Title: From Linear to Circular: Capabilities, Defensive Reasoning, and Supply Chain Collaborations in Manufacturers' Circular Economy Transition

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Abstract

Manufacturers in developing countries face challenges during their transition to the circular economy (CE) due to rapid industrialisation, resource constraints, and the need to balance economic development with sustainability. These conditions provide valuable context for understanding the complexities of CE adoption. This study investigates the critical capabilities required, the impact of defensive reasoning, and the role of supply chain collaboration in overcoming challenges to CE adoption. Using a multiple-case research design and insights from 38 interviews with six manufacturers, the study examines their transition through organisational learning theory. Initially, manufacturers engage in 'single-loop learning,' focusing on circular design, risk monitoring, and resource optimisation strategies. However, defensive reasoning—stemming from concerns over costs and disruptions—emerges as a major obstacle. In response, manufacturers shift to 'double-loop learning,' which re-evaluates their value propositions and business models. This shift is essential in overcoming resistance and enabling sustainable practices. The research highlights the pivotal role of supply chain collaboration, illustrating how it catalyses overcoming challenges to CE adoption. By emphasising organisational learning, this study contributes to the broader discourse on CE adoption in developing countries, showcasing how learning processes enable sustainable practices that align with global goals despite local challenges.

Keywords: circular economy, circular transition, organisational learning, supply chain collaborations, developing countries.

1. Introduction

The growing emphasis on environmental sustainability in global discourse has highlighted the importance of CE principles, which offer a promising framework for aligning economic growth with ecological conservation and for addressing waste reduction and resource efficiency (Abdelmeguid et al., 2022; Agrawal et al., 2021). However, the practical implementation of CE faces significant challenges, especially for manufacturers in developing countries (Ciliberto et al., 2021; Pigosso & McAloone, 2021). These challenges are driven by constraints such as limited access to finance and knowledge gaps in a circular design. Limited access to finance, as a critical challenge, hinders the investment in essential technologies for CE (Abdelmeguid et al., 2022). Small and medium-sized enterprises (SMEs) in countries like India often struggle to secure funding for sustainable initiatives due to high interest rates and stringent lending conditions (Bleischwitz et al., 2022). Furthermore, knowledge gaps in circular design and practices further limit manufacturers' capacity to minimise waste and maximise resource reuse (Hopkinson et al., 2018). For instance, Vietnam's textile industry lacks skills in recycling and waste management, impeding the implementation of circular strategies (Nguyen & Hoang, 2023). These challenges create a crucial entry point for this research, which aims to investigate the transition of manufacturers in developing countries to a CE, focusing on identifying the key capabilities essential for successful adoption, understanding the challenges encountered during the transition, and examining the role of supply chain collaboration in supporting this process.

The first objective of the study is to identify the critical capabilities that enable manufacturers to adopt circular practices effectively. These capabilities include single-loop learning, which allows organisations to refine existing strategies, and double-loop learning, which involves a more profound transformation of organisational values, business models, and operational strategy (Stata, 1989; Argyris & Schön, 1997). This dual learning process is crucial for fostering the competencies needed to transition from traditional linear models to circular approaches, thereby promoting both environmental sustainability and operational resilience in manufacturing sectors within developing countries (Tatoglu et al., 2020; Akhtar et al., 2018). The second objective is to explore manufacturers' challenges in adopting CE principles, particularly focusing on the barriers posed by defensive reasoning. Such reasoning manifests in concerns regarding increased costs, risk aversion, and competing business priorities (Argyris, 1977; Argyris, 1976), often hindering

organisations from fully embracing circular practices. Understanding these psychological and organisational barriers is essential for formulating strategies to dismantle resistance and foster an environment conducive to successfully adopting CE principles. The third objective is to investigate the role of supply chain collaboration in facilitating the transition to a CE. Collaborative efforts within supply chains serve as a key mechanism for overcoming defensive reasoning, enabling open dialogue, shared commitment to sustainability, and collective problem-solving. This collaboration can significantly enhance the adoption of circular practices, as it allows manufacturers to leverage the expertise and resources of their supply chain partners, driving both innovation and long-term sustainability across the value chain (Burke et al., 2023; Stumpf et al., 2023). Accordingly, this research seeks to address three fundamental questions:

Research Question 1: What are the key capabilities that manufacturers in developing countries need to successfully transition to a CE?

Research Question 2: What are the challenges that manufacturers in developing countries encounter during their transition to a CE, and what factors contribute to their success or pose obstacles in this process?

Research Question 3. How can supply chain collaboration and cooperation strategies contribute to the successful transition to a CE for manufacturers in developing countries?

This study employs a qualitative, multiple-case research design, focusing on six manufacturing organizations in Vietnam. Vietnam's rapid economic growth and industrialization present unique opportunities and challenges in the transition to a Circular Economy (CE). As a developing country, it exemplifies the tension between economic development and environmental sustainability (Nguyen et al., 2022). Manufacturing sector, vital to economic growth, also contributes significantly to environmental degradation, making it a relevant context for studying CE transitions (Tanveer et al., 2024). In-depth semi-structured interviews with 38 key informants, including managers and experts involved in CE implementation, provide nuanced insights into the experiences, perceptions, and strategies related to CE adoption in the manufacturing sector of developing countries. The contributions of this paper are twofold. This research provides detailed insights into the specific capabilities and challenges faced by these manufacturers. It emphasises the role of supply chain collaboration as a transformative strategy to overcome these barriers. This

dual focus enriches the understanding of how CE principles can be effectively integrated into manufacturing practices, offering valuable implications for both theory and practice.

This manuscript includes six sections: Section 2 explores the theoretical background of CE adoption in developing country manufacturers, focusing on organisational learning theory. Section 3 outlines the qualitative methodology and case study execution across six manufacturers. Section 4 presents an analysis of empirical findings. Section 5 links the results to the theoretical framework and proposes research propositions. Section 6 summarizes the study's theoretical contributions, practical implications, limitations, and suggests future research directions.

2. Literature background

2.1. CE adoption in developing countries

The global imperative for environmental sustainability has propelled the principles of the CE to the forefront of discussions, advocating for a paradigm shift in economic practices to harmonize growth with ecological preservation (Liu et al., 2022; Kennedy & Linnenluecke, 2022). CE, at its core, underscores the sustainable and efficient use of resources, aiming to minimize waste and prolong product and material lifecycles (Ren et al., 2023; Samadhiya et al., 2023). Its fundamental tenets include waste reduction throughout the product lifecycle, the promotion of reuse, remanufacturing, and recycling practices, and active participation in restoring natural ecosystems. The allure of CE adoption lies in its potential to yield substantial environmental and economic benefits (Sauerwein et al., 2019). Environmentally, CE practices promise reduced greenhouse gas emissions, resource conservation, and a diminished environmental footprint, contributing significantly to climate change mitigation (Goworek et al., 2018). Economically, CE is positioned to stimulate innovation, enhance resource efficiency, and unlock new business opportunities by optimising material flows and reducing disposal costs (Adomako et al., 2022; Bleischwitz et al., 2022).

In the specific context of developing countries, the journey toward CE adoption presents a complex interplay of challenges and opportunities (Blomsma et al., 2019; Pigosso & McAloone, 2021). Resource constraints, inadequate infrastructure, and limited technological access pose formidable

obstacles (Liu et al., 2022; Ren et al., 2023). However, these regions also hold unique opportunities, leveraging their resource-rich environments and emerging markets to pioneer innovative CE approaches (Samadhiya et al., 2023; Stumpf et al., 2023). Challenges include the need for substantial investments in infrastructure and technology coupled with less developed regulatory frameworks in many developing countries. Manufacturers in these settings, integral to global supply chains, navigate a complex terrain where CE adoption can be both an aspiration and a struggle (Pigosso & McAloone, 2021; Ciliberto et al., 2021).

2.2. Supply Chain Collaboration and Organizational Learning in CE Adoption

Manufacturers in developing countries increasingly recognise both the challenges and opportunities of adopting CE practices. These challenges include limited access to finance, knowledge gaps in a circular design, and the need to balance economic growth with sustainability (Abdelmeguid et al., 2022; Bleischwitz et al., 2022). However, CE practices also offer significant advantages, including resource savings, reduced environmental impact, and increased competitiveness in global markets (Akhtar et al., 2018; Haque & Ntim, 2020). A critical enabler in navigating these complexities is supply chain collaboration. Collaborative efforts within global supply chains facilitate technology transfer, knowledge exchange, and mutual support among manufacturers, which can help overcome barriers to CE adoption (Stumpf et al., 2023; Burke et al., 2023). Understanding how manufacturers in developing countries collaborate within their supply chains is essential for uncovering the factors contributing to or hindering the successful transition to a CE (Adomako et al., 2022; Nag et al., 2021).

At the same time, adopting CE goes beyond changes in operational practices; it requires a profound transformation in the organisational mindset. Organisational learning theory provides a valuable framework for understanding how manufacturers evolve through this transformation. It conceptualises learning as a dynamic, continuous process that includes acquiring, interpreting, and disseminating knowledge within an organisation (Real et al., 2014; Morgan & Turnell, 2003). In the context of CE, this learning process involves understanding the principles of circularity and applying them effectively across business processes and strategies (Tatoglu et al., 2020; Bertassini et al., 2021). This progression begins with organisations recognising the need for change and

acquiring the necessary knowledge, which forms the basis for developing key CE capabilities such as circular product design, closed-loop supply chain management, and resource optimisation (Pigosso & McAloone, 2021; Tatoglu et al., 2020).

