

FOREWORD

The circular economy represents a fundamental and necessary alternative to the linear take–make–consume–dispose economic model that currently predominates industrial production systems in Asia. This old model has brought unprecedented economic growth and welfare, but has run its course. Drastically new economic models are needed wherein material inputs and waste generation are minimised through eco–design, recycling and reusing of products, new business models, and new technologies. Products and production systems need to be designed for circularity, materials need to be efficiently processed, and waste needs to be sorted and recycled. Interactive platforms need to be set up that enable people and product connectivity. The value chain needs to be revisited in terms of its circularity function, and customers provided with services rather than throwaway products. This requires a change in mentality – a different way of looking at and organising our production and consumption processes.

Using Industry 4.0 is crucial to make this transition from a linear to a circular economy happen. Industry 4.0 refers to a set of diverse and complex automation processes that are currently being used in the industry from the internet of things and 3D printing to artificial intelligence, cloud computing, machine–to–machine communication, etc. Increasingly, Industry 4.0 technologies should be used to catalyse and facilitate the transition from a linear economic model to a circular one. This requires closer cooperation between the research, technological, and business communities and the creation of an enabling policy, and an institutional, business, and financial environment that will make this cooperation possible.

Major entry points to forward the integration of these two rapidly evolving technological and business fields are resource use and management and waste management: the beginning and the end of the circular economy model. Raw material extraction, processing, and production companies can use Industry 4.0 technologies more efficiently, while the same technologies can be used for more efficient resource management and turning waste into ‘new’ raw material, closing the material cycle.

This ‘closing of the material cycle’, using in an optimal manner the developments of Industry 4.0, will not happen by itself, at least not at the speed needed to transform our economies to conform to the requirements of the Sustainable Development Goals (SDG) such as SDG 9 – sustainable industrialisation – and SDG 12 –sustainable consumption and production. Major policy changes at the business level, and local, national, and international governance levels are needed that include the exchange of expertise at an inter-regional and inter-continental level, development of infrastructure and business activities, with a strong role for eco-innovative small and medium-sized enterprises and the shift from waste thinking to materials management for circularity. We cannot have a circular economy without the 4th Industrial Revolution, and we cannot have a socially useful and sustainable 4th Industrial Revolution without advancing the circular economy.

The chapters in this volume show the key opportunities as well as challenges in embracing the two concepts in the context of the fast-growing emerging economies of ASEAN. Transforming the challenges into opportunities requires the participation of the full breadth of society and actions in nations, sectors, supply chains, and cities. Major trend corrections are needed to get the regionally integrated economies on a pathway towards circularity that is aided by Industry 4.0. The contributing chapters identify key levers and point to inconvenient truths that provide systemic challenges for moving to circularity by the middle of the 21st century.

This book is published as part of ERIA’s effort to disseminate knowledge products that can be used to promote industrial restructuring in ASEAN and East Asia. I am confident that it will help countries to identify policy challenges and opportunities associated with a new wave of industrial revolutions and greater integration of the emerging best practices into the economies of ASEAN and East Asia.



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