

Chapter 1

Introduction –Business and Policy Rationale for Circular Economy in ASEAN and East Asia

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Chapter 1

Introduction – Business and Policy Rationale for Circular Economy in ASEAN and East Asia

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1. Introduction

Over the last 2 decades, regional attention has been paid to the new concept and development model called circular economy, considered to be an alternative to the dominant industrial development model, ‘take, make, and dispose’. The negative effects caused by this linear model of production and consumption are threatening the stability of the fast-growing Asian economies and the sustainability of raw material and energy resources essential for economic growth. Sustainable development requires a balanced and simultaneous consideration of economic, environmental, technological, financial, and social aspects of the country-, sector-, firm-level process as well as interaction among different stakeholders. In that context, circular economy is seen as a new business model expected to lead to a more sustainable and harmonious society.

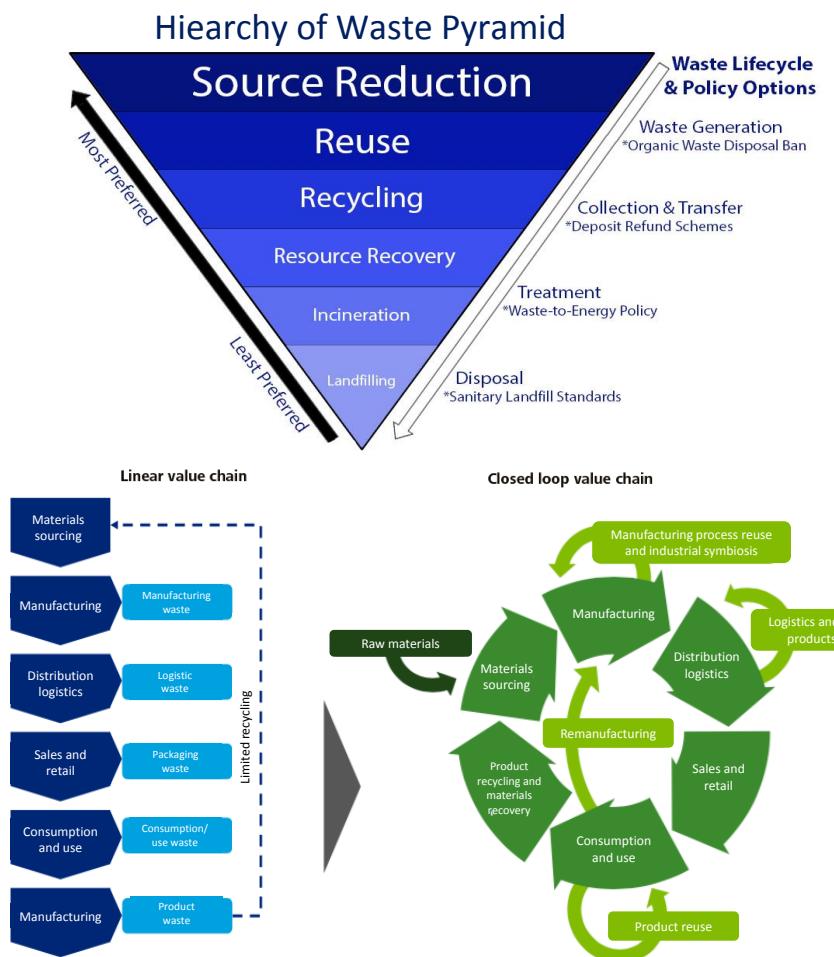
Current trends in global consumption of natural resources such as materials, energy, and water are unsustainable and socially unjust. Sustaining high levels of economic growth in a business-as-usual scenario is not an option, as economic systems already consume more resources today than the planet can provide in a sustainable manner (ADB, 2011). Emerging economies of the Association of Southeast Asian Nations (ASEAN) and East Asia will need further economic growth to satisfy demand for higher material welfare. However, in light of increasing resource scarcities, intensifying international competition over these resources, and growing environmental problems such greenhouse gas (GHG) emissions related to their use, these countries need to follow a pattern of economic growth that is significantly more resource efficient than those industrialised earlier. Increasing the resource efficiency of production will also be a key determinant for economic competitiveness in a world of rising prices of raw materials and energy.

