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VEIKSNIŲ ĮTAKA ŽIEDINĖS EKONOMIKOS PRAKTIKOS PRITAIKYMUI	**THE IMPACT OF FACTORS TO ADOPTION OF CIRCULAR ECONOMY PRACTICES**

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INTRODUCTION

In recent years, the concept of circular economy has garnered significant attention as a sustainable alternative to the traditional linear economic model. A circular economy aims to minimize waste and resource depletion by maximizing the utilization of resources through closed-loop systems, where materials are reused, recycled, or regenerated. This approach stands in stark contrast to the prevailing linear economy, which follows a 'take-make-dispose' pattern, leading to environmental degradation and resource scarcity (Ellen MacArthur Foundation, 2012; Geissdoerfer, et. al., 2017).

The motivation behind selecting this topic stems from the pressing need to address environmental challenges and promote sustainable business practices. Despite growing interest in circular economy principles, there remains a notable gap in understanding its implementation across various business sectors. While some industries have made strides in adopting circular practices, others lag, indicating the need for further exploration and analysis (Ghisellini, Cialani, & Ulgiati, 2016).

Scientific Problem Statement: The existing literature predominantly focuses on theoretical frameworks and case studies within specific sectors, such as manufacturing or agriculture, often overlooking the broader applicability of circular economy principles. This gap impedes comprehensive insights into the challenges and opportunities associated with implementing circularity across diverse business domains. Consequently, there is a need to bridge this divide by investigating factors influencing the adoption of circular economy practices (Blomsma & Brennan, 2017).

Relevance of the Topic: The relevance of this topic lies in its potential to catalyze sustainable development and mitigate environmental impacts associated with traditional economic models. By embracing circular economy principles, businesses can not only reduce their ecological footprint but also unlock economic benefits through resource optimization, innovation, and enhanced resilience to market fluctuations. Moreover, understanding the dynamics of circularity in various sectors is crucial for policymakers, businesses, and stakeholders seeking to foster a transition towards a more sustainable future (Bocken, Short, Rana, & Evans, 2014).

Research Question: How are factors making an impact to the adoption of CE practices?

Aim and Objectives: The aim of this paper is to examine factors that have a significant impact on the application of circular economy practices across different business sectors. To achieve this aim, the following objectives will be pursued:

- To define the current circular economy practices in various business sectors.

- To identify barriers hindering the implementation of circular practices in different industries.
- To explore success factors including strategies for promoting circularity within specific sectors.
- To develop the model of factors influencing CE practices implementation.

Methodology: This research will employ a qualitative analysis. A comprehensive review of existing literature, including scholarly articles, reports, and case studies, will be conducted to provide theoretical frameworks and contextual understanding (Geng et al., 2012). Primary data will be gathered through **interviews with industry experts and stakeholders representing different sectors.**

1. THEORETICAL ANALYSIS OF THE IMPACT OF FACTORS TO ADOPTION OF CIRCULAR ECONOMY PRACTICES

1.1.Circular Economy Practices

In the manufacturing sector, circular economy practices often revolve around resource efficiency, waste reduction, and product lifecycle management. Companies are increasingly implementing closed-loop manufacturing processes, where materials are recycled or reused to minimize waste generation. For instance, remanufacturing and refurbishment of products allow manufacturers to extend the lifespan of goods, thereby reducing the need for virgin resources (Rizos et al., 2016).

Additionally, initiatives such as eco-design and modular product architecture enable easier disassembly and recycling, facilitating the circular flow of materials (Pigosso et al., 2019). Moreover, collaborative approaches, such as industrial symbiosis, foster resource exchange and synergies among manufacturing facilities, leading to enhanced resource utilization and cost savings (Chertow, 2000). The implementation of such circular practices not only contributes to environmental sustainability but also offers economic benefits through improved resource efficiency and reduced production costs. Therefore, fostering circularity in the manufacturing sector requires a combination of technological innovation, collaborative partnerships, and systemic changes in production processes.

In the retail and consumer goods sector, circular economy practices encompass initiatives aimed at reducing packaging waste, promoting product reuse, and implementing reverse logistics systems. Many retailers are transitioning towards sustainable packaging solutions, such as reusable containers, compostable materials, and minimalistic packaging designs, to minimize environmental impact (Ghisellini et al., 2016). Furthermore, the rise of sharing platforms and product-as-a-service models enables consumers to access goods without necessarily owning them, fostering a shift from ownership to access-based consumption (Bocken et al., 2014). This paradigm encourages product durability, repairability, and reusability, aligning with circular economy principles (Tukker et al., 2015).

By embracing circular practices, retailers and consumer goods companies can reduce their environmental footprint, enhance brand reputation, and meet evolving consumer demands for sustainable and ethical products. However, successful implementation of circularity in this sector requires collaboration along the value chain, consumer education, and investment in innovative business models and infrastructure.

Circular economy practices in the food and agriculture sector focus on reducing food waste, promoting sustainable farming practices, and optimizing resource utilization throughout the supply chain. Initiatives such as surplus food redistribution and composting help divert edible food waste from landfills, addressing both environmental and social concerns (Stahel, 2016). Moreover, the adoption of regenerative agriculture techniques, such as organic farming, agroforestry, and soil carbon sequestration, enhances soil health, biodiversity, and resilience to climate change (Pretty et al., 2018).

Additionally, circular business models, such as food waste valorization and biogas production from organic waste, contribute to the creation of a closed-loop system, where organic nutrients are returned to the soil or converted into energy (Kirchherr et al., 2017). Embracing circularity in the food and agriculture sector not only addresses sustainability challenges but also offers economic opportunities, such as cost savings, revenue generation from waste valorization, and improved supply chain resilience. However, realizing the full potential of circular practices requires cross-sector collaboration, supportive policies, and consumer behavior change to foster a circular food system that is regenerative, equitable, and resilient.

In the information technology sector, circular economy practices revolve around extending the lifespan of electronic products, promoting repairability, and recycling electronic waste. Strategies such as modular design, upgradeable components, and repair-friendly product architecture enable easier maintenance and repair of electronic devices, prolonging their usability (Geissdoerfer et al., 2017). Furthermore, initiatives for responsible e-waste management, such as take-back programs, refurbishment, and recycling of electronic components, help mitigate the environmental impact of electronic waste disposal (Baldé et al., 2017). Circular economy practices in the IT sector not only contribute to reducing resource depletion and environmental pollution but also foster innovation, job creation, and economic growth.

By embracing circularity, IT companies can reduce costs associated with resource extraction, minimize regulatory risks, and enhance brand reputation by demonstrating environmental stewardship and social responsibility. However, transitioning towards circular business models requires collaboration across the value chain, investment in technology and infrastructure, and consumer awareness and engagement to create a circular IT ecosystem that maximizes resource efficiency and minimizes environmental impact.

Circular economy practices in the transportation and logistics sector focus on optimizing resource utilization, reducing emissions, and promoting alternative mobility solutions. Initiatives such as vehicle sharing, ride-hailing, and electric vehicle adoption contribute to reducing the environmental footprint of transportation by maximizing vehicle utilization and minimizing congestion (Clewlow & Mishra, 2017). Furthermore, innovations in sustainable fuels, such as biofuels and hydrogen, offer alternatives to

conventional fossil fuels, thereby reducing greenhouse gas emissions and dependence on finite resources (Hickman & Banister, 2019).

Circular practices in the transportation and logistics sector not only address environmental challenges but also offer economic benefits, such as cost savings from fuel efficiency and reduced maintenance costs. By embracing circularity, transportation companies can improve operational efficiency, reduce waste generation, and enhance resilience to external shocks, such as fluctuating fuel prices and regulatory changes. However, realizing the full potential of circular practices in this sector requires investment in infrastructure, policy support, and consumer behavior change to accelerate the transition towards sustainable and efficient transportation systems.

In the oil sector, circular economy practices focus on reducing waste generation, maximizing resource efficiency, and transitioning towards renewable energy sources. Traditional oil extraction and refining processes are resource-intensive and generate significant waste streams, including wastewater, emissions, and by-products. Circular economy principles advocate for the adoption of cleaner production techniques, such as carbon capture and utilization, to minimize environmental impact and maximize the value extracted from resources (Bergek et al., 2015).

Additionally, initiatives such as water recycling and reclamation in oil extraction operations help conserve freshwater resources and mitigate the environmental footprint of oil production (Yuan et al., 2020). Furthermore, the development of biofuels and renewable energy technologies offers alternatives to conventional fossil fuels, reducing dependency on finite resources and contributing to the decarbonization of the energy sector (Dutta et al., 2021).

Embracing circularity in the oil sector not only addresses environmental challenges but also enhances energy security, fosters innovation, and creates new business opportunities in the renewable energy market. However, transitioning towards a circular oil economy requires collaboration between industry stakeholders, policymakers, and civil society to overcome technological barriers, regulatory constraints, and vested interests in the fossil fuel industry.

These expanded descriptions provide a deeper understanding of how circular economy practices are implemented and applied in various sectors, highlighting their potential benefits and challenges.

Table 1. Circular Economy Practices (elaborated by author).

Practices	Manufacturing	Retail and Consumer	Food and Agriculture	Information Technology	Transportation and Logistic
Closed-loop manufacturing processes	Closed-loop processes reduce waste by reusing materials.	Reuse of materials in product packaging and returns management.	Closed-loop systems for reducing food waste and reusing byproducts.	Reuse and recycling of IT hardware components.	Closed-loop logistics, reusing packaging materials and optimizing routes.
Remanufacturing and refurbishment	Remanufacturing extends product lifespan and reduces resource consumption.	Refurbishment of returned consumer goods for resale.	Refurbishment of farming tools and machinery to extend lifespan.	Refurbishment of IT hardware to reduce electronic waste.	Remanufacturing of vehicle parts to extend their lifecycle.
Eco-design and modular product architecture	Eco-design to reduce environmental impact and facilitate recycling.	Sustainable product design to reduce waste.	Eco-friendly packaging and modular tools for agriculture.	Modular product design for ease of upgrade and repair.	Modular vehicle designs to allow easy upgrades and repairs.
Industrial symbiosis	Resource sharing between manufacturers to optimize material usage.	Collaboration between retailers to reduce resource waste.	Sharing resources between agricultural producers.	Data centers utilizing heat for nearby industries.	Resource sharing between transportation hubs for efficiency.
Sustainable packaging solutions	Packaging with reduced material use and recyclability in mind.	Sustainable packaging reduces plastic waste and promotes recyclability.	Sustainable packaging for food preservation and reducing waste.	Reduced packaging in IT hardware shipping, recyclable materials.	Lightweight, recyclable packaging for transportation efficiency.

Table 1. cont.

Practices	Manufacturing	Retail and Consumer	Food and Agriculture	Information Technology	Transportation and Logistic
Sharing resources	Sharing platforms for optimized equipment use.	Sharing platforms to reduce consumer waste.	Shared farming equipment to reduce resource use.	Shared IT infrastructure (cloud, services) to reduce hardware waste.	Shared transportation platforms to improve efficiency.
Surplus food redistribution and composting		Food redistribution programs to reduce waste.	Composting and redistributing surplus food.		
Regenerative agriculture techniques			Regenerative farming improves soil health and biodiversity.		
Food waste valorization and biogas production			Valorization of food waste for energy production.		
Modular design and repair-friendly product architecture	Modular designs for easy upgrades and repairs.	Repairable and reusable consumer goods.	Modular farming tools to extend lifecycle.	Modular IT systems for upgrades.	Repairable and modular transportation systems.

Table 1. cont.

Responsible e- waste management	E-waste management for factory equipment and technology.	Digitalization in retail creates e-waste management needs.	E-waste from agriculture tech and digitalization efforts.	E-waste recycling programs and responsible digitalization.	E-waste from digitalization in logistics and transportation systems.
Vehicle sharing and ride-hailing services		Car-sharing platforms for consumers to reduce vehicle ownership.	Shared agricultural transport services for rural areas.		Shared mobility platforms reduce environmental impact.
Electric vehicle adoption	Electric vehicles in factory transportation reduce emissions.	Retail fleets adopting electric vehicles for deliveries.	Electric tractors and machinery for sustainable farming.		Electric vehicles reduce emissions and dependence on fossil fuels.
Sustainable fuels development and adoption	Use of sustainable fuels in manufacturing processes.	Adoption of sustainable fuels in logistics and transportation.	Sustainable fuel use in agricultural machinery.		Sustainable fuel use for lower emissions.

In conclusion, analyzing the current circular economy practices across various business sectors provides valuable insights into the strategies and initiatives driving the transition towards a more sustainable and resource-efficient economy.

1.2.Barriers of Implementation of Practices

Lack of Awareness and Understanding. One significant barrier hindering the widespread adoption of circular economy principles is the pervasive lack of awareness and understanding among stakeholders. This lack of awareness extends across various sectors, including businesses, policymakers, and consumers, who may not fully grasp the benefits, feasibility, and practical implications of transitioning to circular practices. Without a comprehensive understanding of circular economy principles, stakeholders may

perceive circularity as a vague concept or dismiss its relevance to their operations or daily lives (Preston & Lehner, 2020).

Moreover, the complexity of circular economy concepts, such as closed-loop systems and cradle-to-cradle design, can further contribute to confusion and skepticism among stakeholders, impeding their willingness to embrace circularity. Therefore, efforts to address this barrier should focus on raising awareness, disseminating knowledge, and providing educational resources to empower stakeholders to make informed decisions and take proactive steps towards adopting circular practices.

High Initial Investment Costs. Another formidable barrier to the adoption of circular practices is the significant upfront investment required for transitioning towards circularity. Implementing circular solutions often entails substantial costs associated with technology acquisition, infrastructure development, and process redesign. These investment requirements pose a particularly daunting challenge for small and medium-sized enterprises (SMEs), which may have limited financial resources and capacity to absorb such expenditures (Bocken et al., 2014).

The perceived financial risk associated with high initial investment costs may deter organizations from embarking on circular initiatives, especially in industries where profit margins are already under pressure. Moreover, the long-term benefits of circularity, such as cost savings and resource efficiency, may not always be immediately apparent, further exacerbating the reluctance to commit to circular practices. Therefore, addressing this barrier requires innovative financing mechanisms, such as public-private partnerships, grants, and incentives, to mitigate the financial burden and incentivize investments in circular solutions.

Fragmented Value Chains. Complex and fragmented value chains present significant obstacles to the adoption and implementation of circular practices across industries. In sectors with extensive supply networks, such as manufacturing and retail, coordinating stakeholders and aligning interests along the value chain can be a daunting task. Fragmentation within value chains often leads to information asymmetry, lack of transparency, and distrust among stakeholders, hindering collaboration and impeding the flow of materials and resources within circular loops (Blomsma & Brennan, 2017).