The development of these capabilities is linked to the concept of learning-by-doing, where organisations experiment with CE practices, adapt based on feedback, and engage in a continuous process of improvement (Chaudhuri et al., 2022; Ciliberto et al., 2021). As manufacturers engage with practices like waste reduction, product lifecycle extension, and sustainable material sourcing, they gain valuable insights that contribute to the evolution of their CE capabilities. This iterative process helps organisations stay responsive and adaptive to the evolving demands of circular practices (Agrawal et al., 2021). Supply chain collaboration, in turn, plays a critical role in amplifying the learning process. By integrating diverse perspectives and expertise from various stakeholders within the supply chain, collaborative efforts facilitate innovation, best practice identification, and joint problem-solving, all of which enhance the adoption of CE principles (Ritala et al., 2018; Burke et al., 2023). This collaborative learning process enables manufacturers to tackle the challenges of CE adoption more effectively and enhances their ability to adapt to the complexities of circular practices (Bertassini et al., 2021; Ren et al., 2023).

2.3. Theoretical framing

The theoretical framing of this research is rooted in organisational learning theory, with a specific focus on single-loop and double-loop learning, as well as the role of SC collaboration in facilitating these learning processes. Perceptions and motivations play a pivotal role as organisations question existing notions embedded in linear business models and embrace the foundational principles of CE; this questioning extends to beliefs about resource consumption, waste generation, and the feasibility of circularity (Hopkinson et al., 2018; De Angelis, 2022). Techniques and strategies then come into play as organisations develop and implement practices geared toward CE adoption; this encompasses the redesign of products for circularity, optimisation of supply chains for resource efficiency, and the adoption of sustainable material sourcing practices (Parsa et al., 2022; Nag et al., 2021). The outcomes of CE adoption are multifaceted, encompassing benefits such as reduced waste, cost savings, and enhanced environmental sustainability; however, these benefits coexist with challenges, including resource constraints and resistance to change (Ren et al., 2023;

Ritala et al., 2018). Single-loop learning represents incremental adjustments and improvements within existing practices. For instance, an organisation might introduce recycling initiatives or extend product lifecycles as part of its initial CE journey (Dey et al., 2020; Pigosso & McAloone, 2021).

In contrast, double-loop learning signifies a more profound level of organisational transformation; it involves questioning and re-evaluating fundamental perceptions and strategies (Argyris, 1977; Real et al., 2014). Organisations engaged in double-loop learning may undergo a paradigm shift, reconsidering their entire business models to align with CE principles; this level of learning represents a more transformative and radical approach, pushing organisations beyond incremental changes (Morgan & Turnell, 2003; Ciliberto et al., 2021). Defensive reasoning emerges as a critical barrier to CE adoption, where organisations resist changes due to concerns over increased costs, uncertainty, or disruptions to established processes (Abdelmeguid et al., 2022; Bleischwitz et al., 2022). Overcoming defensive reasoning becomes imperative for successful CE adoption. Strategies that foster openness to change encourage experimentation and provide mechanisms for addressing concerns are crucial in dismantling defensive barriers (Kristoffersen et al., 2020; Tatoglu et al., 2020). This framework, encompassing perceptions, strategies, collaboration, outcomes, single-loop learning, double-loop learning, and defensive reasoning, helps organisations navigate the complex journey toward circularity. By integrating these aspects, organisations can effectively transition to a CE and unlock the associated benefits.

In summary, existing literature addresses the benefits and challenges of CE adoption but often overlooks the interplay between organizational learning and supply chain collaboration (Liu et al., 2022; Kennedy & Linnenluecke, 2022). While resource efficiency, waste reduction, and the need for investment and regulatory support are highlighted (Pigosso & McAloone, 2021; Ciliberto et al., 2021), the mechanisms of organizational learning in CE are rarely explored. This study offers novel insights into CE transitions for manufacturers in developing countries, integrating double-loop learning and supply chain collaboration within organizational learning theory. It highlights how these elements develop critical CE capabilities, shedding light on challenges and opportunities for manufacturers in the developing world.

3. Methodology

3.1. Research setting and sample

Drawing upon organisational learning theory and the relevant literature on CE adoption and supply chain collaboration, the aim was to develop a comprehensive understanding of the transition to CE in developing countries. Our approach was to explore and understand this phenomenon through a process perspective of 'sensemaking,' which acknowledges the complexity of the world and the existence of dualities rather than reducing it to variance-based generalizations (Weick, 1995; Langley & Tsoukas, 2010). Sensemaking refers to " *to those processes by which people seek plausibly to understand ambiguous, equivocal or confusing issues or events*" (Brown et al., 2015, p. 266) and understands firms to be in a constant state of flux or change (Hernes, 2007). We started the investigation by exploring the events that led to change in Vietnamese manufacturers from the 2000s and the underlying mechanisms driving CE in our cases. Through 'sensing' from a variety of primary and secondary sources, the investigators were able to begin the abductive process of connecting data with theory (Langley & Tsoukas, 2010, p. 19). This iterative process of sensemaking allowed us to develop a conceptual framework that integrates double loop learning and supply chain collaboration within the organizational learning theory, ensuring that our research design was both theoretically grounded and empirically robust. Figure 1 outlines our research strategy.

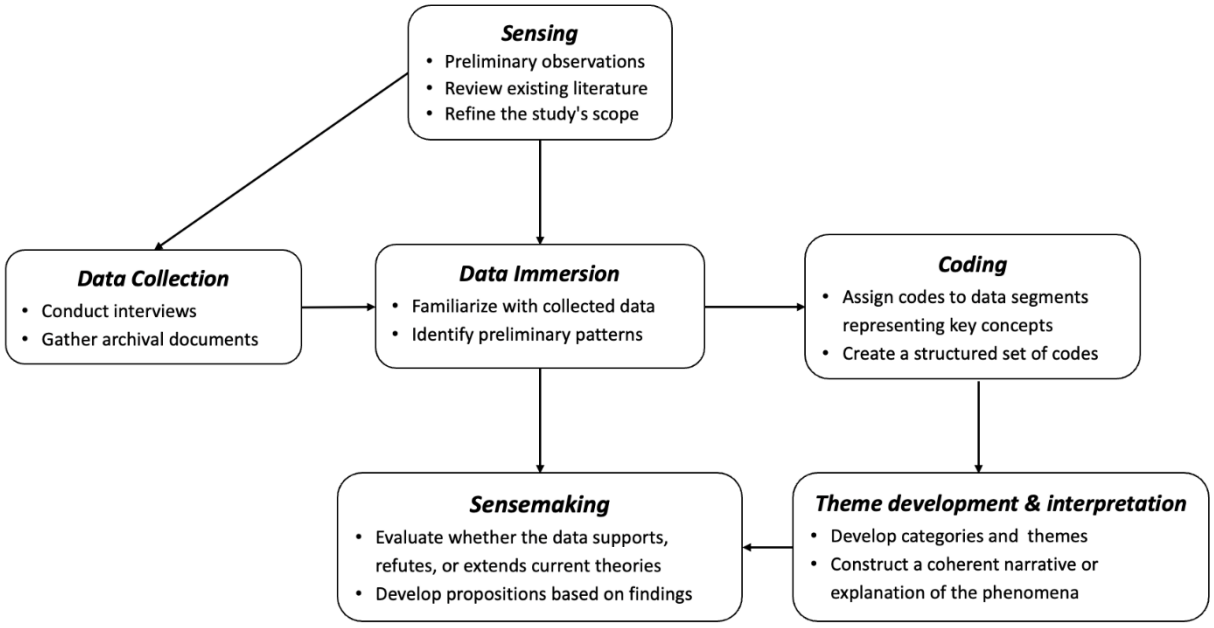


Figure 1. Research strategy

This research employs a multiple-case design (Yin, 2011; Gioia et al., 2013), gathering data through interviews with six Vietnamese manufacturers recognized for their active adoption of circular economy (CE) principles. These firms were selected for their proactive integration of circular practices, making them ideal cases for exploring the complexities of CE transition in a developing country context. The study focuses on early adopters of CE principles who are navigating the challenges of this transition, examining their efforts in areas like product design, supply chain management, and resource optimization. These cases provide valuable insights into both the successes and obstacles encountered during the CE transition in the manufacturing sector, which faces increasing pressure to balance economic growth with environmental sustainability. The interpretive research approach allows for a deep exploration of the organizational learning and transformation required for CE integration. The ability to learn and adapt is central to success, as reflected in the evolving CE practices of these manufacturers, detailed in Appendix 1. The study's focus on companies with varying levels of circular practices offers a holistic view of CE principles in action, contributing to a richer understanding of the strategies that drive or hinder sustainable transitions in manufacturing.

By employing a multiple-case design, this study enhances rigor and provides a structured framework for comparative analysis and contextual exploration (Yin, 2017; Gioia et al., 2013). This approach considers the contextual factors influencing CE transitions across diverse manufacturing settings, focusing on capabilities, challenges, learning processes, and the facilitation of transitions. Through an in-depth examination of these organizations, the study uncovers the interplay between organizational learning and the CE adoption process, offering valuable insights that inform both the participating firms and the wider manufacturing industry. The research contributes to the global discourse on sustainable manufacturing practices and aligns with the growing emphasis on environmentally conscious and economically viable manufacturing. Background information on the case studies is provided in Appendix 1.