The concept of circular economy is not completely new. It is often a pursuit of waste prevention and waste reduction (Figure 1.1). But such very limited point of view may lead



circular economy to fail. Indeed, circular economy aims not only to eradicate waste but also to find new value for them; often what might otherwise be called waste becomes valuable feedstock for successive usage. Indeed, product cycles of use and reuse, aided by the product design, help define the concept of circular economy and distinguish it from recycling, which loses a large amount of embedded resources, energy, and labour. It inspires technological, organisational, and social innovation across and within value chains.

Figure 1.1. Basic Principles of Circular Economy – A Cycle of Resource Efficiency Improvements



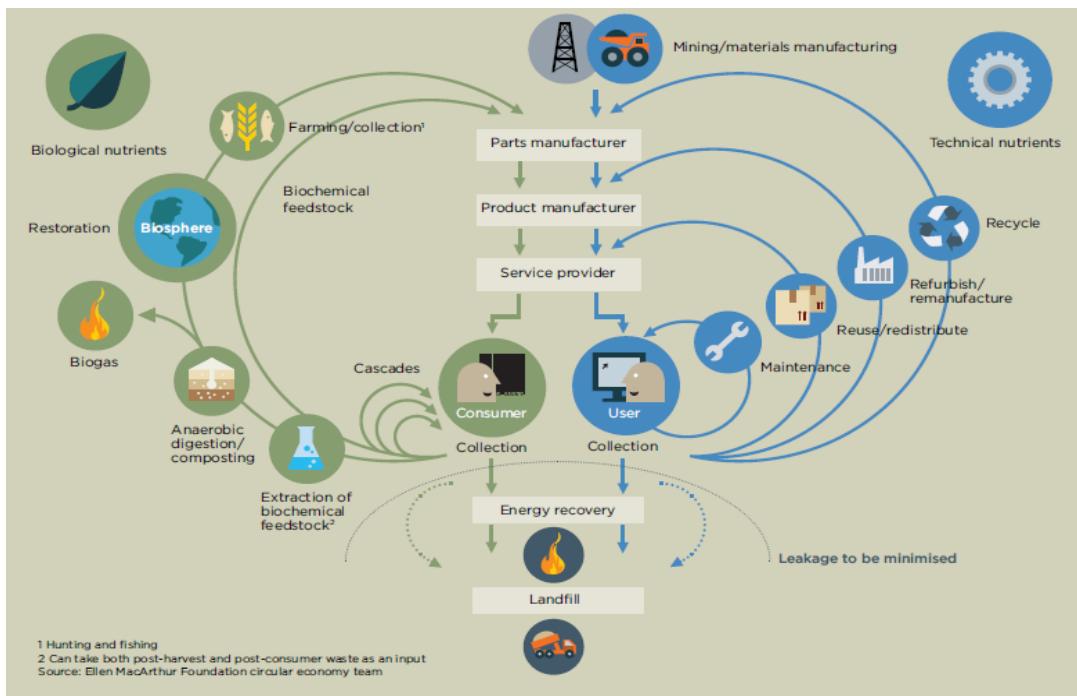
Source: ERIA (2015).

Moreover, an expanded circular economy introduces systems wherein production of consumable components are differentiated. Manufacturers in traditional economy often do not distinguish between the two. In a circular economy, a strict differentiation between products in terms of consumable and durable components is being introduced. The goal of consumables is to reuse non-toxic components, which can have a replenishing effect. The goal for durable components is to reuse them. The goal for consumables is to use non-toxic components so that these could eventually be returned to the biosphere where they could



have a replenishing effect (Figure 1.2). The goal for durable components such as metals, water, energy, etc. is to reuse or upgrade them for other productive purposes through as many cycles as possible. This circular thinking approach contrasts sharply with most current industrial operations.

**Figure 1.2. Broader View of Circular Economy
as a Restorative and Regenerative Industrial System**



Source: Adopted from McCarther Foundation (2013).

Inclusion of circular economic patterns require not only innovative production process but also committed actors. The complexity of transforming circular economy vision into business excellence models most often need innovation designers and corporate leaders who are not averse to take risks.

