International Journal of SDG's Prospects and Breakthroughs, Volume 2, Issue 4, 2024
ISSN-3107-5320

An Examination of Business Models in The Circular Economy Innovation for Sustainability

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Abstract: The circular economy concept's description, methods, and expected outcomes. The circular economy process, which has the potential to attract business and significantly affect the environment, society, and economy, is highlighted in the study. The government cannot be the lone entity promoting the circular economy. It is necessary to take a strategy that involves the cooperation of investors, merchants, and customers. For the sake of the economy, livelihood, and environment, the circular economy concept unites management, resources, and residues. Proper implementation of the Circular Economy idea will stimulate innovation and direct investments. The circular economy has promise for intelligent and sustainable growth. The individual components of sixteen different process models were merged to form this conceptual process model. 33 tasks, 21 deliverables, 88 techniques/tools, and 13 change facilitators or catalysts are listed in the dynamic capacity view. Perceiving, seizing, and transforming are its three phases. It emphasizes the significance of "formalized" decision-making processes, integrates sustainability thinking activities, supports the identification of necessary changes in product innovation and development, and allows the view of processes and procedures with the behaviour and learning skills necessary to inspire circular economy thinking in business model innovation.

Keywords: Circular Economy; Sustainability; Business Models and Considerations; Process Model.

(Submitted: September 02, 2024; Revised: October 07, 2024; Accepted: November 11, 2024; Published: December 30, 2024)

1. Introduction

Through a variety of interfaces, research, and best practices, the Ellen Mathur Foundation and the World Economic Forum are spearheading the shift from the linear to the circular economy. By combining reverse logistics with creative design and business model development of an ecosystem built on teamwork, the circular economy focuses on effective resource management (Whalen & Whalen, 2020). Although the circular model has long been considered relevant, there are still few studies in this field, mostly due to the linear growth models' importance.

After 2024, when a substantial discrepancy between future supply and demand was examined in a scenario with limited resource availability, the emphasis moved from linear to circular (Pieroni et al., 2019). The importance of a circular economy framework in helping corporate organizations and policymakers establish sustainable strategies and policies is evident from the Google search for "circular economy." The circular economic model creates a closed loop ECOSYSTEM for efficient resource use and consumption (Geissdoerfer et al., 2018).

Researchers have discovered a few traits that link the circular economy model and the concept of sustainability. Both ideas are globally applicable; they both emphasize innovative product designs and developments, as well as collaboration amongst several stakeholders from diverse industries. The environment and economics are closely related to one another. Despite their intimate relationship, the environment has received relatively little consideration in the majority of economics textbooks. An understanding of how the environment stimulates economic thought is offered by the circular economy method (Bocken et al., 2021). The three R's—reducing, recycling, and reusing—also show a strong connection between the environment and the economy. The circular economy idea was created to bridge the gap between economics and the environment.

2. Review of Literature

Utilizing renewable energy sources to their fullest potential is necessary to transition from a linear to a circular economy. Awan and Sroufe (2022) argue that business model design must embed renewable energy and circular practices to reduce reliance on imports and mitigate environmental risks. Numerous renewable energy sources are available to replace fossil fuels in different industries. While these energy sources reduce negative environmental and economic impacts, they also require specific metals and rare materials, which could heighten import dependence. In this context, waste-to-energy approaches can also serve as effective alternatives (Bocken et al., 2021).

Recycling, however, has limited capacity in preserving the material value of products. Hysa et al. (2020) show that recycling reduces price volatility and resource scarcity only partially, since much of the embedded energy, labor, and investment is lost in the process. Therefore, scholars stress the importance of exploring strategies to preserve value at the component or product level rather than focusing solely on material recovery.

Reusing components within a circular economy provides a more practical pathway to value preservation. Lewandowski (2016) explains that designing business models for reuse, repair, and remanufacturing keeps products at their highest value, reduces exposure to resource and price shocks, and ensures more efficient energy use. Similarly, Pieroni et al. (2021) demonstrate that manufacturing companies adopting circular business model innovation achieve better alignment with sustainability goals through systematic reuse initiatives.

Importantly, reuse and remanufacturing demand greater labor inputs than traditional manufacturing. Rehman et al. (2022) confirm that product reuse initiatives can generate significant employment opportunities as economies expand repair, refurbishment, and remanufacturing activities. This supports the dual objective of environmental sustainability and social development.

For systemic change, organizations must take the lead. Jabbour et al. (2020) highlight that stakeholder engagement and institutional support are necessary to mainstream high-value reuse. Yet, firms often remain hesitant, fearing that reuse could undermine the market value of new products. Ferasso et al. (2020) reinforce this concern, noting that while circular economy models offer sustainability advantages, scaling them requires overcoming resistance and aligning incentives across business ecosystems.