Moreover, the diversity of actors involved in value chains, including suppliers, distributors, and end-users, adds layers of complexity to efforts aimed at promoting circularity. Establishing trust, fostering transparency, and incentivizing collaboration across fragmented value chains are essential prerequisites for realizing the full potential of circular economy models. Therefore, initiatives to address this barrier should

focus on strengthening partnerships, enhancing communication channels, and promoting collective action among value chain stakeholders to foster a shared commitment to circularity.

Regulatory and Policy Constraints. Inadequate or inconsistent regulatory frameworks and policies represent significant barriers to the widespread adoption of circular practices. The absence of clear guidelines and standards related to circular economy principles creates uncertainty and ambiguity for businesses seeking to embrace circularity. Moreover, conflicting regulations across regions or jurisdictions can further complicate compliance efforts and deter organizations from investing in circular innovation (Kirchherr et al., 2017).

The lack of regulatory incentives or supportive policy measures also undermines the business case for circularity, as organizations may prioritize short-term regulatory compliance over long-term sustainability goals. Addressing regulatory and policy constraints requires close collaboration between policymakers, industry stakeholders, and civil society to develop coherent and enabling frameworks that promote and incentivize circular economy initiatives. Therefore, efforts to overcome this barrier should focus on advocating for policy coherence, conducting regulatory impact assessments, and engaging stakeholders in policy formulation processes to ensure that regulatory frameworks effectively support and enable the transition to circularity.

Limited Access to Resources and Expertise. Access to resources, including recycled materials, renewable energy, and specialized knowledge or skills, is fundamental for implementing circular practices. However, organizations often face significant barriers related to the availability, quality, and affordability of such resources. The limited availability of recycled materials, for instance, can constrain the scalability of circular production processes and hinder efforts to close material loops (Geissdoerfer et al., 2017). Similarly, the shortage of expertise in circular design, manufacturing, and business models poses challenges for organizations seeking to transition towards circularity.

Without access to skilled professionals and technical know-how, organizations may struggle to identify viable circular opportunities, implement effective solutions, and navigate the complexities of circular supply chains. Addressing these resource and expertise gaps requires concerted efforts to build capacity, foster knowledge exchange, and invest in research and development initiatives that support circular innovation. Therefore, initiatives to address this barrier should focus on enhancing resource efficiency, promoting resource recycling and recovery, and investing in skills development and capacity building to empower organizations to adopt and implement circular practices effectively.

Cultural and Behavioral Resistance. Cultural norms, attitudes, and behavioral patterns within organizations and society at large can pose significant barriers to the adoption of circular practices. Resistance to change, rooted in ingrained habits, perceptions, and organizational cultures, can impede efforts to foster innovation and experimentation with circular business models. Organizations may encounter inertia and reluctance to deviate from established ways of working, particularly if circularity requires paradigm shifts or fundamental changes to existing processes (Rizos et al., 2016).

Moreover, risk aversion and preference for the status quo can inhibit the willingness to invest in sustainable practices and embrace the uncertainties associated with circularity. Overcoming cultural and behavioral resistance necessitates comprehensive change management strategies that address mindset shifts, promote learning and adaptation, and create a supportive environment for experimentation and innovation. Therefore, initiatives to address this barrier should focus on fostering a culture of sustainability, promoting awareness and education, and incentivizing behavior change to create an enabling environment for the adoption and implementation of circular practices.

Short-term Focus and Performance Metrics. Traditional business models often prioritize short-term financial performance and profitability over long-term sustainability objectives, creating inherent tensions with circular economy initiatives. The pressure to deliver immediate returns on investment and meet quarterly targets may discourage organizations from allocating resources to sustainable practices and innovation for circularity (Baldé et al., 2017). Moreover, existing performance metrics and incentive structures may not adequately capture the holistic benefits of circular practices, such as resource efficiency, waste reduction, and environmental stewardship.

As a result, organizations may struggle to justify investments in circular initiatives, especially if they perceive sustainability efforts as detracting from their bottom line. Shifting towards a longer-term perspective and incorporating circularity into performance metrics require organizations to reevaluate their priorities, redefine success criteria, and align incentives with sustainability goals. Therefore, initiatives to address this barrier should focus on developing comprehensive metrics and KPIs that capture the full range of benefits associated with circular practices, promoting transparency and accountability, and aligning incentives with sustainable outcomes to drive systemic change.

These expanded paragraphs delve deeper into each identified barrier, providing a more comprehensive understanding of the challenges hindering the adoption and implementation of circular practices across various sectors and stakeholders.

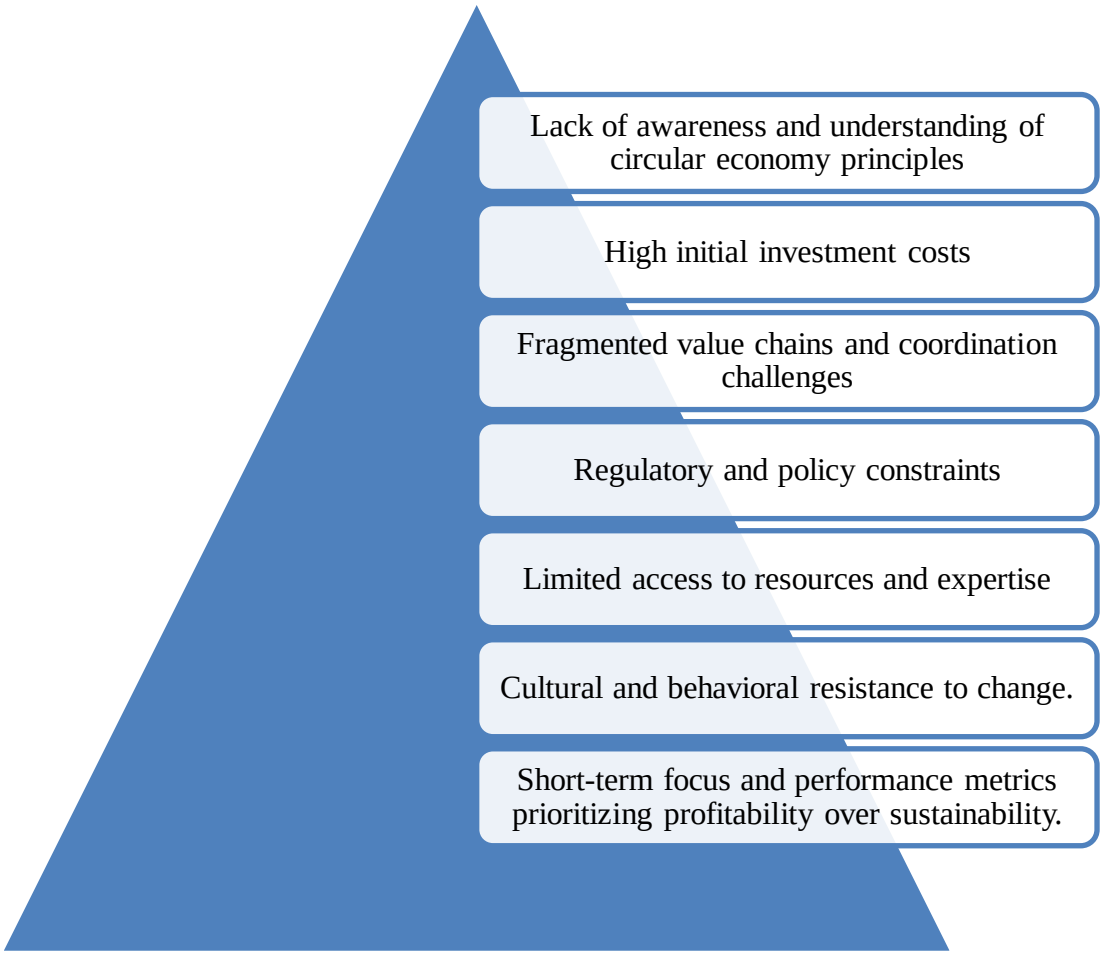

Figure 1. List of Barriers (created by Author)

In conclusion, identifying and addressing these barriers is essential for overcoming challenges and facilitating the widespread adoption of circular practices across different industries.

1.3.Success Factors for Implementation

Circular Business Models and Value Creation. Researchers have identified a variety of circular business models that organizations can adopt to create economic value while minimizing resource use and environmental impact. These models include product-as-a-service, sharing platforms, remanufacturing, and closed-loop systems (Ghisellini et al., 2016). Each model offers unique opportunities for value creation, such as enhanced customer relationships, new revenue streams, and reduced costs through resource efficiency and waste reduction (Bocken et al., 2014).

Circular Supply Chain Management. Effective management of circular supply chains is critical for enabling the flow of materials, products, and information in closed-loop systems. Scholars highlight the importance of collaboration, transparency, and traceability across supply chain partners to optimize resource use, reduce waste, and meet circular economy objectives (Blomsma & Brennan, 2017).

Circular Product Design and Innovation. Designing products for circularity involves considering factors such as material selection, durability, recyclability, and ease of disassembly. Research emphasizes the role of eco-design principles, such as biomimicry, cradle-to-cradle design, and life cycle assessment, in guiding product innovation towards sustainability and circularity (Geissdoerfer et al., 2017).

Circular Economy in Emerging Markets. The adoption of circular economy principles in emerging markets presents unique opportunities and challenges. Scholars argue that circular practices can contribute to inclusive growth, job creation, and poverty reduction in these contexts. However, barriers such as limited infrastructure, regulatory gaps, and informal economies need to be addressed to realize the full potential of circularity (Geng et al., 2012).

Measuring Circular Economy Performance. Developing robust indicators and metrics to measure the performance of circular economy initiatives is an ongoing area of research. Scholars advocate for comprehensive frameworks that capture economic, environmental, and social dimensions of circularity, allowing organizations to assess their progress, benchmark against peers, and communicate their impact to stakeholders (Kirchherr et al., 2017).

Circularity and Sustainable Consumption. Circular economy principles intersect with efforts to promote sustainable consumption patterns and lifestyles. Research suggests that circular practices, such as product-sharing platforms, repair services, and extended product lifespans, can contribute to reducing resource consumption, waste generation, and environmental degradation associated with consumerism (Tukker et al., 2015).

Circular Economy Transition in Developed Economies. Studies have highlighted the transition towards circular economy principles in developed economies, emphasizing the role of policy frameworks, technological innovations, and business models. Research suggests that advanced economies are increasingly integrating circularity into their industrial strategies, with initiatives such as resource efficiency programs, circular procurement, and innovation hubs driving the adoption of circular practices across sectors (European Commission, 2020). Additionally, collaborations between government, industry, and academia are fostering knowledge exchange, capacity building, and pilot projects to accelerate the circular transition (WRAP, 2015).

Circular Economy Metrics and Assessment Tools. The development of standardized metrics and assessment tools is crucial for evaluating the circularity of products, processes, and systems. Scholars have proposed various methodologies, such as life cycle assessment (LCA), material flow analysis (MFA), and environmental foot printing, to quantify the environmental impacts and resource flows associated with

circular economy initiatives (Cossu et al., 2018). These tools enable organizations to identify hotspots, prioritize interventions, and monitor progress towards circularity goals.

Circular Economy in the Built Environment. The built environment represents a significant opportunity for circular economy interventions, given its substantial resource consumption and waste generation. Research explores strategies such as sustainable construction materials, modular design, and adaptive reuse of buildings to minimize environmental impact and promote resource efficiency (Mak et al., 2018). Circular economy principles applied to the built environment can contribute to energy savings, carbon emissions reduction, and improved resilience to climate change.

Circularity in Global Value Chains. The globalization of supply chains presents both challenges and opportunities for advancing circular economy practices. Scholars highlight the importance of supply chain transparency, traceability, and collaboration in enabling circularity across borders (Ivanova et al., 2017). Initiatives such as product passporting, blockchain technology, and circular procurement criteria help address issues related to materials traceability, ethical sourcing, and circularity verification in global value chains.

Circular Economy and Social Equity. Addressing social equity and inclusion is a critical aspect of the circular economy transition. Research emphasizes the need to ensure that circular practices benefit all stakeholders, including marginalized communities, workers, and consumers (Dijkema et al., 2019). Strategies such as inclusive business models, fair labor practices, and community engagement aim to promote equitable distribution of resources, opportunities, and benefits derived from circular initiatives.

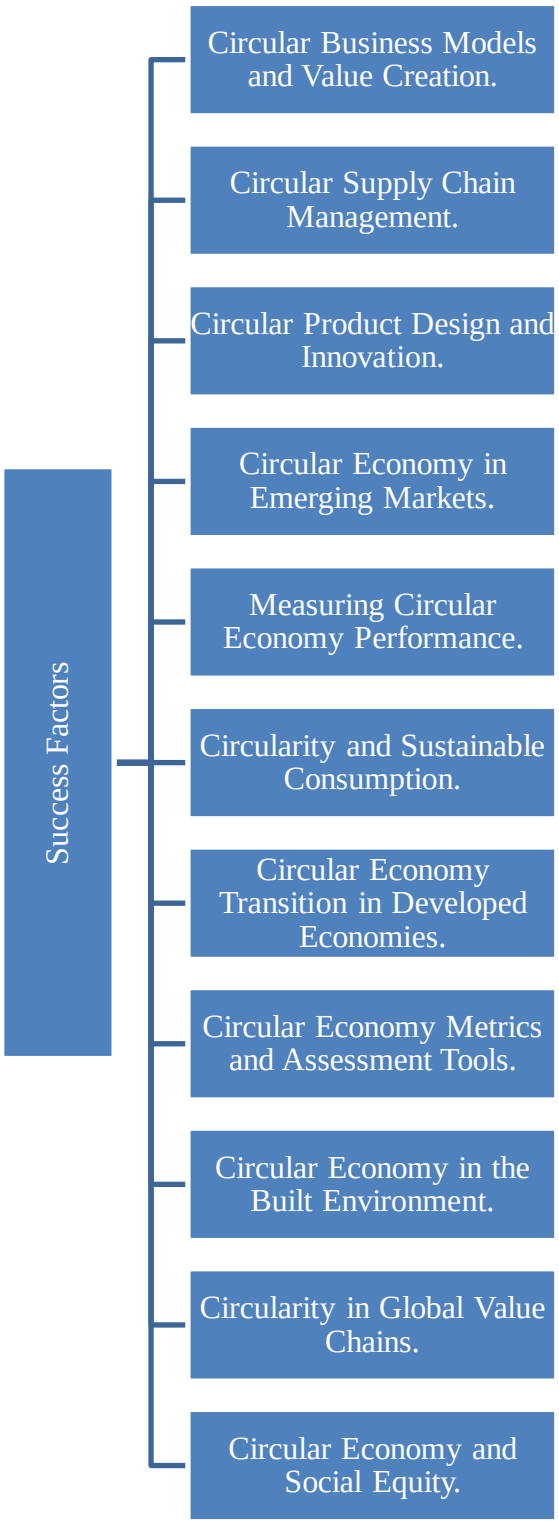

Figure 2. List of Success Factors (created by Author)

In summary, these additional findings underscore the multifaceted nature of the circular economy transition, highlighting the importance of policy support, measurement frameworks, sector-specific interventions, and social considerations in realizing the potential of circularity.

