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Enablers and Barriers to Circular Economy adoption in B2B Operations

The Case Study of Refurbished Spare Parts and its B2B Customer relations in the European Region

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ABSTRACT:

The industrial sector such as maritime industry is transitioning to circular economy. Circular practices are under growing regulatory and environmental pressure to be adopted by the maritime industry. Refurbishment of spare parts is a viable alternative that can be adopted in the case of engine manufacturers to reduce the lifecycle emissions and the material consumption. Despite this potential, implementation in the industry is inconsistent, and the variables that affect customer acceptance have yet to be comprehensively defined.

Through the context of a leading marine engine manufacturer and its B2B customers, this research identifies the specific enablers and barriers influencing the purchase of refurbished parts. Qualitative case study research design has been implemented for this research. Primary data was gathered through semi-structured interviews with five (5) sales managers from the marine engine manufacturing company. The sales managers served as expert sources who possess both technical knowledge about the products and the customer's behavioral responses.

Key findings indicate that nature of business, nature of products and technological factors as significant enablers for ship owners and operators. Financial factors and regulatory factors worked as two-fold dimensions, both a driver and a barrier. Environmental and external stakeholders were neutral, and they were neither facilitators nor hindrances. They were required to have conditions of context that gave the necessary stability to run the initiative. However, social or cultural factors acted as primary barriers.

The research concludes that in order to make the buying of refurbished parts successful, the firm will need to adopt a number of important organizational strategies. To begin with, the company should include the offers of refurbished in all quotes. They also have to enhance marketing and communication with customers and carry out root-case analysis of damaged parts systematically. In order to scale these operations, the company must increase world refurbishment centers and get access to technical drawings of spares in other manufacturing companies. Moreover, it is critical to develop a running-hours monitoring system of refurbished parts. Lastly, the plan must involve focusing on older engine models and warranty extension of refurbished spares parts.

KEYWORDS: circular economy, B2B, adoption, remanufacturing, manufacturing industry, marine engineering

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1 Introduction

In accelerating environmental depletion and resource scarcity, adoption of a Circular Economy (CE) is one path forward for businesses worldwide. Although an increasing number of scholars, policymakers and executives promote this model and recognize its potential to address these global challenges, implementation of the CE in various sectors of the economy is fragmented. CE has become a strategic framework to address these challenges by emphasizing the reuse, refurbishment, remanufacturing, and recycling of materials. CE aims to reduce waste, extend product lifecycles, and close resource loops (Kirchherr et al., 2017).

The potential of circularity within the Business to Business (B2B) sector is considered high in the management of technical nutrients. Technical nutrients are materials that do not biodegrade, but can be circulated continuously through the industrial cycle, which eliminates waste and pollution and reduces resource use (Braungart & McDonough, 2002). Refurbishment and remanufacturing are productive ways to manage technical nutrients. Refurbished spare parts represent a high-value circular strategy that extends product lifespans and reduces the need for virgin material extraction. Adopting a circular approach to spare parts is not only an environmental strategy but also a lever for economic gains, one of the primary drivers of CE identified in the literature (Kirchherr et al., 2017).

However, B2B operations has various challenges such as complex global supply chains, stringent quality requirements, and the need for seamless reverse logistics (Rizos et al., 2021). Moreover, the adoption of refurbished parts comes with several barriers that can be categorized into different dimensions such as technological, cultural or institutional. Subverted definitions of circularity that prioritize low value recycling over high-value refurbishment are considered as one of the common hurdles (Kirchherr et al., 2017). Quality issues in recycled materials, supply chain complexities, coordination problems between companies, design and production of the product, disassembly of products and high start-up or investment costs are considered as practical obstacles too (Jaeger &

Upadhyay, 2020). As a result, the opportunities to address these challenges are provided through enablers like digital product passports, advanced Material Flow Analysis (MFA) and strategic B2B partnerships. Although these are the known factors, empirical evidence in the sector specific to the interaction of these barriers and enablers in the context of industrial spare parts management is lacking.

1.1 Problem Statement, Research Gap and Motivation

"The Circularity Metric continues to decline, the vast majority of materials entering the economy are virgin, with the share of secondary materials falling from 7.2% to 6.9% as of the latest analysis" (Circle Economy, 2025, p.11). This shows how we are failing in the adoption of the CE in the different kinds of industries that are supposed to be promoting for this framework. Most CE theories emphasize "closing loop" through strategies such as refurbishment to maintain value however several industries are locked into linear supply chains. Although the theoretical benefits of CE are evident, the implementation remains slow.

The current CE literature is heavily skewed toward B2C (Business-to-Consumer) environments or macro-level policy discussions. There is a significant research gap in B2B (Business-to-Business) settings, where complex procurement rules, strict service-level agreements (SLAs), and risk-averse corporate cultures create unique hurdles for refurbished components (Bressanelli et al., 2019). The purpose of this study is to move beyond why CE is important to how it can be implemented. By identifying what hinders B2B customers from choosing refurbished parts and what encourages them. Through this study, this study aims to find out how to minimize barriers and maximize enablers to CE specifically pertaining to the refurbished spare parts of the case company.

The operational lifetime of the marine engines is often 25 years or more. This requires overhauls at fixed running intervals. The processes involved in these overhauls or maintenance are replacing or restoring components such as liners, pistons, cylinder heads and turbochargers. Customers purchase new spare parts from original equipment manufacturer (OEM) from different suppliers. However, factors such as cost pressures, supply chain disruptions and decarbonization initiatives have created possibilities to purchase refurbished alternatives.

There are studies that promote the need to adopt the CE practices such as refurbishment and remanufacturing. However, most of the studies are related to the consumer markets. There are few studies on the business-to-business (B2B) marine engine maintenance environment, the enablers and barriers in adopting refurbished spare parts. There are limited studies that discuss the role of sales or Sales managers as promoters of the adoption process, and the organizational readiness to adopt CE practices that are in line with the aftermarket strategies. Consequently, there is little understanding of why the refurbished spare parts practice is not widely adopted despite its environmental and economic benefits.

This study seeks to understand and explore the enabling and hindering factors of adopting the refurbished spare parts purchased in the marine engine aftersales market. This will be done by investigating insights from the Sales managers of various customer segments within the same company in the selected industry. This thesis also seeks to provide more insights on how these enabling or constraining factors impact customer decision-making. Moreover, this research evaluates the current practices of the case company against the CE theory. It will also determine how to enhance the adoption and support the company's business and circularity objectives.

1.2 Research Question and Objectives

This research aims to answer the question:
How do the barriers and enablers of Circular Economy exhibit in the relationship between the company and its B2B customers in the context of refurbished spare parts?

The objectives are as follows:

1. To understand the general barriers and enablers to Circular Economy adoption identified in industrial B2B literature.
2. To analyze how these barriers and enabler exhibit in relationship between companies and their B2B customers.

3. To analyze how this manifestation is similar or different in the context of B2B business refurbished spare parts supply.
4. To design frameworks to remove barriers and strengthen positive effects of enablers to foster CE approach in B2B business refurbished spare part context.

1.3 Scope and Delimitations

The scope of this research will focus on relationship between the case company and B2B customers in adoption of the refurbished spare parts. The market of focus is on the European region. This study will also focus on the refurbished spare parts in the marine business of the case company with the 4-stroke and selected 2-stroke engines. Furthermore, the scope is about the Sales manager's perception, who interacts directly with its B2B customers. This study does not include any direct customer interviews. There are no environmental calculations such as carbon footprint calculations and no thorough evaluation of specific refurbishment technologies. Thus, the findings are interpretative and context-specific, but they hold relevance for further informing a broader CE discussion within the B2B context.

1.4 Thesis Structure

This thesis is divided into five different chapters that assist the reader through the entire research process. First, it has an introduction where the background, the research question, the objectives and the scope of the research are established. Second, the literature review where the research is placed in the context of existing academic research. Third, the research methodology, where a clear account of the data collection and analytical methods is presented. Fourth, the findings and analysis, where primary data that has been collected from the five sales managers, is interpreted against the two main themes of the interview questions. The first theme pertains on the sales managers' portfolio and perception to purchasing refurbished spare parts. On the other hand, the second theme is about the enablers and barriers of purchasing refurbished spare parts. Fifth and lastly, the conclusion summarizes the results of the study and discusses its wider implications, limitations, and recommendations on how to further investigate the topic to present a unified conclusion to the work.

2 Literature Review

The literature review comprises of five chapters. The first chapter discusses circular economy as a concept. The second chapter delves into circular economy specifically to the B2B businesses. The third chapter examines the enablers to CE Adoption in B2B. The fourth chapter presents the barriers to CE Adoption in B2B. The fifth and last chapter discusses the remanufacturing and refurbishing of spare parts as a concept.

2.1 Circular Economy

The concept of a circular economy (CE) is a trending topic recently which has led to several superficial discussions. Trending ideas frequently lose their clarity as they spread, and critics suggest the CE concept weakens its meaning and is less precise because of its popularity (Kirchherr et al., 2017). 114 definitions of circular economy (CE) were thoroughly analyzed in the study conducted by (Kirchherr et al., 2017). Based on the conclusion made in this study, CE is defined as "We defined CE within our iteratively developed coding framework as an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes" (Kirchherr et al., 2017, p.9). The definition continues that it functions in three different levels namely: micro, meso and macro. Micro level refers to the products, companies and consumers, meso refers to eco industrial parks and the macro level refers to city, region, nation and beyond. Circular economy's (CE) goal is to achieve sustainable development wherein environmental quality, economic prosperity and social equity are created for the benefit of the future generations (Kirchherr et al., 2017). Circular Economy is an interdependent system that requires change on both the supply side (businesses) and the demand side (consumers). Neither part can succeed without the other: innovative business models are worthless if consumers do not adopt them, and consumers cannot be circular if businesses do not offer circular products and services.

Understanding CE as a concept is essential to effectively apply it to practical scenarios. Numerous large and international companies are using CE adoption as one of their strategies to achieve their firm's vision and mission. Therefore, truly delving deeply into the real concept of CE adoption is an important factor for the success of this chosen strategy.

Another research was done on the comparison between the 2017 study by Kirchherr et al. (2017)and the 2022 study by Kirchherr et al. (2023) be more consolidated and differentiated. As it described "the trunk of the CE tree has strengthened, while various new leaves have appeared" (Kirchherr et al., 2023, p.9). This is a common pattern on how new concepts such as circular economy evolve within research. This is referred to as a typical evolution of emerging academic concepts which leads to a two-fold evolution, namely centralizing and disintegrating effect. Centralizing describes that the more scholars study the concept, they tend to agree on its core meaning and scope while disintegrating describes that the research branches out and becomes more specific. What are the new concepts that have emerged on the study conducted in 2022 (Kirchherr et al., 2023)?

Some key differences that are shown in the different definitions of circular economy are the core principles, aims, enablers, and policies. About 70-80% of the articles recognized the terms "reuse" and "recycle as the two fundamental principles, which is like the study conducted in 2017. There was also an increased share of definitions that promotes essential systemic shifts to adopt to CE transition. There was a major shift regarding the goal of new set of CE definitions. About 40% of the definitions mentioned two terms which are value maintenance and resource efficiency. Enablers are now the term that were often mentioned in the new set of definitions of CE. It explains that to successfully implement CE, we do not only need the producers and consumers, but the role of policymakers and scholars is now seen as an important factor to realize the goals of the said concept. The importance of aligning the definition CE has a very critical value when it comes to policy making. This consensus definition of CE can serve as a solid framework to develop relevant policies that apply to different industries, political jurisdictions and across life-cycle stage and other issue areas such as extraction processing and end of life management (Kirchherr et al., 2023). After the analysis of 221 definitions, it did not provide the scholars to a particular vision of CE, “but instead aims to illustrate where the academic field currently sits in its own understandings of CE” (Kirchherr et al., 2023)

CE as a concept evolves overtime. This is very evident in the studies conducted above, one made in 2017 and one made in 2023. Six years later, there are already new terms associated with CE. Academic scholars and practitioners alike are continuously interested in Circular Economy (CE) as they believed this is an important framework that can solve the increasing problem on the world’s resources scarcity.