3.2. Data collection

The data collection methodology centres around a multi-stage process of in-depth interviews, ensuring the confidentiality of case firms and informants, with only job titles disclosed to maintain anonymity. The initial stage assesses the interest and involvement of senior management, establishing a foundation for subsequent interactions and identifying key stakeholders in circular design strategies. The next stage involves online meetings with managers and experts directly engaged in implementing circular design strategies, evaluating the firms' capacity to provide relevant data. Emphasis is placed on senior leaders due to their roles in strategic decision-making. Snowball sampling further enhances data collection, ensuring diverse perspectives. A total of 38 semi-structured interviews (Appendix 2: Interview details) with organizational leaders, senior managers, and middle managers across the six enterprises provide valuable insights into the challenges and strategies of CE adoption.

Data collection occurred from March to September 2023, utilizing online platforms such as Zoom and telephone calls for interviews, each lasting up to 90 minutes. The sessions encouraged informants to share their experiences and perspectives relevant to the research aim without bias. Following initial interviews, the research team conducted follow-up emails and phone conversations with key informants to gather additional insights and clarifications, focusing on themes like challenges in implementing CE practices and strategies to overcome them. These

follow-ups were instrumental in exploring complex issues such as financial barriers for SMEs and supply chain collaboration across sectors. Follow-ups also helped to validate and triangulate the initial findings, ensuring the interpretations accurately reflected participants' perspectives and enhancing the credibility and reliability of the research outcomes.

With the consent of each respondent, all interviews are audio-recorded, and detailed notes are transcribed from the recordings. Additionally, the research team collects archival documents such as published reports, presentations, and publicly available sources from the case enterprises. These documents serve as supplementary sources, allowing for the cross-examination and validation of findings from the interviews. The triangulation of data sources enhances the reliability and credibility of the study's findings. Adhering to ethical guidelines, the data collection process ensures informed consent, confidentiality, and respect for the privacy of all participants. The Interview Guide in the appendix 3 highlights the list of questions utilized in this study, providing transparency and replicability in the research process. Appendix 3. The Interview Guide.

3.3. Data analysis

The data analysis for this research involved a rigorous three-step process employing thematic analysis, a well-established method for identifying empirical themes emerging from case study research (Gioia et al., 2013; Yin, 2017). In the initial step, the research team meticulously gathered and analyzed a substantial dataset comprising 390 pages of transcribed data from interviews and archival documents. A systematic search was conducted for recurring phrases and concepts, reflecting the perspectives and experiences of informants. The second step entailed a comprehensive review of the data sources to identify patterns and connections, serving as the foundation for constructing themes derived from first-order concepts. This iterative process aimed to uncover the underlying structure of the data, facilitating the emergence of meaningful themes. The final step included a cross-case comparison to highlight common findings across the cases, organizing these themes into seven main dimensions: Perceptions, Strategies, Outcomes, Cooperation & Collaborations, Single-loop Learning, Double-loop Learning, and Defensive Reasoning. These dimensions represent the higher-level concepts and insights derived from the data. Figure 2 outlines the data structure.

To ensure the reliability of the data analysis, an intercoder reliability (Saunders et al., 2009) procedure was employed, where two independent researchers conducted synthesis, analysis, and coding. The results of this coding process were compared to ensure the consistency of derived themes. Follow-up discussions with informants further enhanced data consistency and accuracy, providing an opportunity to clarify ambiguities and confirm the accuracy of interpretations. In pursuit of accuracy and trustworthiness, initial research findings were shared with respondents from all participating enterprises through a member checking process. This allowed informants to review and validate interpretations and conclusions drawn from their contributions, strengthening the credibility and validity of the research outcomes (Stake, 2013). The systematic three-step data analysis process, complemented by intercoder reliability procedures and member checking, collectively contribute to the rigor and robustness of this study's findings.

Also, in the final step of the data analysis, the themes identified through cross-case comparisons were integrated with the theoretical framework established earlier in the study. This process culminated in the development of the conceptual framework (Figure 3), which was constructed through an iterative and abductive approach. Grounded in organizational learning theory, the framework was continually refined as new insights were drawn from the data. Key dimensions, such as single-loop and double-loop learning and supply chain collaboration, emerged as central concepts. These dimensions were then incorporated into the framework, which reflects the dynamic interplay between organizational learning, defensive reasoning, and collaborative strategies in the context of CE adoption. The abductive process ensured that the framework was both conceptually rigorous and empirically grounded, offering valuable insights into the challenges and strategies inherent to the CE transition, especially within developing country contexts.

4. Research findings

The theoretical framework presented in section 2.3 identified the interplay of seven aspects encompassing perceptions, strategies, collaboration, outcomes, single loop learning, double loop learning, and defensive reasoning which helps organizations to navigate the complex journey

toward circularity. Our research findings identified those seven aggregate dimensions (presented in the form of data structure in Figure 2) and are detailed in the following subsections.

4.1. Perceptions

The perception that CE adoption reduces material waste and leads to significant cost savings emerged strongly in our findings. Participants emphasized the economic benefits, with one interviewee stating, "*Reducing material waste is not just environmentally friendly; it significantly impacts our bottom line*" (Director of Operations, case B). Beyond financial gains, manufacturers recognized CE to enhance their reputation and align with sustainability goals, as noted by a participant: "*Being part of the circular economy is not just about profit; it's about being seen as a responsible and sustainable business*" (Sustainability Coordinator, case A). Clear communication was also identified crucial, with one interviewee emphasizing, "*Communicating the positive impact on costs and our commitment to sustainability is crucial for everyone to understand why we're moving in this direction*" (Eco-Innovation Manager, case C). The perception that recycling materials reduces raw material costs was prevalent, with participants noting shifts in production methods to incorporate recycled materials. As one participant stated, "*We've revamped our processes to incorporate recycled materials, reducing the need for raw inputs and creating a more sustainable production cycle*" (Product Development Manager, case A). Collaboration was also highlighted as crucial, with organizations seeking partnerships to drive sustainable innovation. One interviewee emphasized, "*Collaboration is key; we're working with others in the industry to share insights and jointly develop sustainable solutions*" (Operations Coordinator, case E). The focus on resource optimization and waste reduction emerged as central to perceived value creation, with one participant explaining, "*It's about finding that sweet spot where we use resources efficiently without generating unnecessary waste*" (Operations Support Manager, case F).

Our findings also affirmed that manufacturers see value capture through extended product life cycles. Participants recognized offering maintenance and repair services to extend product use and generate additional revenue. One interviewee noted, "*Our revenue model is evolving; it's not just about selling products but ensuring they have a longer lifespan through maintenance services*" (Case D). Manufacturers also evaluated Return on Investment (ROI) and utilized government

incentives for financial support. One participant explained, "*We're not just extending product life for the sake of it; there's a financial rationale, and government incentives provide an added boost*" (Production Planner, case C). Additionally, compliance with CE regulations was seen as a driver of profitability, with one interviewee stating, "*Regulations are pushing us in the right direction; compliance isn't just about avoiding penalties; it's about thriving in a circular economy*" (Business Process Optimization Manager, case A).

4.2. Strategies

Our findings highlight "Design for Circularity" as a fundamental strategy in CE adoption. Organizations are rethinking product design to enhance durability, reusability, and recyclability, with a focus on eco-friendly materials. As one participant noted, "*It's not just about the product; it's about the materials we choose, ensuring they align with circular principles from the start*" (Production Manager, case D). Emphasizing product longevity and easy disassembly emerged as key strategies. Participants recognized that extending product lifecycles contributes to circularity, with one interviewee explaining, "*Longevity is key; our products are designed for the long haul, and we've made disassembly a seamless process to maximize reuse and recycling*" (Design Research Manager, case C). Manufacturers' proactive engagement in monitoring risks and benefits of CE adoption was also evident in our data. Organizations continuously assess potential challenges and opportunities in circular initiatives. As one participant noted, "*We're consistently monitoring the terrain, understanding the risks, and identifying opportunities for improvement*" (Business Process Manager, case D). Additionally, manufacturers acknowledged short-term resource constraints and investment requirements but viewed them as hurdles on the path to long-term benefits, with one participant stating, "*The benefits in terms of reduced waste and enhanced sustainability far outweigh the initial challenges*" (Plant Manager, case E). In addition, resource optimization emerged as a key strategy in CE adoption, with organizations focusing on efficient resources use in production. One participant explained, "*Every step in our production process is scrutinized for efficiency, ensuring we use resources judiciously*" (Operations Coordinator, case F). Waste reduction and responsible sourcing were also pivotal, with one participant noting, "*Waste reduction is a conscious effort, and sourcing materials responsibly ensures our supply chain aligns with circular principles*" (Product Development Engineer, case C).