1.4.Adaptation of Circular Economy Practices: Case Studies Across Sectors

The circular economy (CE) is a transformative approach to achieving sustainable development by minimizing waste and making the most of resources. Various factors influence the adoption of CE practices, including policy frameworks, organizational capacity, and market dynamics. This part presents an extensive exploration of case studies across different industries to analyze how these factors impact CE adoption. The analysis highlights successful practices, challenges, and lessons learned from sectors such as manufacturing, retail, food and agriculture, information technology, and transportation. By examining the intricacies of these cases, the study provides actionable insights for businesses, policymakers, and researchers aiming to advance CE principles (Ellen MacArthur Foundation, 2023).

The transition from a linear to a circular economy has gained momentum globally, driven by environmental concerns, resource scarcity, and economic opportunities. Linear models, characterized by "take-make-dispose" practices, are increasingly being replaced by circular models that emphasize reuse, recycling, and resource optimization (European Commission, 2022). However, the adoption of CE practices varies across sectors and geographies due to differing regulatory, economic, and cultural contexts.

This part focuses on examining specific cases to understand the enabling and limiting factors that affect CE adoption. By delving into practical examples, the study aims to provide actionable insights for stakeholders aiming to integrate CE principles into their operations. The analysis further seeks to identify common challenges and propose solutions that can be applied across industries (Ellen MacArthur Foundation, 2023).

1. Manufacturing Sector Case: Philips Lighting and the Circular Lighting Model

Philips Lighting (now Signify) developed a "Lighting as a Service" (LaaS) model, where customers pay for light rather than owning the lighting infrastructure. This approach promotes resource efficiency by focusing on product longevity, maintenance, and recycling (Ellen MacArthur Foundation, 2023).

Policy Support: Government incentives for energy-efficient solutions and extended producer responsibility (EPR) regulations were critical. Policymakers in the European Union have actively supported such initiatives through directives encouraging sustainable design and usage (European Commission, 2022).

Market Dynamics: Increasing demand for sustainable solutions in commercial spaces drove adoption. Corporate clients, particularly in regions with high energy costs, found LaaS appealing.

Challenges: High initial costs and the need for customer education on the benefits of LaaS. Companies faced hurdles in convincing clients to shift from traditional ownership models to service-based contracts. Collaboration with policymakers and industry stakeholders is essential. Governments can play a pivotal role in incentivizing businesses to adopt sustainable practices (Ellen MacArthur Foundation, 2023). Clear communication of economic and environmental benefits fosters acceptance. Businesses must invest in marketing and education to overcome consumer hesitancy. The success of the LaaS model has inspired other companies in the manufacturing sector to explore similar service-based models. This shift requires rethinking traditional supply chains and fostering innovation in product design.

2. Retail Sector Case: IKEA and Reverse Logistics

IKEA implemented reverse logistics to reclaim used furniture for refurbishment and resale. This initiative reduces waste and extends the lifecycle of products, aligning with the principles of CE (Ellen MacArthur Foundation, 2023).

Consumer Engagement: Educating customers about the importance of returning used furniture was key. IKEA launched campaigns emphasizing sustainability and the environmental impact of discarded furniture (European Commission, 2022).

Technological Infrastructure: Efficient tracking systems for returned goods facilitated the program's success. Digital platforms allowed customers to schedule pickups and track the status of their returned items.

Challenges: Logistics complexities and variable quality of returned items. The company faced challenges in scaling operations across diverse markets with varying consumer behaviors.

Simplifying the return process increases customer participation. Convenience is a crucial factor in engaging consumers. Technology plays a pivotal role in managing reverse supply chains. Innovations in sorting, tracking, and refurbishment can significantly enhance efficiency (Ellen MacArthur Foundation, 2023). The success of IKEA's reverse logistics model underscores the importance of integrating sustainability into retail operations. Other retailers, such as H&M and Patagonia, have adopted similar initiatives, demonstrating the scalability of such programs.

3. Food and Agriculture Sector Case: Loop's Zero-Waste Grocery Model

Loop, a zero-waste grocery platform, collaborates with brands to package products in reusable containers. Customers return the containers for cleaning and reuse, creating a closed-loop system (Ellen MacArthur Foundation, 2023).

Cultural Shift: Growing consumer awareness about single-use plastics propelled the initiative. Increased media coverage of environmental issues created a favorable environment for Loop's launch.

Partnerships: Strong collaboration with brands and logistics providers ensured scalability. The involvement of major consumer goods companies such as Unilever and Nestlé added credibility and reach (European Commission, 2022).

Challenges: Maintaining hygiene standards and scaling operations across geographies. Logistics posed a significant challenge, particularly in regions with limited infrastructure.

Public-private partnerships enhance operational feasibility. Collaboration with government agencies and NGOs can address logistical challenges. Building trust with consumers is crucial for reusable packaging systems. Transparent communication about hygiene and environmental impact fosters consumer confidence. Loop's model illustrates the potential for innovation in packaging and logistics to drive CE adoption in the food and agriculture sector. The initiative has inspired other companies to experiment with reusable and compostable packaging.

4. Information Technology Sector Case: Dell's Closed-Loop Recycling Program

Dell uses recycled plastics from old electronics to manufacture new products. This initiative exemplifies the integration of CE principles into IT manufacturing (Ellen MacArthur Foundation, 2023).

Technological Innovation: Advanced recycling technologies enabled material recovery at scale. Dell invested in automated systems to separate and process e-waste efficiently.

Regulatory Environment: E-waste regulations in key markets like the EU encouraged adoption. Compliance with these regulations provided Dell with a competitive edge (European Commission, 2022).

Challenges: High costs of recycling and limited availability of recyclable materials in certain regions. The company also faced challenges in raising consumer awareness about e-waste recycling programs.

Investment in R&D for recycling technologies is vital. Continuous innovation ensures the scalability and efficiency of CE practices. Collaboration with consumers to increase return rates of old devices improves material supply. Incentives such as trade-in programs and discounts can boost participation.

Dell's closed-loop program highlights the importance of integrating CE principles into product design and manufacturing. Other IT companies, including HP and Apple, have followed suit, demonstrating the potential for widespread adoption.

5. Transportation Sector Case: Michelin's Tire-as-a-Service Model

Michelin offers a service where customers lease tires and pay based on usage rather than ownership. The model incentivizes durability and end-of-life recycling (Ellen MacArthur Foundation, 2023).

Economic Incentives: Cost savings for fleet operators made the model appealing. Customers benefit from predictable costs and reduced maintenance burdens.

Regulatory Support: Policies promoting sustainable transportation played a significant role. Governments in Europe and Asia provided subsidies for eco-friendly transportation initiatives.

Challenges: Developing infrastructure for tire maintenance and recycling. Michelin had to invest significantly in expanding its service network (European Commission, 2022).

Aligning financial benefits with sustainability goals accelerates adoption. Clear economic incentives enhance customer buy-in. Ensuring infrastructure readiness is crucial for service-based models. Companies must invest in logistics and maintenance networks.

Michelin's model demonstrates the potential for service-based approaches to transform traditional industries. Similar models can be applied to other sectors, such as machinery and automotive manufacturing.

Policy and Regulation: Supportive policies, such as EPR and subsidies for green technologies, significantly influence CE adoption. Policymakers must create an enabling environment for businesses to transition to CE models.

Technology and Innovation: Advanced tools for recycling, tracking, and analytics enable more efficient implementation of CE practices. Investments in R&D are essential for overcoming technical barriers.

Consumer Behavior: Educating and incentivizing consumers to participate in circular initiatives is crucial. Awareness campaigns and reward programs can enhance engagement (Ellen MacArthur Foundation, 2023).

Collaboration: Partnerships between businesses, governments, and non-profits enhance scalability and effectiveness. Collaborative approaches reduce costs and streamline operations.

Financial Viability: Demonstrating economic benefits alongside environmental gains fosters adoption. Companies must provide clear ROI metrics to stakeholders (European Commission, 2022).

The case studies reveal that the successful adoption of CE practices depends on a combination of supportive policies, technological advancements, and stakeholder collaboration. Challenges such as high initial costs, consumer behavior barriers

1.5.Implementation of Circular Economy Application

The implementation of circular economy applications requires a multifaceted approach involving stakeholders across the value chain, innovative business models, supportive policies, and investment in technology and infrastructure. Here, we outline key steps and strategies for effectively implementing circular economy principles in various sectors.

Stakeholder Engagement and Collaboration. Engaging stakeholders across the value chain, including businesses, policymakers, consumers, and civil society organizations, is crucial for successful implementation of circular economy applications. Collaboration fosters knowledge sharing, promotes innovation, and drives systemic change towards circularity (Kirchherr et al., 2017). Stakeholder engagement initiatives, such as workshops, forums, and partnerships, facilitate dialogue, build consensus, and identify opportunities for collaboration.

Innovative Business Models. Adopting innovative business models is essential for leveraging circular economy opportunities and overcoming traditional linear practices. Circular business models, such as product-as-a-service, sharing platforms, and remanufacturing, shift the focus from selling products to delivering services and solutions (Bocken et al., 2014). These models promote resource efficiency, extend product lifespan, and create new revenue streams through product reuse, refurbishment, and value-added services.

Design for Circularity. Designing products and systems for circularity is a fundamental principle of the circular economy. Eco-design, modular product architecture, and material selection are key strategies for optimizing resource use, enabling easy disassembly, and facilitating material recovery and recycling (Geissdoerfer et al., 2017). Integrating circular design principles into product development processes ensures that products are durable, repairable, and recyclable, thus minimizing waste and environmental impact throughout their lifecycle.

Resource Efficiency and Waste Reduction. Maximizing resource efficiency and minimizing waste generation are central objectives of circular economy implementation. Adopting lean manufacturing principles, process optimization, and waste reduction strategies help companies minimize resource inputs, reduce production costs, and improve overall operational efficiency (Rizos et al., 2016). Furthermore,

implementing closed-loop systems, such as material recycling and reuse, enables organizations to extract maximum value from materials and minimize environmental impact.

Technology and Innovation. Investing in technology and innovation is critical for unlocking the full potential of circular economy applications. Advanced manufacturing technologies, digitalization, and automation enable resource-efficient production processes, real-time monitoring, and predictive maintenance (Baldé et al., 2017). Additionally, emerging technologies, such as blockchain, artificial intelligence, and internet of things (IoT), offer opportunities for traceability, transparency, and optimization across supply chains.

Policy Support and Regulatory Frameworks. Enabling policy environments and supportive regulatory frameworks play a vital role in facilitating the transition to circular economy practices. Governments can incentivize circularity through tax incentives, subsidies, and grants for circular businesses, as well as by setting ambitious targets for waste reduction, recycling rates, and resource efficiency (Stahel, 2016). Additionally, harmonizing standards, promoting eco-labeling, and implementing extended producer responsibility (EPR) schemes help create a level playing field and drive market demand for circular products and services.

Consumer Awareness and Behavior Change. Educating consumers about the benefits of circular economy and empowering them to make sustainable choices are essential for driving demand for circular products and services. Communication campaigns, eco-labeling, and consumer engagement initiatives raise awareness about circularity, encourage responsible consumption patterns, and foster a culture of reuse, repair, and recycling (Tukker et al., 2015). Moreover, involving consumers in product design, feedback loops, and co-creation processes enhances product acceptance and promotes a sense of ownership and responsibility towards circularity.

Monitoring, Evaluation, and Continuous Improvement. Monitoring and evaluating the performance of circular economy initiatives are essential for tracking progress, identifying areas for improvement, and optimizing resource allocation. Key performance indicators (KPIs), life cycle assessments (LCAs), and environmental impact assessments help organizations measure the effectiveness of circular practices, assess their environmental footprint, and demonstrate the business case for circularity (Preston & Lehner, 2020). Moreover, fostering a culture of continuous improvement and learning enables organizations to adapt to evolving market conditions, technological advancements, and regulatory requirements, ensuring long-term sustainability and competitiveness.

By adopting a holistic approach that integrates these strategies, organizations can effectively implement circular economy applications, realize tangible benefits, and contribute to building a more sustainable and resilient economy.

1.6. Theoretical Model

The theoretical model is retrieved from sub-chapters above. The model will be useful for representing research questions, analyzing main issues and data, etc. So, the model is represented in figure 3.