The aim of the book is to examine the critical driving forces of the private sector to get engaged in circular economy, and summarise and evaluate the policy pathways pertaining to circular economy experiences and compare them, to grasp similarities and differences among the approaches. Our purpose in this regard is to understand the following questions: (i) What are the opportunities for, and barriers to, large-scale transition to circular economy such as material efficiency, energy efficiency, waste reduction, particularly with an eye on corporate strategy? (ii) Which new institutional and policy frameworks and perspectives does circular economic thinking involve or suggest? (iii) What can be learned about change pathways dealing with corporate behaviour, such as product innovation, process innovation, and evolutionary leaderships? (iv) What can be learned from the regulatory approaches of



government policies and specific features of market creation? (v) Which public–private partnership models and solutions pertain to conflicts and barriers that change pathways involve at the corporate and government levels? Analysis of five country and corporate case studies also brought in immediate and relatively easy-to-implement circular thinking based on current policy approaches and market trends.

2. The Principles and the Need for Policies on Circular Economy

The current industrial systems of the world direct high consumption of materials and energy from resource-rich countries to manufacturing powerhouses in Asia, and distribute the resulting products to the advanced and other emerging economies of the world, where these materials are used, discarded, and replaced. Increasingly, this linear way of industrialisation has come under strain. Some 1 billion new consumers from ASEAN, China, and India will enter the middle class by 2030 (ERIA, 2014). The magnitude of this market shift is squeezing companies between less predictable commodity prices on the one hand and blistering competition on the other. The global financial crisis briefly dampened the demand but the commodity prices have rebounded faster than the global gross domestic product (GDP) as illustrated in Figure 1.3. It also indicates the era of ignoring resource cost is over, and worries about depletion. In response, some countries and companies are questioning the current patterns of production and consumption, and are calling for a new economic model.

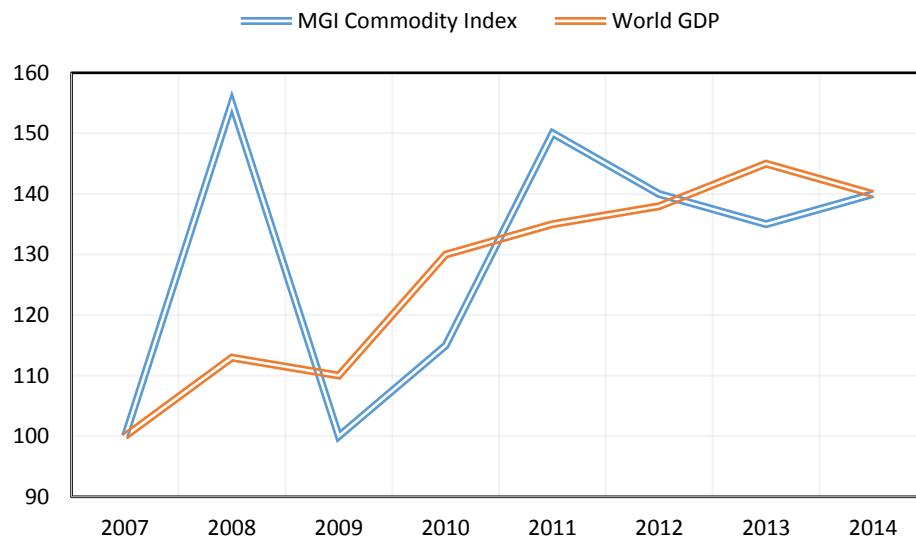
Academically, the concept of circular economy traces back to different schools of thought. Among them is industrial ecology, which promotes the transition from open to closed cycles of materials and energy, thus leading to less wasteful industrial process (Anderson, 2007). In circular economy, products and processes are redesigned to maximise the value of resources through the economy with the ambition to decouple economic growth and resource use (UTS, 2015). The Ellen MacArthur Foundation (2013) attributes to more recent theories such a regenerative design, performance economy, cradle to cradle, and bio-mimicry as an important contribution for the further refinement and development of the concept of circular economy. Circular economy also emerges in the literature through three main actions, i.e. the so-called 3R principle – Reduce, Reuse, and Recycle. This 3R principle becomes 5R to include Remanufacture and Repurpose components. These principles are applied to study the motives, implementation of policies and corporate strategies, and public–private partnerships in Australia, China, Germany, India, Japan, and Korea under the thematic areas of economic, institutional, and management approaches to circular economy.

