

ANALYZING DETERMINANTS OF CIRCULAR ECONOMY ADOPTION IN DAVAO CITY: A SYSTEMATIC REVIEW OF LITERATURE

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DOI: <https://www.doi.org/10.58257/IJPREMS37970>

ABSTRACT

This systematic review synthesizes existing literature on the key determinants influencing the adoption of Circular Economy (CE) practices, focusing on economic, technological, policy, social, and environmental factors. The review identifies the primary drivers and barriers to CE adoption across various industries, with a focus on how these factors interact to shape the feasibility and success of transitioning to a circular model. Economic factors such as cost reduction, profitability, and market demand for sustainable products are identified as key enablers. Technological factors, including innovations in recycling technology and product design for sustainability, are critical for operationalizing circular practices. Policy and regulatory frameworks, along with social factors such as consumer demand and environmental awareness, also play a significant role in driving CE adoption. Finally, the environmental impact of CE, specifically in reducing waste, emissions, and resource depletion, underscores its potential to mitigate environmental degradation. The study uses the PRISMA framework to evaluate studies across databases, offering insights into the complex interplay between these determinants and providing recommendations for overcoming barriers to CE adoption.

Keywords: Circular Economy, economic factors, technological innovation, policy incentives, sustainability, social demand, environmental impact, waste reduction.

1. INTRODUCTION

Circular Economy (CE) is increasingly recognized as a transformative business model that offers companies a path towards sustainability and resource optimization. Unlike the traditional linear economy, which follows a "take, make, dispose" approach, the circular economy operates in a closed-loop system, aiming to reduce waste, recycle materials, and extend product life cycles. This paradigm shift offers several benefits, including cost reduction, improved resource efficiency, and new revenue opportunities through sustainable products (Murray et al., 2017).

However, the transition to Circular Economy practices is influenced by various determinants that shape the economic viability and operational feasibility of such models. Economic factors, including cost reduction, profitability, and the market demand for sustainable products, are among the most significant drivers of Circular Economy adoption (Geissdoerfer et al., 2017). Companies are motivated by the potential for cost savings from resource efficiency, which can enhance profitability. Market demand for sustainable products is also increasing, with consumers increasingly seeking eco-friendly options (Bocken et al., 2016). On the other hand, significant economic barriers, such as initial investment costs and concerns over financial feasibility, remain challenges that businesses must navigate in their transition to circular models (Lacy et al., 2020).

In addition to economic factors, technological factors play a central role in the adoption of CE practices. Innovations in recycling technologies, sustainable product design, and waste management systems are vital to improving the operational efficiency and reducing the costs associated with circular models (Zhu et al., 2018). Despite these innovations, barriers related to the high cost of technology and lack of infrastructure for effective recycling and product design remain obstacles for many industries (Davidson & Evans, 2019).

The role of policy and regulation is another key determinant in facilitating or hindering Circular Economy adoption. Government incentives, tax breaks, and regulatory frameworks that promote sustainability are critical to creating favorable conditions for businesses to implement circular models. Studies by Frosch & Gallopoulos (2020) and Boons & Loorbach (2019) highlight the importance of economic incentives, such as subsidies and tax reductions, in encouraging companies to adopt more sustainable practices.

Social and cultural factors, such as consumer demand for sustainable products and awareness of environmental issues, are increasingly influencing businesses to adopt Circular Economy models. The rise of environmental awareness among consumers and the growing trend of sustainability-driven purchasing decisions create strong market incentives for companies to embrace circular practices (Lacy et al., 2020; Jensen & Martin, 2021). Additionally, the organizational culture within firms, including their commitment to sustainability, plays a crucial role in the adoption of Circular Economy principles (Zhu et al., 2018).

Lastly, the environmental impact of adopting Circular Economy practices is one of the most compelling reasons for their adoption. By reducing waste, carbon emissions, and resource depletion, the Circular Economy offers significant environmental benefits. As the need to mitigate climate change becomes more urgent, adopting circular practices becomes a way for businesses to contribute to global sustainability goals while simultaneously enhancing their economic performance (Cascini et al., 2019).

This systematic review of literature (SRL) seeks to explore these economic, technological, policy, social, and environmental factors influencing Circular Economy adoption, with a particular focus on identifying key enablers and barriers to its widespread implementation.

2. METHODOLOGY

The methodology for this Systematic Review of Literature (SRL) is based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. The PRISMA framework ensures that the review process is transparent, systematic, and rigorous. This approach includes multiple stages, starting with the identification of relevant studies, followed by screening, eligibility assessment, and final inclusion of studies. The review focuses on the key determinants influencing the adoption of Circular Economy (CE), including economic factors, technological factors, policy and regulation, social and cultural factors, and environmental impacts.

