



## Circular Economy Strategies for Business Sustainability:

### A Systematic Review and Meta-analysis

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#### **Abstract:**

The relationship between corporate sustainability and circular economy (CE) methods is presented in this paper through a systematic review and meta-analysis. The importance of resource and environmental sustainability from a commercial standpoint is covered in the first section of the article, which also emphasizes the increasing interest in the circular economy among researchers. To direct the analysis, a dynamic priority quadrant research framework is presented. Using a systematic literature review and meta-analysis methodology, the study conducts an extensive examination of excellent research pieces published between 2011 and 2020. The findings highlight important concepts that have been studied in the literature and investigate the variety of supply chain, organizational, and functional management tactics that practitioners have used to put the circular economy's tenets into practice.

The study also examines how circular economy methods affect financial, social, and environmental performance metrics used in business sustainability assessments. The results provide insights into the possible advantages of switching to circular business models and management practices, and they also aid in the understanding of the relationship between CE strategies and firm performance. This study highlights the significance of sustainable business strategies based on CE principles and is in line with the research focus on the circular economy.

**Keywords:** Circular economy, business sustainability, resource sustainability, systematic review, meta-analysis, value chains, CE business models

#### **1. Introduction**

The paper is structured as follows: the second section introduces environmental and resource sustainability from a business perspective and shares the growing research attention given to the circular economy. The third section presents the dynamic priority quadrant research framework. The fourth section presents a state-of-the-art review of high-quality research essays from 2011 to 2020 using a systematic literature review and meta-analysis methodology. Results identify the most important constructs examined and the range of functional, organizational, and supply chain management strategies adopted by practitioners for the circular economy. Moreover, we analyze the effects of CE strategies on business

sustainability performance indicators such as environmental, financial, and social performance.

The circular economy (CE) aims to decouple economic development and growth from the consumption of resources by closing material cycles and regenerating natural systems. A substantial re-orientation of value chains is required, guided by adopting new CE business models, such as shifting from product to service provision and new management practices. Expected benefits of such a transition include increasing business sustainability via the 3R principles (reduce, reuse, recycle) and responsible treatment and production of unwanted materials, including waste. Owing to these benefits, growing research attention has recently been dedicated to sustainable business strategies based on the principles of the CE. As such, this timely systematic review and meta-analysis investigates the relationship between the uptake of CE strategies and firm performance in terms of sustainability. We are encouraged to present research essays in this second special issue on the circular economy.

## 2. The Concept of Circular Economy

The product becomes a service in a circular economy, adding more value to the product for extended circulation. The circular economic model's attention is primarily on applying sustainable business operations while concentrating on three dimensions of the triple bottom line: reducing environmental impacts, assuring a perpetual economy, and originality to ensure social responsibility. The idea of a CE provides a practical ecological, in particular, biophysical model of sustainability that is much more actionable. It incorporates several industrial ecology themes and strategies, such as closing the loop on materials, dematerializing and/or selecting low-impact materials where possible, and reintroducing pollutants for minimized harm as part of cleaner production. The operating principles of a CE share common social and economic goals with those of the more macro-level concepts of ecological economics and steady-state economic modeling. The life cycle is the center of a CE as this is where control over material flows resides. Circular economy is a transformative transition to sustain our living standards and global carrying capacity. (Awan & Sroufe, 2022); (Barros, Salvador, do Prado, de Francisco, & Piekarski, 2021); (Centobelli, Cerchione, Chiaroni, Del Vecchio, & Urbinati, 2020).

Circular economy (CE) is an emerging proactive framework for business sustainability. It is distinctively characterized by its strategies, including reduce, reuse, remanufacture, repair, redesign, recycle, recover, redistribute, and residual management. The main purpose of the circular economy is to (i) maintain the value of products, materials, and resources as long as possible, (ii) minimize their outflow in the form of energy and harmful gases, and (iii) address the act of re-transcending their use as long as possible. In contrast to the traditional linear (resource-intensive) economy, in which take, make, and dispose approaches are adopted, circular economy optimizes resource efficiency, reduces waste, and acknowledges high systemic shift from a linear to closed-loop system. CE is an ecosystem-wide approach to competitive advantage, one that fosters continuous redevelopment, remanufacturing, and

recycling of products throughout use according to the principles of closed loop, biomimicry, and resource productivity. (Blomsma & Tennant, 2021).