Japan implemented circular economy in 1991 with the Law of Effective Utilisation of Recyclables (IES, 2015) and later on the Japanese Circular Economy Initiative. Circular economy concepts emerged in Germany in the mid-1970s with the Waste Disposal Act. Australia still lacks a relevant federal policy initiative, in spite of past regulations as the Resource Conservation and Recovery Act of 1990. Most Australian states also have adopted since the 1980s a solid waste management hierarchy placing reduction and reuse at the top



of the hierarchy. Korea issued the Waste Management Act (2007) and the Act on Promotion of Resources Saving and Recycling (2008) as the bases for material reuse, a fee system for waste treatment, regulations on the use of one-way packing of goods, a food waste reduction and extended producers' responsibility. China's Circular Economy Promotion Law defines circular economy as a generic term for reducing, reusing, and recycling activities conducted in the process of industrial production, circulation, and consumption. The broader goal of circular economy in India is the achievement of synergistic efforts with national targets towards landfill prevention, attainment of energy efficiency targets, and management of municipal solid waste.

Figure 1.3. Rebound Effects of Resource Prices Compared to Economic Output



Source: Author, based on data from IMF (2015) and MGI (2014).

Although circular economy is predominantly identified with the recycling principle, in these five countries, this may be the least sustainable solution compared to other circular economy principles, such as reduction and reuse, in terms of resource efficiency and profitability. These policies can be integrated with three additional principles developed in the circular economy report developed by the European Environment Agency (EEA, 2015). The first principle, appropriate design, stresses the importance of the design stage in finding solutions to avoid wasteful material use. The second reintroduces the classification of materials into technical and nutrients. The technical materials are designed to be reused at the end of the life cycle whereas the biological nutrients can be safely returned for consecutive use. The third additional principle, renewability, places renewable energy as the main energy source for circular economy to reduce fossil energy dependence and enhance the adaptability of economic systems towards energy security risks. Table 1.1 summarises the main limits and challenges to circular economy as observed from the country policy studies.

**Table 1.1. Main Limits of Circular Economy in the Study Countries**

Principles of Circular Economy	Limits and Challenges	Countries of Reference
Product Design	Design for disassembly, reuse, recycling Design of durable products, design of new models of consumption	China, India
Reduction	Overcome the rebound effect of resource efficiency strategies	Japan, Korea
Reuse	Increase consumer demand towards reuse of products and materials Development of take-back mechanism from companies	Germany, Australia
Recycle	Creation of local markets for recycled materials Risks in global trade of materials Appropriate decision tools	China, India, Australia
Repurposing of Materials	Reuse of materials and safe return to ecosystems	China, India
Waste to Energy	Increase in share compared to fossil fuel	China, India, Japan, Korea, Australia

Source: Author.

3. Circular Thinking in Corporate Management Strategies

Circular economy is a system that is designed to be restorative and regenerative. Instead of discarding assets after only one product cycle, companies are developing ways to continually reacquire and reintroduce the assets to the markets. As discussed earlier, in the volatile markets for resources and even worries about their depletion, the call for circular thinking is getting attention by the corporate leaders. The case studies of the All Nippon Airways (ANA) (Japan), BMW (Germany), Bridgestone (Japan), POSCO (Korea), Datong Coal Mine (China), Ambujah Cements (India), and Waratah Train (Australia) indicate these corporations are finding novel ways to reuse products and components. Their successful initiatives also provoke bolder questions. Could economic growth be decoupled from resource constraints? Could an industrial system that is regenerative by design, which restores material and energy, be good for business?

Corporate excellence is about developing and strengthening the management systems and processes of an organisation to improve performance and create value for stakeholders. While variation exists, if the experience of these companies is any indicator, the answer appears to be affirmative. BMW remanufactures automotive engines and other parts for resale and



reuse. Its plant remanufacturing operations use less energy and raw materials than other players in the market. Bridgestone redesigns its products to make them easier to use again. It also targets components for closed loop reuse, essentially converting worn-out tyres into inputs for new ones. All Nippon Airways (ANA) works with suppliers and consumers to distribute circular benefits that distribute value across its chain of activities. The result is less use of materials and energy and reduction in the volume of waste. The commonality among these cases is service design thinking, which is designing and marketing services that improve customers' experience, and the interactions among policymakers, service providers, and customers. Inclusion of circular economy requirements in corporate excellence models using collaborative service design thinking also brings a tool to determine the enablers, key performance indicators, and benchmarks for innovation and learning (Figure 1.4).

Figure 1.4. A Corporate Excellence Model for Achieving Circular Economy Goals



Source: Author.