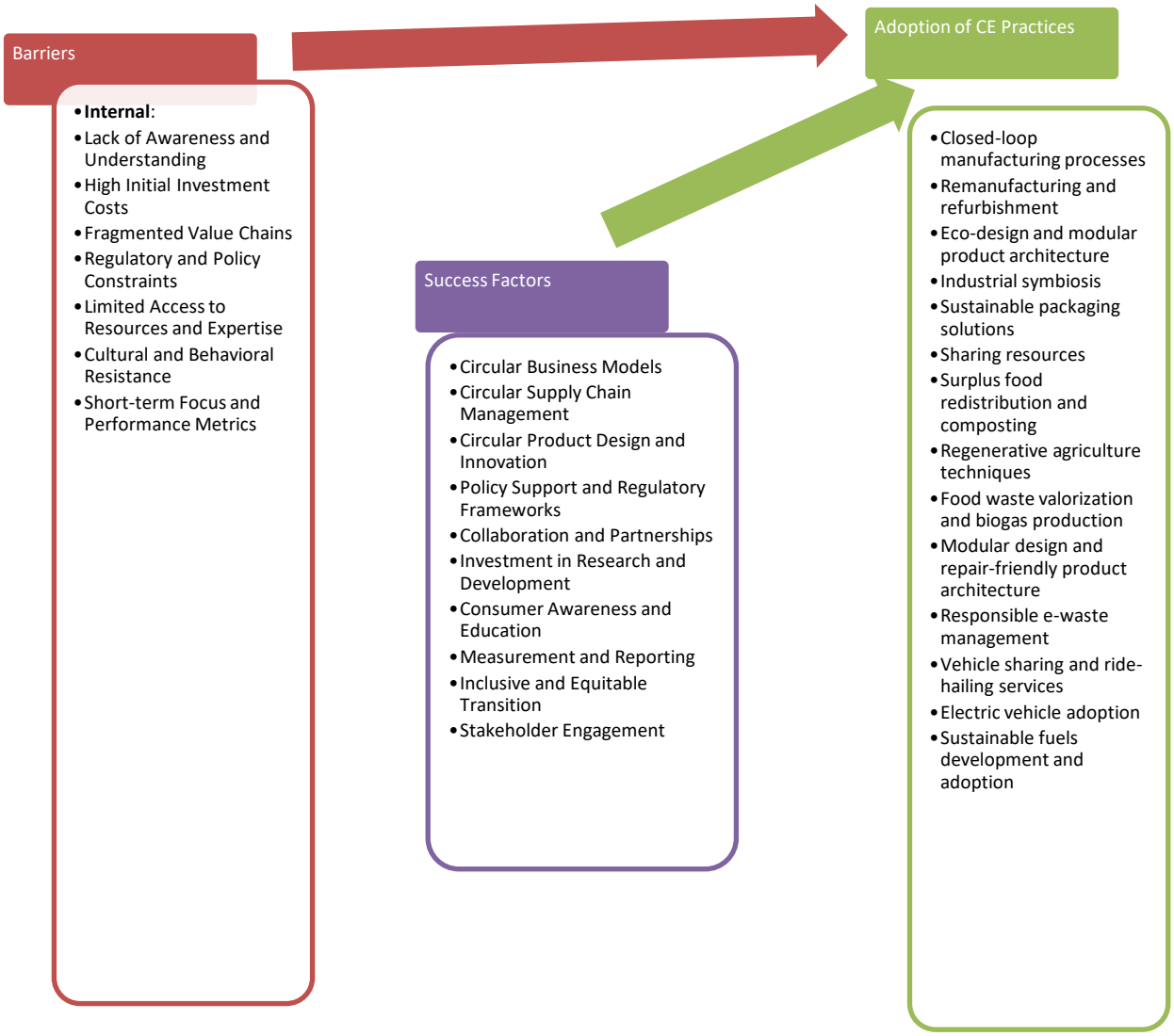

Figure 3. Theoretical Model (created by Author).

The model consists of three variables: dependent variable - Adoption of Circular Economy practices, and two independent variables – Barriers and Success Factors. Each variable consists of elements listed in the corresponding text boxes.

2. METHODOLOGY FOR THE IMPACT OF FACTORS TO ADOPTION OF CIRCULAR ECONOMY PRACTICES

2.1.Research Framework and Design

This study employs a qualitative research framework to delve into the factors that influence the adoption of Circular Economy (CE) practices across various business sectors. The research design integrates in-depth interviews and content analysis to capture a comprehensive understanding of how industry experts, policymakers perceive, experience, and implement CE practices. By focusing on qualitative data, the study aims to explore nuanced insights into the barriers and enablers of CE adoption.

The research will adopt a descriptive and exploratory approach to identify and analyze key themes, patterns, and relationships among the factors influencing CE adoption. This approach is chosen to provide a rich, contextualized understanding of the subject matter and to generate actionable insights for businesses and policymakers. The objective is to highlight the complex interplay of factors that impact the successful integration of CE practices within different sectors.

2.2.Research Methods

Primary Data: Primary data will be gathered through semi-structured interviews with key informants from a diverse range of industries. These interviews are designed to elicit in-depth and detailed information on several key aspects:

1. Current Practices Related to Circular Economy Adoption: Exploring how CE principles are currently being applied within various sectors. This includes examining specific practices such as closed-loop systems, sustainable packaging, and modular design.
2. Challenges and Barriers: Identifying the main obstacles and difficulties encountered in the implementation of CE principles. This may involve financial constraints, lack of expertise, or technological limitations.
3. Success Factors and Enablers: Investigating the factors that have facilitated successful adoption of CE practices. This includes understanding the role of supportive policies, organizational culture, and innovative technologies.

Interview Design: The semi-structured interview guide will be crafted with open-ended questions to allow for a flexible and in-depth exploration of the topics. The questions will be organized into several key areas:

1. Industry-Specific CE Practices: How are Circular Economy principles integrated into practices within your sector? For example, what strategies are used for closed-loop systems, sustainable packaging, and modular design?
2. Internal Barriers to CE Adoption: What are the primary challenges faced in adopting CE practices in your sector? Consider factors such as financial constraints, technical limitations, and resistance to change.
3. Success Factors: What enablers have contributed to the successful implementation of CE practices in your sector? This may include supportive policies, industry collaboration, and technological advancements.

By utilizing a qualitative approach, the study aims to capture a comprehensive view of the factors influencing CE adoption and provide valuable insights for stakeholders seeking to enhance their sustainability practices.

2.3.Data Collection and Instrument

Data Collection: Data will be collected through semi-structured interviews conducted with key informants from various industries, including manufacturing, retail, agriculture, information technology, and transportation. The use of a semi-structured format allows for flexibility in responses while ensuring that all critical areas of inquiry are covered.

Sampling Method: A purposive sampling method will be employed to select participants who have significant knowledge and experience regarding Circular Economy (CE) practices within their respective sectors. This will ensure that the collected data is rich and relevant to the research objectives.

Interview Instrument: The interviews will utilize a semi-structured interview guide, consisting of open-ended questions organized into three key areas.

Data Analysis: After conducting the interviews, the recordings will be transcribed verbatim for analysis. Thematic analysis will be employed to identify patterns, themes, and relationships within the data, allowing for a comprehensive understanding of the factors influencing CE adoption. This structured approach to data collection will ensure that the study captures a nuanced understanding of the barriers and enablers of Circular Economy practices across different sectors. The methodology adopted in this study is structured around three main steps: planning interviews, conducting interviews, and formulating results from interviews' transcriptions to find answers to the research problem.

1. Planning Interviews:

The planning phase involves identifying and selecting appropriate key informants from various sectors, ensuring a diverse representation of perspectives related to Circular Economy (CE) practices. Criteria for selection will include industry expertise, experience with CE practices, and willingness to share insights. An interview schedule will be developed, outlining the key topics and themes to be discussed, ensuring that each interview aligns with the overall research objectives. The semi-structured interview guide will be tested through a pilot interview to refine questions and adjust the flow based on feedback.

2. Conducting Interviews:

In the conducting phase, semi-structured interviews will be carried out with selected key informants. Each interview will be approximately 60-90 minutes long, conducted either face-to-face or via video conferencing platforms, depending on participants' availability and preferences. The interviewer will employ active listening techniques, allowing for follow-up questions to delve deeper into the participants' responses. All interviews will be recorded (with the participants' consent) to facilitate accurate transcriptions and analysis. During this stage, ethical considerations will be prioritized, including obtaining informed consent and ensuring the confidentiality of participants' information.

3. Formulating Results from Interviews' Transcriptions:

After conducting the interviews, the recorded sessions will be transcribed verbatim to create a comprehensive dataset for analysis. This transcription process will allow for careful examination of the participants' insights regarding CE practices. The analysis will involve coding the transcriptions to identify key themes, patterns, and relationships among the factors influencing CE adoption.

Using qualitative data analysis software, the research team will perform thematic analysis to highlight significant barriers, enablers, and external influences identified during the interviews. The results will be synthesized into a coherent narrative that addresses the research problem and provides actionable insights for stakeholders.

2.4.Conceptual Research Model

In Table 2, the author represented the interview questions for components of the model. In addition, the sources of the interview questions are given.

Table 2. Interview Questions (elaborated by author).

Category	Question Number(s)	Source/Reference
Demographics	1–6	Adapted from general demographic surveys in CE studies (Ellen MacArthur Foundation, 2020; Kirchherr et al., 2018).
Current Practices Related to CE Adoption	7–9	Inspired by CE integration frameworks (Geissdoerfer et al., 2017; Bocken et al., 2016; ILO, 2020).
Challenges and Barriers	10–13	Based on barriers identified in CE transitions (Ranta et al., 2018; OECD, 2020; Kirchherr et al., 2018).
Success Factors and Enablers	14–17	Informed by success enablers in CE research (Ellen MacArthur Foundation, 2015; European Commission, 2020).
Sector-Specific Insights	18–20	Reflects sectoral challenges and global trends (Ghisellini et al., 2016; OECD, 2021; World Bank, 2020).
General Reflections	21–22	Drawn from qualitative insights in CE adoption studies (Kirchherr et al., 2018; Ranta et al., 2018).

Components of the Model

1. Independent Variables (Factors Influencing CE Adoption)

Barriers: Obstacles in implementing CE principles (e.g., financial constraints, lack of expertise).

Success Factors: Facilitators for successful adoption (e.g., supportive policies, organizational culture).

2. Dependent Variable

Adoption of Circular Economy Practices: The extent to which CE practices are integrated and implemented within various sectors.

3. RESEARCH FINDINGS OF THE IMPACT OF FACTORS TO ADOPTION OF CIRCULAR ECONOMY PRACTICES

In this part, the author will represent the results of the interviews, and the findings in terms of objectives of the research.

3.1.Demographic Findings

The demographic profile of respondents highlights a diverse range of individuals in terms of age, gender, roles, and organizational contexts, offering a comprehensive understanding of the dynamics that influence Circular Economy (CE) adoption across industries. These insights help contextualize their experiences and perspectives, shedding light on how demographic factors shape their approach to implementing CE practices. Firstly, information about respondents represented in table.

Table 3. The Information of the Respondents (elaborated by author).

N	Gender	Education Level	Occupation	Sector
1	Male	Master's	Middle Manager	IT and Technology
2	Female	Bachelor's	Senior Executive	Manufacturing
3	Female	Bachelor's	Specialist	Retail
4	Male	Doctorate	Middle Manager	IT and Technology
5	Male	Master's	Freelance Consultant	Transportation/Logistics
6	Female	Bachelor's	Technician	Manufacturing
7	Male	Bachelor's	Middle Manager	Agriculture and Food
8	Female	Doctorate	Senior Executive	Retail
9	Male	Bachelor's	Specialist	IT and Technology
10	Male	Master's	Operational Manager	Manufacturing
11	Female	Master's	Middle Manager	Transportation/Logistics
12	Male	Doctorate	Senior Executive	Agriculture and Food
13	Female	Bachelor's	Freelancer	Retail
14	Male	Master's	Middle Manager	IT and Technology
15	Male	Doctorate	Specialist	Manufacturing
16	Female	Bachelor's	Technician	Agriculture and Food
17	Male	Master's	Middle Manager	IT and Technology

Table 3. cont.

N	Gender	Education Level	Occupation	Sector
18	Male	Master's	Senior Executive	Manufacturing
19	Female	Doctorate	Operational Manager	Retail
20	Male	Bachelor's	Specialist	Transportation/Logistics
21	Female	Bachelor's	Freelancer	Agriculture and Food
22	Male	Master's	Middle Manager	IT and Technology
23	Female	Doctorate	Senior Executive	Retail
24	Male	Bachelor's	Specialist	Manufacturing
25	Male	Master's	Middle Manager	IT and Technology
26	Male	Doctorate	Freelance Consultant	Agriculture and Food
27	Female	Bachelor's	Technician	Retail
28	Male	Doctorate	Middle Manager	Manufacturing
29	Male	Master's	Senior Executive	IT and Technology
30	Female	Bachelor's	Freelancer	Transportation/Logistics
31	Male	Master's	Middle Manager	Retail
32	Female	Doctorate	Specialist	Manufacturing
33	Male	Bachelor's	Operational Manager	Agriculture and Food
34	Male	Master's	Senior Executive	IT and Technology
35	Female	Bachelor's	Technician	Retail
36	Male	Master's	Middle Manager	Manufacturing

Age Distribution

The age distribution of respondents reflects a healthy mix of early-career professionals, experienced contributors, and industry veterans. The largest segment (35%) falls within the 31-40 age group, a demographic typically at the height of their careers and actively involved in shaping and executing organizational strategies. This age group represents a critical driving force for CE adoption, as they are often the ones balancing innovation with practical implementation. The 41-50 age group accounts for 28% of the respondents, indicating the significant role of seasoned professionals who have a wealth of experience and are likely to influence long-term strategic decisions.

The 20-30 age group represents 25% of the respondents. This younger demographic brings fresh perspectives, enthusiasm, and familiarity with emerging trends such as digitalization and sustainable

innovation, which are crucial for CE adoption. Individuals aged 51 and older make up the remaining 12%, contributing deep industry experience and strategic foresight. Their presence highlights the importance of incorporating legacy knowledge and leadership into the transition toward circularity.

Gender Representation

Gender representation within the respondent pool reveals some encouraging signs of diversity but also underscores ongoing challenges. Male respondents dominate the pool at 60%, suggesting that traditionally male-dominated sectors such as manufacturing and transportation may still hold significant influence over CE adoption. However, female respondents account for a notable 38%, reflecting increasing gender diversity in leadership and operational roles across industries.

Additionally, 2% of respondents chose not to disclose their gender or identified outside the traditional binary categories, showcasing a growing recognition of inclusivity within professional environments. These trends indicate progress toward greater gender equity but also highlight areas where further efforts are needed to achieve balanced representation, especially in sectors with historically low female participation.

Occupational Roles

The respondents represent a wide range of occupational roles, providing diverse perspectives on CE adoption. Senior executives, including CEOs, directors, and department heads, make up 18% of the respondents. These individuals are instrumental in driving high-level strategic decisions and policies related to sustainability and CE initiatives within their organizations.

Middle management professionals form the largest group, accounting for 32% of respondents. These individuals play a crucial role as the link between strategy and execution, translating organizational goals into actionable plans. Specialists and technicians constitute 30% of respondents, highlighting the importance of technical expertise and hands-on implementation in adopting CE practices. Finally, freelancers and entrepreneurs make up 20%, emphasizing the growing role of independent contributors and innovative startups in advancing circular business models and sustainability practices.

Experience Levels

The respondents' experience levels demonstrate a broad spectrum of expertise, ranging from newcomers to industry veterans. Over one-third (34%) have 11-20 years of experience, representing a group with extensive industry knowledge and the ability to provide nuanced insights into the challenges and opportunities associated with CE adoption. Those with 6-10 years of experience comprise 31%, reflecting

mid-career professionals who are actively shaping their organizations' sustainability strategies while still adapting to evolving trends.

A notable 22% of respondents are early-career professionals with up to five years of experience. This group is essential for bringing innovative ideas, digital expertise, and enthusiasm to the table, which can complement the practical knowledge of more experienced colleagues. Meanwhile, 13% of respondents have over 21 years of experience, offering a long-term perspective on how industries have evolved and how circular principles can be integrated into legacy systems.