4.3. Outcomes

The adoption of CE fosters a culture centred on sustainability, driving a significant shift in organizational mindset and values. As one participant highlighted, "*CE is not just a set of practices: it's a mindset shift. Our employees now champion sustainability*" (Director of Operations, case B). This transformation is accompanied by structural and process adaptations, with organizations becoming more flexible and adaptable to integrate circular practices. As noted by an interviewee, "*We've adapted processes to ensure circularity is embedded in every facet of our operations*" (Operations Manager, case A). CE adoption also enhances organizational agility, enabling firms to respond swiftly to changing market conditions and customer preferences. One participant shared, "*We've become more agile in responding to market shifts, ensuring our products stay relevant*" (Product Aesthetics Specialist, case C). Additionally, aligning with evolving customer values is emphasized, as a participant noted: "*Circularity helps us address changing customer values swiftly*" (Quality Control Manager, case E).

Furthermore, CE adoption drives a transformation in business models, such as leasing and take-back schemes, which move beyond traditional sales paradigms. A participant explained, "*Our business model is no longer just about selling; it's about enabling circular practices*" (Operations Coordinator, case E). This shift is accompanied by innovative approaches to revenue generation, with organizations exploring new avenues aligned with circular principles. As one interviewee observed, "*CE has challenged us to think beyond traditional revenue sources*" (Business Process Manager, case D). Finally, the implementation of Key Performance Indicators enables organizations to measure and track their progress in circularity. One participant emphasized, "*We have clear KPIs that guide our circular initiatives*" (Business Operations Analyst, case E). Transparent communication of circularity efforts is essential for building trust with stakeholders, as noted by a participant: "*We transparently disclose our achievements, building trust and credibility*" (Director of Operations, case B).

4.4. Single loop learning

The findings illustrate the adoption of Single Loop Learning in product design, focusing on incremental adjustments to enhance circularity. Participants highlighted efforts such as using recyclable materials and simplifying disassembly processes to optimize product life cycles and reduce environmental impact. As one participant noted, "*We iteratively changed material choices to make our products more recyclable. It's about continuous improvement*" (Product Launch Manager, case D). Rather than implementing radical changes, manufacturers focus on strategic modifications to existing designs, aligning with CE principles while maintaining product functionality (Eco-Innovation Manager, case C). In monitoring and insight, sustainability plays a pivotal role in Single Loop Learning. The Sustainability Coordinator (case E) emphasized the iterative nature of monitoring CE adoption's effects on resource use, waste generation, and overall sustainability. "*Our journey began with basic monitoring, assessing how CE adoption influenced our practices*" (Sustainability Coordinator, case E). The immediate insights gained from this process drive real-time adjustments that mitigate risks and optimize benefits: "*CE adoption is a continuous journey. Immediate insights allow us to adapt quickly*" (Sustainability Coordinator, case E). Resource efficiency also emerges as a key element of Single Loop Learning. The Operations Manager (case A) shared how iterative adjustments are made to improve resource efficiency and reduce waste. "*We are constantly seeking ways to save resources... through more efficient production processes or finding sustainable sources*." This approach extends to improved sourcing and energy consumption practices, contributing to CE goals: "*By iteratively optimizing our sourcing strategies and reducing energy consumption, we contribute to the broader objectives of CE*" (Operations Manager, case A).

4.5. Defensive reasoning

Our exploration into CE adoption reveals a recurring theme of defensive reasoning hindering transformative practices. The Production Manager (case D) highlighted a widespread fear that circular practices would increase operational costs: "*There's a prevailing fear that embracing circular practices will incur additional costs, impacting our bottom line*." This concern extends to initial investments, where organizations show reluctantance to commit upfront, as emphasized by the Chief Operating Officer (case F): "*The upfront investments seem prohibitive to many. It's challenging to convince stakeholders to look beyond immediate costs and consider long-term*

gains." Risk aversion is another critical barrier, with organizations preferring stability over the perceived risks of transformative CE practices. The Manufacturing Supervisor (case C) noted, "*CE brings inherent uncertainties. Many prefer stability over the perceived risks*." This risk aversion combined with concerns about potential disruptions to workflows, hinders organizations from experimenting with circular strategies, as the Production Manager (case D) observed: "*Uncertainty and potential disruptions are viewed as threats*."

Competing priorities also impede CE adoption. The Operations Manager (case A) discussed how immediate business concerns, such as production targets and customer demands, often overshadow long-term CE strategies: "*CE, while important, often takes a back seat to the pressing demands of daily operations.*" The Production Planner (case C) echoed this, noting: "*CE becomes secondary when there's pressure to meet production goals and fulfil customer orders*." Resource constraints further exacerbate challenges in double loop learning. Despite recognizing the benefits of CE, organizations struggle with limited financial and human resources. The Sustainability Coordinator (case E) highlighted this issue: "*There's a gap between acknowledging the benefits and having the resources to translate intentions into action*." Similarly, the Operations Coordinator (case F) remarked: "*There's a paradoxical situation where organizations recognize the benefits of CE but struggle to allocate the necessary resources."* These constraints contribute to stagnation, limiting progress in CE adoption.

4.6. Double loop learning

As organizations adopt CE practices, double loop learning drives profound transformation beyond surface-level changes. The Technology Strategist of case A explains how double loop learning leads organizations to re-examine their value propositions: "*Double loop learning compels us to rethink our value propositions. CE can be a unique market selling point, prompting us to re-evaluate everything from product design to distribution*." This process involves fundamental reassessment of product design, sourcing strategies, and distribution channels to align with circular principles. The Business Process Manager of case C adds, "*Our journey prompts a re-evaluation of how we design, source materials, and distribute products. It's about reshaping our entire approach*." Double loop learning also influences value creation and delivery. The Eco-Innovation

Manager of case C notes, "*We're not just re-evaluating what we produce; we're re-evaluating how we create and deliver value."* This reflective innovation leads to changes in sourcing, production, and distribution practices. The Product Launch Manager of case D observes, "*Double loop learning prompts us to question and reimagine our sourcing, production, and distribution, optimizing resource use and aligning practices with CE principles*." In terms of value capture, double loop learning shifts organizations from traditional revenue models to CE-focused strategies. The Business Process Manager of case C states, "*Double loop learning challenges us to reconsider how we capture value, exploring shifts toward product-as-a-service and leasing or subscription-based models*." Similarly, the Manufacturing Supervisor of case D emphasizes, "*Our focus on double loop learning encourages us to explore product-as-a-service and leasing, aligning our business strategies with the circular mindset*."

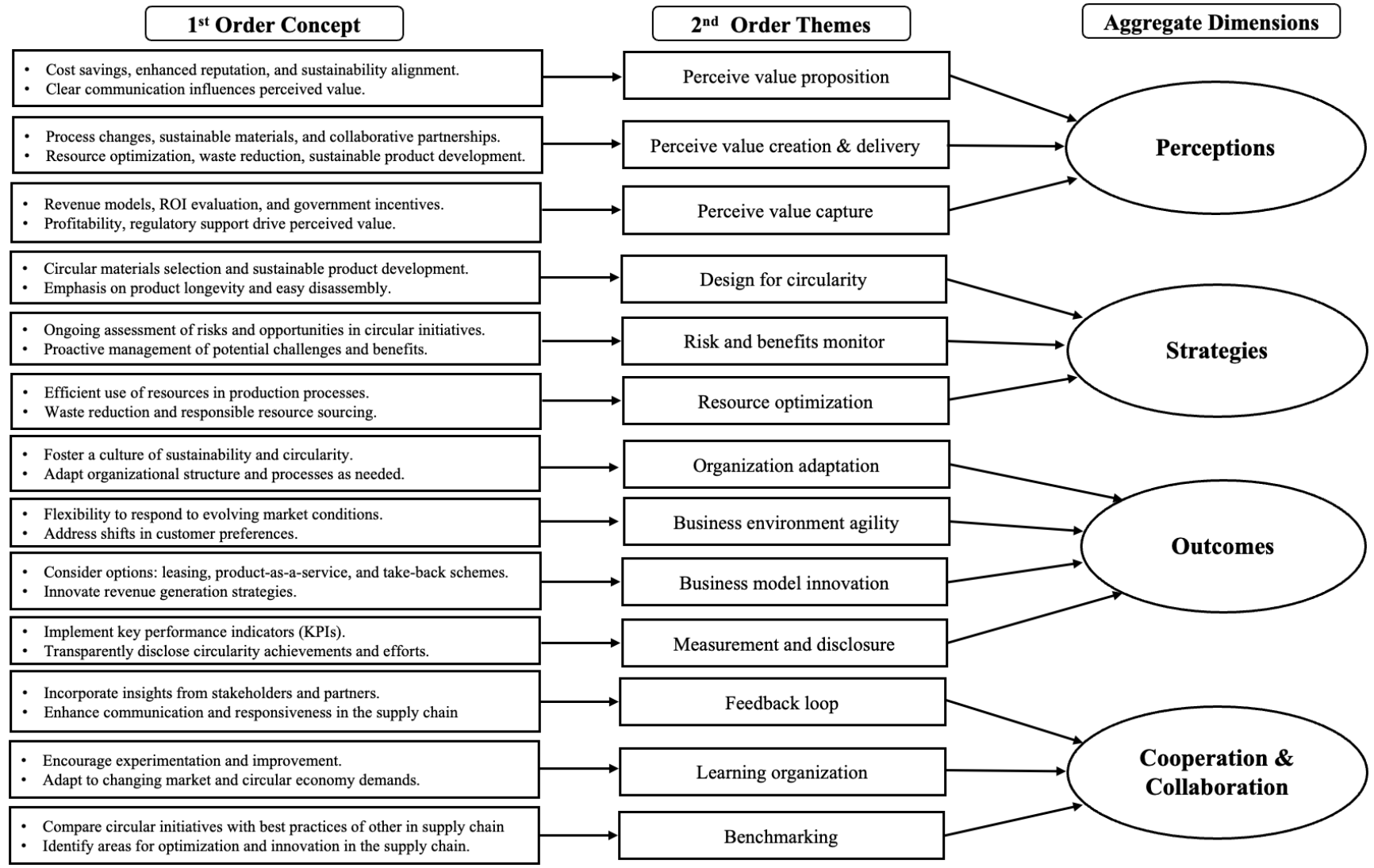
4.7. Supply chain cooperation and collaboration

In CE adoption, supply chain cooperation and collaboration are crucial enablers, countering defensive reasoning and fostering a culture of continuous improvement, learning, and benchmarking. The operations coordinator of case E highlights the role of feedback loops in continuous improvement. He emphasizes, "*Our feedback loop incorporates valuable insights from stakeholders and partners, enhancing communication and responsiveness, and mitigating defensive reasoning*." This approach ensures that stakeholder input is used to refine circular practices and drive improvements. Similarly, the Director of Operations of case B adds, "*Our commitment to CE is reflected in enhanced communication and responsiveness, minimizing defensive reasoning through real-time feedback from supply chain partners*."