Exploratory approaches to resource efficiency, including eco-design methods specifically to encourage participation from a broad array of stakeholders, proto typing, incorporating rapid feedback loops from customers to evaluate and evolve ideas all become key performance indicators. Their experiences are just samples in a growing body of evidence suggesting that the business opportunities in circular economy are real and sometimes large. Nevertheless, it will not be easy for many other corporate enterprises. The in-depth analysis on corporate case studies show that they go through four distinctive stages in operationalising the concept of circular economy. During that process, they also faced different challenges which could be categorised into four stages as described in Table 1.2, and developed capabilities to tackle them.

**Table 1.2. Corporate Challenges and Business Competencies for Circular Economy**

Stage 1: Viewing circular economy as an business opportunity	Stage 2: Making value chains circular	Stage 3: Designing new products and services	Stage 4: Developing new business models
Corporate Challenge			
To ensure that compliance with regulations becomes an opportunity for innovation	To increase resource efficiency throughout the value chain	To develop new production processes or redesign existing ones to become circular	To find new ways of delivering and capturing value, which will change the basis of competition
Competencies Needed			
The ability to anticipate and shape regulations The skills to work with other companies to implement creative solutions	- Expertise in techniques such as life cycle assessment, resource accounting - Ability to redesign operations to use less raw materials and energy and generate less waste - Capacity to ensure that suppliers and consumers make their choices circular	- Skills to know which process, products, and services are resource efficient - Ability to generate real public support for circular offering and not to be considered as green washing - Management knows how to scale both the use of reused materials and the manufacture of recycled materials	- Capacity to understand what consumers want and to figure out different ways to meet those demands - Ability to understand how partners can enhance the value of circular offerings
Innovation Opportunity			
Using compliance to induce the company and its partners to experiment with technologies for resource efficiency, raw material use, and process	- Developing sustainable sources of raw materials and components - Increasing the use of recycled, and reuse of, materials and clean energy sources - Finding innovative uses for returned materials	- Applying innovative techniques in product development - Decoupling compact and resource-efficient services	- Creating monetisation models that relate to services rather than products - Devising business models that combine technologies and physical infrastructure to allow industries to use the waste-to-energy products

Source: Author.

In stage 1, *viewing compliance on regulations for circular economy*, the corporate executives feel the pressure to abide by regulations and standards as well as voluntary codes. It is tempting to adhere to lower standards; however, smarter companies comply with more stringent internal rules to avoid further strict regulations. Companies that focus on meeting emerging norms gain more time to experiment with materials, technologies, and financing resource efficiency. This also yields substantial first mover advantage in terms of fostering innovation within the firms. Once companies have learned to keep pace with regulations and standards, they become more proactive about circular economic practices. In stage 2, *making values chains circular*, multinational firms such as Bridgestone and ANA focus on reducing the



consumption of raw materials and non-renewable energy sources. The drive to be more resource efficient also extends from manufacturing facilities and offices to the value chain. At this stage corporations work with suppliers, retailers, and consumers to develop eco-products and components to reduce waste. The preliminary aim is usually to create a better image, but most corporations end up reducing the costs or creating new businesses as well. That is particularly helpful in difficult economic times when corporations are desperate to boost profits.

Stage 3 in corporate strategy is *designing sustainable products and services*. At this stage, companies start to realise the fact that a sizeable consumer market prefers recyclable products and service offerings, and that their business can score over competitors by being the first to redesign existing products or develop new ones. In order to identify product and service innovation priorities, enterprises have to use competencies and tools they acquired in the earlier stages of their evolution. To design new recyclable products, corporations such as Bridgestone also understand consumer concerns and carefully examine product life cycles. They must learn to combine marketing skills with their expertise in scaling up raw material supplies. As they move up in the markets that lie beyond their traditional expertise, they team up with knowledge institutes and non-governmental organisations. *Developing new business model* is stage 4. A successful model includes novel ways of capturing revenues and delivering circular services in tandem with other companies. New technologies provide pioneering companies with the ability to challenge conventional wisdom. At this stage corporate executives learn to question existing business models to act entrepreneurially to develop new delivery mechanisms. As companies become more adept at this, the experience will lead them to the final stage of circular innovation, where the impact of new product or production process extent ends beyond a single market.