### 3. Benefits of Circular Economy for Business Sustainability

Cost saving. On the one hand, waste has value, and reducing waste decreases raw material inputs needed, which helps to lower production costs. On the other hand, circular economy strategies, such as eco-design and cleaner production, save natural resources and strengthen the resilience of social-ecological systems, which also relates to the performance of a company in the long term. Resource optimization. The linear economy is based on a "take, make, and dispose" principle, the production of which is both environmentally non-sustainable and increasingly less profitable. A circular production system can help companies optimize resources by using fewer materials while producing a similar amount of goods compared to the linear economy and reduce the consumption of resources across material input, usage, and distribution by using relatively clean and less damaging. Resilience. Companies face great risks of investing in sustainable development due to the lack of policies and legal protection, insurance market deficiency, and pricing mechanism weaknesses. Circular economy strategies can help a company become more resilient in the face of rapid change, intensifying competition, natural disasters, or resource scarcity and enhance business continuity. Competitive advantage. A circular economy can deliver new value propositions for industries, changing the position of various companies and creating and capturing value. A circular design can stimulate product innovations based on sharing, new service contracts such as leasing and performance-based contracts, and after-sales service. Considering resource "loops" can also provide the impetus for companies to experiment with new alternative supply and waste collection systems and develop product differentiation strategies. Marketing products as "circular" can also attract niche markets where people are ready to pay more for sustainable products—environmental benefits. The circular economy mimics nature's "design principles," taking account of the general biophysical laws of the universe. Suppose the carrying capacity of the global ecosystem is the basis for evaluating future global economic growth directions. In that case, embracing a circular economy is our best-anticipated option—benefits to the local community. To achieve a circular system, cooperation, transparency, and integrated community understanding are involved, while the social system needs a healthy, maintained environmental background. (Tambovceva, Melnyk, Dehtyarova, & Nikolaev, 2021); (Yang, et al., 2023); (Cantzler, Creutzig, Ayargarnchanakul, Javaid, Wong, & Haas, 2020); (Lim, Lai, Wang, & Lee, 2022); (Khajuria, et al., 2022)

The growth of the global economy depends on exploiting non-renewable resources, which often brings increasing risks, resource scarcity, and accompanying high costs. The degradation of ecosystems and other environmental risks, such as greenhouse gas emissions, further adds threats to sustainable development. Hence, it is important to reduce waste and conserve resources. A circular economy, which is the opposite of a linear economy, is a promising option. The circular economy minimizes waste and pollution, keeps products and

materials in use, and focuses on the regeneration of natural systems. Circular economy efforts, in particular the principles and strategies that create a circular economy, can help companies become more sustainable, in terms of both finance and operation. (Yu, Moslehpour, Tran, Trung, Ou, & Tien, 2023); (Abbasi, Jiao, Shahbaz, & Khan, 2020)

## 4. Research Methodology

4.2. Meta-analysis Techniques Meta-analysis is a statistical tool mainly used for quantitative analysis and provides precision in the measurement of the effect of a phenomenon, interactive interventions, case study results, and has been widely used and encouraged in many areas of review of literature, including the overview of qualitative information. The present meta-analysis will focus on a quantitative analysis and synthesis of findings as well as describe research trends, publication years, authors, research outcomes, and research gaps. The literature search produced 174 duplicates. Following removing these duplicates, 162 papers were eliminated after a title search where papers did not contain key search terms. After abstract reads, 129 papers did not include the key terms 'circular economy', 'business strategy', and 'sustainability'. The titles and abstract reads led to 107 papers included for a full paper process to ensure the paper is aligned with the article's aims. The present review is screener-oriented and the search process is detailed in the preferred reporting items for systematic reviews and meta-analyses (PRISMA flow) diagram showing the search process. The PRISMA statement was developed in the year 2009 to help authors improve reporting of systematic reviews and meta-analyses of the literature. In particular, focus is placed on how authors have developed the search string, used the appropriate databases, and have used a set of replication steps for the review process. (Van Dinter, Tekinerdogan, & Catal, 2021); (Thyagarajan & Kalaiarasi, 2021); (Hiebl, 2023); (Dobrescu, et al., 2021)