This review follows a structured process that includes the following stages: Identification, Screening, Eligibility, and Inclusion. The review process was designed to ensure comprehensive coverage of the literature while maintaining methodological rigor.

Research Design. This study employs a systematic literature review approach. A systematic review is a research method that aims to comprehensively identify, evaluate, and synthesize all available studies on a particular topic, ensuring transparency and minimizing bias (Liberati et al., 2009). The review process follows a structured and pre-defined methodology to evaluate determinants of Circular Economy adoption based on the studies retrieved from major academic databases.

The review is structured to answer the following key research questions (KRQs):

- RQ1: What are the key economic factors influencing the adoption of Circular Economy practices across different industries?
- RQ2: What are the technological innovations enabling the adoption of Circular Economy models?
- RQ3: How do policy incentives and regulations impact the transition to Circular Economy models?
- RQ4: What are the social and cultural factors, including consumer demand and organizational culture, influencing Circular Economy adoption?
- RQ5: What are the environmental impacts associated with Circular Economy practices?

The search strategy for identifying relevant studies was conducted in a systematic, multi-phase process, which involved initial screening, full-text screening, eligibility assessment, and final inclusion. In the first phase, a total of 534 studies were initially identified. These studies underwent the removal of duplicates and a preliminary evaluation based on their titles and abstracts. After this evaluation, 391 studies remained for further review. The studies were assessed to determine if they addressed one or more of the following factors: economic (e.g., cost reduction, profitability), technological (e.g., innovations in recycling or product design), policy and regulation (e.g., government incentives, regulatory frameworks), social (e.g., consumer demand, environmental awareness), or environmental (e.g., waste reduction, emissions).

In the next step, exclusion criteria were applied to refine the selection. Studies that were not directly related to Circular Economy (CE) adoption or did not focus on the key determinants—economic, technological, policy, social, or environmental—were excluded. Additionally, non-peer-reviewed articles, conference proceedings, and reports were discarded, along with studies published before 2017, as they were less likely to reflect the most recent developments in Circular Economy practices. After applying the exclusion criteria, 139 studies remained.

The eligibility phase involved a more detailed assessment based on a set of specific criteria. Only studies addressing Circular Economy adoption and its determinants—including economic, technological, policy, social, and environmental factors—were considered. To ensure the research was current and relevant, only studies published between 2017 and 2024 were included, and only those published in English were eligible. The review also encompassed a variety of study designs, including empirical studies (quantitative, qualitative, or mixed methods) as well as conceptual frameworks related to CE adoption. Studies focusing on industries or countries with relevance to global CE practices were prioritized, with particular attention given to those addressing economic incentives and technological innovations in both developed and developing economies. After applying the eligibility criteria, 83 studies remained for further review.

In the inclusion phase, eligible studies with available full texts were further scrutinized to 67 studies. The final inclusion phase focused on ensuring that the studies were of high academic quality by selecting those published in peer-reviewed journals. As a result, 41 studies were included in the final review. The researcher conducted a thorough and systematic search using four well-established, reliable online databases: Scopus, Web of Science, Google Scholar, and Semantic Scholar. These databases are reputable platforms for accessing high-quality academic literature, ensuring the integrity and relevance of the selected studies.

Table 1. Distribution of Studies in Peer-Reviewed Journals and Databases

Source	Number of Studies
Scopus	18
Web of Science	16
Google Scholar	41
Semantic Scholar	41

These databases index peer-reviewed journals, conference proceedings, scholarly books, and other academic materials recognized for their credibility and scholarly rigor. Studies lacking accessible full texts or published in non-peer-reviewed sources were excluded to maintain the integrity of the review. Out of the 41 studies that passed the eligibility criteria, eighteen (18) can be found in Scopus and sixteen (16) in Web of Science. All of these studies can be found in Google Scholar and Semantic Scholar (see Appendix 1).