2.2 The Circular Economy in B2B Business

Circular Economy has developed as an alternative to the linear economy has become a popular approach to improve sustainability in the B2B markets. The interest is spread widely to the different world’s largest market systems such as China (Mathews & Tan, 2011) the European Union (McDowall et al., 2017) and the United States (Esposito et al., 2018) One of the important reasons on the widespread popularity is that it captures various sustainability trends like carbon neutrality (Türkeli et al., 2018), resource efficiency (Ghisellini et al.,2016)and industrial ecology (Zaoual & Lecocq, 2018) which serves as an overall framework for the global transition to sustainability (Hopkinson et al., 2018). As it is evident that scholars are leaning more towards B2B. It seems there is a higher opportunity to accelerate the CE adoption on this type of setting.

The study made by Ranta et al (2020) identified four “value creation logics” that B2B suppliers use in their customer value propositions in circular economy contexts namely are resurrect, share, optimize and replace. Resurrect means restoring value in used or end of life products. Share describes as enabling sharing of products or assets. Optimize refers to increasing efficiency of production, usage or resource use. Replace indicates replacing existing solutions with more circular ones, for example substituting raw materials with recycling services instead of products (Ranta et al., 2020). These logics supports to frame how B2B firms can compete in their strategies and in how they make circularity offer value to their target clients. These four proposed logics are simple terms to remember when planning or contemplating to present customer value propositions in the context of CE to the B2B companies' prospects.

Cooperation between businesses is now the new trend in driving operational success and efficiency in the modern market. This is evident when competition is no longer happening just between individual companies instead of coopetition occurs between entire supply chains or value chains. Coopetition happens between groups or networks of companies. Coopetition is a term used to explain a strategic combination of cooperation and competition. It arises when businesses decide to collaborate on common efforts and acquire mutual benefits but remain competitive in the market (Butt, 2025). This duality enables companies to take advantage of cooperation and not to ruin their personal competitive objectives (Xie et al., 2023).

2.3 Enablers to CE Adoption in B2B

Businesses are actively interacting and strategically building partnerships to compete more effectively as a team. These collaborative relationships span various scales, from industry-wide collaboration to the entire economy Koval et al. (2025), and encompass both internal arrangements within a single capital group (intra-organizational network organization) and alliances between independent enterprises (inter-organizational enterprise networks). This set-up sounds ideal, however there are three important factors to be considered before interactions between firms can be treated as networks. These are exchange, commitment and reciprocity. They are mandatory attributes of this kind of relationship(Kowalska & Jankowska-Mihułowicz, 2025). Relational exchange greatly relies on the effective flow of information within the network relations. Comparatively, commitment in a networked relationship is a multidimensional measure that involves reciprocity. With the combination of operational, informational, social, and investment-based commitments, firms can develop a strong governance mechanism that is effective in alleviating the risk of partner opportunism (Kowalska & Jankowska-Mihułowicz, 2025). There are numerous drivers to CE Adoption in B2B that can be found in B2B industrial literature. However, there are two classifications that stand out while investigating the different barriers to CE adoption in a B2B setting. Enablers can be identified as either hard or soft enablers. Hard power relies on economic or technical pressure to compel change. In contrast, soft power operates through attraction, utilizing values and institutional practices to naturally shape attitudes and preferences (Nye, 1990, 2006). This definition provides a clear distinction between these two concepts. Although according to the study conducted by de Jesus & Mendonça (2018) the distinction of the two is not always easy to separate in practice. The categorization of the drivers as either hard or soft is often complementary in nature.

Table 1: Typology and definition of enablers to a CE by (Reproduced from de Jesus & Mendonça, 2018, p.78)

Classification	**Enablers**	**Examples**
"Harder" factors	Technical	Availability of technologies that facilitate resource optimization, remanufacturing and re-generation of by-products as input to other processes, development of sharing solutions with superior consumer experience and convenience
	Economic/Financial/ Market	Related to demand-side trends (rising resource demand and consequent pressures resource depletion) and supply-side trends (resource cost increases and volatility, leading to incentives towards solutions for cost reduction and

Classification	Enablers	Examples
		stability
"Softer" factors	Institutional/ Regulatory	Associated with increasing environmental legislation, environmental standards and waste management directives
	Social/ Cultural	Connected to social awareness, environmental literacy and shifting consumer preferences (e.g. from ownership of assets to services models)

Technical enabler is considered a hard factor. For balancing the product's quality, robustness and effectiveness, the availability of technical solutions is an important condition together with designing optimal product for new products and processes (de Jesus & Mendonça, 2018). An example of these are products that are meant to be restored and rented several times which require advanced technology to enhance and optimize replacement of parts (Mont, 2008). Therefore, technical drivers have a vital role in the transition to a CE. Another hard factor of enabler to CE is the economic and financial market. As defined in Table 1, this is in relation to the demand and supply side trends. Due to the high demand from consumers despite the continuous depletion of resources, organizations tend to find alternatives to solve the issue in using more raw materials. Thus, a good motivation to reconsider the benefits of CE. On the other hand, the supply is less, which results in high costs of raw materials. Consequently, this trend promotes a more sustainable and circular economic models (Preston, 2012)

Institutional/Regulatory is one of the soft enablers to a CE. Legal frameworks, taxes, incentives, infrastructure development are public policy measures that address market failures and the establishment of a conducive environment for innovation and entrepreneurship (de Jesus & Mendonça, 2018). The value of institutional/regulatory drivers in the implementation of a CE is equivalent to the role of laws and taxes in boosting environmental-friendly technical change (Porter & Linde, 1995). Institutions such as government have a powerful influence in implementing CE practices.

Another study conducted by Aloini et al. (2020) where the enablers of circular economy (CE) initiatives are summarized and analyzed. In this study, it was not categorized as either soft or hard. The CE drivers were classified into seven (7) dimensions namely: institutional, economic, environmental, organizational, social, supply chain and technological. Institutional, economic, social and technological are the same enablers that were found in the study made by (de Jesus & Mendonça, 2018). Environmental, organizational and supply chain are additional drivers to CE. To further understand the seven (7) dimensions, table 4 summarizes and defines each dimension and the driver for each of them.

Table 2: The drivers of circular economy (CE) initiatives by (Reproduced from Aloini et al., 2020, p.5)

Dimension	Driver
Institutional	**Legal and regulatory environmental framework:** policies, laws, directives, regulations, standard requirements set by institutions, including extra costs for environmental pollution and waste (inefficient consumption taxes), regulations on landfill and end-of-life. **Support:** tax cuts, refund policies, funding, low-interest loans, subsidies policies, incentives (e.g., for developing new solutions for waste collection, for cleaner production, for repairing or renovating products instead of purchasing new ones).
Economic	**Potential for improving cost efficiency, profitability, revenue streams, and competitiveness:** transportation cost

Dimension	Driver
	savings, resources' efficient use and recover (Rs, rare materials included), rising resource demand, higher resources cost, cost reduction and higher profitability from circular use of resources, profitability / firm performance / competitiveness, access to funding, response to competition, reducing dependency from raw materials import, volatility of resources' price. **Potential for new business development and innovation:** new value creation, accessing green, niche or new markets.
Environmental	**Environmental concerns:** climate change and global warming, overconsumption of energy and resources, scarcity of resources, environmental safety, resource constraints**.**
Organizational	**Strategical concerns:** brand reputation and social responsibility, business resiliency, ISO 14001 certification, corporate strategy for CE and sustainability, change to a sustainable and competitive business model, quality of circular products, potential for differentiation and strengthening. **Skills and capabilities for CE:** training and education for CE, development of skills and capabilities for CE, employee involvement and motivation towards CE and sustainability.
Social	**Global pressure:** pressure towards greening and healthier practices from community, competitors, society. **Opportunity for job creation**

Dimension	Driver
	Consumers' awareness: environmental awareness, shifting of consumer preferences (e.g., from ownership of assets to service models and to sustainable products).
Supply Chain	**Communication and collaboration:** environmental collaboration with customers / suppliers, collaboration or partnership Supply Chain with stakeholders (organizations, NGOs, government) within the SC, communication practices and knowledge sharing, potential for reducing supply dependence and avoiding high and volatile prices, interconnection capacity (geographical proximity, affinity of company management to work in an interconnected manner). **Supply configuration:** SC integration, management of reverse network, supply market structure.
Technological	**Technology for Rs:** Technologies such as digital platforms, additive manufacturing, AI used for the R framework (reuse, repair, refurbish, remanufacture) **Information and Communication Technologies (ICT):** blockchains, AI, IoT, digital twins

Table 2 identified the drivers in detail on what are the factors may enable an organization to adopt CE practices. According to the study conducted by Aloini et al (2020), the most important drivers are institutional and economic dimensions. Interventions from institutions such as government and other regulatory bodies (i.e. International Maritime Organization (IMO), International Standardization for Standardization (ISO) has a huge impact to business organizations' economic strategies that can lead to CE innovations (Moktadir et al., 2018; Tura et al., 2019). Moreover, through institutional drivers it leads to more sustainable initiatives and activities. Therefore, both institutional organizations and regulatory bodies play a crucial part in driving business organizations towards CE. The social drivers appear to be of growing importance specifically on the consumers' awareness and global pressure in playing an important role in CE initiatives (Jia et al., 2020; Moktadir et al., 2018). A good example is cited on the study made by (Moktadir et al., 2018) where it showed how customer awareness was relevant for the two leather producing companies in Bangladesh. According to (Govindan & Hasanagic, 2018), the impacts of CE drivers are dependent on the specific context involved. Different context examples are the business sector, the country and the type of organizations.

2.4 Barriers to CE Adoption in B2B

Similarly to CE drivers, there are numerous barriers to CE Adoption in B2B that can be found in B2B industrial literature. However, there are also two classifications that stand out while investigating the different barriers to CE adoption identical to the CE enablers in a B2B setting. Barrier can also be identified as either hard or soft. Barriers are factors that hinder the transition towards a CE (de Jesus & Mendonça, 2018). To further understand the hard and soft factors of the barriers to CE, Table 3 summarizes the typology and definition of barriers to a CE. The table below defines the different kinds of drivers that are categorized as either a hard or a soft factor.

There are numerous barriers to CE Adoption in B2B that can be found in B2B industrial literature. However, there are two classifications that stand out while investigating the different barriers to CE adoption in a B2B setting. Barriers can be identified as either hard or soft barriers. Enablers can be identified as either hard or soft enablers. Hard power relies on economic or technical pressure to compel change. In contrast, soft power operates through attraction, utilizing values and institutional practices to naturally shape attitudes and preferences (Nye, 1990, 2006). This definition clarifies the differences between the two terms. Although according to the study conducted by de Jesus & Mendonça (2018) the distinction of the two is not always easy to separate in practice. The categorization of the barriers as either hard or soft is often complementary in nature. A good example is when the CE adoption barrier is lack of recycling technology (hard barrier), the usual cause of this is lack of government funding which is a regulatory factor (soft barrier).

In the study conducted by de Jesus & Mendonça (2018) there are several broad factors that prevent CE, ranging from the hardest which are the technical and economic to the softest which are social and institutional factors. Table 3 summarizes the terms and definitions of barriers to CE adoption in B2B.

Table 3: Typology and definition of barriers to CE by (Reproduced from de Jesus & Mendonça, 2018, p.78)

Classification	Barrier	Examples
"Harder" factors	Technical	Inappropriate technology, lag between design and diffusion, lack of technical support and training.
	Economic/Financial/Market	Large capital requirements, significant transaction costs, high initial costs, asymmetric information, uncertain return and profit
"Softer" factors	Institutional/ Regulatory	Misaligned incentives, lacking a conducive legal system, deficient institutional framework
	Social/ Cultural	Rigidity of consumer behaviour and businesses routines

To further understand the categorization of the CE adoption barriers mentioned in table 1, each one of them will be discussed. First, the technical barrier is considered as a hard barrier as defined earlier, it is a force change through technical or economic means. Appropriate technologies are needed to develop CE. This is through technologies that would provide technical solutions to balance product durability, quality and efficiency. Additionally, technical solutions for designing optimal product life-cycle scenarios for new products and processes (Bakker et al., 2014). These kinds of appropriate technologies are vital to successfully develop CE. Technology gaps which refer to gaps or lags between processes and product development and lag between invention and production also fall under the technical barriers (Gao et al., 2006). The said gaps will hinder the development of CE as it would not allow it to advance to the next phase of implementation. Moreover, the shortage of enough educated or specialized personnel is also considered as one of the technical barriers in CE adoption (Geng et al., 2010). Good technical support and training are also essential to move forward in the implementation of CE. Technology solutions and processes need skilled personnels for the implementation to be successful.