Becoming a learning organization aligns with double loop learning principles. The Business Process Optimization Manager of case A underscores the importance of knowledge sharing, noting, "*Our aspiration is to be a learning organization, encouraging knowledge sharing and minimizing defensive reasoning*." This culture of experimentation and adaptation fosters innovation and addresses defensive reasoning, ensuring organizations remain responsive to market dynamics and CE demands. The Business Operations Specialist of case E supports this by

emphasizing, "*Encouraging experimentation and adaptation minimizes defensive reasoning and promotes continuous improvement*." Benchmarking is a vital tool for assessing CE progress.

Benchmarking serves as a valuable tool for organizations to gauge their progress in CE adoption. The Quality Control Manager of case E states, "*Benchmarking compares our circular initiatives with industry best practices, identifying areas for optimization and innovation*." This process not only drives improvement but also reduces defensive reasoning by offering a clear roadmap. The Production Planner of case F further explains, "*Benchmarking identifies areas for optimization and innovation, ensuring that defensive reasoning is addressed through tangible examples of successful practices*."


1st Order Concept
2nd Order Themes
Aggregate Dimensions
• Cost savings, enhanced reputation, and sustainability alignment.
• Clear communication influences perceived value.
Perceive value proposition
• Process changes, sustainable materials, and collaborative partnerships.
• Resource optimization, waste reduction, sustainable product development.
Perceive value creation & delivery
• Revenue models, ROI evaluation, and government incentives.
• Profitability, regulatory support drive perceived value.
Perceive value capture
Perceptions
• Circular materials selection and sustainable product development.
• Emphasis on product longevity and easy disassembly.
Design for circularity
• Ongoing assessment of risks and opportunities in circular initiatives.
• Proactive management of potential challenges and benefits.
Risk and benefits monitor
• Efficient use of resources in production processes.
• Waste reduction and responsible resource sourcing.
Resource optimization
Strategies
• Foster a culture of sustainability and circularity.
• Adapt organizational structure and processes as needed.
Organization adaptation
• Flexibility to respond to evolving market conditions.
• Address shifts in customer preferences.
Business environment agility
• Consider options: leasing, product-as-a-service, and take-back schemes.
• Innovate revenue generation strategies.
Business model innovation
• Implement key performance indicators (KPIs).
• Transparently disclose circularity achievements and efforts.
Measurement and disclosure
Outcomes
• Incorporate insights from stakeholders and partners.
• Enhance communication and responsiveness in the supply chain
Feedback loop
• Encourage experimentation and improvement.
• Adapt to changing market and circular economy demands.
Learning organization
• Compare circular initiatives with best practices of other in supply chain
• Identify areas for optimization and innovation in the supply chain.
Benchmarking
Cooperation & Collaboration

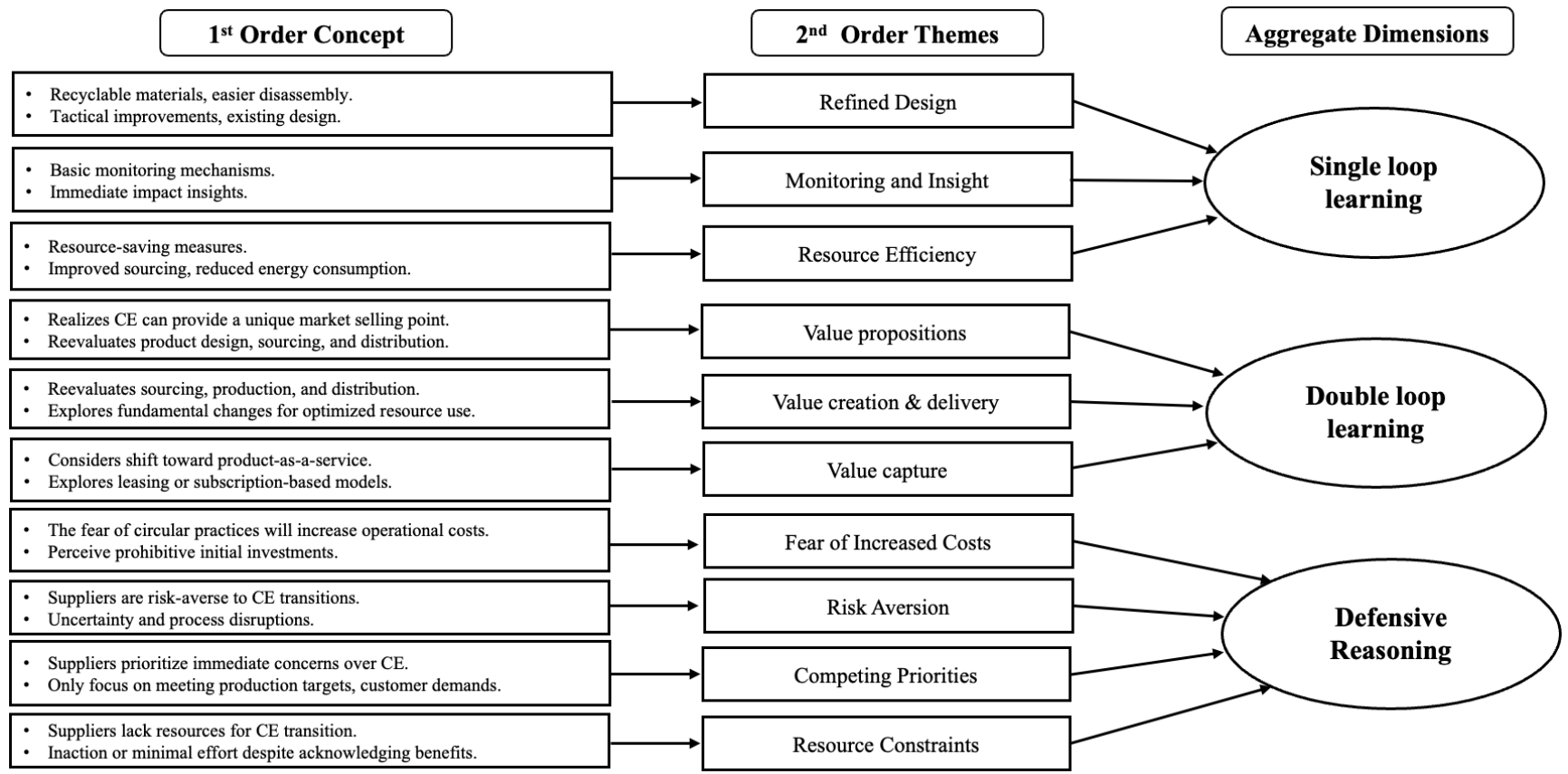


Figure 2. Data structure

5. Discussion

5.1. Critical capabilities for CE transition

Navigating the transition to a CE demands a broad set of capabilities from manufacturers in developing countries. A core capability is circular product design, which emphasizes durability, reusability, and recyclability. This approach is consistent with existing literature, which highlights the pivotal role of product design in facilitating circular practices and enabling extended product life cycles (Bocken et al., 2016; Sauerwein et al., 2019; Stumpf et al., 2023). Additionally, manufacturers must engage in active assessment, monitoring, and management of risks and benefits associated with CE adoption. This aligns with research emphasizing robust risk management strategies as essential for overcoming the complexities of CE transitions (Bertassini et al., 2021; Ciliberto et al., 2021; Pigosso & McAloone, 2021). Effective risk assessment enables organizations to anticipate challenges and build resilience, ensuring successful integration of CE principles. Resource optimization emerges as another central capability, where manufacturers prioritize efficient resource utilization, waste reduction, and sustainable material sourcing. This aligns with the broader discourse on responsible resource management in the context of CE (Chaudhuri et al., 2022; Bleischwitz et al., 2022; Blomsma & Brennan, 2017) and underscores the importance of balancing environmental objectives with long-term economic sustainability (Goworek et al., 2018; Haque & Ntim, 2020).