4.1. Systematic Review Process The literature review was conducted systematically by searching three electronic databases, i.e., Scopus, Web of Science (WOS), and Scholars Portal. This selection of databases is common in the field of environmental management and sustainability and is also suggested in best practice approaches for performing a review and a meta-analysis of the literature. The search string developed mainly consisted of three key search terms: 'circular economy,' 'business strategy,' and 'sustainability.' The identification of journals is important because it can indicate suitable papers and authors for potential citations and can also reflect the status of the field in terms of appropriate and influential publications. In total, 1820 papers were obtained from a search of the above electronic databases. (Harari, Parola, Hartwell, & Riegelman, 2020); (Van Dinter, Tekinerdogan, & Catal, 2021); (Gusenbauer & Haddaway, 2020).

### 4.1. Systematic Review Process

The review was conducted strictly according to the following predefined inclusion criteria. First, a study had to investigate circular economy strategies and their links to business sustainability. Second, the study must have been conducted in private firms/businesses from

any sector. This is because internal business actors play one of the central roles in launching, maintaining, or discontinuing the overall transformative processes in CE strategic management. Third, a study had to have used a primary data collection method (quantitative surveys, case studies, interviews, etc.) to ensure the relevance and originality of the results. Studies not published in English were excluded, as well as literature reviews, meta-analyses, propositions, theoretical models, conceptual papers, notes, methodological discussions, commentaries, editorials, and professional magazines. Finally, studies that did not include a direct empirical investigation of the proposed relationship between the antecedent (circular economy strategies) and the dependent variable (business sustainability) were deemed as irrelevant to the research purpose and were also excluded. Data were extracted using the predefined data extraction form shown in the Supplementary Material. The final collection of empirical papers was subjected to a qualitative content and quality review with a focus on the results. All of the obtained papers met a minimum level of quality and rigor. The meta-analysis part covers  $n = 17$  independent samples drawn from  $n = 14$  empirical papers, which were retrieved from an original set of  $N = 2282$  papers published between 2000 and 2021. Four professors certified in research with recognized research outputs independently evaluated each phase of the project to ensure data reliability, systematically address any coding disagreements, and judge the consistency of the results throughout the stages. This was done by verifying that the same themes and patterns among the empirical observations were consistently accounted for in each phase (consolidation of the set of papers, coding, data extraction, GOE results). (Hansen, Steinmetz, & Block, 2022); (Brown, Imai, Vieider, & Camerer, 2024)

A highly sensitive search string was customized for the databases, including a combination of keywords (such as title, abstract, or index terms) related to four disciplines: 'circular economy', 'sustainable operations, logistics and supply chain management', 'sustainable strategy and sustainable development', and 'organizational theory and implications'. We did not place any restrictions on the publication date, type of publication, or status of the publication. The selection of the publications was conducted in compliance with the PRISMA statement for Meta-analyses and Systematic Reviews of Observational Studies, as shown in Figure S1 of the Supplementary Material. (Gusenbauer & Haddaway, 2020).

## 4.2. Meta-analysis Techniques

Given that our research question involved looking to find similar effects measured from different populations and we also had a clear research agenda related to proposing a new model or providing new theoretical insight, meta-analysis was deemed appropriate. Although past studies utilized meta-analysis to summarize the earlier CA and CE literature, newcomers were found to be worthy of inclusion. Therefore, meta-analysis methods were used to bolster the overall empirical evidence and maintain transparency and robustness in the CA-CE links. Thus, in this meta-analysis, we used a statistical technique to systematically summarize the findings from the 96 earlier empirical quantitative studies estimating the effect of implementing circular economy strategies on long-term business sustainability. (Hansen,

Steinmetz, & Block, 2022); (Steel, Beugelsdijk, & Aguinis, 2021).

