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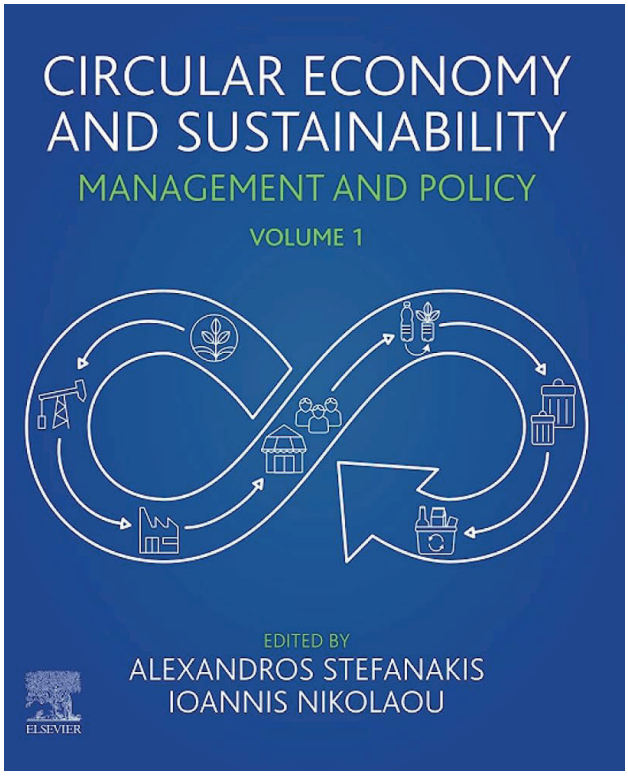
CISA

BOOKS REVIEW 1



CIRCULAR ECONOMY AND SUSTAINABILITY: MANAGEMENT AND POLICY (VOLUME 1)

Edited by: Alexandros Stefanakis and Ioannis Nikolaou

The book "Circular Economy and Sustainability: Management and Practices" is an anthology consisting of 34 chapters written by a total of 82 people. The book, which comprises a total of 698 pages, is very comprehensive and thematically diversified - it covers several different aspects of circular economy (CE) and sustainability. This first volume of a two-part series focuses on the management and policy aspects of circular economy and sustainability in various fields and disciplines. Overall, the book provides a very wide-angle presentation and discussion around different solutions and concepts to implement CE. Whilst the book is not thematically divided into different parts, a certain division between themes can still be discerned. The opening contributions frame the concept of CE and the bioeconomy, followed by more business-oriented chapters on efforts and models for circularity, including various life cycle analysis perspectives. This is followed by several case studies regarding different countries as well as different types of operations, as well as some thematic studies concerning e.g., urban environments, collaborative leadership, and design practices.

Chapter 1 opens with a review of the current CE literature. The authors show which scientific areas have covered the largest part of CE literature, the development of CE studies over time, and the level of analysis that attracts the greatest emphasis regarding the CE concept.

In Chapter 2 the readers are introduced to the concept and relevance of Adam Smith's invisible hand for CE. To reach true sustainability, the author means that the relationships between economics, society and the environment must be restored, and that it is not sufficient to merely address resource use and waste.

Chapter 3 provides an overview of system thinking and what drives systemic change, e.g., the engine of growth model. Examples are provided from both a macro level (e.g., material footprints) and micro level (e.g., linear, and circular business models).

In Chapter 4, the circular bioeconomy is defined through its key characteristics, for example the renewable nature of the inputs. While both the forest and agricultural sectors can be seen as representatives of a conceptual circular bioeconomy, the author notes that there are many challenges connected to commercial forestry and agriculture.

The relationship between the adoption of CE, focusing on strategies to optimize water use, and the financial performance among more than 10,000 European SMEs is analyzed and discussed in Chapter 5.

Chapter 6 provides an historical account of CE, from the 1960's with the start of the environmental movement through the 1990's and the emergence of concepts related to CE (Cradle-to-Cradle, Biomimicry, Blue economy etc.) to the 2010's and forward, where putting CE from theory to practice is centerfold.

In Chapter 7, a framework for evaluating the involvement of firms in the CE on micro, meso and macro level is outlined, including a methodological tool in the form of a questionnaire for investigating CE strategies implemented by firms. The findings show for example that the main CE strategies adopted by firms include recycling, refurbishing, and remanufacturing.

