam. This study shows that the barriers and opportunities have been mainly validated in general and increase attention and awareness to introduce actions necessary to encourage SME's development in line with circular economy principles.

Vehicles are the main source of transportation of persons and goods. Scrapped or end-of-life vehicle (ELV) disposal is expected soon to become a serious challenge for countries as the vehicle market in many countries continues to accelerate, while vehicle life expectancy is declining. This leads to the market for used vehicles and recycled parts expected to continue to expand. If ELV disposal is not handled appropriately, serious social and environmental problems will arise, and costly neglect will harm property and circular economy business opportunities. Therefore, to reduce waste to protect the environment, countries aim to encourage the reuse and recycling of ELV components by rapidly recovering ELVs. In Chapter Pham Hoang Ha and Pham Thi Thu Hong studied *International Experience on Financial Policy to Promote the Process of Collecting and Recycling Scrapped Vehicles and Lessons for Vietnam*. The country has been oriented to apply appropriate fiscal policy to support the recovery of discarded vehicles to enhance their reuse and recycle. The article studies the experiences of developed and developing countries in establishing fiscal policy mechanisms to contribute to the recovery of waste vehicles. An acceleration of the process of recovering discarded vehicles from manufacturers and users will provide important lessons for implementation of reuse, repair, and recycle principles of circular economy in Vietnam.

Banking systems in all countries are digitalized. Mobility of capital in the fast-growing international capital market is significantly higher than mobility of goods and labor. Digitalization has increased the speed of transactions significantly, and technology has been labor saving. Chapter authored by Ha Le Thuy is entitled *Electronic Banking Fraud Prevention in Vietnam in the Context of a Circular Economy*. The article investigates electronic banking fraud and clarifies fraud in the banking sector. The phenomenon is one of the risks arising in the circular economy. It highlights current methods of e-banking fraud through research and learns about legal regulations domestically and internationally. In addition, the

article also identifies the risks and challenges for preventing e-banking fraud in Vietnam. It can be instrumental to finding effective electronic banking fraud prevention solutions to enhance implementation of circular economy in Vietnam.

1.4 Part 3: Circular Economy Transition and Its Implications for Sustainable Development

This part consists of four chapters presenting research on transition from a linear economy to circular economy. The first chapter elaborates on closing the loop by investigating how energy use efficiency labeling supports circular economy goals. The second chapter looks at the impacts of climate change on circular economy development and ensuring human rights and well-being of the population in Vietnam. The third chapter reviews the EU's legal framework for secondary raw material use, and it provides recommendations for Vietnam secondary material management. The final chapter explores the ambitions and needs of SMEs in transition to circular economy in Vietnam.

Energy labels serve as a crucial tool for educating consumers on the energy efficiency of household appliances. These energy labels enable consumers to make wise decisions that save energy and money and reduce their carbon footprint by providing precise information on appliances energy consumption. Energy-efficient appliances promote sustainability by reducing energy consumption and greenhouse gas emissions and conserving depletable and scarce resources. By conserving natural resources and minimizing resource extraction and waste generation, energy efficiency together with circular economy promotes sustainable development for future generations. Mahirah Kamaludin, A. A. Azlina, Awang Noor Abd Ghani, and Zaiton Samdin contributed Chapter entitled *Closing the Loop: How Energy Efficiency Labeling Supports Circular Economy Goals*. This study observes the Malaysian state of public awareness and knowledge of energy-efficient labeling and its acceptance. The study has collected primary data from 791 participants in selected states of Malaysia. About 75% of the samples are willing to pay more for energy-efficient appliances to support sustainability. The study found that age, employment status, and environmental awareness are important factors that drive the public willingness to spend more on energy labeled appliances. Energy labels provide information about energy consumption and the environmental impact of the products, thus supporting application of the circular economy. Recognition of the labels relevance by policymakers, industry stakeholders, and the public is crucial for employment of energy-efficient labeling. Besides, the energy labels play a vital role in accomplishing sustainable development goals 7 (SDG 7), namely, "Affordable and Clean Energy."

Climate change is said to be one of the biggest challenges humanities are facing in the twenty-first century, and Vietnam is one of the most vulnerable countries in the world. Weather phenomena such as droughts, floods, landslides, and storms have

complicated developments. The risk of forest fires in the North Central and Central Highlands ecological regions is increasing. The literature shows that the risk of landslides in mountainous areas is affecting the agricultural and industrial economy, impacting on human rights and social justice. The environmental and health consequences threaten the assurance of human rights standards in Vietnam. Chapter written by Dang Thi Ha and Tran Thi Dieu Ha is entitled *Impact of Climate Change on Circular Economy Development and Ensuring Human Rights in Vietnam*. According to some studies, it is more difficult to ensure human rights standards in developing countries, and disadvantaged groups are most vulnerable to the impacts of climate change. In addition, they also suffer serious impacts from greenhouse gas emissions when living in urban areas or near industrial zones. In recognizing the seriousness of climate change, Vietnam is searching for solutions to deal with this situation. The potential measures include transition of the agricultural economy that is dependent on resources and heavy industry to a circular economy and reduction of greenhouse gas emissions which are strategic goals. The focus here is on the nexus between minimizing the impact of climate change, maintaining economic growth, and ensuring human rights standards.