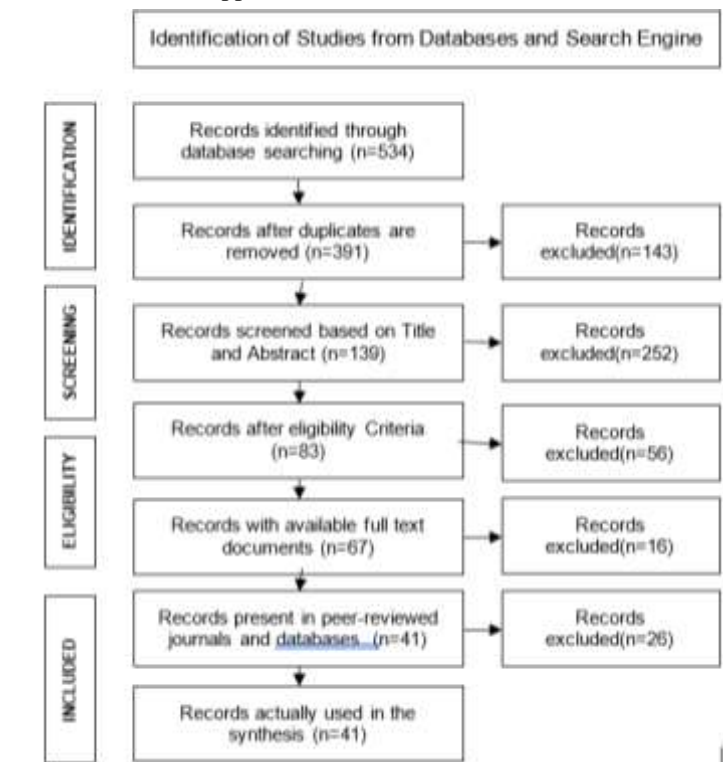


Figure 1. Contextualized PRISMA Model Used in the Study

By adhering to systematic and rigorous methodologies, this study ensures that only the most relevant, up-to-date, and methodologically robust literature contributes to analyzing the determinants of Circular Economy adoption in Davao City. This approach, grounded in established systematic review techniques, provides a structured framework to address the research questions and generate actionable insights for fostering Circular Economy practices in urban settings.

For the data synthesis, a qualitative approach was used to analyze the selected studies thematically. The synthesis focused on identifying the key determinants of Circular Economy adoption, and several themes emerged from the literature. These included economic drivers such as cost reduction and profitability, technological drivers like recycling innovations and sustainable product design, policy and regulatory drivers including government incentives and

international agreements on sustainability, social drivers such as consumer preferences for sustainable products and the role of organizational culture, and environmental drivers like waste reduction, carbon emissions reduction, and resource efficiency. The synthesis also involved discussing how these various factors interact and how they either facilitate or hinder the adoption of Circular Economy practices across different contexts.

The determinants identified in the literature reveal several key factors influencing the adoption of Circular Economy practices. Economic factors include cost reduction, profitability, and the growing market demand for sustainable products, which serve as significant drivers for businesses to transition to circular models. Technological factors play a crucial role as well, with innovations in recycling technologies, sustainable product design, and waste management systems enabling more efficient and effective implementation of Circular Economy principles. Policy and regulation also emerge as critical determinants, with government incentives, tax benefits, regulatory frameworks, and international agreements on sustainability providing the necessary support and enforcement to encourage adoption. Social and cultural factors, such as consumer demand for sustainable products, heightened awareness of environmental issues, and the influence of organizational culture, further shape the willingness and capacity of businesses to embrace circular practices. Finally, environmental impact is a compelling motivator, as reducing waste, emissions, and resource depletion aligns with global sustainability goals and addresses the urgent need for climate action. These interconnected determinants collectively highlight the multifaceted nature of Circular Economy adoption and the importance of an integrated approach to overcoming barriers and fostering widespread implementation.

3. RESULTS AND DISCUSSION

The adoption of Circular Economy (CE) practices is influenced by a multitude of interrelated factors spanning economic, environmental, policy and regulatory, social and cultural, and technological dimensions. Drawing insights from 41 studies, this section examines these factors in depth, analyzing their role as enablers or barriers to CE implementation. The discussion integrates global and regional perspectives, emphasizing the complex interplay of these determinants and their relevance to fostering a sustainable CE framework in Davao City. By synthesizing findings from diverse contexts, this analysis provides actionable insights and practical implications for stakeholders aiming to promote CE adoption.

Economic Factors

Economic determinants are fundamental to the adoption of CE practices, as they present both compelling drivers and notable barriers. Tran et al. (2023) and Kumar et al. (2023) identified cost reduction, profitability, and market demand for sustainable products as primary incentives driving CE adoption. By stabilizing supply chains and optimizing resource efficiency, CE practices contribute significantly to financial performance, as seen in case studies from both developed and developing economies (Barros et al., 2023). Pasqualotto et al. (2023) further demonstrated that firms implementing CE practices reported enhanced sustainability outcomes, including improved cost management and revenue growth, thereby reinforcing the economic rationale for transitioning to circular systems.