Second, the Economic/Financial/Market barriers, these are also classified as a hard barrier. In most cases, although technical solutions are already in place, it could not be implemented due to economic and market limitations (de Jesus & Mendonça, 2018). This is a good example that each barrier is not elusive but complementary as they can affect one another. High initial investment costs, market uncertainty and limit new investments are considered obstacles that fall under economic/financial/market barriers (Jones et al., 2013). An example from eco-industrial parks in China, (Zhu et al., 2015) highlights "conflicts with financial gains, lack of a technical workforce, and lack of research funding are all barriers within China for promoting sustainable industrial development." Identifying these barriers is important to understand what kind of solutions can be implemented to transition to CE.

Third, the Institutional/Regulatory barrier, which is considered as a soft barrier. This barrier is considered one of the most important factors limiting the development of a CE Non-conducive legal systems and misaligned systems are not only obstacles, but they largely contribute to making incumbent paradigm more difficult to change (de Jesus & Mendonça, 2018). This is an important change to break the traditional methods (i.e.

linear) to give an opportunity to new initiatives such as CE. An example would be existing environmental policies influence the definition as to what is, and what is not considered as a waste (i.e. materials are often classified as waste too quickly even if they, or their components, could still be reused), thus possibly hampering the development of industrial eco-parks and symbiotic relations (Zhang et al., 2010). The example given indicates how important environmental laws or policies can hinder the promotion of CE practices.

Fourth and the last barrier is Social/Cultural barriers. This last is also identified as a soft barrier. The slow change in consumer behaviour and businesses routines is considered as a hurdle under this category. This is due insufficient awareness about CE practices and availability of choices (de Jesus & Mendonça, 2018). The gap that is seen in this barrier is investing in education of consumers and business owners about circular economy as a concept and different kinds of circular business models.

Another study by Kirchherr et al. (2018) identified four categorizations of CE barriers namely cultural, regulatory, market and technological and 15 sub- barriers that will be presented in Table 2. In the said study, the barriers are not classified as either soft or hard barrier as opposed to the study conducted by de Jesus & Mendonça (2018) however it adopted the conceptualization of the four main classifications of the CE barriers.

Table 4: Coding framework of CE barriers by (Reproduced from Kirchherr et al., 2018, p.266)

Barriers	**Sub-barriers**
Cultural - Lacking awareness and/or willingness to engage with CE	• Hesitant company culture • Limited willingness to collaborate in the value chain • Lacking consumer awareness and interest • Operating in a linear system

Barriers	Sub-barriers
Regulatory - Lacking policies in support of a CE transition	• Limited circular procurement • Obstructing laws and regulations • Lacking global consensus
Market - Lacking economic viability of circular business models	• Low virgin material prices • Lacking standardization • High upfront investment costs • Limited funding for circular business models
Technological - Lacking (proven) technologies to implement CE	• Lacking ability to deliver high quality remanufactured products • Limited circular designs • Too few large-scale demonstration projects • Lack of data, e.g. on impacts

Table 4 presented a summary of the main barriers to CE and its corresponding sub-barriers to further understand each category. First, the cultural barriers, there are various authors that have discussed the definition of cultural barriers. An example is Ranta et al. (2018) argues that "customers prefer new products". Another example that parallel to the first example is Vanner et al. (2014)claims that "limited consumer […] acceptance" would be one explanation regarding CE's limited implementation progress so far. Therefore, the negative behaviors toward CE refers to the cultural barrier. Sub-barriers of cultural barrier namely lacking consumer interest and awareness, hesitant company culture and operating in a linear system are the CE obstacles found in the research of (Kirchherr et al., 2018). Lacking consumer interest and awareness to CE is an alarming as this is the initial step towards embracing this concept. Hesitant company culture refers to an organization where CE is restricted to the corporate social responsibility (CSR) or environmental departments. CE has less appeal for the operations and finance department, which are considered an influential department in the company culture. Operating in a linear system explains that the actors of the supply chain tend to be very conservative towards CE. It is still in the phase that they are not ready to accept CE. Therefore, when the collaboration between the value chains is missing this will result in the slow transition to CE.

Second, regulatory barriers refer to limited circular procurement, obstructing laws and regulations and the lack of global consensus. There are several examples in the study made by Kirchherr et al. (2018) on how some laws and regulations hinder the transition to CE. One example is, according to one of the interviewees, when they cannot use recycled materials in the top layers on asphalt because it is regulated. The study made by Kirchherr et al. (2018) did not find regulatory barriers as the main barrier as EU is their focus. EU is the frontrunner in promoting CE initiatives and providing incentives. An example was made by a German environmental party Alliance 90/The Greens. They offered that the value added tax (VAT) for any reparations should be lowered from 19% to 7% in Germany to make reparations more attractive (Kirchherr et al., 2018).

Third, the market barriers include low virgin material prices, lacking standardization, high upfront investment costs and limited funding for circular models as sub-barriers. According to Mont et al. (2017) “low prices of many virgin materials would prevent CE products to outcompete their linear equivalents” Additionally, Preston (2012, p.10) suggests that “the recycling of many materials does not occur because it is uneconomical relative to the production of virgin material”. This explains why actors of supply chain, either the producer or consumer side, easily choose virgin materials than refurbished when there is hardly any difference on the economic value. High-upfront investment costs refer to CE initiatives that tend to be too expensive. An example cited in the research of Kirchherr et al. (2018)when an interviewee shared that there are two parts of investment in CE, one is the learning where a firm might lose money and the second part, the implementation where you will possibly gain a fortune. Due to these high costs involved in CE initiatives, it requires financial subsidies to ensure economic viability (Ranta et al., 2018). Furthermore, “access to suitable sources of finance is key” for organizations aiming to transition to a CE (Rizos et al., 2015, p.18). This indicates that due to high cost of initial investment, financial support is needed to pursue CE initiatives, this can be coming from either large firms or governmental organizations.

Fourth and lastly are the technological barriers which refer to the absence of proven technologies to implement CE. According to several relevant literature such as Vanner et al. (2014) and Preston (2012)having the relevant technology in place is essential for the CE transition. Furthermore, Preston (2012, p.10) argues that “the [CE] opportunities are huge if technical barriers could be overcome”. Therefore, overcoming this barrier is vital to the transition to CE. Lacking ability to deliver high quality remanufactured products, limited circular designs, too few large-scale demonstration projects and lack of data, e.g. on impacts are the sub-barriers of technological barriers. These are important to understand as they are the specific technological barriers that were found in the relevant literature.

The presentation and discussion of the enablers and barriers to CE in a B2B setting is an essential part of the literature review. This would help us to examine how do the enablers and barriers of CE exhibit in the relationship between the case company and its B2B customers in the context of refurbished spare parts. The next section of the literature review would provide us with the basic concept of refurbishment and remanufacturing of spare parts to understand several technical terms that might arise during the qualitative interviews that will be performed.

2.5 Refurbishment and Remanufacturing of Spare Parts

Value-retention processes (VRPs) are a collective term that refers to the practices of direct reuse, repair, refurbishment and remanufacturing. These are the central activities within the technical material and product cycles of a CE (Russell & Nasr, 2023). To extend the understanding of these different practices, table 5 defines each term.

Table 5: VRPs practices defined by (Russell & Nasr, 2023)

Practices	Definition
Direct reuse	Referring to products that will be used again (same purpose as it was originally made for), and this specific product is not yet considered as a waste.
Repair	Referring to when a specified fault needs to be fixed for the product to be used again. (still the same purpose as it was originally made for)
Refurbishment	Referring to the altercation of a product. This usually happens within maintenance or intermediate maintenance operations. The goal is to increase or restore functionality or to meet applicable technical standards.
Remanufacturing	This refers to a standardized industrial process that happens within a factory. The aim is to restore the original as new condition and performance better.

It is vital to know the differences in the use of these terms so we will learn when to use the term correctly and not interchangeably. It is also important in this study what does refurbish means as we will use refurbished spare parts in the case company as the context of this research.

To further understand about VRPs, there are two critical terms that should be differentiated correctly. These are: end of use (EOU) and end of life (EOL). EOL refers to when a product has no other use but to be recycled or discarded into the environment while EOU is if there are other options to keep the products or its spare parts within the market via VRPs(Russell & Nasr, 2023). As explained by the International Resource Panel (Bringezu et al., 2018), VRPs can be divided into two categories: Full-Service Life processes and Partial Life processes. This is exhibited in Figure 1. Full-Service life processes denote to processes that facilitate the fulfilment of a completely new life. It corresponds to the expected service life in years to every service life of the product. This includes manufacturing new products (OEM), remanufacturing, and refurbishment within factory settings and industrial operations. On the other hand, partial life processes refer to processes that enable the completion of the products to be slightly extended by various VRP processes such as direct reuse, repair and refurbishment. These processes usually take place in maintenance operations.

The length of the lines in Figure 1 is only meant to reflect relative service life duration enabled by different VRPs and does not mean the actual service life duration. The dotted lines reflected potential service life extensions enabled by each VRP while service life guarantees indicated by solid lines. To briefly explain Figure 1, assuming the completion of a product’s first service life cycle (starting at EOU), the goal of VRPs is to extend the product’s service life through VRPs such as repair or complete regeneration such as remanufacturing (Bringezu et al., 2018). It is important to clearly understand the quantification of VRP as it impacts the businesses’ decision whether to incorporate VRPs in their CE strategies. As having a clarity of data regarding how VRPs differ, associated economic and environmental impacts can be realized (Russell & Nasr, 2023)