2.1.Objective of Study

The study will focus on the following objectives

1. To comprehend the idea of the circular economy, its many facets, and its anticipated effects.
2. To investigate circular business concepts that are founded on the principles of reduce, recycle, and reuse.
3. To investigate the fundamental elements affecting young people's involvement in a circular economy.
4. To investigate young people's inclination to engage in a circular economy using empirical means.

3. Research Design

This exploratory study's goal is to understand the "circular economy" idea, including its definitions, procedures, anticipated effects, policy framework, and framework for circular business models in India, as well as a few chosen industries. Examining businesses in the automotive, electrical, and construction industries that use new circular business models based on the three pillars of the circular economy—reduce, reuse, and recycle. The circularity framework of the reduce, reuse, and recycle paradigms in India has been analyzed using the case study approach. To understand the business model (canvas), the format created (Ferasso et al., 2020) is used. To understand the decision-making process involved in circular consumption, the causal study approach has been utilized. To assess the likelihood that consumers will be open to participating in a circular economy, a multivariable model is created. Finding the relative significance of the many circular consumption parameters at various phases of consumption was the first step. The Delphi

technique was applied in order to comprehend the relative significance of the various aspects of circular behaviours. At each step of consumption, the experts were asked to rank the reactivities according to their preferences. Not likely Using the R SWARA technique, judgment sampling is used to produce weights. The chosen nine re-activities that are thought to be crucial and essential for circular consumption have been given weight using the R SWARA technique. The R SWARA approach's stability and credibility are also confirmed using the Rough Best Worst method (BWM). Non-probability convenience sampling has been used to understand the consumption pattern. There are 214 responders in the sample size. Scholars have described consumption as a complex process that combines materialistic, social, cultural, and economic systems.

Consumption, according to researchers in the field of consumption studies, is the process by which agents appropriate and appreciate things, whether for practical, expressive, or contemplative reasons, whether they are bought or not, and they have some control over them. The components can be extracted using a variety of techniques. Principal axis factoring (PAF) and principal component analysis (PCA) are the two most widely used techniques. Removing variance that applies to sets of variables is the primary goal of exacting factors from the original matrix of association. After the common variance is extracted, a residual matrix is left. In order to explain the remaining variance, the subsequent element is then taken out of the residual matrix. Until the factors can no longer account for any appreciable variance, this process is repeated (Hysa et al., 2020).

PCA uses diagonals for analysing a correlation matrix, while the latter uses an iterative procedure to calculate an estimate of dependability. The researcher's goal also influences which of the two approaches is used. The latter is favored if the goals include identifying the latent constructs. However, if data reduction is the goal, then gathering scores on a large number of measurable variables and reducing them to scores on a smaller number of composite variables is the process. The goal of this approach is to preserve as much of the original variables as feasible. Principal components analysis (PCA) is a better choice if data minimization is the aim. The Principal Component Method was judged appropriate since the primary objective of factor analysis was to determine the fewest factors that would explain the most variance in the collected data. It only summaries the variables into smaller groupings rather than focusing on latent components.

4. Experimental Analysis

The findings also highlight unexplored problems and research needs, including the creation of business models for retained ownership-related risk reduction in product-service offers and the examination of how and why companies extend their business models for product value. Comparative and longitudinal research on the economic or environmental outcomes of different product lifespan extension business models may also be a useful and productive line of inquiry.

Table 1: Weight Value of Criteria for Circular Consumption Behaviour Obtained Using R SWARA

What types of business models are most prevalent in the circular economy (e.g., product-as-a-service, sharing economy, closed-loop production)?	0.109378	0.131979
How can businesses in various sectors (such as manufacturing, retail, and services) handle the circular economy's business model innovation?	0.107068	0.098085
Which key performance indicators (KPIs) are utilized to gauge how well circular economy company models are working?	0.160798	0.132167
What are the salient features of circular economy business models?	0.110906	0.088613
How do companies in the circular economy create and capture value?	0.131487	0.124414
How do sustainability and innovation contribute to the creation of business models for the circular economy?	0.0947	0.087873
What effects do circular economy business models have on social responsibility and environmental sustainability?	0.107168	0.092888
What are the economic benefits and challenges associated with adopting circular economy business models?	0.106525	0.094952
What effects do laws and regulations have on the creation and application of circular economy business models?	0.077697	0.077688

The most significant factor influencing a consumer's choice in the circular economy, according to a comparison of weight values derived using R SWARA or BWM, is receiving in exchange during the acquisition stage, followed by repairing or renewing the product to extend its life during the usage stage, and returning to the system during the disposal stage.