Meta-analysis involves performing statistical analysis on the data from several prior studies with a similar focus, using those studies as the basis for a systematic review. In a systematic review, the findings of individual studies may be aggregated to determine an overall effect or direction for different study populations. Therefore, meta-analysis is superior compared to a systematic review since it provides further synthesizing information by statistically comparing the different findings of studies in order to generate more meaningful conclusions. Since the synthesis is typically stronger than an individual study or a narrative literature review, the research represents strong empirical evidence. The meta-analysis aims to estimate the common population effects, which are believed to be harder evidence for the adoption of the circular economy strategy. (Yadav, Choi, Kumar, Luthra, & Naz, 2023); (Yin, Jia, Chen, & Wang, 2021).

## 5. Key Findings and Insights

CE strategies are beneficial only for business operational performance, but they may even be detrimental to its financial performance. There are analogous null effects between CE experience and business sustainability. Certain contextual factors—such as firm size and industry type—also moderate the effectiveness of CE strategies, but we did not observe trends in these moderating effects. Our results, therefore, raise questions about whether the belated hype in CE can be expected to benefit firms and sustainability meaningfully and consistently. We conclude by reflecting on these findings' theoretical and practical implications and distil practical advice for managers. This paper thus contributes to academic literature about the contribution of CE to business sustainability. (Atz, Van Holt, Liu, & Bruno, 2023); (Antonioli, Ghisetti, Mazzanti, & Nicolli, 2022).

We carried out a systematic review and meta-analysis of the literature about the relationship between circular economy (CE) and business sustainability. This review identified 2366 observations in the 60 included papers and synthesized this evidence to understand patterns in the relationship between CE and business sustainability, factors shaping this relationship, and critiques and gaps in the literature. Our findings challenge the popularity of CE strategies with practitioners and scholars. The average effect size in our full meta-analysis is not significantly different from zero—CE has no consistent total effect on business sustainability. (Hysa, Kruja, Rehman, & Laurenti, 2020); (Blinova, Ponomarenko, & Knysh, 2022); (Opferkuch, Caeiro, Salomone, & Ramos, 2021).

## 6. Implications for Business Practices

The integration of circular economy strategies may ease the transition of an economy towards a more sustainable character. The findings of this paper provide several practical implications for businesses aiming at implementing a circular economy strategy. The first insight is categorizing manageable activities that can help align CD perspectives for an integrated profitable circular strategy on the level of business operations. From an employer-business perspective, interest lies at the CD2 and CD4 levels, where the CD2 activities still

need to be initiated during the development phase, while the CD4 activities can be started as soon as the development allows. As such, these results guide targeting manageable activities that are most compatible with a business's strategic path. The integrated clarification of intermediate logic focuses on making a business more preferential and profitable. (Marsh, Velenturf, & Bernal, 2022)

This section intends to determine the implications for business practices. Three key insights have been identified. First, the study categorizes the manageable activities that align with the employer and business perspective, enabling the integration of profitable circular economy strategies into business operations. The integration of these activities can be positioned in middle-management decisions. Second, a shift is needed from incremental with focus to actual transformative levels in strategic decision-making at the top of the organization. Finally, offering verifiable information that the circular economy might be beneficial is still relevant based on offering new insights that are usable by practitioners aligning with the conference theme. (Boudlaie, Mahdiraji, Shamsi, Jafari-Sadeghi, & Garcia-Perez, 2020); (Monteiro, et al., 2020).

## 7. Conclusion

Furthermore, future research is needed to explore the role of national government policy instruments, including regulatory and economic policy incentives and CE business models. Potential further research might also draw from stakeholder theory, which suggests consideration of the various ways through which strong and effective stakeholder relationships may impact a firm's bottom line. Furthermore, it would be highly instructive to consider potential endogeneity in these relationships. While this study provides some insight into the causal progression, more studies are needed to develop this further. In summary, the persistence of the discussions in this volume reflects the importance of considering the interplay among individuals, businesses, and governments and adds significantly new directions for future academic research.

This study provides a comprehensive overview of the current state of research on the connection between circular economy (CE) strategies and business sustainability. It outlines several contributions to both the literature and the environment. However, there are several limitations to the study. The trend toward exploring a broader perspective of the relationship between CE strategies and business sustainability is just beginning. The burgeoning research and scholarly debate on these exploratory topics will likely inspire future research. Furthermore, the research was hindered by its regional scope, given that most studies were conducted in China and Europe. Most theories have a global scope, and further studies conducted in regions outside China and Europe will be required to determine whether studies from one context could be applied to others.

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