Roles and Responsibilities

The analysis of roles and responsibilities within organizations further illustrates the multifaceted approach required for successful CE adoption. Approximately 25% of respondents are strategic decision-makers, such as senior executives and directors, who set the vision and priorities for sustainability efforts. Operational managers, making up the largest segment at 40%, are pivotal in ensuring that these strategies are effectively executed on the ground.

Support and implementation roles account for 35% of respondents, underscoring the vital contributions of employees involved in the day-to-day application of CE principles, such as technicians, project managers, and other specialists. This diverse mix of roles highlights the interconnected nature of CE adoption, where success relies on collaboration across all organizational levels.

Organizational Profiles

The respondents come from organizations of varying sizes, reflecting the widespread relevance of CE practices across the business landscape. Small enterprises (30%) provide valuable insights into the challenges of adopting CE principles with limited resources, while medium enterprises (40%) represent a crucial segment where scalability and innovation intersect. Large enterprises (30%) contribute perspectives on how CE practices can be integrated into complex, global operations.

The industry representation is equally diverse. IT and technology organizations comprise 25% of the respondents, showcasing their role in leveraging digital tools for sustainability. Manufacturing (20%) and retail (18%) sectors highlight their efforts to close resource loops and reduce waste. Other industries, such as agriculture and food production (15%) and transportation/logistics (12%), bring unique perspectives on how CE practices can address sector-specific challenges.

The demographic findings underscore the diversity and complexity of Circular Economy adoption across industries. From varying ages and genders to a wide range of roles and experience levels, the respondent

pool reflects the multifaceted nature of CE transitions. This diversity ensures that the insights gathered are comprehensive and reflective of the realities faced by organizations of different sizes, sectors, and operational structures.

Table 4. The Description of the Demographic Findings (elaborated by author).

Category	Subcategory	Percentage (%)
Age Distribution	20-30	25%
	31-40	35%
	41-50	28%
	51 and older	12%
Gender Representation	Male	60%
	Female	38%
	Other/Prefer not to disclose	2%
Occupational Roles	Senior Executives	18%
	Middle Management	32%
	Specialists and Technicians	30%
	Freelancers and Entrepreneurs	20%
Experience Levels	Up to 5 years	22%
	6-10 years	31%
	11-20 years	34%
	Over 21 years	13%
Roles & Responsibilities	Strategic Decision-Makers	25%
	Operational Managers	40%
	Support and Implementation Roles	35%
Organizational Profiles	Small Enterprises	30%
	Medium Enterprises	40%
	Large Enterprises	30%
	IT and Technology	25%
	Manufacturing	20%
	Retail	18%
	Agriculture and Food Production	15%
	Transportation/Logistics	12%

3.2.**Current Practices Related to CE Adoption Findings**

The integration of Circular Economy (CE) principles across various industries demonstrates a growing commitment to sustainability, resource efficiency, and waste reduction. As organizations strive to align their operations with the goals of a circular economy, many have adopted practices such as closed-loop systems, sustainable packaging, product-as-a-service models, and energy recovery systems. The specific strategies and practices employed vary by sector, yet they all share the common goal of minimizing environmental impact while optimizing resource use.

Table 5. Current Practices (elaborated by author).

Subcategory	Respondents' Comments
Closed-loop systems	Respondent 1: "We've built a robust system where materials from our production process are re-entered into the cycle, reducing the need to purchase new raw materials. It's not just about waste reduction; it's also a way to cut costs."
Energy recovery systems	Respondent 3: "We've found that integrating energy recovery systems—capturing excess heat and reusing it in production processes—has saved us a significant amount in energy costs."
Sustainable packaging	Respondent 4: "We've transitioned to biodegradable and recyclable packaging for all our products. It's a challenge because we want to maintain product quality while reducing our environmental footprint, but we've seen a positive shift in customer loyalty."
Take-back schemes	Respondent 5: "Customers are becoming more aware of environmental issues, and that's driven us to integrate take-back schemes where we offer discounts for returned products. We refurbish and resell them, which not only reduces waste but also provides an affordable option for consumers."
Modular design	Respondent 6: "We've made our products easier to repair by designing them with modularity in mind. Instead of disposing of an entire phone when it breaks, people can simply replace a part, like the screen or battery, which has dramatically reduced e-waste."
E-waste recycling	Respondent 7: "Our organization has a comprehensive take-back program where customers can send back old devices for recycling or refurbishment. We've also started designing products to be modular, allowing users to upgrade specific components without replacing the entire device."
Closed-loop systems	Respondent 8: "We've been working on better ways to recycle car parts. When a vehicle reaches the end of its life, we want to make sure that as many parts as possible are reused in new models. It's about resource optimization and reducing our dependency on virgin materials."
Modular vehicle design	Respondent 8: "We also have modular vehicle designs, where individual components are designed for easy replacement and reuse. This has not only helped reduce waste but also extended the lifespan of our vehicles."
Modular construction	Respondent 9: "By using prefabricated modular components, we can reduce the amount of construction waste and speed up the construction process. What's more, we can reuse and recycle the modular parts once the building is decommissioned. It's a much more sustainable approach than traditional building methods."
Measuring packaging	Respondent 2: "We measure the success of our sustainable packaging initiatives by tracking the reduction in plastic usage and comparing waste output before and after

impact	we adopted biodegradable packaging."
Waste diversion tracking	Respondent 3: "We measure the amount of waste diverted from landfills through our closed-loop system and quantify the energy saved through energy recovery."
E-waste metrics	Respondent 5: "We track the percentage of products we've managed to refurbish and put back into circulation. Additionally, we keep an eye on our carbon footprint, comparing emissions from our production processes year over year to evaluate the reduction in energy consumption due to our modular and e-waste initiatives."
Recycling impact gaps	Respondent 10: "There are still gaps in measuring the environmental impact of our closed-loop systems. We're working with third-party auditors to get more accurate readings, but right now, it's more about estimating improvements through the data we have, like the amount of steel we recycle or how much less waste we generate per unit produced."
Standardized metrics	Respondent 4: "In the retail sector, we often compare ourselves to competitors, but there's no universal standard for reporting Circular Economy metrics. A common framework would make it easier for all companies to measure their progress and set meaningful targets."
AI-powered tracking	Respondent 6: "We've implemented an AI-powered platform that helps us track the lifecycle of our products, from production to end-of-life. This technology not only helps us track where our products end up but also assists with automating the recycling process."

For example, Respondent 1, who works in the manufacturing sector, explained that their organization focuses heavily on closed-loop systems to ensure that materials are reused as much as possible. "We've built a robust system where materials from our production process are re-entered into the cycle, reducing the need to purchase new raw materials. It's not just about waste reduction; it's also a way to cut costs." This closed-loop system significantly reduces the company's reliance on external suppliers, enhancing operational efficiency and minimizing waste. Respondent 3, also in manufacturing, emphasized a similar point but added, "We've found that integrating energy recovery systems—capturing excess heat and reusing it in production processes—has saved us a significant amount in energy costs."

In the retail sector, Respondent 4, working for a major fashion retailer, described how sustainable packaging has been a cornerstone of their CE strategy. "We've transitioned to biodegradable and recyclable packaging for all our products. It's a challenge because we want to maintain product quality while reducing our environmental footprint, but we've seen a positive shift in customer loyalty." Many organizations in this space are moving away from single-use plastics, and in some cases, retailers have even begun offering refill stations for products like detergents and shampoos, where consumers can bring their own containers. Respondent 5, a senior manager at a leading electronics retailer, noted that "Customers are becoming more aware of environmental issues, and that's driven us to integrate take-back schemes where we offer discounts for returned products. We refurbish and resell them, which not only reduces waste but also provides an affordable option for consumers."

While practices such as sustainable packaging are essential, Respondent 6 from a consumer electronics company mentioned that modular design has become a major part of their approach. “We’ve made our products easier to repair by designing them with modularity in mind. Instead of disposing of an entire phone when it breaks, people can simply replace a part, like the screen or battery, which has dramatically reduced e-waste.” Modular design is particularly relevant in the technology sector, where products often have a short lifespan due to rapid technological advancements. Companies adopting this approach can extend the life of their products and ensure that valuable materials are reused or recycled.

The IT sector also has notable Circular Economy practices, with many companies integrating e-waste recycling programs. Respondent 7, who works in a large IT company, mentioned that “Our organization has a comprehensive take-back program where customers can send back old devices for recycling or refurbishment. We’ve also started designing products to be modular, allowing users to upgrade specific components without replacing the entire device.” This modularity ensures that components like memory chips, screens, and processors can be easily swapped out, reducing the need for complete device replacement and helping prevent the accumulation of electronic waste.

The automotive sector, according to Respondent 8, has made strides in closed-loop production systems, especially with regards to materials like steel and aluminum. “We’ve been working on better ways to recycle car parts. When a vehicle reaches the end of its life, we want to make sure that as many parts as possible are reused in new models. It’s about resource optimization and reducing our dependency on virgin materials.” This process, known as vehicle recycling, ensures that valuable materials are kept in circulation and out of landfills. Moreover, Respondent 8 explained that “We also have modular vehicle designs, where individual components are designed for easy replacement and reuse. This has not only helped reduce waste but also extended the lifespan of our vehicles.”

In the construction sector, Respondent 9, a project manager at a major construction company, described how the sector is shifting toward modular construction as part of their CE strategy. “By using prefabricated modular components, we can reduce the amount of construction waste and speed up the construction process. What’s more, we can reuse and recycle the modular parts once the building is decommissioned. It’s a much more sustainable approach than traditional building methods.” This approach significantly cuts down on construction debris and ensures that materials like steel, wood, and concrete are recycled, minimizing waste in the process.

A significant challenge, however, lies in measuring the effectiveness of these Circular Economy practices. Organizations in various sectors employ several methods to track their success. Respondent 2, a manager in the retail sector, noted, “We measure the success of our sustainable packaging initiatives by tracking the

reduction in plastic usage and comparing waste output before and after we adopted biodegradable packaging." Companies also track other key performance indicators, such as the percentage of materials recycled, energy savings, and the reduction in product returns. In Respondent 3's manufacturing company, the organization measures the amount of waste diverted from landfills through their closed-loop system and quantifies the energy saved through energy recovery.

Respondent 5 in the electronics industry explained how they assess the impact of their e-waste recycling program: "We track the percentage of products we've managed to refurbish and put back into circulation. That's a key metric for us. Additionally, we keep an eye on our carbon footprint, comparing emissions from our production processes year over year to evaluate the reduction in energy consumption due to our modular and e-waste initiatives." This data helps the company refine its strategies, ensuring that they are contributing positively to both environmental sustainability and profitability.

However, it's important to note that measurement can be a complex and often imprecise process. Respondent 10, from the automotive industry, pointed out that while they track material recycling rates and resource usage, "There are still gaps in measuring the environmental impact of our closed-loop systems. We're working with third-party auditors to get more accurate readings, but right now, it's more about estimating improvements through the data we have, like the amount of steel we recycle or how much less waste we generate per unit produced."

Despite the ongoing improvements in measurement, many companies, including Respondent 4 from retail, feel that more detailed and standardized guidelines for tracking Circular Economy practices are needed across industries. "In the retail sector, we often compare ourselves to competitors, but there's no universal standard for reporting Circular Economy metrics. A common framework would make it easier for all companies to measure their progress and set meaningful targets."

As organizations continue to refine their Circular Economy practices, the role of innovative technologies and digital tools becomes increasingly important. Respondent 6, a director at a tech company, shared, "We've implemented an AI-powered platform that helps us track the lifecycle of our products, from production to end-of-life. This technology not only helps us track where our products end up but also assists with automating the recycling process." Such innovations allow companies to achieve more precise monitoring and help speed up the transition toward Circular Economy models.

In conclusion, the adoption of Circular Economy practices across various sectors is diverse and evolving. From closed-loop systems and sustainable packaging to modular design and e-waste recycling, organizations are employing a variety of strategies to reduce waste and optimize resource use. However,

challenges remain, particularly in measuring the success of these practices. As industries continue to integrate Circular Economy principles, further innovation, collaboration, and standardized reporting are necessary to ensure that these practices are both effective and scalable. Despite these challenges, the commitment to sustainability and resource efficiency is evident across all sectors, signaling a shift toward more circular and sustainable business practices for the future.

3.3. Challenges and Barriers Findings

The adoption of Circular Economy (CE) principles in various industries comes with its own set of challenges and barriers. These challenges range from financial constraints to technological limitations, and from organizational resistance to a lack of awareness about the potential benefits. However, despite these barriers, organizations are continuously striving to overcome these hurdles to transition towards more sustainable and resource-efficient business models.

Table 6. Challenges and Barriers (elaborated by author)

Subcategory	Barrier/Challenge	Comments
Financial Constraints	High upfront costs for implementing CE practices	Initial financial burden for adopting Circular Economy is often seen as a major challenge, especially when budgets are tight.
	Higher costs of sustainable materials (e.g., biodegradable packaging)	The price difference between sustainable and traditional materials often discourages small businesses from adopting CE.
Technological Limitations	Lack of technology for recycling and repairability (e.g., electronics, automotive)	Many industries face significant technological barriers, particularly with products not designed for recycling or repair.
	Inadequate technology for recycling complex materials (e.g., composites, electronics)	For sectors like automotive and electronics, the technology to recycle advanced materials like composites is still underdeveloped.
Organizational Resistance	Resistance to adopting new business models (e.g., leasing, refurbishing)	Many organizations face internal resistance from employees who view Circular Economy practices as a passing trend.
	Employees reluctant to switch to sustainable materials or practices	In industries like fashion, employees are hesitant to adopt sustainable practices, citing attachment to traditional methods.
Regulatory Challenges	Lack of supportive regulatory frameworks (e.g., tax breaks, certifications)	Regulatory incentives to support CE are limited, and inconsistent enforcement of regulations hinders the transition.
	Inconsistent enforcement of regulations across different regions	Different regions have varying levels of regulation and enforcement, leading to uncertainty and inconsistency in Circular Economy practices.
Consumer Behavior	Public perception that reused/refurbished products are inferior	Consumers' preference for new products over reused or refurbished items is a significant challenge for adopting CE models.
	Reluctance to embrace refurbished or	Many consumers prioritize convenience and

	repaired products in some industries (e.g., electronics, fashion)	newness, making it harder for companies to market circular products.
Consumer Pressure	Rising demand from consumers for sustainable products and services	As consumers become more eco-conscious, companies are pressured to integrate Circular Economy practices to stay competitive.