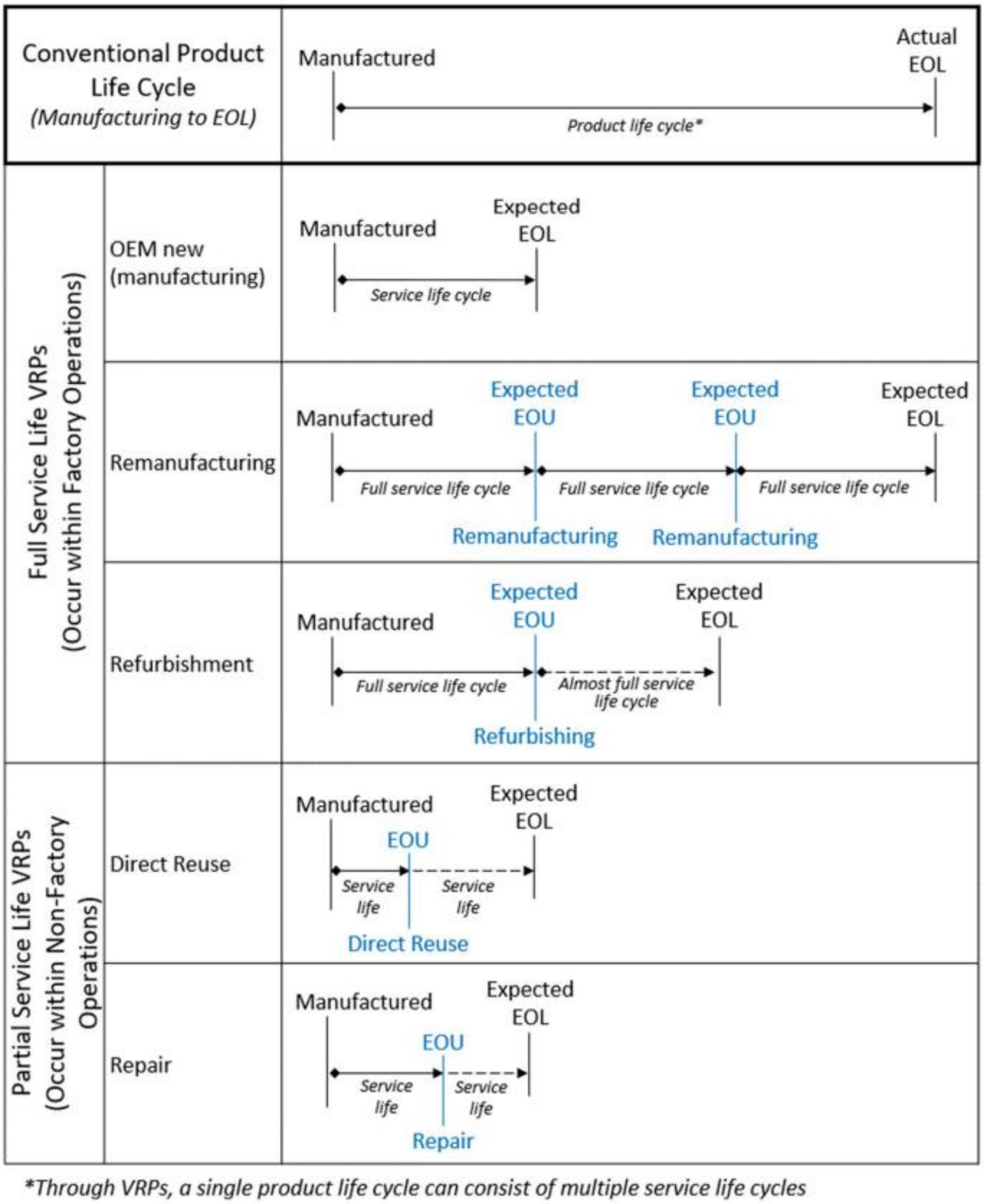

Figure 1: Descriptive economic system model utilized for top-down analysis by (Bringezu et al., 2018)

2.6 Theoretical Framework

The theoretical framework of this research is not so much a fixed map but more a reflection of the tensions that exist in B2B literature. As illustrated in Figure 2 on the next page, there is an imbalance in how researchers categorize circular economy (CE) adoption. Currently, literature seems much more focused on what facilitates these practices than what hinders them. Other themes, such as environmental and external stakeholders are almost exclusively discussed as enablers in previous studies, which perhaps overlooks how they might also function as significant barriers.

Instead of leaning to these rigid lists, this research considers these dimensions as fluid. It could be argued that financial or market dimension rarely stays in one category. It probably switches between a barrier, or enabler based on the context of the transaction at that point. The study will focus on the behaviour of these forces in a live business environment by condensing these categories into single factors of the interview stage.

The framework intentionally considers two variables, namely the "nature of the business" and the "nature of the products" into the framework. It is unlikely that the concept of circularity operates in a similar path in all areas. These two factors were added as it is an overlooked area of consideration in CE research that needs to be investigated. In the case of the product under consideration being a vital part such as a refurbished spare part of a marine engine the technical and psychological obstacles are presumably even greater than in other sectors. Such machinery is likely to exert special pressures on the size and urgency of such machinery which might not be reflected in general CE theories. The aim of this study is to find out how the enablers and barriers affect the company and its B2B customers in purchasing refurbished spare parts. Through this framework, this will serve as the foundation to test these theories in practice.

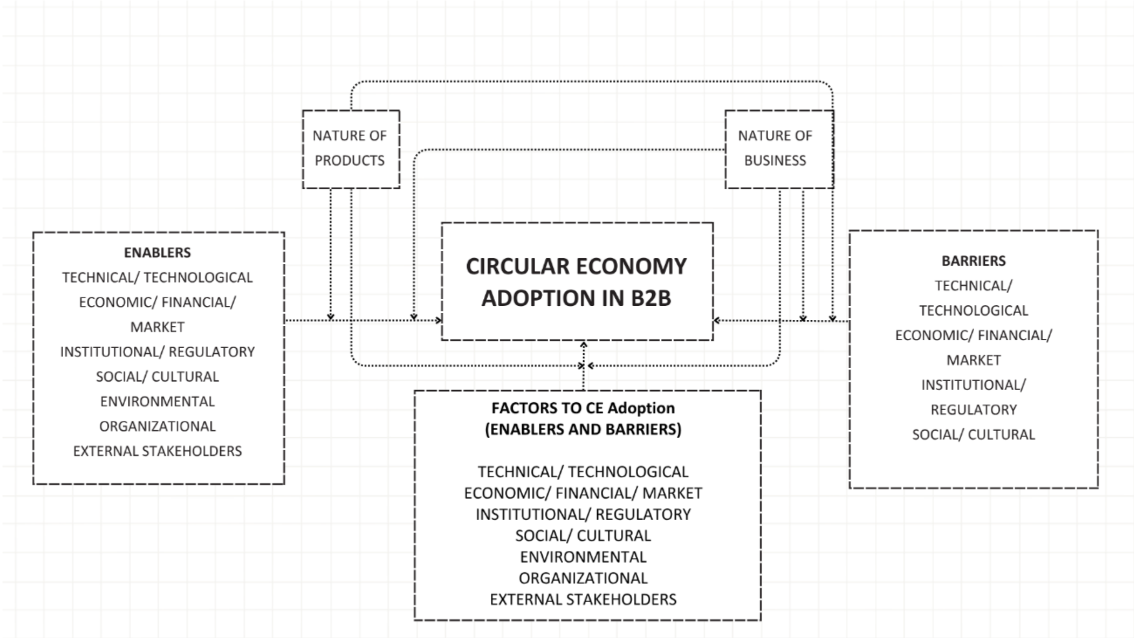

Figure 2: The Theoretical Framework (Source : Author's work)

3 Research Methodology

This chapter presents the methods on how this study will be conducted. The first sub-chapter examines the chosen research approach for the thesis topic: barriers and enablers to CE adoption in B2B operations. The context used in this study will be presented in the second sub-chapter. The third, fourth and fifth chapter will discuss the case selection, how the data will be collected and how the information gathered will be analyzed. Finally, the sixth sub-chapter will assess the quality of data that will be collected and analyzed.

3.1 Research approach

Qualitative case study research design based on the framework proposed by Yin (2009) is adopted in this research. This is the chosen approach because it allows the examination of an existing phenomenon which is the adoption of refurbished spare parts within a real life B2B context. There are five components following Yin's (2009) design logic namely research questions, unit of analysis, logic linking data to propositions and criteria for interpretation. First, the research question is how do the enablers and barriers of CE exhibit in the relationship between the company and its B2B customers in the context of refurbished spare parts. Second, the propositions are the seven (7) theoretical dimensions of CE adoption identified in the literature. Third, the unit of analysis is the adoption of CE process specifically of purchasing refurbished spare parts used in B2B operations. Fourth, the logic linking data to the proposition is the adoption of Pattern matching by (Yin, 2009) to match empirical data to theoretical concepts. Fifth and lastly is the criteria for interpretation, which is the use of duality lens, theoretical dimensions applying to both enablers and barriers to assess the nature of the factors.

3.2 Context: The company case

In accordance with Yin's (2009) emphasis on the importance of “context”, the case company serves as the empirical setting or as the environment for this research. The company is a global leader in innovative technologies and decarbonization initiatives providing a unique perspective to study B2B circularity due to its established refurbished spare parts program. It is important to recognize that while the case company provides the data, the phenomenon being studies is the broader CE adoption, specifically refurbished spare parts used in B2B operations.

3.3. Case selection

B2B accounts offering refurbished parts for different customers is the case of this study. The Sales managers at the company represented different European markets namely France, Netherlands, Belgium and Denmark. Additionally, they have diverse customer segments or B2B key accounts which include offshore, merchant, dredging and ferries. Each served by a sales manager who is offering refurbished parts among other offerings to the customer. The company manufactures two major types of engines, namely two-stroke engines and four-stroke engines. The sales managers from the company are utilized as expert sources who possess knowledge of both technical knowledge about the products and the customer’s behavioral responses and therefore are suitable units of observation for the case.

Below is the table where the differences among the five (5) Sales managers are presented. They are divided into years of experience in the current role, market focus groups (geographical location), fleet or vessel characteristics and engine types.

Table 6: Sales managers' profile

Sales Manager	Years of experience in the current role	Market Focus	Vessel Characteristic	Engine Types
1	17	Navy & special vessels	Diverse	4-stroke engines
2	6	Industrial and ferries in France	Medium and Large	2 stroke engines and 4 strokes engines
3	17	Danish tanker and ferries	Large fleet	4-stroke engines
4	10	Dredging, offshore, ferries, merchant fleet in Netherlands and Belgium	Diverse	2 stroke engines and 4 strokes engines
5	15	Dredging, offshore	Diverse	4 stroke engines

3.4 Data Collection

The primary data was collected through semi-structured interviews. This method is flexible, allowing the researcher to ask follow-up questions when a participant mentions something unexpected (Saunders et al., 2019). Five (5) Sales managers from the case company were interviewed with questions revolving in two themes. The first theme comprises the Sales manager’s customer portfolio and its relationship with offering refurbished spare sparts. The second theme consists of the enablers and barriers to refurbished spare parts adoption. Purposive sampling is performed to select interviewees who have expertise and direct involvement in the after-sales services. The five (5) interviewees are either handling one of this type or both. The interview is conducted using Microsoft (MS) Teams. Each interview lasted approximately from fifty (50) minutes to one (1) hour and recorded and transcribed with the interviewee's permission. The researcher immediately cross checks the transcription made by MS teams, if there are mis-spelled words to ensure that correct data are captured. Table is the list of the five (5) Sales managers that were interviewed together with the date and the length of their interview, mode of interview and the language of interview.

Table 7: List of Interviewees

Interviewee Code	**Date of the Interview**	**Length of the Interview**	**Mode of Interview**	**Language Used in the Interview**
SM1	17 March 2026	51m & 27s	OL- MS Teams	English
SM2	18 March 2026	39m & 59s	OL- MS Teams	English
SM3	19 March 2026	54m & 6s	OL- MS Teams	English
SM4	20 March 2026	1h, 2m, 18s	OL- MS Teams	English
SM5	27 March 2026	1h, 14m, 10s	OL- MS Teams	English

Labels: *OL-MS Teams- Online Microsoft Teams, SM- Sales manager*

Secondary data about the firm and its business as well as target customers was collected utilizing the information from both the internal and external company's website. The author has access on the company's internal website as the author is also employed at the same organization but from a different department. Additionally, secondary information is also obtained from the different customers' profile online mentioned during the interviews. These resources support the researcher to understand more about the firm's business and its B2B customers.

3.5 Data Analysis

Semi-structured interviews from the sales managers are the primary data of this study. The data acquired from the interviews conducted were analyzed using Pattern matching by (Yin, 2009) . With Yin's pattern matching technique, this study analyzes data based on how they align with expectations based on theory. The expected pattern comprises the seven adoption factors derived from the B2B literature search. This template represents the expected factors that might drive or hinder CE adoption in the B2B refurbished spare parts market. Using the templates provided by the literature review, the seven (7) adoption factors were used as benchmark comparisons for the empirical data collected through the five (5) semi - structured interviews. With the help of deduction coding, this study will attempt to match findings gathered from the five (5) interviewees against the established set of CE adoption factors identified from the previous literature search. By comparing and contrasting findings from each case and the other cases, opposing explanations were developed for any differing empirical findings from the existing literature. This can both strengthen the current theory and prompt the development of future research avenues.