Chapter 8 covers the topic of resource-service-systems (RSS). First, the authors identify a knowledge gap within the current RSS literature. Second, the authors propose solutions to the identified gaps by applying two analytical frameworks to explain what a circular strategy entail. Finally, this is applied to an exploratory case in the automotive industry.

The topic for Chapter 9 is CE and life cycle assessment (LCA). Where resource efficiency is supposed to increase

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through closed loop technologies where waste is eradicated, is not necessarily beneficial from an environmental point of view. By combining the more linear CE and the holistic LCA, the study shows that it is possible to make more in-depth analyses of economic, social, and environmental sustainability.

Another perspective of life cycle assessment is provided in Chapter 10, where life cycle costing (LCC) is used to include economic sustainability in the CE. In the study, LCC is operationalized in a case study of the ceramic sector. By comparing the results of using a conventional LCC, which involves a strict economic evaluation, and an environmental LCC, where externalities are quantified from a life cycle perspective, the study shows that circularity does not necessarily mean a higher level of sustainability.

One of the world's largest consumers of raw materials and natural resources is the construction sector, and the sector also accounts for the largest part of waste in most countries. Chapter 11 presents a conceptual framework that shows the potential interactions of implementing three main principles of CE across different construction stages: reduced demand for buildings and/or materials, circular design of buildings and circular business models.

In Chapter 12, the author explores how eco-design is a key to success in closing the loops in CE through discussion of guidelines and the utilization of eco-design tools based on those guidelines. Some of the guidelines presented are design for assembly/design for disassembly, design for remanufacture, design for recycling or design for composting.

Chapter 13 provides a literature review of sustainable finance and begins by explaining the central topics of sustainable finance and CE, thereafter some salient parts of sustainable finance and the evolution of sustainable finance is discussed. Sustainable finance is proposed to contain three distinct elements: environmental, social and governance considerations. The chapter concludes by proposing three key sectors for future dissemination of sustainable finance and CE policies.

Chapter 14 is a case study aiming to e.g., review key features, drivers and barriers of the operational environment of CE, on different levels, including the municipal perspectives in the Kymenlaakso region in Finland, on advancing sustainable and CE-oriented public procurement. For the regional study, a questionnaire survey addressing main development factors and challenges was used. The results indicate that procurement organizations in many ways do consider sustainability and CE in planning and implementation, but that guidance and training is lacking. Public procurement is not only an important support for economic development, but also a useful tool for creating incentives for companies to move from a linear to a CE model.

The authors of Chapter 15 propose a methodological framework, a scoring system, as a practical tool for incorporating criteria for CE principles in awarding contracts and selecting tenderers.

In Chapter 16, the authors have performed an econometric analysis and a literature review to examine the connection between corporate social responsibility and corporate financial performance in the chemical industry. The analysis has taken place across several regions where conclusions about possible differences and similarities between them have been able to be drawn and discussed.

Human capability for collaborating to reach the Sustainable Development Goals (SDGs) is discussed in Chapter 17. The authors share their experiences, learnings, and results from an awareness-led social laboratory – Beyond Waste: Circular Resources Lab 2018. They share their insights on the values set and self-work needed, as the authors put it, to experience healing interconnectedness in the context of increasing complexity and diversity through "the magic of serendipity."

In Chapter 18, the authors describe how Signify (formerly Philips Lighting) has developed its sustainable design and environmental engineering, including the social dimension of sustainability. Lightning has made great technological advances that now lead to more possibilities to use light for brighter lives and a better world.

In Chapter 19 the authors analyze the role of CE for urban sustainability based on the premise that cities can play an important role in the development of a sustainable society. However, this requires a retraining of "urban thinking" and ideas for how to rethink the sustainable city are presented as the sustainable urban growth approach. The usefulness of CE is a matter of to what extent its operationalization can contribute to redefine urban growth.

The role of information and communication technology in the transition to smart and sustainable cities is explored in Chapter 20. Challenges such as privacy of citizens and possibilities such as deployment of internet-of-things or artificial intelligence are highlighted using emerging technologies in the smart sustainable city concept. A demarcation between soft smart cities and hard smart cities is presented. In addition to this, practical examples of how emerging technologies can be integrated to create a smart sustainable city are highlighted.