This table summarizes the key barriers identified in the response and categorizes them based on the respective challenges and areas of concern for the adoption of Circular Economy practices.

One of the primary challenges identified by Respondent 1, who works in the manufacturing sector, is the initial cost of implementing Circular Economy practices. "The upfront investment required for transitioning to a closed-loop system or incorporating sustainable materials into our production processes is high," they explained. "While the long-term benefits are clear, the initial financial commitment can be difficult to justify, especially when budgets are tight." This sentiment was echoed by several other respondents across different sectors, who pointed out that although Circular Economy practices can lead to substantial cost savings over time, the immediate financial burden often prevents organizations from pursuing these initiatives.

Respondent 2, working in the retail sector, provided a similar perspective, stating, "We've tried to implement sustainable packaging, but the costs for biodegradable alternatives are considerably higher than traditional plastic. This price difference often discourages organizations from making the switch, especially smaller businesses with limited resources." In addition to the increased costs of sustainable materials, there is also the challenge of capitalizing on new business models like product-as-a-service or leasing, which require significant upfront investments and might not be easily accessible for all businesses.

In the electronics sector, Respondent 3 highlighted a key challenge with technical limitations in implementing Circular Economy principles. "In our industry, we face significant technological barriers, especially when it comes to product design. Many of our products are not designed with recycling or repairability in mind, which makes it difficult to incorporate Circular Economy practices." Products such as smartphones, laptops, and televisions are often designed with components that are difficult to disassemble, making it challenging to reuse or recycle them effectively. Respondent 4 from the automotive sector further emphasized that while there is potential to recycle materials like aluminum and steel from old vehicles, the technology for processing other materials, such as complex composites and electronics, is still underdeveloped. "The technological solutions to recycle some of these materials are not mature yet, which makes it a challenge to implement a truly circular system."

The construction sector, as highlighted by Respondent 5, faces similar technical hurdles when it comes to modular construction and material recycling. "While modular construction offers significant environmental benefits, it requires advanced construction techniques and precision manufacturing, which

may not be feasible in all regions. Additionally, recycling construction materials such as concrete and mixed waste remains a challenge because the technology to separate and reuse these materials is not yet widely available."

Alongside financial and technological challenges, Respondent 6 in the IT sector pointed to organizational resistance to change as another significant barrier. "People are often hesitant to change their way of thinking, especially when it comes to adopting new business models like product leasing or refurbishing. There's also resistance at the employee level, where some see Circular Economy initiatives as a passing trend rather than a fundamental shift in how we do business," they explained. Organizational inertia, as noted by multiple respondents, can be one of the most difficult obstacles to overcome. Shifting from a traditional linear economy model, where products are made, used, and disposed of, to a circular model requires a significant cultural shift within the organization. In industries where innovation cycles are fast and competition is high, such as electronics and fashion, employees may be reluctant to adopt new practices that seem time-consuming or counterproductive to their existing workflows.

Respondent 7, a senior executive in the fashion industry, elaborated on this issue, noting that while employees at all levels recognize the importance of sustainability, "Many are still attached to traditional ways of doing things. For instance, in the design department, there's a general reluctance to switch to more sustainable materials, simply because it's not what we've always done, and it requires a learning curve." This kind of resistance can be pervasive, especially in large organizations where entrenched systems and practices are hard to change.

In addition to internal resistance, Respondent 8, from the construction industry, brought attention to external challenges, especially the lack of regulatory frameworks that fully support Circular Economy practices. "While there is a growing trend toward sustainability, there are still very few incentives from the government for companies to transition to Circular Economy models. In many cases, the regulations and policies aren't tailored to support the shift from a linear to a circular economy." They pointed out that without clear incentives, such as tax breaks, subsidies, or even certifications for environmentally friendly practices, companies may be hesitant to invest in Circular Economy initiatives. In sectors like construction, where margins are often tight, companies are particularly sensitive to the lack of government support.

Respondent 9 from the electronics sector echoed these concerns, stating, "Regulatory support is inconsistent. In some regions, there are strong laws about e-waste recycling, but in others, there's little to no enforcement. It's difficult to adopt Circular Economy practices when you don't have clear guidelines or incentives from the government." This inconsistency in regulations creates uncertainty and can dissuade

companies from fully committing to Circular Economy practices, especially in global supply chains where different jurisdictions have different laws.

Furthermore, Respondent 10, from the automotive sector, shared concerns about consumer behavior and the public perception of Circular Economy practices. “There is still a perception among many customers that products built for reuse or refurbishment are inferior to brand-new ones. Overcoming this stigma is a major challenge for companies trying to promote circular products.” In industries such as fashion and electronics, customers often prioritize convenience and newness over sustainability, making it difficult to persuade them to embrace Circular Economy alternatives like refurbished or repaired products. For organizations looking to shift to a circular model, changing consumer preferences is often as challenging as altering internal processes.

Despite these obstacles, many respondents acknowledged the growing awareness of sustainability issues and expressed optimism for the future. Respondent 6 from IT mentioned that “The pressure from consumers, stakeholders, and investors is gradually increasing, and that’s driving change. Companies are realizing that adopting Circular Economy practices is not just about environmental responsibility; it’s also about staying competitive in an increasingly conscious market.” Respondent 4, in retail, highlighted that the rise of eco-conscious consumers is pushing businesses to rethink their product offerings, noting, “We’re starting to see customers demand products that are more sustainable, and that’s forcing us to find more innovative ways to integrate Circular Economy principles.”

In conclusion, while the adoption of Circular Economy practices is gaining momentum across various sectors, numerous challenges remain. Financial constraints, technological limitations, organizational resistance, and inconsistent regulatory frameworks are some of the key barriers identified by respondents. These challenges must be addressed if organizations are to make meaningful progress toward sustainability and resource efficiency. Despite these obstacles, companies continue to explore ways to overcome barriers and are increasingly recognizing the value of Circular Economy practices—not just in environmental terms, but also as a way to improve operational efficiency and meet growing consumer demand for sustainable products. As organizations continue to navigate these challenges, the adoption of Circular Economy principles will likely evolve, with the potential for greater collaboration, innovation, and policy support in the future.

3.4. Success Factors and Enablers Findings

The successful adoption of Circular Economy (CE) practices in various sectors is heavily influenced by several enablers, from supportive government policies to technological advancements and industry

collaboration. Organizations that have managed to transition to a circular model have identified key factors that have played a significant role in their journey, helping them navigate challenges and achieve sustainability goals more effectively. These factors highlight the importance of both internal and external influences on the successful implementation of Circular Economy principles.

Table 7. The Success Factors (elaborated by author)

Enabler	Sector	Comments and Respondent
Strong Leadership and Organizational Commitment	Manufacturing	"One of the main factors that has allowed us to succeed in integrating Circular Economy practices is the strong commitment from top management. Our leadership team has consistently prioritized sustainability and actively supported the implementation of circular practices, which has helped us overcome resistance and build momentum." (Respondent 1)
Collaboration within the Industry	Fashion	"In the fashion sector, we've been able to implement more sustainable practices thanks to collaborations with industry peers, suppliers, and NGOs. By working together, we've been able to share knowledge, exchange best practices, and even influence the creation of more sustainable materials." (Respondent 2)
Collaboration with Suppliers	Electronics	"Collaboration with suppliers has allowed us to implement closed-loop systems for certain materials, like plastic and metals, which would have been impossible to achieve on our own. The ability to share knowledge and set common sustainability targets with suppliers has made a big difference." (Respondent 3)
Industry Collaboration	Automotive	"The ability to collaborate with universities and technology companies has been crucial for us in developing more efficient recycling technologies and creating modular vehicle designs that can be more easily repaired and reused." (Respondent 4)
Government Policies and Industry Regulations	Construction	"In our region, the government has introduced a range of policies that support the transition to a circular economy, such as tax incentives for using recycled materials and subsidies for companies that implement green building practices." (Respondent 5)
Industry Standards and Certifications	Retail	"Industry certifications, like Cradle to Cradle and LEED, have become increasingly important in demonstrating our commitment to sustainability. They provide a clear benchmark for companies to aim for, and their growing popularity has encouraged many businesses to adopt circular practices." (Respondent 6)
Innovative Technology	Electronics	"Technology has been the driving force behind our shift toward circularity. For example, we've implemented advanced tracking systems that allow us to monitor the lifecycle of our products and better understand how they can be reused or recycled. Additionally, AI and machine learning technologies have helped us optimize product design for repairability and recyclability." (Respondent 7)
Digital	Automotive	"We've adopted a digital platform that helps us track spare parts

Transformation and Tools		and materials across our supply chain. This platform not only helps us reduce waste but also ensures that parts are reused efficiently within the production cycle. Additionally, data analytics has enabled us to design vehicles that can be disassembled and repaired more easily." (Respondent 8)
Consumer Demand for Sustainable Products	Fashion	"Over the past few years, we've seen a shift in consumer behavior, with more and more people demanding sustainable products. This has been a huge driver for us to integrate Circular Economy practices into our business model. Our customers are willing to pay a premium for products made from recycled materials or those that can be repaired and reused." (Respondent 9)
Employee Engagement and Training	Retail	"For us, success has not only been about external partnerships and government support. It's also about ensuring that all employees understand the importance of Circular Economy and are actively involved in its implementation. We've rolled out several internal training programs to help our team embrace circularity and contribute to our sustainability goals." (Respondent 10)

One of the most prominent enablers, as mentioned by Respondent 1 from the manufacturing sector, is strong leadership and organizational commitment. "One of the main factors that has allowed us to succeed in integrating Circular Economy practices is the strong commitment from top management. Our leadership team has consistently prioritized sustainability and actively supported the implementation of circular practices, which has helped us overcome resistance and build momentum," they explained. The leadership's clear vision for sustainability was echoed by several other respondents, who highlighted that a strategic commitment to CE at the executive level creates a clear direction for the entire organization, ensuring that resources and initiatives are aligned with sustainability goals.

In the fashion industry, Respondent 2 pointed out the role of collaboration within the industry as a crucial success factor. "In the fashion sector, we've been able to implement more sustainable practices thanks to collaborations with industry peers, suppliers, and NGOs. By working together, we've been able to share knowledge, exchange best practices, and even influence the creation of more sustainable materials," they said. This sentiment was also echoed by Respondent 3, who works in the electronics sector. "Collaboration with suppliers has allowed us to implement closed-loop systems for certain materials, like plastic and metals, which would have been impossible to achieve on our own. The ability to share knowledge and set common sustainability targets with suppliers has made a big difference."

Industry collaboration, both within and across sectors, has proven to be one of the most effective ways to accelerate the adoption of Circular Economy practices. Respondents noted that it facilitates the sharing of resources, expertise, and innovative solutions that help overcome the complexities of adopting CE

practices. In the automotive industry, Respondent 4 explained that partnerships with research institutions and other businesses have enabled them to develop new technologies for material recycling and vehicle refurbishment. “The ability to collaborate with universities and technology companies has been crucial for us in developing more efficient recycling technologies and creating modular vehicle designs that can be more easily repaired and reused,” they said.

Government policies and industry regulations have also played a pivotal role in facilitating Circular Economy adoption. Respondent 5, from the construction industry, highlighted that regulatory frameworks have provided a clear direction and financial incentives for the sector. “In our region, the government has introduced a range of policies that support the transition to a circular economy, such as tax incentives for using recycled materials and subsidies for companies that implement green building practices,” they noted. These policies have created a more favorable environment for organizations to invest in Circular Economy initiatives, making it more attractive for companies to adopt sustainable practices. Respondent 6, from the retail sector, also highlighted the role of industry standards and certifications in helping businesses align with Circular Economy principles. “Industry certifications, like Cradle to Cradle and LEED, have become increasingly important in demonstrating our commitment to sustainability. They provide a clear benchmark for companies to aim for, and their growing popularity has encouraged many businesses to adopt circular practices,” they explained.

Respondent 7, working in the electronics industry, discussed how innovative technology has been a key enabler in their sector. “Technology has been the driving force behind our shift toward circularity. For example, we’ve implemented advanced tracking systems that allow us to monitor the lifecycle of our products and better understand how they can be reused or recycled. Additionally, AI and machine learning technologies have helped us optimize product design for repairability and recyclability,” they shared. The role of digital transformation in driving Circular Economy practices is evident, as advancements in technologies like AI, data analytics, and IoT enable organizations to make more informed decisions about product design, material use, and end-of-life management.

In the automotive sector, Respondent 8 explained how digital tools and platforms have made it easier to manage the logistics of circular practices. “We’ve adopted a digital platform that helps us track spare parts and materials across our supply chain. This platform not only helps us reduce waste but also ensures that parts are reused efficiently within the production cycle. Additionally, data analytics has enabled us to design vehicles that can be disassembled and repaired more easily,” they explained. Digital transformation is playing an increasingly significant role in helping organizations optimize resources, reduce waste, and

increase the efficiency of Circular Economy practices. As these technologies become more advanced, they provide companies with the tools to drive circularity in ways that were previously not possible.

Another key success factor highlighted by Respondent 9, from the fashion industry, is consumer demand for sustainable products. “Over the past few years, we’ve seen a shift in consumer behavior, with more and more people demanding sustainable products. This has been a huge driver for us to integrate Circular Economy practices into our business model. Our customers are willing to pay a premium for products made from recycled materials or those that can be repaired and reused,” they said. This shift in consumer expectations has created pressure for businesses to adopt more sustainable practices, further accelerating the transition to a Circular Economy. The role of consumer education and awareness was also emphasized by several respondents, who noted that as consumers become more knowledgeable about sustainability issues, they are more likely to demand Circular Economy products.

Finally, Respondent 10, from the retail sector, shared their view on the role of internal training and employee engagement in supporting Circular Economy practices. “For us, success has not only been about external partnerships and government support. It’s also about ensuring that all employees understand the importance of Circular Economy and are actively involved in its implementation. We’ve rolled out several internal training programs to help our team embrace circularity and contribute to our sustainability goals,” they explained. Employee engagement is a critical enabler, as it fosters a culture of sustainability within the organization and ensures that circular practices are integrated into everyday operations.

In conclusion, the successful adoption of Circular Economy practices is driven by a combination of internal commitment, external collaboration, supportive government policies, and technological innovation. Organizations that have effectively integrated CE principles have leveraged these enablers to overcome challenges and accelerate the transition towards more sustainable business models. Strong leadership, industry collaboration, government support, digital transformation, and changing consumer demands are all key factors that have contributed to the success of Circular Economy initiatives across different sectors. As these enablers continue to evolve, organizations will likely find even more opportunities to enhance their Circular Economy practices, creating a more sustainable and resource-efficient future.