3.6 The Assessment of the quality of the data

In this research, to evaluate the quality of the data, the trustworthiness framework by (Guba & Lincoln, 1989) is applied. There are four (4) pillars of trustworthiness namely: credibility (internal validity), transferability (external validity), dependability (reliability) and confirmability (objectivity) (Guba & Lincoln, 1989). Credibility is ensured by sharing earlier findings with a senior Sales manager at the case company to confirm that identified barriers reflect their daily challenges. On the other hand, transferability was shown by providing a detailed description of the Sales manager's portfolio and the nature of the products that are discussed in the first theme. This allows other B2B firms in similar industries to assess if these findings may be applicable to their context. Credibility is performed maintaining a coding log that documented every change made to the template. This process will show a clear trail from the raw interview transcripts to the final aggregate factors. To perform confirmability, the researcher recognized the role as an outside observer and used pre-defined template gathered from the literature to strengthen the analysis. This method prevented personal opinions from overshadowing the sales manager’s own perspective.

4 Findings and Analysis

The aim of this chapter is to present the findings regarding the enablers and barriers of refurbished spare part adoption within the B2B context of the focal company. The analysis is organized into two main themes. The first theme describes the Sales manager's portfolio where they present their responsibilities, size and geographical location of their B2B customers, number of refurbished spare parts ordered and their perception of purchasing refurbished spare parts.

The second theme, the duality of adoption factors, explores the seven (7) dimensions identified in literature (e.g., Financial, Cultural, Technological). Two more adoption factors were added by the author namely nature of business and nature of products. Instead of separating these into distinct lists of barriers and enablers, this study adopts a dual perspective. Each factor is explored as a dynamic force that can either hinder or facilitate the purchase of refurbished spare parts depending on the specific B2B context. The following sections present this duality, supported by direct evidence from the Sales managers as the interviewees.

The company is global leader in innovative technologies and decarbonization initiatives. It provides a unique perspective to study B2B circularity due to its established refurbished spare parts program. There are two main market segments within the company. First is the marine market and second is the energy market. It is important to remember that the focus of this study is the marine market. The five sales managers are from the marine division of the company. As mentioned earlier in the research methodology, under the case selection, there are several types of B2B customers for each of the sales managers. There are two important terms to understand and remember, namely reconditioning and remanufacturing. In the company context, it is necessary to draw a line between reconditioning and remanufacturing as they are different work processes. The reconditioning process is based on a restoration model whereby the original part of the item used by the customer is restored and replaced in the same unit. Remanufacturing, in contrast, is an exchange operation, with the customer being provided with a replacement unit on the spot, and the need to return the defective core within a 12-week time frame. As a result, the strategies require alternative logistics and management strategies.

4.1 Sales manager's portfolio and perception in purchasing refurbished spare parts

It is important to define the "lens" through which these observations were made before analyzing the CE adoption factors. The Sales manager's portfolio and internal perceptions served as a primary link between the case company and its B2B customers. This has a significant impact on how enablers and barriers to refurbished spare parts are navigated.

All five Sales managers are involved in lifecycle sales. Lifecycles sales are when vessels need after sales service such as spare parts, maintenance and upgrades. Providing technical and commercial guidance to their B2B customers is one of the common responsibilities among the Sales managers.

One of the Sales manager's responsibilities is to serve as a primary contact for customer issues. SM4 stated that *" My responsibility from the sales side, the person the customer talks with and that I help them with the lifecycle of their vessels based on overhauls, but also looking to do with them together in the decarbonization part of it and discussing how we can maintain their vessels and the engines and proposing what we have on those vessels on the best way".*

Different segments present different kinds of readiness on the adoption of refurbished spare parts. For example, sales manager 1, who handles dredging customers, where they use heavy equipment with harsh wear, there is high potential for refurbishing some components. On the other hand, merchant fleets such as sale manager 4 handles tend to show more caution in using refurbished spare parts.

SM1 mentioned that "*And then we typically talk about the propulsion part. So, the vessel with the propeller beneath is always in a harsh environment. And the propeller is really hurt by that. So together with the group in Amsterdam, we often go out trying to, yeah,* *refurbish, remake the propeller and in most cases that is possible. In some cases, we have to replace it with a new one"*.

Additionally, SM5 said that "*But if you look to my other customer who is in merchant sector, margins are thin, poor. They don't make so much money, so they are typically not interested in paying a premium for a certain security. And there you have the distinction between these are services we offer and offer the customer security warranty. But this service come with a premium".*

Regarding the question regarding how many refurbished spare parts are ordered in a particular amount of time, only SM2 is able to provide an estimate of his own targets. Notice that he is largely handling 2 stroke engines. His targets for this year (2026) are to perform half a million euros in terms of reconditioning. In this interview, there are two important terms that arise. SM2 emphasizes that these are important terms that we should remember. These are the terms that the company uses internally. The two terms are reconditioned and remanufactured spare parts.

SM2 explained the differences as "*There are two different points, and we have to take that into our consideration. There are remanufacturing parts and there are reconditioned parts. If we are performing the reconditioning, the customer is dropping a part, we are performing the repair. And give it back to the same vessel, the same parts.*
If we are talking about remanufacturing parts, therefore we are talking, we are selling to the customer one part, and he has got 12 weeks to send us the old parts back. So, it's a different process and different approach I would say".

The last topic discussed in this first theme is the Sales manager's perception of refurbished spare parts. All the five (5) Sales managers have a shared understanding that refurbished spare parts are reconditioned components that are restored to original equipment manufacturer (OEM). Additionally, refurbished spare parts are often delivered through an exchange or swap program. However, there are vital differences among the five sales managers. Sales manager 1 perceives refurbished spare parts as strongly adding both environmental and regulatory value.

SM1 quoted: "*Now perhaps to summarize it there, that I really like the fact that we don't throw away components that we can reuse even with the small say refurbished, yeah, business on that. But it saves a lot of materials if we reuse these kinds of components and perhaps even make like in the European law now and make components that are* *reusable and so that can use the law to tell our customers, hey this is something you don't get a new one because we can reuse this for a certain amount of time".*

Sales manager 3 interprets refurbished spare parts as essentially a repair process that restores components to full functionality. He confirms that this is important for both customers' cost control and the company's competitiveness. Sales manager 4 defines refurbished spare parts mainly through swap or exchange sets such as cylinder heads and other components used during overalls. He further described it as the company installs a ready-overhauled part or also known as a "swap set" and removes the customer's used part for reconditioning. Sales managers 2 and 5 define refurbished spare parts as a cost savings factor for B2B customers but emphasize the customer hesitation.

SM 2 revealed that "*The reconditioning services and the warranty I would say is the same as the new we are doing like OK; we renew the parts for the customer at a roughly 30% of the new of the price of the new components"*. Additionally, AM4 said "*In general, I think many of our competitors, they embraced a system like this, the recondition parts for many years earlier than what our company did and why is that? I think it's a financial reason because you firstly need to invest as an OEM in new parts, make them available and sell them. Towards customer as a recondition part in order to receive the exhausted parts from Mr. Customer and recondition those and bring them onto the market again. So, there is the circularity, but this financing was I think the issue*".

Various definitions of refurbished spare parts are evident among the five (5) Sales managers of the case company. Refurbished spare parts are either a technical process, logistical tool or a strategic sustainability measure. Although the terminology varied across all the interviews, some used either refurbished, reconditioned or remanufactured, the operational meaning was consistent. Important differences of the refurbished spare parts concept emerged as discussed earlier, this is an indication of a fragmented internal conceptualization. This reflects gaps in the organization's alignment on positioning refurbished spare parts.

4.2 Enablers and Barriers to refurbished spare parts

This section addresses the research question by examining the nine (9) dimensions included in the semi-structured interviews. In this analysis, a barrier is defined as a factor hindering the adoption of purchase refurbished spare parts while an enabler is defined as a factor that facilitates the customer toward adoption.

4.2.1 Nature of business (B2B)

In all five (5) interviews, the sales managers explain that the preference of B2B customers to refurbished spare parts is heavily dependent on the operational risk, confidence in the supplier and the sensitivity of the business of the customer. Customers do not only see refurbished parts as an easy way to save money or contribute to sustainability but also evaluate them based on their stability and the overall effect on the business in the long term.

In the case of customers with mission critical applications such as navy and dredging, availability and reliability prevail in the buying decisions. These customers are typically less sensitive to price and therefore default to new parts, even when refurbished options exist. As SM1 explained, “Both customer segments (Navy & Dredging) are driven by availability and reliability,” and because they operate in contexts where budgets are less restrictive, “they are typically asking for new.” At the same time, SM1 noted that organizational goals around circularity create some openness to reuse, particularly when quality can be assured, stating that “the mission on circularity pushes re-use of good quality components also.”

The refurbished parts were also reported to be a strategic tool that helps the company to maintain more customer relations, as opposed to being a product category on its own. SM3 pointed out that offering refurbished options can indirectly drive new sales and strengthen long-term collaboration. As they stated, “It supports the new sales, yeah,” and added that helping customers save money allows them to purchase more services and components over time. SM3 further emphasized the relational aspect of this approach: “We are interested in our customers staying competitive and we can work with them and grow together with them. That's what we are here for.” SM3 also stressed the relational factor of this strategy: We are interested in our customers remaining competitive and we can collaborate with them and develop together with them. That is what we are here. This represents a B2B attitude in which value is created during the life of the relationship as opposed to specific transactions.

From a broader market perspective, SM4 stressed that in B2B marine environments, acceptance of refurbished parts is rarely driven by sustainability or lower price alone. Instead, customers focus on how refurbished solutions fit into their risk management and operational strategies. As SM4 explained, “acceptance of refurbished parts is not driven by sustainability or price alone, but by perceived operational risk, control, and lifecycle impact.” Refurbished solutions are therefore accepted when they help “reduce uncertainty, protect uptime, and align with their risk management strategy,” rather than being positioned merely as cheaper alternatives.

Lastly, SM5 supported the notion that the B2B decision-making process regarding refurbished parts is consistent with the overall business logic. On their part, there is nothing fundamentally different at work, as they observed: “Overall, but business-wise, B2B considerations, I believe it is the same. This remark substantiates the general result that professional customers assess refurbished spare parts in a pragmatic manner, based on the fixed criteria, including reliability, and business value.

Overall, the responses indicate that risk perception, and operational context influence customer preferences in the B2B markets in terms of refurbished spare parts. Refurbished parts gain acceptance not by being cheaper or more sustainable in isolation, but by being presented as reliable, well-managed solutions within a long-term business relationship. In summary, the nature of the business of a customer will be the fundamental determinant of their risk tolerance, budgetary flexibility and operational priorities, which in turn will drive their interest in refurbished spare parts. When the risk they are exposed to is high, in a mission-critical environment where the failure of equipment has very severe consequences, their price sensitivity is low, and their risk aversion is high. They will not be thinking of cost-saving but guaranteed uptime. On the other hand, in highly competitive commercial market, firms are considering refurbished parts as a strategic lever. To these companies, where the operational risk can be mitigated and the supplier confidence is very high, refurbished parts provide a means of ensuring that the companies remain competitive in the market and that the suppliers are not afraid to give them the parts. Table 8 summarizes the different customer segments for each manager with their unique differences and shared similarities.

Table 8: Summary of differences and similarities of the different B2B customer segments

Sales manager	**Customer segment**	**Unique characteristics & priorities (Differences)**	**Shared customer mindset (Similarities)**
SM 1	Navy & Dredging	Operates with less restrictive budgets and very low-price sensitivity. Will opt for new parts.	Evaluates parts based on reliability, supplier confidence, and long-term operational stability rather than just upfront cost.
SM3	Tanker and ferries	They view refurbished parts as a way to save money on hardware so they can invest in additional services	Prioritizes the overall effect on the business in the long term. Does not view refurbished parts

Sales manager	Customer segment	Unique characteristics & priorities (Differences)	Shared customer mindset (Similarities)
		and components over time. Values long-term collaboration.	merely as a cheap alternative, but as a strategic business decision.
SM 4	Dredging, offshore, ferries, merchant fleet	Decisions are heavily weighed on how a refurbished solution impacts the overall equipment lifecycle.	Acceptance is heavily dependent on perceived operational risk. Sustainability or lower price alone are never the primary drivers for adoption.
SM5	Dredging, offshore	Apply practical business logic to purchasing decisions. Evaluates refurbished parts through traditional business criteria: reliability, and tangible business value.	Requires a high degree of trust and confidence in the supplier. Demands that refurbished parts are reliable and well-managed solutions.