As organizations embrace CE, they must also develop an adaptive organizational culture. This flexibility allows them to respond swiftly to market shifts and environmental changes, positioning adaptability as a critical capability for success in the CE (Ritala et al., 2018; Bocken et al., 2016; De Angelis, 2022). This ability to adapt extends to navigating evolving regulatory environments and market demands, particularly related to sustainability. Organizations demonstrating agility in these areas are better equipped to align with changing consumer preferences and regulatory expectations (Adomako et al., 2022; Akhtar et al., 2018; Dey et al., 2020). Moreover, adopting innovative business models, such as product-as-a-service and leasing, is crucial for CE adoption. These models mark a shift from traditional linear business strategies, offering sustainable alternatives for value creation (Bocken et al., 2016; Burke et al., 2023; den Hollander et al., 2017). As organizations rethink how they generate value, they move beyond the limitations of traditional models and explore new, circular business opportunities. Lastly, transparency in reporting CE

initiatives plays a vital role in building trust and credibility with stakeholders. Clear communication of circularity goals and achievements fosters accountability, aligns with the broader emphasis on transparency in the CE literature (Adomako et al., 2022; Nag et al., 2021; Ghisellini et al., 2016). By prioritizing transparency, organizations can create a culture of responsibility and demonstrate their commitment to sustainable practices. Appendix 4 highlights the paper's main findings related to critical capabilities for CE transition.

5.2. Challenges and success factors in CE adoption

As manufacturers in developing countries transition to the CE, they face a range of challenges requiring strategic navigation. One significant hurdle is the fear of increased operational expenses, rooted in traditional linear economic thinking, which can prevent full commitment to circular practices. This concern is widely recognized in literature as a barrier to CE adoption (Kristoffersen et al., 2020; Bertassini et al., 2021; Blomsma et al., 2019). Overcoming this requires a shift in perception, focusing on the long-term economic benefits of circularity. Another challenge is the risk aversion often associated with CE transitions, where uncertainty hinders organizations from exploring innovative circular approaches. Literature stresses the importance of embracing calculated risks and experimentation for successful CE adoption (Bocken et al., 2016; Ciliberto et al., 2021). To address this, organizations must foster a culture that encourages learning and exploration.

Additionally, manufacturers often prioritize immediate business concerns over CE adoption, relegating circular initiatives to secondary importance. Literature highlights the need for circularity to be integrated into core business strategies to overcome this dichotomy (Bertassini et al., 2021; Johansen et al., 2022). This shift requires viewing circular practices not as optional but as integral to long-term business success. Finally, limited financial and human resources present a significant challenge in the CE transition, a challenge also discussed in the literature (Hopkinson et al., 2018; Ghisellini et al., 2016). While resource constraints are a reality, creative solutions such as partnerships and innovative funding models are essential for overcoming these hurdles and ensuring a sustainable circular journey. Appendix 5 highlights the paper's main findings related to challenges and success factors in CE adoption.

5.3. Strategies for enabling double loop learning through supply chain collaboration

The transition to a CE for manufacturers in developing countries is significantly influenced by supply chain collaboration, which plays a crucial role in facilitating double loop learning over single loop learning. Literature highlights that such collaboration fosters an environment conducive to profound transformation (Nag et al., 2021; Stumpf et al., 2023; Warmington-Lundström & Laurenti, 2020). By engaging in reflective discussions, stakeholders challenge core perceptions about products, services, and relationships, prompting organizations to reassess their value propositions and move beyond surface-level adjustments. This aligns with double loop learning, encouraging manufacturers to redefine their strategies and identities within a circular context.

An essential outcome of double loop learning through supply chain collaboration is the reduction of defensive reasoning. Collaborative problem-solving helps overcome barriers such as fear of increased costs, risk aversion, competing priorities, and resource constraints. Open dialogues, as advocated by Adomako et al. (2020), Nag et al. (2021), and Burke et al. (2023), allow stakeholders to explore innovative solutions and shift organizational thinking, facilitating deeper engagement with CE principles. This collaborative approach not only addresses immediate concerns but also drives a transformative shift in organizational perspectives, aligning with the principles of double loop learning. Appendix 6 highlights the strategies for enabling double loop learning through supply chain collaboration.

The research framework in Figure 3 presents three key propositions for enabling double loop learning in the supply chain, ultimately supporting a successful CE transition for manufacturers in developing countries. First, within the context of feedback loop establishment, a proactive approach is crucial. Instead of relying solely on post-implementation feedback, organizations should institute continuous feedback mechanisms throughout the supply chain (Adomako et al. 2020; Nag et al., 2021; Stumpf et al., 2023). This involves regular evaluations, discussions, and adjustments in real-time, creating an iterative process of learning and improvement. This proactive engagement aligns with the principles of double loop learning, encouraging stakeholders to critically assess and adapt their strategies based on ongoing insights.

Proposition 1: *A proactive feedback loop within the supply chain fosters iterative learning and reflective discussions, pushing manufacturers beyond single loop learning to a nuanced comprehension of circular practices.*

Second, cultivating a learning organization culture necessitates a fundamental shift in how knowledge is valued and shared within the supply chain. Organizations should actively promote experimentation, open dialogue, and a willingness to challenge conventional thinking. This cultural transformation goes beyond the incremental adjustments associated with single loop learning, fostering an environment where stakeholders continuously explore innovative CE practices (Bertassini et al., 2021; De Angelis, 2022). It encourages not only the refinement of existing practices but also the exploration of entirely new approaches aligned with circular principles.

Proposition 2: *Actively fostering a learning organization culture, encourages exploration of innovative CE practices, aligning with double loop learning by challenging fundamental perceptions and pushing the boundaries of conventional thinking.*

Third, redefining benchmarking practices involves more than assessing performance against industry norms. Manufacturers should seek inspiration from industry leaders who have embraced CE principles wholeheartedly. This goes beyond performance evaluation to inspire a transformative shift in thinking. Benchmarking in this context becomes a tool for challenging the status quo and exploring unconventional approaches (Abdelmeguid et al., 2022; Parsa et a., 2021). This approach resonates with the principles of double loop learning, encouraging manufacturers to reassess their perceptions about what constitutes success and innovation in the CE.

Proposition 3: *Redefining benchmarking against CE leaders inspires fundamental shifts in thinking, going beyond performance evaluation to provide invaluable insights into unconventional approaches and innovative strategies, in line with the principles of double loop learning.*

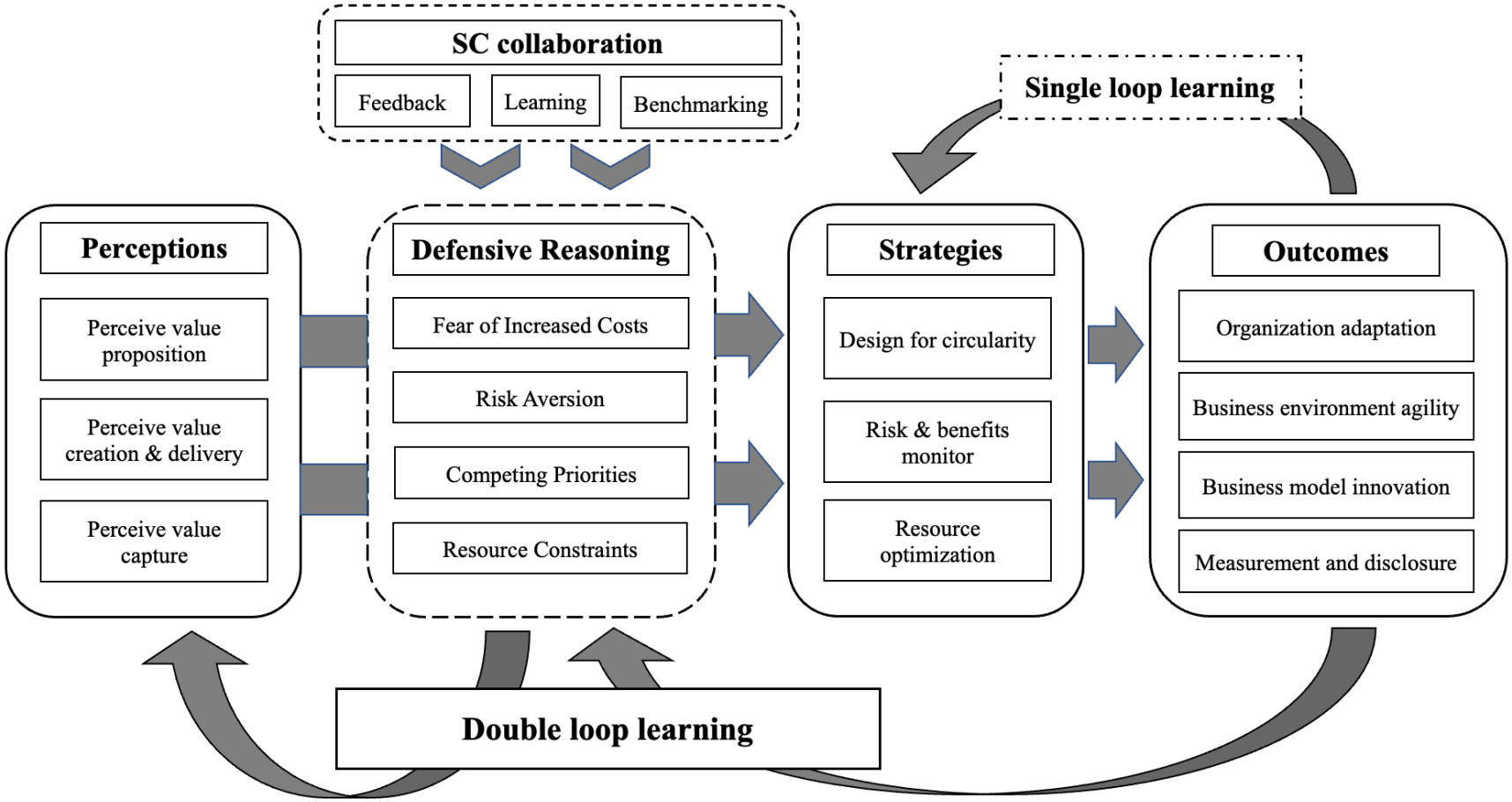


Figure 3. Research framework

6. Research implications

This research offers novel and original insights into the transition to a CE for manufacturers in developing countries by integrating the concepts of double loop learning and supply chain collaboration within the theoretical framework of organizational learning theory. This study uniquely emphasizes the profound impact of collaborative supply chain dynamics in fostering a deeper, transformative learning process, thus, it delivers both theoretical and practical contributions.