In Chapter 21, a framework for circular food consumption practices is proposed. Based on the "ecological perspective of consumption", consumer behavior is reconnected with CE-principles, and food consumption is seen as a stage in the biological metabolism for food. The framework is expected to make it possible to assess how likely it is that consumers will undertake CE-activities related to food.

Chapter 22 begins with a discussion of the impact of the extractive industries on the environment in general to then continue with deliberations upon the role of mineral wastes in the CE. A review of recent developments in valorization of mineral wastes is presented, especially which potential material benefits may be present and how legacy waste sites may affect other values such as eco-system services (e.g., biodiversity) culture and recreation or science.

The case study in Chapter 23 shows how waste can be used as a raw material for energy and material production. Up to 63% of the EU's raw material needs are covered by imports. EU legislation tries to solve the problems of material and energy dependence through two separate approaches. The study shows that waste recovery can solve both problems in one approach.

Chapter 24 presents an overview of solid waste collection and transport for rural communities and urban municipalities, with a more detailed insight for Poland. The authors provide examples of solutions to the optimization problems, e.g., by applying artificial intelligence algorithms to optimize the vehicle's travel route.

Through an analysis of 75 studies, Chapter 25 shows the different aspects of the new age clothing industry and its innovative sustainable practices and its contribution to a CE. Globally, the second most polluting industry is the apparel industry. Forecasts show that apparel consumption only will increase, and only about 20% of clothing is recycled and reused.

The aim of Chapter 26 is to contribute to the knowledge on transitional processes by examining existing literature on niche development and then apply the findings to the Dutch dairy sector. The results show that the dairy sector is "at the threshold of returning to a circular economy", but that the situation is different today than it was before World War II, not least in terms of the institutional setting. A key question is at what institutional level it is appropriate to organize the CE-system: national, regional, European or even global?

Chapter 27 is an exploratory study aiming to determine conceptual categories related to CE in industry. Using content analysis technique to review the scientific literature two main factors of interest were found: waste management and production management, which is seen as confirmation of the "growing association between circular economy and development, integrating socioenvironmental management with economic and financial gain."

In Chapter 28 the importance of the leadership factor for circular companies is discussed, and collaborative leadership is described as an appropriate leadership style. The chapter can serve as a guide for leaders who want to understand the role of, and improve, leadership skills when it comes to CE.

A trajectory analysis of eco-cement, in particular the ongoing transition from ordinary Portland cement to eco-cement, is presented in Chapter 29. The comparative analysis is based upon previous research regarding the eco-cement transition in the Netherlands which revealed six key dimensions. The authors examine the presence, and discuss the implications, of these dimensions in the ongoing transitions in China and Japan.

Chapter 30 describes the business, environmental and technical aspects of CE. Opportunities and challenges to implement CE principles at Linde Material Handling GmbH are then identified and discussed with the support of a literature study and in-person interviews.

In Chapter 31, the findings of the project VALUABLE are presented. The authors discuss the connection between electronic vehicles and drivers for a CE, through circular (vehicle) battery chains. In addition, potential barriers for such value chains are presented and which enablers would be necessary to facilitate them.

Corporate social responsibility reports from 2017 from five different companies are analyzed in Chapter 32 to assess the sustainability reporting of the cosmetic industries.

In Chapter 33, sustainable CE development in Finland is addressed from a company perspective. The authors explore what companies consider as necessary drivers for, and potential barriers against, a CE. Data is gathered through multiple-choice surveys witch then is presented and discussed.

In the final chapter of the book, the implementation of CE in two countries, Armenia in Portugal, is presented. The study is a contextual analysis in which the author accounts for how historical, geographical, and political context may affect fulfillment of a CE. Two central themes, socioeconomic relationships and emerging circular economy policies, serve as a starting point to discuss various macro, meso and micro level strategies. The chapter provides unique insights into how CE strategies are adopted in different countries.

Overall, the book comprises a comprehensive account of how circular economy can be understood from different perspectives. It provides a very wide-angle presentation and discussion around different solutions and concepts to implement circular economy. The book is designed to provide readers, including professionals, academics, engineers, researchers, government employees and industrial stakeholders, a better understanding of the concept and definition of circular economy, for it to be useful in their further work.

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