

Viktoria Drabe

Innovating in a Circular Economy

Exploring the Case of Cradle to Cradle Implementation

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Foreword

The understanding that natural resources are a finite good and should be used with prudence is becoming more and more commonly accepted in society. With regard to our current economic system, however, it also becomes clear that this awareness is often difficult to realize in practice, as the world's resources continue to be constantly depleted and internationally agreed climate targets are repeatedly missed. At the same time, our economy, defined by a linear direction of material flows and characterized by a take-make-waste approach, is increasingly confronted with a dramatic depletion of finite resources, an increase in price volatility, and a growing customer expectation for product sustainability.

Understandably, this outlined understanding repeatedly spurs the discussion and search for concepts that open up opportunities for the environment and the economy alike and are intended to resolve the seemingly inherent conflict between economy and ecology. The idea of a Circular Economy (CE), as promoted by the Ellen MacArthur Foundation and its associated companies and stakeholders, has been the subject of intense debate in recent years and represents a particularly promising concept. CE describes an alternative paradigm representing an industrial system that is restorative and regenerative by intention and design.

In this work, Mrs. Drabe examines the motivations of companies embarking on the Circular Economy journey and how they can be successful in doing so. For this purpose, she focuses on the Cradle to Cradle paradigm (C2C) with its associated certification program, which represents the state-of-the-art to transfer the idea of the Circular Economy to the operational implementation level. Her empirical field is formed by companies that have implemented this program and have gained corresponding experience in implementation and certification.

While the research landscape so far contains numerous studies on the definition, delineation and conceptual implications of alternative concepts of an environmentally friendly economy, there is little empirical evidence on the enablers and barriers of actual, operational implementation. To the best of my knowledge, the present

Foreword

dissertation by Mrs. Drabe is the first comprehensive, empirical study on the implementation status of Circular Economy in industry using C2C innovation as an example. In this sense, Mrs. Drabe is doing real pioneering work and has presented what I consider to be important and insightful work.

The results of the qualitative interview series not only provide initial, interesting findings on the problems, challenges, and opportunities of C2C implementation and certification, but also allow her to develop informed propositions that in turn form the basis for the quantitative exploration she subsequently conducts and lays out by means of an online survey. She develops the underlying variables from existing related theories and through newly developed constructs from her qualitative study. Following an exploratory factor analysis, she elaborates on the impact of critical motivational and organizational contextual factors with respect to the organizations' satisfaction with the implementation. Based on the extensive and insightful discussion of her research findings, Mrs. Drabe elaborates two frameworks to be able to build an adequate organizational environment for a substantial embedding of CE at the organizational level.

Overall, this work makes a distinct contributions to Circular Economy research and provides valuable recommendations for companies regarding the design and marketing of C2C products and services as well as the related internal process changes. The quality of the research results combined with the very knowledgeable application of scientific methods as well as the insightful interpretation and precise presentation of the results validate the research approach chosen by Ms. Drabe. For me, the essential contribution of the work lies in the very well-founded theory discussion and expansion as well as reappraisal of a very actual as well as significant phenomenon. In this respect, Mrs. Drabe makes an important contribution to science as well as to decision-makers in corporate practice and politics.

Hamburg, December 2021

Univ. Prof. Dr. Dr. h. c. Cornelius Herstatt

Acknowledgements

The current economic system, mainly building on a linear direction of material flows, is increasingly being confronted with a dramatic depletion of finite resources, increase of price volatility and a growing customer expectation with respect to product sustainability and quality. The concept of Circular Economy (CE) describes an alternative paradigm, especially with respect to innovation and product design.

Decoupling growth from resource use, CE provides a substantial business imperative, which an increasing number of companies and governments start to recognize. From the research perspectives, the research landscape hitherto covered numerous studies on definitions and conceptual implications, while there is little empirical evidence on enablers and barriers of actual CE implementation. This points at a research opportunity with a focus on organizational implications of CE. Given the nascent stage of research, the work uses a hybrid approach consisting of a qualitative and quantitative study to find answers to the central research questions of why companies decide to engage in CE efforts and how the organizational context affects its implementation. For this purpose, the Cradle to Cradle (C2C) certification, a closely related standard which is granted to companies based on specific assessment criteria, was selected as the empirical field.

Based on an exploratory factor analysis and a subsequent multiple linear regression, the work lays open which parameters can foster an adequate organizational environment to substantially anchor CE on the organizational level. The conclusion provides valuable guidance not only from the research perspective but also includes managerial and political implications in order to spur the transition towards a Circular Economy.

Throughout the writing of this work I have received great support and assistance for which I am very grateful. First, I would like to express my sincere gratitude to my interview partners and survey participants who not only made it possible to accomplish my research goal by providing the most valuable input, but also encouraged

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my endeavour by cheering the purpose of my research project and underlining its relevance for them.

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Furthermore, I feel privileged to have met and worked with an amazing set of colleagues, many of whom became friends. You have contributed ideas, were always open for discussions and made the PhD time a truly fun and memorable experience.

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Hamburg, January 2022

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List of Abbreviations

AVE	Average variance extracted
B2B	Business-to-business
B2C	Business-to-customer
B2G	Business-to-government
C2C	Cradle to Cradle
C2C PII	Cradle to Cradle Products Innovation Institute CE
CEO	Chief Executive Officer
CFA	Confirmatory factor analysis
CITC	Corrected item-to-total correlation
CSR	Corporate social responsibility
DF	Degrees of freedom
DV	Dependent variable
e. g.	exempli gratia (English: for example)
EFA	Exploratory factor analysis
EM	Expectation maximization
EPEA	Environmental Protection Encouragement Agency
et al.	et alii (English: and others)
EU	European Union
F	Test statistic of F-test (F-statistic)
i. e.	id est (English: that is)
IV	Independent variable
KMO	Kaiser-Meyer-Olkin criterion
MBDC	McDonough Braungart Design Chemistry
MCAR	Missing completely at random
MSA	Measure of sampling adequacy
n.s.	Not significant
N/A	Not applicable
PCA	Principal component analysis
R&D	Research and development
R ²	Coefficient of determination (explained variance)
RQ	Research question
SD	Standard deviation
SDG	Sustainable Development Goals
USD	US Dollar
VIF	Variance inflation factor