6.1. Theoretical Implications

The findings of this research hold several theoretical implications that advance the existing knowledge within the literature of organizational learning theory and CE adoption (Pigosso et al., 2021; Ren et al., 2023; Adomako et al., 2022). Firstly, this study significantly contributes to the theoretical foundation of organizational learning theory (Argyris, 1976; Stata, 1989; Real et al., 2014) by showcasing its practical application in guiding sustainability transitions. The study expands the boundaries of this theoretical framework by providing empirical evidence of how organizational learning principles operate in the intricate process of adopting CE practices. This extends the theoretical understanding of organizational learning into sustainability, offering valuable insights for scholars and practitioners alike. Secondly, a fundamental theoretical contribution lies in the refined conceptualization of CE capabilities, the distinction between single loop and double loop learning (Argyris, 1977; Argyris & Schön, 1997), as elucidated in this research, adds depth to the understanding of how organizations cultivate the essential competencies required for successful CE adoption (Ren et al., 2023; Pigosso & McAloone, 2021). This nuanced conceptualization enhances the theoretical framework by delineating organisations' specific learning processes, shedding light on the intricacies of capability development in the context of CE practices.

Moreover, this research makes a notable theoretical contribution by identifying and elaborating on defensive reasoning as a critical barrier to CE adoption (Hopkinson et al., 2018; Wang et al., 2022). The conceptualization of defensive reasoning extends the broader literature on organizational resistance to change (Goworek et al., 2018; Bertassini et al., 2021), offering a focused examination of the specific defensive attitudes that impede sustainability transitions. This nuanced

understanding of defensive reasoning contributes to a more comprehensive comprehension of the challenges organizations face (for instance, see Bleischwitz et al., 2022; Hopkinson et al., 2018) when navigating the complexities of adopting CE principles. Lastly, the introduction of a set of propositions in this paper opens avenues for future research. These propositions, grounded in the findings of the study, provide a foundation for empirical testing and further exploration. Future research endeavours can leverage these propositions to deepen the understanding of the dynamics between organizational learning, defensive reasoning, and CE adoption, contributing to the ongoing scholarly discourse in this field.

6.2. Practical Implications

This research carries substantial practical implications for manufacturing organizations, particularly those operating in developing countries, offering actionable insights that can guide their transition to a CE. Firstly, the delineated capabilities framework emerges as a practical guide for organizations navigating the complexities of CE adoption. Particularly relevant for organizations in developing countries, this framework provides clear guidance by differentiating between single loop and double loop learning. Single loop learning focuses on incremental improvements within existing processes, such as enhancing recycling efforts, refining resource use, and managing CE-related risks. This approach allows for immediate, though limited, gains without overhauling current business models. In contrast, double loop learning involves a deeper transformation, requiring organizations to reassess and fundamentally alter their core value propositions and business models to fully integrate CE principles. This includes questioning underlying assumptions, exploring innovative strategies like product-as-a-service or leasing models, and adopting a comprehensive approach to sustainability. By understanding these differences, organizations can more effectively target their resources and efforts, facilitating a more efficient and sustainable adoption of circular practices.

Secondly, the research underscores the pivotal role of supply chain collaboration and cooperation as practical strategies to overcome defensive reasoning. Organizations can draw actionable guidance from these strategies, applying them to foster open dialogue, collaborative problem-solving, and a shared commitment to CE principles. These practical steps contribute to a smoother transition by addressing the psychological barriers inherent in defensive reasoning, promoting a

more collaborative and adaptive organizational culture. Moreover, industry associations find practical leverage in these findings to champion sustainable practices within the manufacturing sector. The emphasis on collaboration and the creation of a supportive ecosystem for CE adoption aligns with broader sustainability goals. Industry associations can play a pivotal role in disseminating these insights, catalysing a collective shift towards circular economies within the manufacturing sector.

6.3. Limitations and future research avenue

This qualitative study employs a multiple case research design to offer valuable insights into the key capabilities and challenges faced by manufacturers in developing countries during their transition to a CE. However, it is crucial to recognize specific limitations that may impact the generalizability of the findings and highlight potential avenues for future research within the context of this paper. Firstly, the findings emanate from a specific set of manufacturing firms in developing countries. The main reason for acknowledging this limitation is that this research represents a pioneering effort in this direction, focusing specifically on the narrow scope of manufacturing industries in developing countries. Consequently, caution should be exercised when applying these findings to a broader population of businesses, particularly those in different industries or regions. Future research should expand on this study by investigating a more diverse range of industries, including both manufacturing and services, and encompassing multiple developed and developing countries. This broader scope would enhance the generalizability of the results and provide a more comprehensive understanding of CE adoption across various contexts. Secondly, the qualitative research approach adopted in this study, primarily through in-depth interviews, offers rich insights into the experiences and perceptions of the participants. However, it may not provide a comprehensive quantitative analysis of the identified capabilities and challenges. Future research could complement these qualitative findings with quantitative assessments, specifically focusing on manufacturers in developing countries during their CE transition.

Furthermore, this study focuses on understanding the individual experiences of case firms in adopting CE principles. Future research could extend its focus by incorporating a comparative analysis between firms that have successfully transitioned and those that have faced challenges.

Such an approach would elucidate the factors contributing to the successful implementation of CE principles in the context of manufacturing firms in developing countries. Additionally, this study provides a snapshot of the impact of supply chain collaboration and cooperation strategies in mitigating defensive reasoning at a particular moment in time. Future research endeavours could adopt a longitudinal approach to track the effectiveness of these strategies over time, offering insights into their long-term effects on the successful transition to a CE for manufacturers in developing countries. Lastly, while this study delves into the internal perspectives of firms, future research could explore the viewpoints of external stakeholders, such as customers, suppliers, and regulatory bodies, within the unique context of manufacturing firms in developing countries. This approach would contribute to a more holistic understanding of the dynamics surrounding the circular transition within this specific context.

References

Abdelmeguid, A., Afy-Shararah, M., & Salonitis, K. (2022). Investigating the challenges of applying the principles of the circular economy in the fashion industry: A systematic review. *Sustainable Production and Consumption*, 32, 505-518.

Adomako, S., Simms, C., Vazquez-Brust, D., & Nguyen, H. T. (2022). Stakeholder Green Pressure and New Product Performance in Emerging Countries: A Cross-country Study. *British Journal of Management*. https://doi.org/10.1111/1467-8551.12595.

Agrawal, V., Atasu, A., & Ülkü, S. (2021). Leasing, modularity, and the circular economy. *Management Science*, 67(11), 6782-6802.

Akhtar, P., Khan, Z., Frynas, J. G., Tse, Y. K., & Rao-Nicholson, R. (2018). Essential micro-foundations for contemporary business operations: Top management tangible competencies, relationship-based business networks and environmental sustainability. *British Journal of Management*, 29(1), 43-62.

Argyris, C. (1976). Single-loop and double-loop models in research on decision making. *Administrative Science Quarterly*, 363-375.

Argyris, C. (1977). Double loop learning in organizations. *Harvard Business Review*, 55(5), 115-125.

Argyris, C., & Schön, D. A. (1997). Organizational learning: A theory of action perspective. *Reis*, (77/78), 345-348.

Bertassini, A. C., Ometto, A. R., Severengiz, S., & Gerolamo, M. C. (2021). Circular economy and sustainability: The role of organizational behaviour in the transition journey. *Business Strategy and the Environment*, 30(7), 3160-3193.

Bleischwitz, R., Yang, M., Huang, B., Xiaozhen, X. U., Zhou, J., McDowall, W., ... & Yong, G. (2022). The circular economy in China: Achievements, challenges and potential implications for decarbonisation. *Resources, Conservation and Recycling*, 183, 106350.

Blomsma, F., & Brennan, G. (2017). The emergence of circular economy: A new framing around prolonging resource productivity. *Journal of Industrial Ecology*, 21(3), 603-614.