Despite these benefits, financial obstacles remain pervasive, particularly for small and medium enterprises (SMEs), which often face high initial costs, limited access to capital, and uncertainties about long-term profitability (AlJaber et al., 2023; Gonçalves et al., 2022). Singh et al. (2022) emphasized the importance of integrating CE principles into organizational long-term planning and securing top management support to overcome these barriers. Moreover, Rosa and Paula (2023) highlighted the influence of national economic conditions, such as fiscal incentives and market dynamics, on the pace and success of CE adoption. For Davao City, developing localized financial mechanisms—including subsidies, tax benefits, and public-private partnerships—could help address these economic barriers and unlock the full potential of CE practices.

Environmental Factors

Environmental considerations serve as both a motivation and a measure of success in CE adoption. Studies by Cainelli et al. (2017) and Wiebe et al. (2019) emphasized the pivotal role of environmental policies in promoting resource efficiency and eco-innovations. CE practices have demonstrated substantial benefits in reducing waste, emissions, and resource depletion. For instance, Agrawal et al. (2020) showcased how CE initiatives in the automobile industry minimized environmental impacts, while Souza de Abreu et al. (2022) detailed the role of CE in mitigating climate change through sustainable road transport practices.

In biodiversity-rich regions like Davao City, implementing effective waste management systems and addressing resource depletion are critical. Foster and Kreinin (2020) and Cavalcante and Araújo-Silva (2023) highlighted the importance of regional cooperation and community engagement in enhancing environmental sustainability. However, Mongo et al. (2021) noted that while CE practices generally yield positive long-term environmental outcomes, short-term challenges, such as increased emissions during the initial transition phase, may arise. Pasqualotto et al. (2023)

underscored the need for standardized environmental metrics to evaluate CE outcomes effectively, particularly in regions where ecological preservation is paramount. Integrating these metrics into local policies and initiatives would enable stakeholders in Davao City to better align CE adoption with environmental objectives.

Policy and Regulation

Policy and regulatory frameworks are essential for facilitating CE adoption, as they provide the structural and financial incentives needed to drive change. Cainelli et al. (2017) demonstrated that environmental policies significantly influence eco-innovations, while Vasconcelos and Bernardo (2024) highlighted the European Union's progress in integrating CE principles into public policy. Despite these successes, challenges such as limited awareness, infrastructure gaps, and regulatory inconsistencies often hinder the effectiveness of CE policies (Payne et al., 2021; Ferro, 2021).

In Davao City, localized policies tailored to the region's socio-economic context could act as powerful enablers of CE adoption. Studies by De Giovanni and Ramani (2023) and Ogutu et al. (2023) explored innovative policy tools, including game theory models and fiscal incentives, which could be adapted to the local context. Regulatory measures such as mandatory waste segregation, incentives for adopting green technologies, and the promotion of extended producer responsibility could address barriers like limited expertise and capital constraints (Lieder & Rashid, 2020; Albrizio et al., 2016). Moreover, fostering collaborative governance models that engage multiple stakeholders—from government agencies to private enterprises—can ensure the successful implementation of CE policies in Davao City.

Social and Cultural Factors

Social and cultural dimensions are critical for the widespread adoption of CE practices, as they shape organizational behavior, consumer attitudes, and community engagement. Bertassini et al. (2021) and Barboza et al. (2022) highlighted the importance of fostering a culture of innovation and collaboration within organizations to drive CE implementation. Organizational values, long-term planning, and active participation by top management play central roles in ensuring the successful integration of CE principles (Singh et al., 2022).

Consumer awareness and behavior also significantly impact CE adoption. Szilagyi et al. (2022) demonstrated that environmentally conscious consumers are more likely to support circular purchasing decisions, thereby creating market demand for sustainable products and services. However, barriers such as limited consumer education and resistance to behavioral change persist (Johansson & Larsson, 2015; Ferreira et al., 2022). Community-based initiatives and targeted awareness campaigns in Davao City could address these challenges by fostering a culture of sustainability at the grassroots level.

Stratan (2017) emphasized the role of social enterprises in aligning CE principles with social and environmental goals. Successful examples of community-led circular initiatives demonstrate the importance of stakeholder engagement, including collaboration between policymakers, businesses, and civil society organizations. For Davao City, leveraging these insights to build inclusive and participatory CE frameworks could significantly enhance social acceptance and adoption.

Technological Factors

Technological innovation is a cornerstone of CE adoption, enabling advancements in recycling, product design, and waste management systems. Studies by Demestichas and Daskalakis (2020) and Kio et al. (2022) highlighted the transformative potential of emerging technologies such as artificial intelligence, blockchain, and the Internet of Things (IoT) in optimizing CE processes. These technologies enable data-driven decision-making, enhance material tracking, and improve resource efficiency across supply chains.

