

Foreword

Globalisation, technological advancement, and resource consumption have historically served humanity well by typically delivering both economic growth and social progress. However, as these drivers have accelerated, evolved, and become intertwined over time, a divergence between economic growth and environmental sustainability has occurred, placing the planet and social progress under strain. In this context, the emerging concepts of Industry 4.0 and the circular economy offer promising opportunities for correcting the course with the right governance, an enabling environment, and public–private partnerships.

The countries and companies of the Association of Southeast Asian Nations (ASEAN) and East Asia stand at an important moment in history. The global, digitally enabled Industry 4.0 is already the fastest period of innovation ever. It is underpinned by rapid advances in technologies, including artificial intelligence, robotics, the Internet of Things, nanotechnology, and biotechnology, to name a few. Previous industrial revolutions advanced economic development but came largely at the expense of environment. In the past 2 decades, ASEAN and East Asia have emerged as the world's largest consumers of natural resources and raw materials. Resource demands continue to expand in line with the region's increasing population, rapid urbanisation, and continued economic growth. Without appropriate planning, the consumed resources and materials may ultimately end up as waste and pollution. It is, therefore, imperative that countries in the region focus on and invest in the circular economy for the improvement of resource efficiency.

Using Industry 4.0 is crucial to make the transition from a linear to a circular economy and requires closer cooperation between the research, technological, and business communities. It also requires the creation of an enabling policy and an appropriate institutional, business, and financial environment to make this cooperation possible. The major entry points to advance the integration of the rapidly evolving technological and business fields are resource use 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 to turn the raw materials into new raw materials, closing the material cycle.

An important role in building a life strategy for Industry 4.0 and the circular economy lies in the results of assessments of the readiness of national economies and companies to adapt and adopt the initiatives. Readiness is often defined as the ability to capitalise on future production opportunities, mitigate risks and challenges, and be resilient and agile in responding to uncertainties. There are different approaches to such an assessment of readiness that use different qualitative and quantitative key indicators, both for countries and individual companies.

The chapters in this volume show assessment frameworks of differing magnitude for embracing the two concepts in the context of the fast-growing emerging economies of ASEAN. To provide governments and businesses with action-oriented information on the readiness of Industry 4.0 and the circular economy, the contributing authors developed multi-level self-assessment frameworks. It is the first comprehensive, quantitative measure of readiness in ASEAN and East Asia. Subsequent validation in countries and industries has led to various improvements in the way the ERIA Self-assessment Tool for Industry 4.0 and the Circular Economy is constructed and used.

As policymakers and industry leaders continue to refine and expand their industrial development and environmental protection programmes, this book provides them with useful measures to assist in their decision-making. This book is being published as part of ERIA's efforts to disseminate knowledge products that can be used to promote industrial restructuring in ASEAN and East Asia. I am confident that this book will help countries to identify the policy challenges and opportunities associated with the Fourth Industrial Revolution and allow for greater integration of it into the thinking on sustainability.

A handwritten signature in black ink, reading "H. Nishimura". The signature is written in a cursive, flowing style with a large initial "H" and a long, sweeping underline.

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