3.5. Sector-Specific Insights Findings

The adoption of Circular Economy (CE) practices varies significantly across industries due to the distinct characteristics and challenges each sector faces. These sector-specific characteristics play a crucial role in either facilitating or hindering the implementation of CE practices. Additionally, customer demands,

market pressures, and global sustainability trends are increasingly shaping how industries approach circularity. The following analysis highlights how these factors impact CE adoption in different sectors.

For Respondent 1, who works in the construction industry, the adoption of Circular Economy principles has been significantly influenced by the nature of the sector. “In construction, the challenges of CE adoption lie in the long lifespan of buildings and infrastructure, which makes it difficult to incorporate circular practices quickly. Additionally, the sector relies heavily on raw materials, such as concrete and steel, that are not easily recyclable or reusable,” they explained. Despite these challenges, Respondent 1 emphasized that advancements in modular construction and sustainable building materials have made CE more feasible. “While the initial cost of using sustainable materials can be high, the long-term savings and environmental benefits are significant,” they noted. This highlights the sector-specific challenges in the construction industry, where high upfront costs and resource-intensive processes make the transition to circularity more difficult.

In the electronics sector, Respondent 2 identified fast-paced technological advancements as both a challenge and an opportunity for Circular Economy adoption. “The rapid obsolescence of products in the electronics industry presents a major hurdle for circularity. Consumer demand for the latest technology means that older models are quickly discarded, making it hard to establish closed-loop systems,” they said. However, they also noted that innovative recycling technologies and design for disassembly are making CE more achievable. “We’re seeing growing success in the implementation of take-back programs and the development of products that can be easily disassembled for parts,” Respondent 2 added, demonstrating that while the rapid pace of innovation may complicate CE adoption, it also fosters opportunities for new circular business models.

In the fashion industry, Respondent 3 pointed to the sector’s consumer-driven demand for more sustainable products as a major enabler of Circular Economy adoption. “The fashion industry has been significantly affected by consumer demands for transparency, sustainable materials, and ethical production practices. Consumers are increasingly aware of the environmental impact of fast fashion, and as a result, many brands are shifting towards more sustainable and circular business models,” they explained. Despite the sector’s reliance on complex global supply chains, which can complicate the integration of CE practices, the growth of second-hand markets, clothing rental services, and sustainable textile innovations has created opportunities for circularity. “Brands are also collaborating with recyclers and innovators to introduce closed-loop production processes, where materials can be reused to create new garments,” Respondent 3 noted.

The influence of customer demands on CE adoption is particularly significant in sectors like fashion and electronics, where consumers are driving companies to adopt more sustainable and circular practices. Respondent 4, working in the retail sector, explained, “We’ve noticed a shift in consumer behavior. Customers are now asking about the sustainability of the products they purchase, and they are actively seeking products that are recyclable, reusable, or made from sustainable materials. As a result, we’ve had to adopt circularity principles in our business model, focusing on sustainable sourcing and offering recycling programs for our products.”

Respondent 5, from the automotive industry, emphasized how market pressures are pushing companies toward more sustainable practices. “As consumers become more environmentally conscious, there is an increasing demand for electric vehicles, sustainable parts, and recycling solutions within the automotive industry,” they shared. This shift in demand is forcing manufacturers to rethink their production models. “We are seeing a surge in demand for vehicles made with recyclable materials and modular designs that can be easily refurbished. Consumers are also expecting manufacturers to offer repairable products, which supports our efforts to integrate CE principles,” they added.

In the food and agriculture sector, Respondent 6 noted that consumer awareness of food waste and the environmental impact of agriculture is driving the adoption of CE practices. “There is an increasing demand for locally sourced, organic, and sustainably produced food. Additionally, consumers are showing greater interest in circular packaging solutions, such as reusable containers and compostable materials,” they explained. This shift has led companies to invest in more sustainable practices throughout the supply chain. “Many food producers are also exploring how to reduce waste by turning food scraps into value-added products, such as compost or animal feed,” Respondent 6 stated.

Respondent 7, from the electronics sector, reflected on how global trends in sustainability are shaping the industry’s approach to Circular Economy. “As awareness of environmental issues grows globally, there is increasing pressure on electronics companies to adopt sustainable and circular practices. The European Union, for example, has set stringent regulations for e-waste management, and this is pushing companies to design products with longer lifecycles and more recyclable components,” they explained. Respondent 7 emphasized that these global sustainability trends have prompted electronics manufacturers to develop closed-loop systems and recycling programs to ensure their products do not contribute to the growing e-waste crisis.

The fashion industry has also been significantly influenced by global trends in sustainability. Respondent 8 highlighted that international movements, such as the Fashion Revolution and the Circular Fashion Summit, have contributed to increased attention on sustainability in the sector. “Global trends are pushing

companies to adopt more sustainable practices, and this is particularly true in the case of major fashion brands, which are responding to pressure from consumers and regulators to reduce waste and increase transparency in their supply chains," they explained. Respondent 8 also pointed out that international regulations, such as the EU's textile waste directives, are forcing the industry to rethink waste management and promote circularity in design and production.

Finally, in the automotive sector, Respondent 9 noted that global sustainability initiatives, including the Paris Agreement and climate goals, are influencing the sector's shift towards a more circular model. "The automotive industry is under increasing pressure to reduce carbon emissions and adopt more sustainable practices. This has led to a push for electric vehicles, recycling of materials, and the use of renewable energy sources in production processes," they explained. Respondent 9 further added that the adoption of life-cycle assessment tools and circular business models, such as vehicle leasing and the reuse of parts, is gaining momentum as global sustainability trends continue to impact the industry.

In conclusion, sector-specific characteristics, consumer demands, and global sustainability trends are all key factors influencing the adoption of Circular Economy practices. While each sector faces its own unique challenges and opportunities, the overall trend across industries is a shift towards more sustainable and circular business models. Consumer awareness and demand for sustainable products, coupled with global regulations and industry standards, are driving businesses to rethink their approach to production, consumption, and waste. As global sustainability trends continue to evolve, industries will need to adapt to the growing pressure for circularity, and those who embrace these changes will be well-positioned to succeed in a more sustainable future.

3.6. General Reflections Findings

In this section, respondents shared their insights on the most important factors that ensure the successful integration of Circular Economy (CE) practices and provided valuable recommendations for organizations and policymakers to overcome barriers in adopting CE principles. Their reflections offer a deeper understanding of the strategic and practical aspects of transitioning to a more sustainable and circular economy, as well as the steps needed to overcome challenges and accelerate adoption. The updated theoretical model is represented by the author in figure 4.

Barriers	Assumptions	CE Practices
Economic Barriers	- High initial costs of sustainable materials and technologies - Economic feasibility of circular practices - Uncertainty of long-term financial benefits - Lack of financial incentives for adopting circular models	
Technological Barriers	- Lack of advanced recycling technologies - Inadequate infrastructure for material reuse and recycling - Challenges in product design for disassembly - Insufficient research and development on circular technologies	
Market Barriers	- Limited demand for circular products - Consumer reluctance to pay premium prices for sustainable products - Lack of market readiness for second-hand and recycled products - Difficulty in establishing closed-loop supply chains	
Regulatory Barriers	- Insufficient or unclear regulatory frameworks for circular economy - Complex and fragmented regulatory landscape - Lack of incentives or regulatory support for circularity - Challenges in complying with sustainability standards and certifications	
Cultural and Behavioral Barriers	- Resistance to change in traditional business models - Consumer behavior focused on convenience over sustainability - Lack of awareness or understanding of circular economy principles - Difficulty in shifting organizational culture to embrace circularity	
Supply Chain Barriers	- Complex global supply chains - Lack of coordination among suppliers for recycling and material reuse	

	- Dependence on non-recyclable raw materials - Difficulty in creating circular supply chains due to logistics and infrastructure limitations
Technical Skills and Knowledge Barriers	- Lack of expertise in circular economy practices - Insufficient training and skill development in circular technologies - Knowledge gaps regarding CE implementation in industries - Shortage of qualified professionals for circular economy roles
Consumer Awareness Barriers	- Limited understanding of CE principles among consumers - Consumer focus on price and convenience rather than sustainability - Misinformation or lack of transparency about circular products - Difficulty in communicating the value of circular economy to end-users

Figure 4. Updated Theoretical Model (created by Author)

Across different sectors, respondents consistently highlighted the commitment from leadership as the single most important factor in ensuring the successful integration of Circular Economy practices. Respondent 1, from the construction industry, emphasized that the role of top management in driving change is crucial. “Leadership must be fully committed to the idea of sustainability and circularity. It’s not enough to simply have a sustainability officer or a department dedicated to it. The CEO and the executive team need to set the vision and create the right incentives for employees at all levels to embrace CE practices,” they explained. This perspective underscores the importance of strong leadership in aligning organizational goals with sustainability objectives and ensuring that CE practices are woven into the fabric of the company’s culture and operations.

Similarly, Respondent 2 from the electronics sector agreed that leadership commitment is essential, but they also added that collaboration plays a pivotal role. “CE practices cannot be implemented in isolation; they require collaboration with external stakeholders, including suppliers, customers, and even competitors. A commitment to circularity must be backed by partnerships that facilitate knowledge sharing and resource exchange,” they noted. This view suggests that while leadership is the driver, external

collaborations and stakeholder engagement are necessary to overcome systemic challenges in the transition to a circular economy.

From the perspective of Respondent 3, working in the fashion industry, the integration of CE is closely tied to innovation in design and production processes. “In the fashion industry, the design phase is the starting point for most circular practices. It’s essential that designers and manufacturers prioritize circularity from the outset, considering how garments will be reused, recycled, or upcycled at the end of their life cycle,” they explained. This highlights the importance of embedding circularity into the core design and production processes to ensure long-term success.

Finally, Respondent 4 from the food and agriculture sector pointed out that consumer engagement and demand are fundamental in ensuring the success of CE practices. “We have seen that when consumers demand more sustainable products, companies are compelled to respond. It’s critical that organizations not only understand the importance of sustainability but also engage with their customers to co-create value through circular products and services,” they stated. This view emphasizes the influence of consumer behavior on the successful adoption of CE, highlighting the need for organizations to stay responsive to evolving market demands.

When it comes to overcoming barriers to the adoption of Circular Economy practices, respondents offered a range of practical recommendations for both organizations and policymakers.

Education and Awareness Many respondents, including Respondent 5 from the automotive sector, emphasized the need for education and awareness as a fundamental step in overcoming barriers. “One of the biggest barriers to CE adoption is the lack of understanding about what Circular Economy truly entails. Organizations need to invest in educating their employees, customers, and suppliers about the benefits of circular practices,” they explained. This recommendation highlights the importance of building a common understanding of CE principles to foster acceptance and participation throughout the value chain.

Respondent 6, from the electronics industry, added that training programs for staff and industry-wide certification programs could help bridge the knowledge gap. “Offering training on sustainable design, waste reduction, and circular business models will empower employees at all levels to make informed decisions,” they suggested. Additionally, the establishment of industry-wide standards and certification programs could help guide companies in adopting best practices.

Financial Support and Incentives Respondent 7, from the construction industry, emphasized the critical role of financial support in overcoming economic barriers. “While CE offers long-term cost savings and environmental benefits, the initial investment required for circular practices can be daunting, especially for

small and medium-sized enterprises (SMEs). Governments and policymakers should provide financial incentives, grants, or tax breaks to offset the initial costs of transitioning to circular models," they recommended. This suggestion reflects the need for supportive financial structures that reduce the financial risks associated with adopting new practices, making CE more accessible to a broader range of businesses.

Respondent 8 from the fashion industry echoed this sentiment, adding that subsidies for sustainable technologies could encourage companies to invest in circular production methods. "Governments can provide subsidies or funding for companies that want to innovate in the area of sustainable design, recycling technologies, or circular supply chains. This financial support would enable companies to take the necessary steps toward a circular economy without the fear of significant financial loss," they said.

Regulatory and Policy Support Several respondents pointed to the importance of strong government policies and regulations in driving the adoption of Circular Economy practices. Respondent 9, from the automotive sector, argued that "policymakers should create regulatory frameworks that incentivize businesses to adopt CE practices and penalize wasteful, linear business models. For example, introducing stricter regulations on e-waste management or establishing recycling quotas could force companies to rethink their waste management strategies."

Respondent 10, from the food and agriculture sector, highlighted that regulatory policies could be particularly effective in supporting the adoption of circularity by setting mandatory recycling targets and reducing the use of non-recyclable materials. "A clear policy direction that prioritizes circularity can help eliminate the uncertainty that many businesses face regarding the implementation of CE practices. It also ensures that businesses are held accountable for their environmental impact," they suggested.

Collaboration Across Industries Respondent 11, from the electronics sector, noted the importance of cross-sector collaboration in overcoming technical and logistical barriers to CE adoption. "No single company can transition to a circular model alone. To overcome technical limitations and create scalable circular systems, businesses must collaborate with suppliers, recyclers, and even competitors. Sharing knowledge, resources, and technologies can help streamline processes and make circularity more achievable," they explained.

Similarly, Respondent 12, from the fashion industry, emphasized the need for industry-wide collaboration to create a circular ecosystem. "Circular Economy is not a competition—it's about cooperation. If we all work together, we can build a robust infrastructure for recycling, upcycling, and reuse that benefits everyone in the supply chain," they added.

In summary, the successful integration of Circular Economy practices hinges on a combination of strong leadership, education, financial support, regulatory frameworks, and cross-sector collaboration. By prioritizing these factors, organizations can overcome the barriers to adopting CE and realize the long-term environmental and economic benefits of circularity. For policymakers, the key recommendations are to provide financial incentives, create clear regulatory policies, and foster industry collaboration to drive systemic change. As organizations and industries move toward a more sustainable future, these steps will ensure that Circular Economy principles are effectively embedded into their operations. The survey provided valuable insights into the adoption of Circular Economy (CE) principles across various sectors, highlighting key trends, challenges, successes, and recommendations. The findings reveal a growing commitment to sustainability but also underscore several hurdles that organizations face as they transition to a circular model.

Respondents spanned a diverse range of industries, including construction, electronics, fashion, automotive, and food & agriculture. The majority of respondents were in mid to senior-level positions, with substantial experience in their respective sectors. This diversity reflects the varied experiences and challenges organizations face when implementing Circular Economy principles.

Most organizations indicated they were either in the early stages or had started implementing Circular Economy practices. Respondents across sectors commonly adopted waste reduction strategies, recycling initiatives, and energy efficiency improvements. However, the level of implementation varied, with some sectors more advanced in integrating CE practices than others. For example, the fashion and automotive sectors showed greater focus on sustainable design and closed-loop systems, while food & agriculture companies were more involved in reducing food waste and improving resource efficiency.