4. Designing Public–Private Partnerships for Circular Economy

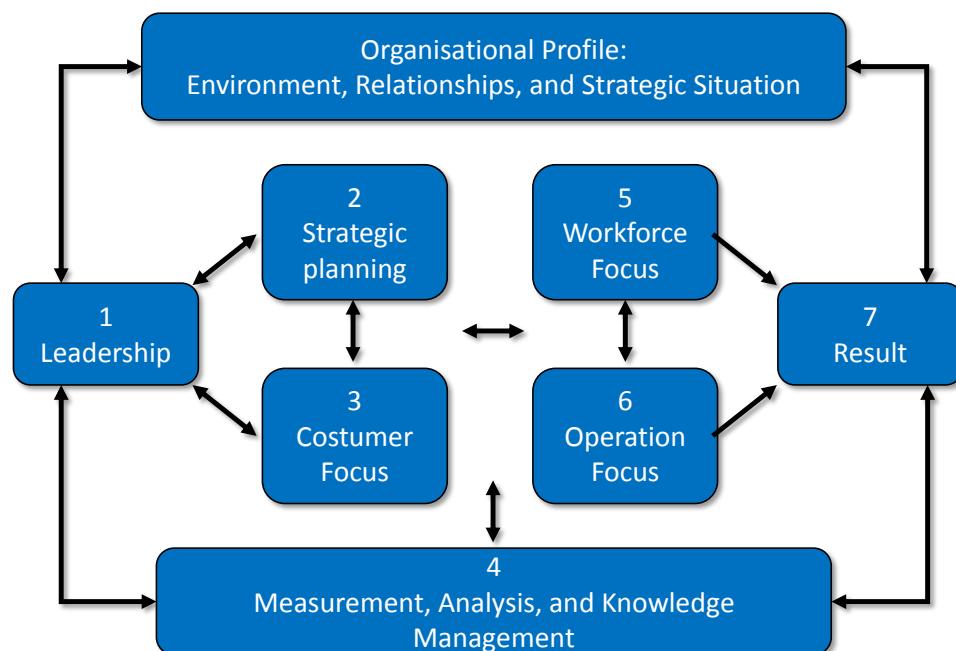
Public–private partnerships (PPPs) are a mechanism through which government authorities and private entities come together for the delivery of specified services on mutually agreed terms and conditions. Through this partnership, the benefits of private sector's dynamism, access to finance, knowledge of technologies, managerial efficiency and entrepreneurial spirit become available. Risk is allocated among parties which are best suited to manage the risk. PPPs as an efficient mode of implementation of public projects have already been demonstrated in several sectors such as highways, airports, powers, railways, etc. Operationalisation of circular economy concepts such as waste-to-energy can be enhanced through PPPs. For that, public authorities should determine the functions to be performed on a PPP mode. They may also take into account functions that can be outsourced or can be performed through PPP mode. Having determined these, public authorities should carefully assess the most appropriate technological options and business models.



PPPs in circular economy-related projects are relatively new in Asian countries; Australia offers some new insights on PPP as a tool to achieve circular economy. The Waratah Train PPP project in New South Wales illustrates some key performance indicators to incorporate circular economy principles in PPPs. Innovative capacity within the PPP framework is understood here in the broad sense as covering the procurement of raw materials, designing the production process and services, and creating consumer awareness. The corporate excellence models resemble those of the Baldridge criteria proposed by Nanda (2015) that sees compliance, resource conservation, and waste disposal as part of corporate social responsibility.

This kind of sophisticated PPP approach also captures additional complexities in incorporating circular economy. It also describes strategic planning as a process of matching technical possibilities with customer needs and operational focus to make use of opportunities involving multiple stakeholders and differentiate between incremental and radical actions.

Figure 1.5. A Public–Private Partnership Model Based on Balridge Performance Criteria



Source: Nanda (2015).

5. Comparing and Contrasting the Economic, Institutional, and Management Approaches

The chapters in this volume represent a wide range of corporate strategies and different public policy instruments to achieve circular economy. They help understand the external drivers and internal barriers in achieving the goals of circular economy. They also provide complementary insights by focusing on particular economic institutional or management



factors. In addressing the policy objectives and choice of instruments or corporate pathways, it is helpful to consider these insights. In particular, the three approaches differed in their ways by which the pathways for circular economy are projected, risks are tackled, and uncertainties are addressed, and in the importance they assign to different factors in creating incentives for concerted action.