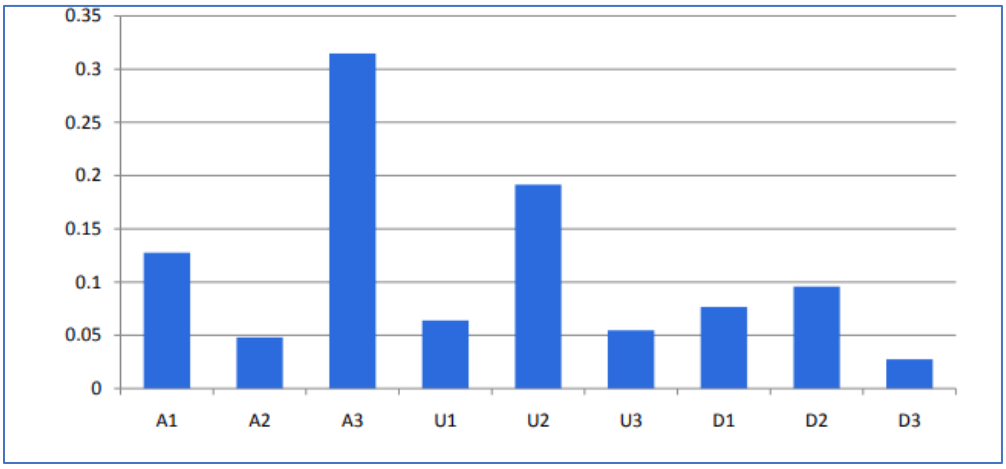

Figure 1: Weights Assigned to Various Consumption Behavior in Different Stages of Consumption- BEST- WORST Method

The customer places the least value on giving up anything without money, according to the weight values that were analyzed. This suggests that as a product reaches its end of life, buyers are searching for value. Additionally, the analysis shows that peer-to-peer sharing and repair businesses have commercial prospects (Bakker et al., 2018). The primary focus of business models should be on creating economic value that can support circular consumption. Numerous studies look at circular business models in relation to SDG achievement and broader sustainability ideas.

Table 2: Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Value Proposition	3.236	35.957	35.957	3.017	33.522	33.522	2.864	31.819	31.819
Market Demand	2.349	26.102	62.058	2.005	22.274	55.796	2.016	22.401	54.220
Cost Savings	1.361	15.120	77.179	1.153	12.816	68.612	1.295	14.391	68.612
Stakeholder Engagement	.766	8.515	85.694						
Digitalization	.464	5.160	90.854						
Emerging Technologies	.339	3.772	94.626						
Data Analytics	.275	3.060	97.687						
Revenue Streams	.137	1.522	99.209						
Regulatory Framework	.071	.791	100.000						

For example, by quantitatively evaluating the sustainability performance of circular practices, future research could conceptually and empirically deepen our understanding of the relationship between sustainability and the circular economy. If and how the circularity movement makes companies and their supply chains more sustainable, as well as how organizations take their contexts into account when integrating sustainability goals into their agendas, are more study questions to think about.

Table 3: Rotated Factor Matrix

Description	Factor		
	1	2	3
What types of business models are most prevalent in the circular economy (e.g., product-as-a-service, sharing economy, closed-loop production)?	-.011	.889	.154
How can businesses in various sectors (such as manufacturing, retail, and services) handle the circular economy's business model innovation?	.085	.473	-.069
Which key performance indicators (KPIs) are utilized to gauge how well circular economy company models are working?	.913	.205	-.069
What are the salient features of circular economy business models?	.802	-.150	-.158
How do companies in the circular economy create and capture value?	.733	.282	.251
What role do innovation and sustainability play in the development of circular economy business models?	.221	-.598	.150
How do circular economy business models impact environmental sustainability and social responsibility?	.662	.453	-.593
What are the economic benefits and challenges associated with adopting circular economy business models?	.762	-.269	-.048
What effects do laws and regulations have on the creation and application of circular economy business models?	.014	-.051	.893

By offering a research agenda, this study sought to expand the body of knowledge already available in the fields of business models and the circular economy while also consolidating recent advancements in these areas. We were able to determine the most common subjects in current research as well as the rising themes in the literature by conducting a qualitative review and bibliometric analysis of a small number of chosen papers. These indicate promising directions for further investigation.

5. Conclusion

The results of the network bibliometric analysis confirm our findings. That was carried out using VOS viewer, which made it possible to examine the connections between important phrases. It goes beyond the conventional use of bibliometrics to examine author, institution, and citation networks. This analytical technique made it possible to identify important phrases that aren't fully covered in recent research articles and to build a rich and dense network of crucial terms and their links. Furthermore, by using VOS viewer as a data mining tool for chosen articles, it was possible to identify the papers that contained the chosen key terms and to identify prospective research gaps that may be investigated in future studies. This process is different from other quantitative reviews (like meta-analysis) and qualitative assessments of the literature (like systematic reviews or meta-synthesis). It enables the identification of important word groups and their relationships; a more comprehensive qualitative literature review could go deeper into these. A wide range of subjects and research issues examined at the nexus of business models and the circular economy are highlighted in this study. Its findings not only illuminated new study areas and white spots in the field, but also brought attention to the challenges being investigated in the field today. This will probably encourage more research. Our analysis, conclusions, and suggestions for further study are intended to inspire fresh, innovative inquiries and avenues in the domains of business models and the circular economy.

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