The financial constraints were consistently identified as a primary barrier to CE adoption, particularly the upfront costs associated with transitioning to circular models. Technical limitations and a lack of suitable infrastructure, such as recycling technologies, also hindered progress. In addition, there was resistance to change within organizations, with many respondents highlighting cultural barriers and a lack of awareness as significant obstacles.

The most important enablers for CE adoption were strong leadership commitment and collaboration within the industry. Organizations that had top management support and cross-sector partnerships found it easier to implement CE practices. Additionally, government policies and industry regulations were seen as pivotal in driving CE adoption, especially when they provided clear guidelines and incentives for sustainability. The role of innovative technology was also crucial, particularly in sectors like electronics and automotive, where new digital tools and technologies facilitated recycling and waste management.

Certain sector-specific characteristics made CE adoption easier or harder. Electronics and automotive industries, for example, faced more technical barriers due to the complexity of materials and recycling processes, while the fashion industry struggled with design and production shifts. However, consumer demand for sustainable products was a strong driver across all sectors, especially in the fashion and food industries. Respondents noted that companies are increasingly aligning their strategies with global sustainability trends, though the level of response varied.

The single most important factor for successful CE integration was a strong organizational commitment from leadership, supported by industry collaboration and innovative design. Respondents recommended that organizations focus on education and awareness-building to overcome resistance, while policymakers should provide financial incentives and clear regulatory frameworks to ease the transition. The need for greater cross-industry collaboration was emphasized to overcome technical and logistical challenges, creating a circular ecosystem that benefits all stakeholders.

In conclusion, while progress toward Circular Economy adoption is evident across sectors, organizations continue to face significant challenges related to finance, technology, and cultural resistance. Strong leadership, policy support, and collaboration within and across industries will be key to accelerating the transition to a circular economy and realizing its full potential for sustainability and business growth.

While the findings from the survey provide valuable insights into the adoption of Circular Economy (CE) principles, there are several limitations to the study that should be considered when interpreting the results.

Sample Size and Diversity: Although the survey included respondents from various sectors, the sample size may not be representative of the entire population across all industries. In particular, certain sectors, such as construction or automotive, may have had a higher number of respondents, while others, like healthcare or finance, may have been underrepresented. A larger and more diverse sample could provide a more comprehensive understanding of CE adoption across different industries.

Self-Reported Data: The data collected from respondents is self-reported, which introduces the possibility of response bias. Respondents may have provided answers that reflect the ideal practices in their organizations or their personal views on CE, rather than accurately depicting the full scope of their company's CE efforts. Additionally, respondents may have overestimated their organizations' progress or avoided mentioning challenges and failures.

Geographic Bias: The interview may have a geographic bias, with more respondents from regions where Circular Economy practices are more widely adopted or better supported by government policies and

regulations. Countries or regions with less mature CE policies or practices may be underrepresented in the results, leading to an overestimation of the global adoption rates.

Sector-Specific Variability: The adoption of CE principles varies significantly by sector. For instance, electronics and automotive industries may face more technical barriers in the implementation of CE due to the complexity of their products and materials. On the other hand, sectors like fashion or food may experience different challenges related to design and waste management. These sector-specific challenges may have skewed the overall findings and should be considered when applying the results to specific industries.

Limited Depth on Certain Topics: While the survey provided a broad view of Circular Economy adoption, certain aspects, such as the specific technologies used for recycling or the regulatory frameworks in place, were not explored in depth. The lack of detailed follow-up questions on some critical topics means that deeper insights into these areas are lacking.

Technological Focus: While the role of innovative technology in facilitating CE adoption was highlighted, the survey did not differentiate between various types of technology, such as digital tools, AI-based recycling systems, or sustainable materials technologies. A deeper understanding of how different technologies contribute to CE could provide more actionable insights for organizations.

External Factors: The study focused primarily on the internal practices and perspectives of organizations but did not fully account for external market conditions or global trends such as economic downturns, pandemics, or trade restrictions that could impact CE adoption. These external factors may play a significant role in shaping the pace of transition to a circular economy, especially for smaller businesses or those operating in volatile markets.

Short-Term Focus: Some respondents expressed frustration with the short-term performance metrics commonly used in their organizations, which may undermine long-term sustainability efforts. However, the survey did not explore how organizations reconcile short-term goals with long-term CE strategies. Further research into how CE initiatives align with financial and operational goals over time could provide a clearer picture of their effectiveness.

Despite these limitations, the findings provide valuable insights into the current state of Circular Economy adoption, identifying both the enablers and barriers organizations face. Future studies with larger, more diverse samples and deeper sector-specific analysis could provide a more nuanced understanding of the challenges and opportunities associated with Circular Economy implementation across industries.

CONCLUSION AND RECOMMENDATIONS

1. The concept of circular economy has emerged as a pivotal solution to address the environmental challenges associated with the traditional linear economic model. As the world grapples with resource depletion and waste generation, the circular economy offers a sustainable alternative by promoting closed-loop systems where materials are continually reused, recycled, or regenerated. This research aimed to investigate the factors influencing the adoption of circular economy practices across various sectors and highlight the challenges and opportunities organizations face while transitioning towards more sustainable business practices. By focusing on the implementation of circular economy principles, this study sought to provide deeper insights into the current state of adoption and its potential for fostering sustainable development.

2. The theoretical framework of the study revolves around the concept of circular economy as a transformative model that contrasts the traditional 'take-make-dispose' economic model. The literature review underscored the growing recognition of circular economy principles in sectors such as manufacturing, agriculture, and fashion. The reviewed studies, such as those by Geissdoerfer et al. (2017) and Ghisellini et al. (2016), highlighted both the opportunities and the significant challenges businesses face when implementing circular practices. These challenges include financial constraints, technological limitations, and sector-specific barriers. However, successful adoption has been observed where strategic leadership, regulatory support, and technological innovations converge to promote sustainable practices.

3. This research employed a qualitative methodology, including a comprehensive literature review and interviews with industry experts to gather primary data. The the interviews offered insights from practitioners directly involved in implementing these practices. Through these combined approaches, the study was able to uncover key factors that influence the adoption of circular economy practices, including financial constraints, technological barriers, resistance to change, and the role of government policies.

4. The results of this study revealed that while many sectors have begun to embrace circular economy practices, there remains a notable variation in the depth and scope of adoption. Sectors such as manufacturing and retail have made significant progress in adopting closed-loop systems, sustainable packaging, and product redesign. However, challenges such as high initial investment costs, lack of infrastructure, and resistance to change remain prevalent in many industries. The study found that organizational culture, financial constraints, and technological limitations were significant barriers to the full implementation of circular practices. On the other hand, successful

adoption was facilitated by strong leadership, regulatory support, and industry collaboration. The findings emphasized the need for a comprehensive approach that integrates technological innovation, policy frameworks, and stakeholder collaboration to overcome these challenges.

Recommendations

Based on the findings of this research, several recommendations can be made to businesses, policymakers, and industry leaders to facilitate the broader adoption of circular economy practices:

Investment in Research and Development (R&D): Businesses should invest in R&D to overcome technological limitations and develop more efficient circular solutions. This includes advancing recycling technologies, creating sustainable product designs, and exploring new ways to close product life cycles. Governments can support these efforts by offering funding incentives for R&D initiatives aimed at circular economy innovations.

Government Support and Policy Frameworks: Governments play a crucial role in promoting circular economy adoption by creating conducive policy environments. Regulations that incentivize recycling, product longevity, and waste reduction can help drive industry-wide change. Policies should also focus on creating clear guidelines and standards for circular practices, thus providing businesses with the necessary tools to implement these strategies effectively.

Addressing Financial Constraints: One of the primary barriers identified was the financial burden associated with transitioning to a circular economy. Companies, particularly small and medium-sized enterprises (SMEs), often face challenges in securing funding for initial investments in circular practices. To overcome this, financial mechanisms such as grants, subsidies, or low-interest loans can be introduced by governments to ease the financial strain and encourage more companies to invest in circular solutions.

Building Awareness and Overcoming Resistance to Change: Resistance to change remains a significant barrier to the adoption of circular economy practices. To address this, organizations should invest in awareness campaigns and training programs to educate employees and stakeholders about the benefits of circularity. Building a culture of sustainability within organizations will help overcome inertia and foster a mindset shift towards circularity. Additionally, organizations should communicate the long-term economic and environmental benefits of circular economy practices to all stakeholders to gain buy-in and support.

Collaboration and Knowledge Sharing: Collaboration within industries and across sectors can accelerate the transition to a circular economy. Businesses should engage in partnerships, share best practices, and work together on joint projects to develop and scale circular solutions. Industry networks, conferences,

and collaborative platforms can facilitate knowledge exchange and create synergies that promote wider adoption of circular economy practices.

Sector-Specific Strategies: Given the sector-specific nature of circular economy practices, tailored approaches are necessary for successful adoption. Industries such as fashion, electronics, and automotive may require different strategies due to the nature of their products and materials. Companies should conduct sector-specific assessments to identify the most suitable circular practices for their operations and address the unique challenges they face in implementing these practices.

In conclusion, while the adoption of circular economy practices has gained momentum, significant barriers remain. Overcoming these challenges requires a multi-faceted approach involving investment in innovation, supportive policies, financial assistance, organizational commitment, and industry collaboration. By addressing these factors, businesses and policymakers can create an environment that fosters the widespread implementation of circular economy principles, contributing to a more sustainable and resilient global economy.

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THE IMPACT OF FACTORS TO ADOPTION OF CIRCULAR ECONOMY PRACTICES

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Master Thesis

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SUMMARY

68 pages, 1 table, 3 figures, 35 references

The essay explores the implementation of Circular Economy (CE) practices across various sectors, highlighting factors influencing their adoption, challenges faced, and strategies enabling success. The Circular Economy offers a sustainable alternative to the traditional linear model by promoting resource reuse, recycling, and regeneration. Despite its benefits, CE adoption varies significantly across industries due to differences in sectoral characteristics, organizational readiness, and regulatory environments.

Findings reveal that financial constraints, technical limitations, and resistance to change within organizations are major barriers to CE adoption. However, successful implementation often stems from innovative technology, government policies, industry collaboration, and increased consumer demand for sustainable practices. Respondents emphasized the importance of leadership commitment and clear regulatory support as key enablers of CE practices.

Sector-specific insights indicate that industries like manufacturing benefit from modular designs and closed-loop systems, while retail and agriculture face challenges due to supply chain complexities. Globally, growing market pressures and sustainability trends are driving sectors toward adopting CE principles. Recommendations include increasing government incentives, fostering technological innovation, enhancing consumer awareness, and strengthening collaboration among stakeholders to overcome barriers and maximize CE's potential.

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SANTRAUKA

68 puslapiai, 2 lentelė, 3 paveikslai, 35 literatūros šaltiniai

Šiame magistro darbe analizuojama žiedinės ekonomikos (ŽE) praktikų taikymo įvairiuose sektoriuose situacija, pabrėžiant veiksnius, darančius įtaką jų diegimui, patiriamus iššūkius ir strategijas, užtikrinančias sėkmę. Žiedinė ekonomika siūlo tvarią alternatyvą tradiciniam linijiniam modeliui, skatindama išteklių pakartotinį naudojimą, perdirbimą ir atnaujinimą. Nepaisant jos pranašumų, ŽE taikymas labai skiriasi įvairiuose sektoriuose dėl sektorių specifikos, organizacinio pasirengimo ir reguliavimo aplinkos skirtumų.

Rezultatai parodė, kad pagrindinės kliūtys, trukdančios ŽE taikymui, yra finansiniai apribojimai, techninės galimybės ir organizacijų atsparumas pokyčiams. Tačiau sėkmingas įgyvendinimas dažnai priklauso nuo inovatyvių technologijų, vyriausybės politikos, pramonės bendradarbiavimo ir didėjančio vartotojų reikalavimo tvariai veiklai. Tyrime dalyvavę respondentai pabrėžė, kad vadovybės įsipareigojimai ir aiški reguliavimo parama yra pagrindiniai veiksniai, leidžiantys įgyvendinti ŽE praktikas.

Sektorių analizė atskleidė, kad tokie sektoriai kaip gamyba gauna naudos iš modulinių dizainų ir uždaros grandinės sistemų, tuo tarpu mažmeninė prekyba ir žemės ūkis susiduria su tiekimo grandinės sudėtingumu. Globaliai augantis rinkos spaudimas ir tvarumo tendencijos skatina sektorius įgyvendinti ŽE principus. Rekomendacijose siūloma didinti vyriausybės paskatas, skatinti technologines inovacijas, didinti vartotojų informuotumą ir stiprinti suinteresuotų šalių bendradarbiavimą siekiant įveikti kliūtis ir maksimaliai išnaudoti ŽE potencialą.

APPENDIX 1

Interview Questions

Section 1: Demographics

1. What is your age?
2. What is your gender?
3. What is your current occupation?
4. How many years of experience do you have in your sector?
5. What is your role or level of responsibility in your organization?
6. Can you briefly describe your organization (e.g., size, industry, primary activities)?

Section 2: Current Practices Related to CE Adoption

7. Can you describe how your organization integrates Circular Economy principles into its operations?
8. What specific strategies or practices, such as closed-loop systems, sustainable packaging, or modular design, have been implemented in your sector?
9. How do you measure the effectiveness of these CE practices in achieving sustainability goals?

Section 3: Challenges and Barriers

10. What are the primary challenges your organization faces in adopting CE practices?
11. How do financial constraints affect the adoption of Circular Economy principles in your sector?
12. What technical or technological limitations hinder CE adoption in your organization?
13. How does resistance to change within the organization or sector impact the implementation of CE practices?

Section 4: Success Factors and Enablers

14. Can you share any factors that have significantly contributed to the successful adoption of CE practices in your organization?
15. How has the role of government policies or industry regulations facilitated CE adoption?
16. In what ways has collaboration within the industry supported the implementation of Circular Economy principles?
17. How has innovative technology or digital transformation influenced the adoption of CE practices in your sector?

Section 5: Sector-Specific Insights

18. Are there sector-specific characteristics that make CE adoption easier or harder in your industry?
19. How do customer demands or market pressures influence the implementation of CE practices?
20. How has your sector responded to global trends in sustainability and Circular Economy adoption?

Section 6: General Reflections

21. Based on your experience, what do you believe is the single most important factor in ensuring the successful integration of CE practices?
22. What recommendations would you give to organizations or policymakers to overcome barriers to CE adoption?