The economic, institutional, and management approaches discussed under country policies and corporate stories aim to change the linear model of industrial process, and seek to examine the range of actions and actors involved in the interactions, the role of uncertainty and bounded rationality within the decision-making process of learning and expectations, and the role of institutional drivers and barriers. However, as the five country cases and six corporate strategies indicate, these approaches differ in their focus on different aspects of the circular economy, and their application of its principles. The economic approach tends to focus on particular policy instruments and investigate how corporate strategy responds to these and reduce costs. The institutional approach focuses on wider system rules and actions and investigates how these influence corporate strategies. The management approach focuses on the role of macro policies and responses of the firms involved in the national move towards circular economy. A combination of these different approaches are useful in that they highlight different aspects of the overall complex dynamic process of technological, behavioural, and financial innovation needed to activate the circular economy. Comparing and contrasting the different approaches help to understand the challenges and opportunities with circular economy as illustrated in Table 1.3.

These approaches should help business leaders and policymakers to be more effective, if they seek to influence the rate and direction of circular economy. It starts from the recognition that circular economy is an endogenous feature of competitive economies and, hence, resource efficiency could be induced by integrated economic, energy, and environmental policies.

**Table 1.3. Comparing and Contrasting the Challenges with Different Approaches for Circular Economy**

Perspective	Perspective	Business	Social	Technological	Leadership	Efficiency
Economical	Risks	Potential challenges vary by products and services	Health concerns around reuse of toxic materials	Building robust data on firm-level material and resource use	Lack of integrated policies and planning	Delays in customers accepting new products and service schemes
	Cost	Extended life cycle requires additional design and validation increases product costs	Perceived and actual costs of circular activities	Added cost of upgrading technologies	Total cost of ownership increases. Long-lasting products substitute new models and decrease sales	Recovery and return of products for refurbishment are not easy and cost more
Institutional	Feasibility	Reuse and recycling are not feasible in all industries	Influences behavioural patterns of consumers	Accommodating CE at different levels of manufacturing and procurement	Industry structure is not aligned with the economic structure	Difficulty in obtaining financial support
	Support system	Bidding and other supplementary process changes	Ease of availability for buying and selling goods	Lack of complete system support	Lack of overall governance structure and integrated policies	Customers' aversion to new products and services
Management	Awareness	Lack of awareness among stakeholders	CE follows a push for sustainable consumption	Consumers lack understanding and acceptance of 3R	Lack of awareness about CE	Unavailability of knowledge on how to implement CE
	Guidance	Unavailability of knowledge on the right purpose of use of resources	Lack of focus on circular economy in formal and vocational education	Lack of measurement system to baseline resource usage	Lack of appropriate incentive system impacting resource recovery	Unavailability of key performance indicators and final target setting throughout the process

3R = reduce, reuse, recycle; CE = circular economy.

Source: Author.

6. Conclusion

The papers presented in this book highlight not only the opportunities but also the complexity of circular economic systems and the drivers for, and barriers to, innovation within corporate management systems and policy pathways. Ultimately, the systematic nature of barriers means that individual corporate actions, while necessary, will not suffice to create circular economy at scale. The real payoff will come only when multiple players across the business



and research communities, supported by policymakers and investors, come together to reconceive key manufacturing processes and flows of materials and products. Should that happen, as the country papers and corporate strategies indicate, the benefits would be huge; these include net raw material saving, mitigated supply risks, increased innovation potential, and creation of new markets. More detailed studies are needed to quantify these benefits at the regional level.

Nevertheless, focusing a collective effort on the leverage points of circular economy that would have a systematic impact is the key to unlocking these potentials. Many of the case studies presented in this volume suggest that the place to start is raw material consumption and energy flows, as these represent the most universal industrial assets. The ultimate objective is to close material loops on a regional scale and to achieve tipping points that would bring major streams of material and energy back into the system, at high volume and quality levels, through established markets. It also implies that different policy packages, employed at different stages of resource efficiency, will be required for each different market.

The papers and the resulting analysis also demonstrate the richness of public and private initiatives currently being undertaken and, if executed to a full scale, will reconcile prosperity and sustainability and overcome the trade-offs. This report also indicates the benefits of public–private partnership to accelerate the transition that warrants further study and analysis. There are also significant gaps in our understanding on circular economy. The role of destructive technology, finance, and business model also need attention. It may not be possible or even desirable to try to achieve a grand regional blueprint. However, it is possible to make progress at the national and corporate levels that different approaches remain open to integration of new ideas and to provide useful policy insights to transition to secure circular economy.

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