4.2.2 Nature of products

As shown by the insights of the sales managers about the nature of the products, the service logic surrounding the products is often dominant. Spare parts in the marine are not any hardware. It can be said to be a subset of greater consideration that is concerned with risk, predictability of costs and time.

SM3 presented an important observation regarding the difference between high technology characteristic of a spare part and mechanical property of it. The maturity of technology seems to be a facilitator since the components of machinery cease to be cutting-edge. In this way, the perceived risk associated with using a refurbished spare part is less. Thus, it appears that technology has balanced that refurbishment is not an experiment to be undertaken but a normal engineering procedure.

As SM3 quoted *“The product itself, the mechanical components which we are reconditioning, they are not considered as high technology anymore. They have maybe been. Design has been changed a little bit, but uh, there's no, there's no fancy technology in that anymore.”*

Another factor that relates to the nature of the product is the usage cycles or as some of the Sales managers refer them to running hours or TBO- Time Between Overhaul. Both SM2 and SM5 agreed that the product’s suitability for refurbishment depends on how often it needs maintenance. The longer time needed before maintenance; refurbishment becomes less relevant. However, when there is shorter time needed before maintenance, the frequency of the need makes a refurbished spare part such as "exchange set" appear to be more practical and attractive operational solution.

SM5 quoted *“Example and typical propulsion installation. You're only paying attention to maintenance once in five years or maybe in seven years, something like that. And then having a reconditioned set from us now is less important. I mean, looking at, for instance, engines, yeah, every two years. It's coming up overall so, the frequency that makes sense.”*

The last factor shared about the nature of products is about the financial predictability factor. For some customers with large fleets, the refurbished part is an enabler because it offers maintenance costs upfront, avoiding the financial uncertainty of sending their own part away for repair and not knowing the final bill until the work is done. It suggests that choosing refurbished parts is not just an environmental choice but is also a risk management tool. The nature of the product as a fixed price exchange solves the customer’s "fear of the unknown" regarding repair costs.

SM4 quoted *“And they said, hey, we are interested because we want to know upfront what the cost will be. That was the main reason we had enough time to do the standard overall. They just wanted a more fixed cost. I wouldn't expect that. I would have expected before I was in the discussion. I would have expected they would say, OK, we don't have a lot of time to do the overhaul. Something like that, yeah. But no, the reason was we wanted, we want a more fixed price, so it even has nothing really to do with that it's refurbished.”*

4.2.3 Technological factors

All five sales managers unanimously established that technology is the primary driver for circularity. They have all agreed that the company’s technological infrastructure serves as a strong foundation for the refurbishment program. Therefore, the availability of appropriate technology is present in the company to develop the refurbished spare parts business operations. Technology in the case company has a characteristic of precise engineering and operational reliability.

SM1 shared a high-technology method used in repairing parts in a marine engine. This method is identified as the “lock in stich” method. It has been compared to sewing but on a massive industrial scale. This suggests that it could re-make the complete of a block possible, effectively extending the life of the most critical engine components. Thus, prolonging the life of the engine.

As SM1 stated*: “I don't know if you looked into things like lock and stitch, but now we in the unlikely event that say an engine breaks down and components come out of the engine, for instance on the side of and it's anyway always on the side of the engine mostly. But then we have the capability of what they call lock and stitch. You can actually compare it with sewing like with a needle and a thread, but then on a high-level technology* *based so we can remake the complete block in most cases when something like that happens".*

Another perspective from SM3 is about technology viewed as operational reliability. He argues that the heavy investment in robotics across the global hubs has removed the variable of human error. As he highlighted, technology is an enabler because it offers "stable employees" that lead to producing consistent quality products. This consistency is vital in B2B markets where the customer's trust in a refurbished part depends entirely on it meeting original manufacturer's standards.

SM3 quoted*: "That's very important. And there has been a big investment program in new technology machinery in these hubs and they are, they are based on robotics. So, robotics whether we like it or not, they are stable employees. They can work during weekends and holidays and they can ensure equal quality human beings cannot. You know, human beings can make errors. They can, they need to have a break. They need to go on holiday. They and so, so, so that so these robots in all hubs. One is missing in Dubai however, but we have robots in all these workshops, and they ensure much better quality".*

Despite technological factors showing as strong enablers, there are some necessary nuances shared. SM5 shared logistical integration in the refurbishment business. He argues that while mechanical technology is fully mature, logistical technology is critical to support the reconditioning processes. On the other hand, SM4 suggests that refurbished spare parts should be focused on the older engines than the newer ones. This appears as an indication of strategic boundaries. Effective application of refurbished spare parts seems to be more appropriate to older models of marine engines.

4.2.4 Financial or Market factors

Based on the semi-structured interviews among the five (5) sales managers, the price of the refurbished spare parts is not the critical focus in this dimension. It leans towards the high costs of longer delivery time of the spare parts and the strategic game for keeping customers loyal.

SM1 and SM5 shared that the daily rate of an offshore vessel is from 50K€ to 1M€ per day. Therefore, the vessel operators or owners are not concerned about whether the part is refurbished or new, as long as the spare parts are readily available. Refurbished parts win when they are available instantly off the shelf. On the other hand, a new part might have a longer lead time. SM5 added that using exchange sets reduces the two to three weeks waiting time required for a traditional overhaul, saving the client millions in potential lost revenue.

As SM1 quoted *"Yes, it affects the costs, for offshore vessels, day rate can easily increase to a million a day. So, it's then they will check what is available. If a new part is available directly, they will buy that without too many concerns. If a new part isn't available because it's a lengthy delivery time, for instance, then they will look for a refurbished part"*

Another insight that was shared under this dimension is how the market competes. According to SM3, new parts are often locked down by patents, so the OEM has no competition. However, refurbishment market is wide-open, anyone with a workshop can try to do it. In order to survive this, the big players have to stop selling "parts" and start selling "certainty." SM2 admits they are expensive, but they justify it by giving the customer a clear schedule and a guaranteed stock.

SM2 quoted: "One of the key factors for us to succeed, I would say, so for the fact that to provide, we are expensive, we will not lie, I would say we are expensive. The thing is what kind, what kind of services can be provided to the customer. In order to justify this price gap, all the questions are here and to me be able to build a stock saying. OK, you are purchasing that, we are getting back and so and so on. It's kind of very comfortable for the customer. I got a visibility, you know exactly when, you know exactly how, you know exactly how much and so on and so on"

Upfront initial investments have also been brought up under this market/financial dimension. According to SM5 there is a major obstacle that usually gets overlooked is the upfront cash needed to start these programs. For an OEM (original equipment manufacturer) to even offer a refurbished exchange, they first have to spend their own money to build a "seed stock" of new parts. If a company is tight on cash, they will remain to selling new spare parts because building a circular "exchange" system is a massive financial commitment at the start.

According to SM4, large scale customers often find it more financially sound to buy their own swap or exchange sets. Large scale customers are those who own more than ten (10) identical marine engines. Therefore, they tend not to participate in the case company refurbishment program. It serves as the company's biggest competitor. Additionally, SM5 also shared that some customers are not “very fond” of refurbished parts because they feel they do not know exactly what they were getting compared to new spare part. Therefore, there is still issue of trust within their customers.

Financial or market dimension works both as an enabler and barrier. Market factors such as high vessel day-rates and long lead times for new spare parts are pushing customers toward refurbished parts. However, the lack of trust and the ability for large fleets to manage their own spares are considered as the main barriers.

4.2.5 Regulatory or Institutional factors

Regulations from regulatory institutions such as IMO and class societies are not hindering the adoption of refurbished spare parts according to the feedback of five (5) managers. On the contrary, environmental legislation serves as a stimulus for development. Nonetheless, a shift toward circularity appears to be motivated less by a morally motivated dedication to circularity than by future carbon taxes and official stamps.

The transition toward mandatory emission tracking is a primary enabler. SM1 highlights the significance of "Scope 1, 2, and 3" reporting, noting that refurbished components offer a direct route for companies to lower their documented carbon footprints. While current adoption is partly driven by corporate image, SM4 argues that the real shift will occur when these footprints carry a direct financial penalty, such as ETS (Emission Trading) costs or fines.

SM4 stated *": "No issues on this. It does not hamper the purchase of the refurbished spare parts. That depends if they have to pay taxes, if in future we are allowed to have a certain common footprint and if they go over it, they need to pay a fine. And then I can imagine that this would be interesting for them, but I don't know with fuel, with CO2 emissions, you know above this we're going to pay ETS, we're going to. So that's already a cost driver, I think for now that's for a refurbished and the carbon footprint is still. Companies are thinking more now, showing the world that they care. But they will really care if they have to pay?"".*

Another proof that regulatory factors serve as an enabler is that for the maritime industry, the "Class society" and the International Maritime Organization (IMO) act as gatekeepers. SM2 and SM3 indicate that these institutions now facilitate the use of reconditioned parts, provided they come with an OEM guarantee. An IMO "stamp" serves as a quality benchmark, distinguishing legitimate refurbished parts from low-quality "copycats" and giving owners the legal security to install them.

AM3 quoted: *"IMO really supports this. IMO are interested in OEMs, once there is an IMO stamp, it is guaranteed that those are original parts, not a copycat."*

Regulatory and institutional factors acted as both an enabler and a barrier. It is seen as a driver when IMO stamps guarantee original and high-quality products and when it supports to lower the carbon footprint. However, the potential of carrying tax penalties exceeding carbon footprints may act as a barrier in the future.

4.2.6 Social or cultural factors

Social and cultural factors are seen as significant factors in the adoption of purchasing refurbished spare parts. The sales managers reported that there were still customers who doubted the quality of refurbished parts. Environmental awareness is increasing, but it is yet to make its way to the working levels of the maritime industry. This is mostly a high-level corporate discussion rather than a normal procurement practice.

SM1 and SM2 observed that Europe are leading the way in ecological awareness. Contrary to other regions, specifically parts of Asia, it remains less focused on circularity. It appears that there is a clear geographical divide in how refurbished spare parts are perceived. Therefore, it suggests that the adoption of refurbished parts is closely tied to the regional maturity of sustainability discussion. Where the circularity or "green" topics are prioritized, the resistance to use refurbished parts decreases.

SM1 quoted: *"Depending on where you are in the world. Europe, he thinks do more on the refurbished spare parts, but other parts of Asia are thinking less about this". And SM2 stated: "Based on his experience with his customers, we and his customers are advanced when it comes to green and ecological topics".*

A major cultural hindrance is the "stigma of the refurbished failure." SM3 highlights a critical psychological barrier: if a new part fails, it is viewed as an unfortunate technicality, but if a reconditioned part fails, the decision-maker faces immediate scrutiny for not choosing "new." This fear of being blamed for an "avoidable" risk creates a conservative culture where stability and proven quality are prerequisites for any shift in mindset.

One of the major cultural obstacles was shared by SM3. He highlighted the stigma tied to using refurbished spare parts. He has compared that if a new part fails, it is viewed as an unfortunate technicality while if reconditioned part fails, the decision-maker faces scrutiny for not choosing a new part.

SM3 quoted: "*And one thing you can say if something is wrong with such a part, if we have given the wrong layer on a piston crown or done it incorrect way then you have immediate failure rate which will steady increase on board a vessel and when this happen and you can actually point fingers as at this particular. That which was reconditioned then you have a problem because then they will say, oh, we should have taken a new one, we should have taken a new one*".

There is a disconnect between corporate strategy and daily operations according to SM4. Sustainability departments are often more interested in circularity. However, it fails to reach the staff responsible for managing the vessels. This creates a cultural gap between upper management and engineers and buyers on the ground. The first promotes refurbished spare parts in theory, however the latter remained to their traditional procurement habits. Operational teams are more focused on reliability and risk avoidance therefore they will stick to their old purchasing processes. Therefore, refurbished spare parts are viewed more as an abstract corporate goal than a practical tool for operations team.