Blomsma, F., Pieroni, M., Kravchenko, M., Pigosso, D. C. A., Hildenbrand, J., Kristinsdottir, A. R., Kristoffersen, E., Shahbazi, S., Nielsen, K. D., Jönbrink, A.-K., Li, J., Wiik, C., & McAloone, T. C. (2019). Developing a circular strategies framework for manufacturing

companies to support circular economy-oriented innovation. *Journal of Cleaner Production*, 241, 118271. https://doi.org/10.1016/j.jclepro.2019.118271

Bocken, N., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320. https://doi.org/10.1080/21681015.2016.1172124

Bundgaard, A. M., & Huulgaard, R. D. (2019). Luxury products for the circular economy? A case study of Bang & Olufsen. *Business Strategy and the Environment*, 28(5), 699-709.

Burke, H., Zhang, A., & Wang, J. X. (2023). Integrating product design and supply chain management for a circular economy. *Production Planning & Control*, 34(11), 1097-1113.

Brown, A. D., Colville, I., & Pye, A. (2015). Making sense of sensemaking in organization studies. *Organization Studies*, 36(2), 265-277.

Chatzidakis, A. & Shaw, D. (2018). Sustainability: Issues of Scale, Care and Consumption. *British Journal of Management*, 29(2), 299-315.

Chaudhuri, A., Subramanian, N., & Dora, M. (2022). Circular economy and digital capabilities of SMEs for providing value to customers: Combined resource-based view and ambidexterity perspective. *Journal of Business Research*, 142, 32-44.

Ciliberto, C., Szopik-Depczyńska, K., Tarczyńska-Łuniewska, M., Ruggieri, A., & Ioppolo, G. (2021). Enabling the Circular Economy transition: A sustainable lean manufacturing recipe for Industry 4.0. *Business Strategy and the Environment*, 30(7), 3255-3272.

Crossan, M. M., Lane, H. W., White, R. E., & Djurfeldt, L. (1995). Organizational learning: Dimensions for a theory. *International Journal of Organizational Analysis*, 3(4), 337-360.

De Angelis, R. (2022). Circular economy business models: A repertoire of theoretical relationships and a research agenda. *Circular Economy and Sustainability*, 2(2), 433-446.

den Hollander, M. C., Bakker, C. A., & Hultink, E. J. (2017). Product Design in a Circular Economy: Development of a Typology of Key Concepts and Terms. *Journal of Industrial Ecology*, 21(3), 517–525. https://doi.org/10.1111/jiec.12610

Dey, P. K., Malesios, C., De, D., Chowdhury, S., Abdelaziz, F. B., & Saint-Aignan, F. (2020). The impact of lean management practices and sustainable oriented innovation on sustainability performance of small and medium sized enterprises: Empirical evidence from the UK. *British Journal of Management*, 31(1), 141-161.

Geng, Y., Sarkis, J., Ulgiati, S., & Zhang, P. (2019). Measuring China's circular economy. *Science*, 339(6117), 1526-1527.

Ghisellini, P., Cialani, C. and Ulgiati, S. (2016), A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, 114: 11-32.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15–31.

Goworek, H., Land, C., Burt, G., Zundel, M., Saren, M., Parker, M., & Lambe, B. (2018). Scaling sustainability: Regulation and resilience in managerial responses to climate change. *British Journal of Management*, 29(2), 209-219.

Haque, F., & Ntim, C. G. (2020). Executive compensation, sustainable compensation policy, carbon performance and market value. *British Journal of Management*, 31(3), 525-546.

Hernes, T. (2007). *Understanding organization as process: Theory for a tangled world* (Vol. 2). Routledge.

Hopkinson, P., Zils, M., Hawkins, P., & Roper, S. (2018). Managing a complex global circular economy business model: Opportunities and challenges. *California Management Review*, 60(3), 71-94.

Johansen, M. R., Christensen, T. B., Ramos, T. M., & Syberg, K. (2022). A review of the plastic value chain from a circular economy perspective. *Journal of Environmental Management*, 302, 113975.

Kennedy, S., & Linnenluecke, M. K. (2022). Circular economy and resilience: A research agenda. *Business Strategy and the Environment*, 31(6), 2754-2765.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221-232.

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular economy: the concept and its limitations. *Ecological Economics*, 143, 37-46.

Kristoffersen, E., Blomsma, F., Mikalef, P., & Li, J. (2020). The smart circular economy: A digital-enabled circular strategies framework for manufacturing companies. *Journal of Business Research*, 120, 241-261.

Langley, A., & Tsoukas, H. (2010). Introducing perspectives on process organization studies. In: Hernes & Maitlis. *Process, Sensemaking, and Organizing*, 1(9), 1-27.

Liu, Q., Trevisan, A. H., Yang, M., & Mascarenhas, J. (2022). A framework of digital technologies for the circular economy: Digital functions and mechanisms. *Business Strategy and the Environment*, 31(5), 2171-2192.

Morgan, R. E., & Turnell, C. R. (2003). Market-based organizational learning and market performance gains. *British Journal of Management*, 14(3), 255-274.

Nag, U., Sharma, S. K., & Govindan, K. (2021). Investigating drivers of circular supply chain with product-service system in automotive firms of an emerging economy. *Journal of Cleaner Production*, 319, 128629.

Nguyen, H. T., Hoang, T. G., Nguyen, L. Q. T., Le, H. P., & Mai, H. X. V. (2022). Green technology transfer in a developing country: Mainstream practitioner views. *International Journal of Organizational Analysis,* 30(3), 699-720.

Nguyen, G., & Hoang, T. (2023). Impact of US anti-forced labor laws on Vietnam's textile industry. Hinrich Foundation. Available at: https://www.hinrichfoundation.com/research/wp/sustainable/impact-of-us-anti-forced-labor-laws-on-vietnam-textile-industry/

Parsa, A., Van De Wiel, M. J., & Schmutz, U. (2021). Intersection, interrelation or interdependence? The relationship between circular economy and nexus approach. *Journal of Cleaner Production*, 313, 127794.

Pigosso, D. C., & McAloone, T. C. (2021). Making the transition to a circular economy within manufacturing companies: The development and implementation of a self-assessment readiness tool. *Sustainable Production and Consumption*, 28, 346-358.

Real, J. C., Roldán, J. L., & Leal, A. (2014). From entrepreneurial orientation and learning orientation to business performance: analysing the mediating role of organizational learning and the moderating effects of organizational size. *British Journal of Management*, 25(2), 186-208.

Ren, Y., Wu, K. J., Lim, M. K., & Tseng, M. L. (2023). Technology transfer adoption to achieve a circular economy model under resource-based view: A high-tech firm. *International Journal of Production Economics*, 264, 108983.

Ritala, P., Huotari, P., Bocken, N., Albareda, L., & Puumalainen, K. (2018). Sustainable business model adoption among S&P 500 firms: A longitudinal content analysis study. *Journal of Cleaner Production,* 170, 216–226. https://doi.org/10.1016/j.jclepro.2017.09.159

Samadhiya, A., Agrawal, R., Kumar, A., & Garza-Reyes, J. A. (2023). Blockchain technology and circular economy in the environment of total productive maintenance: a natural resource-based view perspective. *Journal of Manufacturing Technology Management*, 34(2), 293-314.

Sauerwein, M., Doubrovski, E., Balkenende, R., & Bakker, C. (2019). Exploring the potential of additive manufacturing for product design in a circular economy. *Journal of Cleaner Production*, 226, 1138–1149. https://doi.org/10.1016/j.jclepro.2019.04.108

Saunders2, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students. In Pitman Publishing imprint* (5th ed.). https://doi.org/10.1108/qmr.2000.3.4.215.2

Stake, R. E. (2013). *Multiple case study analysis*. Guilford press.

Stata, R. (1989). Organizational learning-the key to management innovation. *MIT Sloan Management Review*, 30(3), 63.

Stumpf, L., Schöggl, J. P., & Baumgartner, R. J. (2023). Circular plastics packaging–Prioritizing resources and capabilities along the supply chain. *Technological Forecasting and Social Change*, 188, 122261.

Tanveer, U., Hoang, T. G., Truong, H. Q., Ishaq, S., & Gong, Y. (2024). The critical role of procurement in the emergence of circular business models: Insights from multiple cases of Vietnamese manufacturers. *Business Strategy and the Environment*.

Tatoglu, E., Frynas, J. G., Bayraktar, E., Demirbag, M., Sahadev, S., Doh, J., & Koh, S. L. (2020). Why do emerging market firms engage in voluntary environmental management practices? A strategic choice perspective. *British Journal of Management*, 31(1), 80-100.

Wang, J. X., Burke, H., & Zhang, A. (2022). Overcoming barriers to circular product design. *International Journal of Production Economics*, 243, 108346.

Warmington-Lundström, J., & Laurenti, R. (2020). Reviewing circular economy rebound effects: The case of online peer-to-peer boat sharing. *Resources, Conservation & Recycling: X*, 5, 100028.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.

Weick, K. E. (1995). *Sensemaking in organizations* (Vol. 3). Sage.

Wiedenhofer, D., Virág, D., Kalt, G., Plank, B., Streeck, J., Pichler, M., Mayer, A., Krausmann, F., Brockway, P., Schaffartzik, A., Fishman, T., Hausknost, D., Leon-Gruchalski, B.,

Sousa, T., Creutzig, F. and Haberl, H. (2020). A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part I: bibliometric and conceptual mapping, *Environmental Research Letters*, 15 (6): 063002.

Yin, R. K. (2011). *Applications of case study research*. sage.

Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage publications.