Secondary raw materials refer to material that is not the primary products from manufacturing and other industrial sectors. The significance of secondary material in production is important for material use, application of circular economy, and achievement of sustainable development. Huynh Phan Nhu Ngoc and Nguyen Ngoc Phuong Dinh in Chapter focus on the issue of *EU's Legal Framework for Secondary Raw Materials and Recommendations for Vietnam: Toward Sustainable Resource Management and Circular Economy*. This study explores the European Union's legal framework for secondary raw materials and offers customized recommendations to empower Vietnam in the pursuit of sustainable resource management and adoption of circular economy principles to reduce, reuse, and recycle materials. The paper delves into key EU directives, regulations, and policies adopted to Vietnamese conditions and emphasizes their role in optimizing secondary raw materials. A comparative analysis of Vietnam's current regulations is provided, and attempt is made to identify opportunities for alignment. Additionally, the article showcases practiced examples of sustainable approach to recycled materials. The authors present a theoretical framework for circular economy implementation and methodology for secondary raw materials. Detailed statistical data on the circular material use rate in the EU and a case study on Vietnam's initial success further enrich the content. The analysis paves the way for Vietnam's transition toward a sustainable development and circular economy.

Small and medium-sized enterprises (SMEs) are considered as the backbone of economies. SMEs drive growth, provide new employment opportunities, and open new markets. SMEs contribute significantly toward gross domestic product (GDP) and supply and anchor big retail businesses with products and services. Circular business model allows SMEs to capitalize on the economic benefits of reusing resources and minimizing waste by recycling, contributing to firms' profitability, growth, survival, and environmental sustainability. The circular economy promotes resource use efficiency, reuse of resources, repairs, and recycling. In addition, the CE

approach cuts costs for businesses and consumers and reduces dependence on fragile and volatile markets for raw materials. The final Chapter written by Nguyen Cong Thanh and Timber Haaker is labeled *Exploring the Ambitions and Needs of Small and Medium-Sized Enterprises in the Transition to the CE in Vietnam*. The survey results from a sample of 69 SMEs operating in the northern, central, and southern regions of Vietnam are reported in this study. The surveyed enterprises show their ambitions in implementing the CE in the future. The key issues motivating SMEs to adopt CE business model fall into economic, financial, and market categories. The key barriers to adopting CE business models relate to technological and cultural factors. SMEs in Vietnam lack experience and knowledge of CE business models. The results show a strong need for supporting SMEs in Vietnam to gain a better understanding of the CE approach. The findings point to importance of public support playing a role to enable a more effective CE adoption and implementation in Vietnam.

2 Editor Policy Recommendations

Promoting the circular economy in Southeast Asia requires a set of policy recommendations that integrate economic growth with environmental stewardship. These recommendations, derived from the ten chapters of this volume, address the unique challenges and opportunities in the region circular economy adaptation.

One key recommendation is for ASEAN member states to adopt a circular economy (CE) framework tailored to the region's needs to address the growing plastic waste problem. Drawing on the European Union's success, countries should focus on reducing, reusing, and recycling (3R principles of CE) plastic waste. This requires strong laws that make producers responsible for waste and promote sustainable waste management. Collaboration across ASEAN, such as setting common standards in using plastics and other materials and sharing knowledge, will help to protect the environment and drive green economic growth. Involving businesses and local communities is essential to make the transition to a circular economy inclusive and sustainable.

Standardized methods for estimating electronic waste (e-waste) are essential for better management in SAARC and ASEAN countries, as suggested by Chapter "A systematic review of E-waste estimation methods and models in SAARC and ASEAN countries". Governments should implement consistent and reliable methods to ensure accurate data collection and informed policy decisions. By doing so, countries can better compare e-waste data and coordinate regional efforts to address e-waste challenges. Focusing on future e-waste estimates and using advanced statistical models will help to prepare for potential increasing amounts of electronic waste. These practices will support recycling and disposal strategies, therefore reducing negative environmental and health impacts.

To effectively address the unique challenges of the circular economy, as an example, Vietnamese policymakers can develop a more resilient and adaptive

monetary policy approach. Chapter “A transmission mechanism of monetary policy and circular economy in Vietnam” implies that Vietnam’s monetary policy could benefit from allowing more flexibility in the exchange rate rather than maintaining tight control. This adjustment would enable the exchange rate to better reflect actual economic conditions, leading to greater stability. Furthermore, managing inflation by addressing underlying causes, such as supply chain issues, rather than relying solely on monetary policy, would promote more stable prices and support implementation of sustainable growth. Directing increased money supply toward production sectors like manufacturing would stimulate investment and job creation, in particular green jobs, while clear communication from the central bank about inflation targets would reduce uncertainty and build confidence among business community and consumers.