SM4 quoted: *"But we are not there yet, and the customers are also not there yet. So, I can see that this can be a part of that circular solution. But we are talking now still to people, a bit of high-level discussions. So, and not really in staff people, staff people, so not in the line".*

Social and cultural factors behave as a hindrance in purchasing refurbished spare parts. While the maritime industry is beginning to accept the idea of circularity, the "new is always better" culture remains dominant.

4.2.7 Environmental factors

The overall feedback from the sales managers suggests that environmental factors are beginning to influence the use of refurbished spare parts. The impact is not uniform and very contextual to the customers. Environmental motivation is hardly characterized as a major driving force in operational sales discussions. Instead, it tends to appear at a strategic level within customer organizations. There is a positive trend for circularity to be included in the corporate strategy. However, it seems financial gains are more dominant than environmental benefits.

SM1 stated that circularity is typically a boardroom discussion. This refers to a strategic goal set by executives than a priority for technical staff. Environmental factors driving a sale are highly dependent on the specific strategy of the shipping company and the individual values of the person in charge. As some companies' environmental initiatives are their priority and some are not.

SM1 stated: *"To do something in that that area and others they don't mind at all. And so, it's very much depending partly on the strategy of the company and partly on the persons that you speak individually".*

When sustainability becomes part of a company's financial identity, choosing refurbished parts becomes a practical way to demonstrate progress toward lowering emissions.

SM3 shared that several companies have started to include carbon footprint data in their annual financial reports. Formalization of environmental impact appears to be a growing motivator. Therefore, purchasing refurbished spare parts is not only seen as a circular practice but as measurable metric that stakeholders would like to see. This leads to circularity becoming part of a company's financial identity. Therefore, choosing refurbished parts becomes a practical way to demonstrate progress toward lowering emissions.

On the contrary, SM4 argues that the environment is not a primary motivator just yet. There are still other urgent issues. Currently, the industry's focus is heavily weighted toward fuel efficiency and direct CO2 emissions from engines. Due to these factors, it has more immediate impact on costs and regulations. In effect, the carbon savings found in refurbished spare parts are often viewed as a secondary priority.

SM5 shared that some customers are starting to dislike the idea of discarding good components that could be saved. However, this moral motivation is often blocked by a price issue. If refurbishing a part cost as much as buying a new one, the environmental benefit is not enough to influence most customers. For the environment to be a true motivator, it needs to be paired with a financial incentive.

As SM5 quoted: "*They don't fancy the idea by throwing away components because I recently had a firm discussion on that one. To overhaul to refurbish a component, it was more or less the same money wise as buying a new one and that that is well from commercial point of view. It's OK, but that that's not something you would like to proceed in future, you should make it even a little bit cheaper*".

To summarize, environmental factors are at this time more of a supportive condition than a driving factor. They have the greatest impact when circularity is part of corporate strategy. Although operational level and environmental factors are inclined to support than substitute justified decisions based on cost and performance.

4.2.8 Organizational strategies

There are eight (8) tangible strategies recommended by the sales managers during the interview. The following paragraphs will delve into each one of them.

First, the five (5) interviews share a similarity in that refurbished spare parts are yet to become embedded as a strategic component of the company offering. Although refurbishment is a practice, in essence, it is considered to be a back up to new spares. Several sales managers highlight that customers will tend to consider refurbished solutions more when they are placed well in the portfolio and are being proactively marketed as a component of the company value propositions. This absence of visibility implies that this is taken to be one of the major restricting factors.

SM1 quoted*: "I think marketing wise we should make that bigger effort, make that visible and that we are doing this. Get his own place in our, yeah, in our solutions that we sell." I think we should actively show that we give our customers a choice and the choice of something new and the choice of something refurbished."*

Second, communication is recurrently stated as a main organizational issue, internal and external. The argument by some managers is that refurbished spare parts are not marketed as per their possible significance. It is not the absence of information but a lack of targeted communication and follow-up. Advertising like presentations or emails is considered to be inadequate when they fail to reach the relevant individuals.

SM4 quoted: "You can send emails and those kinds of things, but that doesn't work. You have to talk with the right people in the company."

Third, technical confidence and structured processes are two factors that were suggested as an organizational strategy. One manager notes that the company frequently replaces damaged parts without a thorough understanding of why they broke down and this undermines the overall story of quality and enhancement. In the absence of systematic root-cause analysis, refurbished parts may be perceived as reused, as opposed to re-engineered, and this decreases customer confidence.

SM2 stated: ""Finding the root why an important component is broken… this investigation of why a component is broken is missing."

Fourth, organizational strategies such as availability and ease of access may drive customer motivation. The refurbished parts become more appealing when they are as simple to buy as new parts and the customers are able to see the available clearly. Yet, local constraints of refurbishment centers do not allow the company to access customers of other regions, especially those that are distant from current ones.

SM3 quoted: "If buying a refurbished one is as easy to deal with as for instance buying a new one. We don't have any workshop in Australia… we are not local, we're not there."

Fifth, in addition to logistical limitations, access to technical drawings is another organizational obstacle that SM3 places importance on as a historical issue in the organization. The company is also involved in refurbishing its own parts and also carries out a recondition of parts by other manufacturing companies. Access to original drawings with important measurements, distances, and wall thickness is fundamental in the provision of quality, safety and technical credibility. SM3 notes that the future EU laws are likely to oblige OEMs to allow access to such non-confidential technical drawings, although proprietary design specifications will be safeguarded. Such change in regulation is considered to be of strategic significance, because it re-decreases the reliance on OEM gatekeeping, and reduces structural barriers to third-party refurbishment. Consequently, both technical and organizational overhead of multi-brand reconditioning will be reduced in the long run.

Trust is connected to transparency and documentation. Customers may not need exhaustive technical data, but they expect clarity regarding the history and condition of refurbished components. Structured registration of running hours, overhaul activities, and testing are seen to reduce uncertainty and increase acceptance. Additionally, managers acknowledge that refurbishment has technical and commercial limits. Especially for parts nearing the end of their maintenance lifecycle.

Sixth, transparency and documentation are related to trust. Customers might not require technical information that is exhaustive, but they require the information on the history and condition of refurbished components to be clear. Systematic recording of working time, maintenance operations, and testing is observed to decrease uncertainty and gain acceptance. Additionally, managers admit that there are technical and commercial limits to refurbishment. Particularly when parts are towards the end of their maintenance cycle.

SM4 quoted: “I can imagine that the customer will say OK, but how many running hours has this been already? If the parts are close to the end-of-life date… then it will start to be difficult to sell a refurbished part.”

Seventh, refurbished spare parts for older engine types are viewed as more relevant from a strategic sales perspective. Old engine types typically have a large installed base and highly competitive pressure. In these cases, refurbished components can offer a price advantage over competitors while maintaining acceptable performance levels. Therefore, helping the company recover lost market share.

SM4 quoted: “Especially we have some engines where we have a large installed base, but our competition is very high.”

Eight and lastly, warranty conditions are described as a powerful tool for building customer trust and confidence. Customers perceive refurbished parts as riskier than new ones, even when cheaper. Extending warranty periods is seen as one of the most concrete ways the company can show belief in its refurbishment quality. Thus, it will reduce customer hesitation and improve refurbished spare part adoption

SM4 shared: “If you are so convinced that we have very good quality refurbished parts, then you have to show that. The only way to show it is to give, for example, a longer warranty period.

The interviews suggest that motivating customers to use refurbished spare parts depends largely on organizational strategy than technical feasibility alone. Clear positioning, targeted communication, transparency, availability, and visible confidence in quality all leads to how reliable and attractive refurbished solutions appear to customers.

4.2.9 External stakeholders (suppliers, regulators, etc.)

In interviews conducted, the role that external parties play in the purchase of refurbished spare parts within the marine industry is characterized as indirect and of secondary importance. Although there are limitations placed upon where refurbished components can be procured, these boundaries often arise from factors extrinsic to the user (e.g. regulators, ship's agents and OEM). In reality, however, it's the user (customer) that has the final say on adoption, which is governed by its organizational policies, appetite for risk and lifecyle calculations.

For legal and commercial purposes, external agents and authorities can impair the acceptance of refurbished parts, about the given component. SM1 specified, "If you've class - approved components and, like IMO annex 6 type of regulations, then OEM becomes the only available choice. This is like a structural barrier for you to choose other refurbished options and third parties. " If, nevertheless, the specific part to be substituted doesn't call for such a type of formal recognition, the stakeholders are insignificant and leave the market open for third parties and traders to participate. Still, it was remarked by SM1, "It's up to customer choice, not the push by stakeholders. It's up to customers that are willing to pay some small premium to guarantee OEM parts. Therefore, stakeholders limited some options but it's up to customers.

SM2 also minimized the role of the stakeholders and argued that the ultimate decision lies with the vessel management: "And yes, sometimes minor parties, as ship's agent, are invited but that has no impact. " Thus, stakeholders have a limited role and, usually, aren't initiators of refurbished spare parts adoption but followers of procurement transactions, playing minor background roles.

SM3 took a supply-side and lifecycle viewpoint and observed that the external stakeholders have a bearing on the refurbished spare parts indirectly by technological evolution and product obsolescence. They explained that certain portions will need renewal since there are old ones that will be out of use and even become not relevant, especially in areas like automation. These alterations, sometimes initiated by outside producers or technology suppliers, may decrease the presence of refurbished parts and lead to delivery problems and huge stocking expenses. In this regard, the stakeholders influence the feasibility of refurbished products instead of positively or negatively promoting their use.

SM4 gave the clearest conceptual frame of stakeholder influence, highlighting that stakeholders facilitate or limit adoption with no direct influence on demand. According to SM4, the role of external stakeholders is significant and yet not a direct driver of customer demand for refurbished spare parts. Their impact works in terms of regulatory acceptance, presence of credible alternatives, sustainability awareness, and logistical feasibility. In the end, though, SM4 affirmed that the decisions to adopt are customer-driven and are based on the following drivers: operational risk, remaining lifecycle and cost predictability.

Overall, the answers obtained from stakeholders are unanimous in saying that their gatekeeping role is substantial, although not a significant driver in adopting spare parts for the marine industry. Although refurbishments may be subject to regulatory approval or exclusion by virtue of an OEM's position and market presence, they are ultimately customer decisions than stakeholder driven initiatives. The implementation of refurbished spare parts is not so much of stakeholder conviction. But to do with the feasibility of their integration into customer-oriented internal risk management policies and operational priorities.

5 Conclusion

Circular economy is a known phenomenon that provides both environmental and economic benefits. This topic is a very timely topic as the world population continues to increase, resources decrease at the same time. Adoption of CE practices such as refurbished spare parts in B2B markets is a positive indication that CE goals are heading to the right direction. However, like any other transitions, the obstacles to progress there will always be present. Understanding the enablers and barriers to CE adoption will support us to transition successfully to CE. This topic was chosen because existing CE research frequently studies B2C markets and studies about adoption of CE practices specifically the refurbished spare parts in the marine engine industry are missing.

The research question, "How do the barriers and enablers of Circular Economy exhibit in the relationship between the company and its B2B customers in the context of refurbished spare parts?" enables the author to identify and understand the specific drivers and barriers that affect the company and its B2B customers in purchasing refurbished spare parts. This research was able to provide specific enablers that facilitate the purchase of refurbished spare parts and specific barriers that hinder CE adoption. Through these findings, the author is prospective that the company's refurbished spare parts business division will be able to overcome the barriers and to develop more this promising CE business model.

After analyses of the five (5) semi-structured interviews, clear understanding was achieved on how CE adoption factors to purchased refurbished spare parts exhibits between the case company and its B2B customers. Out of the nine (9) factors of Circular Economy (CE) adoption identified, the nature of the business, the nature of the products and the technological abilities Interestingly, both financial/market factors and regulatory/institutional factors worked in a two-fold dimension both as the drivers and barriers to adoption.

Although environmental factors and external stakeholders did not play a direct trigger role in adoption, they acted as supportive prerequisites. On the other hand, social and cultural factors were found to be a continuing hindrance.