Andrews (2020) underscored the importance of sustainable product design in fostering circularity, emphasizing principles such as modularity, repairability, and recyclability. However, technological barriers, including high implementation costs and inadequate infrastructure, often impede CE adoption, particularly in developing regions (Pasqualotto et al., 2023; Lieder & Rashid, 2020). In Davao City, investing in affordable and context-appropriate technologies could address these challenges. Collaborative efforts between local governments, academic institutions, and private enterprises could also accelerate the deployment of circular technologies.

Su et al. (2019) and Pan et al. (2020) further emphasized the role of design innovation in enabling CE practices. By integrating design principles that prioritize material efficiency and waste reduction, businesses can enhance the profitability and feasibility of CE initiatives. For Davao City, fostering partnerships between technology providers and local industries could facilitate the adoption of these innovative solutions, driving sustainable economic growth.

Synthesis and Implications

The adoption of CE practices is inherently multifaceted, requiring a holistic approach that addresses economic, environmental, policy, social, and technological dimensions. While economic incentives and environmental policies act

as primary drivers, persistent challenges such as high initial costs, limited awareness, and inadequate infrastructure must be addressed to realize the full potential of CE adoption. A multi-level strategy that integrates emerging technologies, community engagement, and tailored regulatory measures is essential to overcome these barriers (Pasqualotto et al., 2023; Kumar et al., 2023).

For Davao City, a localized CE strategy that leverages its unique socio-economic and environmental context is critical. Policymakers, businesses, and communities must collaborate to create enabling conditions for CE adoption, prioritizing financial mechanisms, capacity-building programs, and technological innovation. Future research should focus on refining metrics to quantify CE outcomes, exploring design-centric solutions, and identifying effective policy mixes to support sustainable transitions at both local, national, and global levels.

4. CONCLUSION

This systematic review has provided a thorough analysis of the determinants influencing Circular Economy (CE) adoption in Davao City, highlighting the interconnected roles of economic, environmental, policy and regulatory, social and cultural, and technological factors. These factors serve as both enablers and barriers to the implementation of CE practices, underscoring the complexity of transitioning to a sustainable and resource-efficient model. By synthesizing insights from 41 peer-reviewed studies, this research sheds light on the multi-faceted challenges and opportunities associated with CE adoption.

Economic factors, such as cost reduction, profitability, and market demand for sustainable products, are pivotal in driving CE practices. However, financial barriers, particularly for small and medium enterprises (SMEs), continue to impede progress. Localized financial mechanisms, such as subsidies and public-private partnerships, could alleviate these challenges and unlock the economic potential of CE for regions like Davao City.

Environmental considerations remain a significant motivator for CE adoption, as these practices contribute to reducing waste, emissions, and resource depletion. However, regional environmental priorities, such as waste management and biodiversity conservation in Davao City, require tailored solutions. Effective waste management systems and community engagement are essential for ensuring that CE practices align with local ecological needs.

Policy and regulatory frameworks are critical in shaping CE adoption. Government incentives, tax benefits, and regulatory mandates play a decisive role in promoting sustainable practices. However, the success of these policies depends on addressing barriers such as limited infrastructure and expertise. A collaborative governance model that includes policymakers, businesses, and civil society organizations is vital for overcoming these challenges and fostering CE adoption in Davao City. Social and cultural factors, including consumer awareness, organizational culture, and community engagement, also significantly influence the adoption of CE practices. Educational initiatives and targeted awareness campaigns are needed to foster a culture of sustainability, both at the organizational and community levels. Leveraging social enterprises and participatory frameworks could further enhance social acceptance and integration of CE practices.

Technological advancements, including innovations in recycling, sustainable product design, and waste management systems, are foundational to CE adoption. However, high implementation costs and limited access to advanced technologies remain significant barriers. Strategic investments in affordable and context-appropriate technologies, coupled with collaborative efforts among governments, academia, and the private sector, could accelerate technological adoption and innovation in CE practices. In conclusion, the successful adoption of CE practices in Davao City requires an integrated, multi-level approach that addresses the unique socio-economic, environmental, and technological contexts of the region. By leveraging the interplay of these determinants and fostering collaboration among stakeholders, Davao City can transition toward a sustainable circular model. Future research should focus on refining metrics for measuring CE outcomes, exploring innovative design solutions, and identifying effective policy mixes to support sustainable transitions both locally and globally. This study provides a robust framework for understanding the complexities of CE adoption, offering actionable insights that can guide policymakers, businesses, and communities in their pursuit of sustainable development.

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