Chapter “Barriers of law regulation to a circular economy in SMEs to integrate in a sustainable development strategy” suggests that simplifying and clarifying regulations is critical to helping small and medium-sized enterprises (SMEs) in Vietnam to adopt circular economy practices. Updating laws to better support recycling, waste reduction, and sustainable material use will make it easier for SMEs to engage in material circular practices. Offering incentives such as tax benefits, easier access to funding, and support for green technology innovation activities will further encourage SMEs to prioritize sustainability. Improved collaboration between the government, industry, and educational institutions is also necessary, providing SMEs with the knowledge, training, and support needed to overcome barriers related to a lack of expertise, knowledge, or resources. Building supportive infrastructure, including better waste management systems and accessible recycling facilities, will further enable the adoption of circular economy practices.

Financial policies that incentivize the proper disposal of end-of-life vehicles (ELVs) could significantly improve recycling efforts in Vietnam. Offering financial rewards for vehicle owners who take their old vehicles to authorized recycling facilities, funded by taxes or fees from vehicle sales, would make this option more attractive than informal markets. Implementing prepaid recycling fees at the point of new vehicle purchase could also support the recycling process and raise consumer awareness about more responsible disposal. Tax breaks or fee reductions for those who recycle their old vehicles and purchase new ones would encourage the shift to cleaner, more efficient models. Enhanced vehicle registration and monitoring systems would further help to manage ELV issue effectively.

Combating electronic banking fraud in Vietnam requires strengthening security measures and raising public awareness, as Chapter “Electronic banking fraud prevention in Vietnam in the context of a circular economy” concludes. The government and banks should adopt advanced technologies to protect customer data and regularly update security systems to stay ahead of evolving fraud methods. Public awareness campaigns are crucial to educate customers about common fraud tactics, such as phishing, and provide guidance on protecting personal information. Enhancing regulations and enforcement by updating laws and imposing severe penalties on fraudsters will also be necessary. Collaboration between banks, government

agencies including environmental agencies, and international organizations will improve the identification and mitigation of risks.

Chapter “Closing the loop: How energy efficiency labelling supports circular economy goals” focuses on circular economy in Malaysia and suggests that boosting energy efficiency and supporting the circular economy can be achieved by promoting the widespread use of energy efficiency labels on appliances. Public awareness campaigns should educate consumers on the cost savings and environmental benefits of energy-efficient products. Making energy labeling mandatory for a broader range of products would further ensure and utilize potential energy savings. Financial incentives, such as tax rebates or discounts, can encourage consumers to choose energy-efficient options. Collaboration between the government and manufacturers is essential to ensure that energy labels are clear, accurate, and trustworthy.

Incorporating climate adaptation strategies into economic policies is vital for addressing the impact of climate change, in this case on Vietnam’s development and protecting human rights. Enforcing environmental laws, setting clear regulations on emissions and waste management, and promoting sustainable practices will support a circular economy. Educating the public, particularly in vulnerable areas, about climate change and how to take protective actions is essential. Investments in resilient infrastructure, such as flood-resistant housing and early warning systems, are crucial to minimizing damage from extreme weather events. Protecting vulnerable groups by ensuring that they have access to necessary resources, including healthcare and safe housing, is a priority.

Vietnam can benefit from adopting elements of the European Union’s framework for managing secondary raw materials to support the transition to a circular economy. Strengthening legal regulations similar to the EU’s Waste Management Framework Directive will help reduce waste and promote active and broad recycling. Extended producer responsibility (EPR) programs, which make producers accountable for the entire life cycle of their products, encourage eco-friendly design and reduce waste. Investment in recycling infrastructure will foster a domestic circular economy and reduce dependence on imported materials. Public awareness campaigns promoting recycling and sustainable practices are also necessary, along with fostering public-private partnerships to accelerate the adoption of circular economy initiatives.

To further support small and medium-sized enterprises (SMEs) in Vietnam as they transit to circular economy practices, Chapter “Exploring the ambitions and needs of small and medium-sized enterprises in the transition to the CE in Vietnam” suggests that increasing awareness and understanding through targeted training and informational campaigns is key. Financial support in the form of subsidies or low-interest loans can help reduce the costs of transitioning to circular business models. Promoting partnerships and collaborations by creating platforms for SMEs to connect with larger firms, research institutions, and consumer networks will drive innovation and knowledge-sharing. Improving access to technology and infrastructure, such as recycling facilities and modern technologies that support CE practices, is crucial for enabling SMEs to adopt circular economy practices, contributing to sustainable development and green economic growth in Vietnam.

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