In order to persuade the B2B customers to use refurbished parts, the sales managers found eight (8) tangible organizational strategies. The first five strategies are concerned with incorporation of refurbished options into the core sale process and increasing technical reach. In particular, managers propose showing refurbished components with new ones in all formal offers, more active marketing, and communication with clients, as well as systemic root-cause analysis of damaged parts. In addition, a strategic focus on the development of global refurbishment hubs and access to technical drawings by other manufacturing companies.

The last three strategies revolve around data tracking and market growth with specific focus. These involve coming up with a special running-hours tracking system to measure the performance of refurbished parts with time. Furthermore, the results indicate that attention should be paid to older types of engines where the installed base is substantial enough to support and grow refurbishment business models and extend warranties on refurbished parts.

The study finds that circularity in the marine aftermarket is not constrained by technological factors, but the issues surrounding perception, process, and strategic alignment. According to the study made by Aloini et al (2020) that the most important enabler is the organizational strategies. Furthermore, it was emphasized that CE involvements usually require strong and long-term strategies to complete the CE adoption. Through these considerations refurbished spare parts can become not only a niche, but also a support to value creation of competitive and truly circular lifecycle business models.

5.1 Theoretical implications

Figure 3 shows how the new framework relates against literature. As discussed earlier on the theoretical framework under the literature review, there were seven (7) CE adoption factors found in the B2B literature, and the author added two (2) more CE adoption factors namely nature of business and nature of products. Some of the CE adoption factors acted more as enablers, a barrier, dual factors (both enablers and barriers) and lastly, acted as supportive pre-requisites. Therefore, this implies that CE adoption factors act in various ways. This depends on a specific CE practice such as refurbished spare parts and a specific industry, the marine engine business sector.

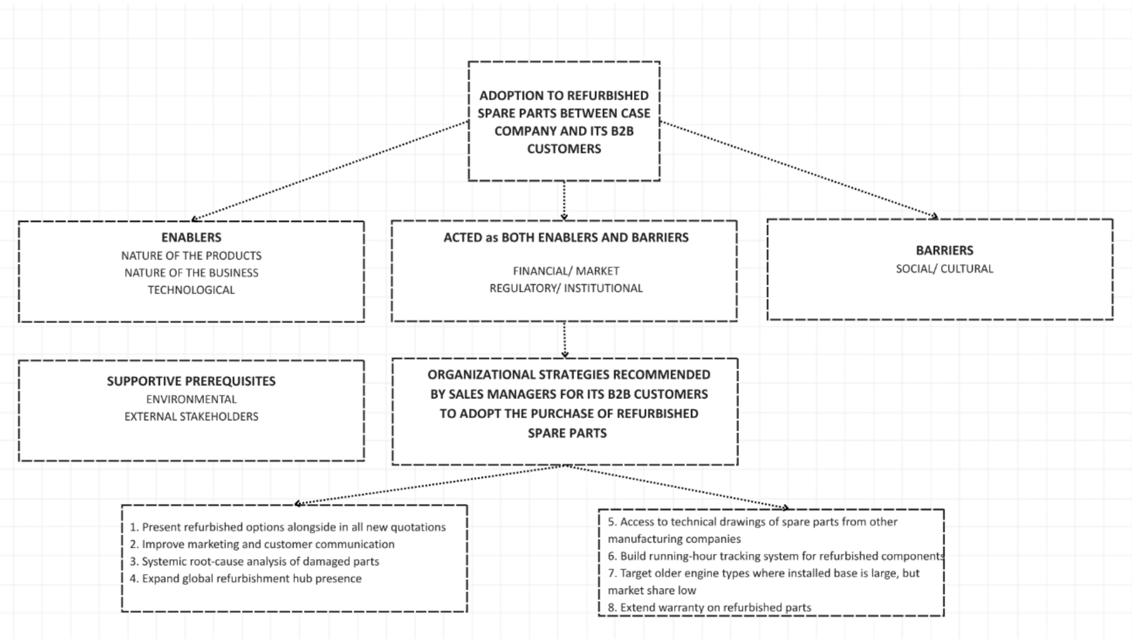

Figure 3: Revised theoretical framework (Source: Author's work)

5.2 Managerial implications

This research provides several opportunities for managers to enhance the company's refurbished spare parts business. The implications apply across different areas of business such as after-sales, supply chain and marketing. They represent actionable steps to bridge the gap between circular economy goals and existing operational practices. There were eight (8) tangible organizational strategies recommended. First, provide refurbished option alongside all new quotations. This can be simply included in the sales platform, such as the company's sales portal, automatically suggesting refurbished alternatives when available. Additionally, the sales managers should always mention it to the customers when presenting new offers. Second, improving marketing and customer communication. Establishing a formal refurbished spare parts commercial strategy can be considered as a managerial action. Third, Systemic root-cause analysis of damaged parts. Creating a team that is responsible to conduct further investigation on the damaged parts and designing an efficient tool could support to realize this strategy. Fourth, expanding global refurbishment hub presence. Partnerships with local certified workshops where OEM presence is limited and feasibility studies for expanding refurbishment operations are seen as managerial actions.

Fifth, access to technical drawings of spare parts from other manufacturing companies. Providing access to these drawings will lead to easier refurbishment of spare parts. Passing regulatory practices among the OEM manufacturers can realize this goal. Sixth, build running hour tracking system for refurbished components. Digital passports for components or RFIDS would assist in tracking the remaining running hours of the spare parts. Seventh, target older engine types where installed base is large, but market share is low. Placing priorities to older engine type in offering refurbished parts is an easy step to progress in this recommended strategy. Eight and lastly, extend warranty on refurbished spare parts. One step closer to this strategy is by marketing extended warranty for refurbished spare parts as competitive differentiator.

5.3 Limitations of the study

There are four (4) limitations found in this study. First, the only focus markets considered in this paper is European markets i.e. Netherlands and France which represent more evolved aftermarket support environments. Hence, they could give different perceptions on cultural values, regulations and economic considerations impacting circular economy strategies in developed versus developing countries, such as in Asia, Africa or Latin America.

Second, the limitation regards the fact that the presented findings are context dependent. The case study conducted about the case company covers only this one firm's circular activities. Therefore, while it provides interesting insights into circular economy strategies in the engine repair and overhaul industry, the results obtained may not entirely be generalized and transferred to companies with other organizational designs or industries with differing operating logic.

Third, another limitation is the study design of collecting qualitative data from a single source. The information was only collected from account managers, completely ruling out the input of other relevant groups of people involved in the process, including service engineers, supply chain managers, workshop technicians and even customers themselves. Therefore, not only is there a focus on just one position in the company hierarchy, but there may also be potential interviewer - interviewee bias whereby the interviewed people could tailor their answers in compliance with organizational codes or stereotypes. Hence, this focus leads to viewing the results as just one occupational point of view and not a complete view of the organization's operational circularity.

Fourth and lastly, qualitative data collection limits the ability to provide an overview of relevant key performance indicators needed to measure the circularity level. In particular, the lack of quantitative measures concerning the percentage of refurbished parts, refurbishment costs relative to those of new parts, component failure rate of refurbished parts and the environmental savings generated by the refurbished models makes it difficult to fully determine the economic and environmental potential of the suggested models.

5.4 Suggestions for future research

After considering the limitations of the study, some recommendations for further research will be presented. First, comparative studies are around the globe market. A study of CE adoption in Asia-Pacific, Latin America or Africa would show some new cultural and operational dynamics with CE adoption and refurbished spare parts. Second, to benchmark with other CE leaders. Company's model should be extended to other sectors like aviation and automotive remanufacturing industries in the future to find best practices to transfer. Third, and finally, it's lifecycle data and predictive modelling. It could be interesting to investigate in the future how to implement running hours analytics, predictive modelling of lifetime and digital passport for spare parts.

References

Aloini, D., Dulmin, R., Mininno, V., Stefanini, A., & Zerbino, P. (2020). Driving the Transition to a Circular Economic Model: A Systematic Review on Drivers and Critical Success Factors in Circular Economy. *Sustainability*, *12*(24), 10672. https://doi.org/10.3390/su122410672

Bakker, C., Wang, F., Huisman, J., & den Hollander, M. (2014). Products that go round: exploring product life extension through design. *Journal of Cleaner Production*, *69*, 10–16. https://doi.org/10.1016/j.jclepro.2014.01.028

Braungart, M., & McDonough, W., (2002). *Cradle to cradle: Remaking the way we make things*. North Point Press.

Bressanelli, G., Perona, M., & Saccani, N. (2019). Challenges in supply chain redesign for the Circular Economy: a literature review and a multiple case study. *International Journal of Production Research*, *57*(23), 7395–7422. https://doi.org/10.1080/00207543.2018.1542176

Bringezu, S., Gries, N. von, Hellweg, S., Hilton, B., Kreiss, C., Nasr, N. Z., & Russell, J. D. (2018). *IRP (2018) Re-defining value – The manufacturing revolution. Remanufacturing, refurbishment, repair and direct reuse in the circular economy.* https://www.eco-conception.fr/library/h/redefining-value-the-manufacturing-revolution.html

Butt, A. S. (2025). Coopetition in supply chains: A case study of Australian construction industry in supplier market. *Journal of Business Research*, *189*, 115111. https://doi.org/10.1016/j.jbusres.2024.115111

Circle Economy. (2025). *A circular economy to live within the safe limits of the planet*. https://pdf.circularity-gap.world/?report=CGR_Global_2025_Report_0c90048033&page=1

de Jesus, A., & Mendonça, S. (2018). Lost in Transition? Drivers and Barriers in the Eco-innovation Road to the Circular Economy. *Ecological Economics*, *145*, 75–89. https://doi.org/10.1016/j.ecolecon.2017.08.001

Esposito, M., Tse, T., & Soufani, K. (2018). Introducing a Circular Economy: New Thinking with New Managerial and Policy Implications. *California Management Review*, *60*(3), 5–19. https://doi.org/10.1177/0008125618764691

Gao, C., Hou, H., Zhang, J., Zhang, H., & Gong, W. (2006). Education for regional sustainable development: experiences from the education framework of HHCEPZ project. *Journal of Cleaner Production*, *14*(9–11), 994–1002. https://doi.org/10.1016/j.jclepro.2005.11.043

Geng, Y., Xinbei, W., Qinghua, Z., & Hengxin, Z. (2010). Regional initiatives on promoting cleaner production in China: a case of Liaoning. *Journal of Cleaner Production*, *18*(15), 1502–1508. https://doi.org/10.1016/j.jclepro.2010.06.028

Ghisellini, P., Cialani, C., & 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. https://doi.org/10.1016/j.jclepro.2015.09.007

Govindan, K., & Hasanagic, M. (2018). A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective. *International Journal of Production Research*, *56*(1–2), 278–311. https://doi.org/10.1080/00207543.2017.1402141

Guba, E., & Lincoln, Y. (1989). *Fourth generation evaluation*. Sage publications.

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. https://doi.org/10.1177/0008125618764692

Jaeger, B., & Upadhyay, A. (2020). Understanding barriers to circular economy: cases from the manufacturing industry. *Journal of Enterprise Information Management*, *33*(4), 729–745. https://doi.org/10.1108/JEIM-02-2019-0047

Jia, F., Yin, S., Chen, L., & Chen, X. (2020). The circular economy in the textile and apparel industry: A systematic literature review. *Journal of Cleaner Production*, *259*, 120728. https://doi.org/10.1016/j.jclepro.2020.120728

Jones, P. T., Geysen, D., Tielemans, Y., Van Passel, S., Pontikes, Y., Blanpain, B., Quaghebeur, M., & Hoekstra, N. (2013). Enhanced Landfill Mining in view of multiple resource recovery: a critical review. *Journal of Cleaner Production*, *55*, 45–55. https://doi.org/10.1016/j.jclepro.2012.05.021

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the Circular Economy: Evidence from the European Union (EU). *Ecological Economics*, *150*, 264–272. https://doi.org/10.1016/j.ecolecon.2018.04.028

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, *127*, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Kirchherr, J., Yang, N.-H. N., Schulze-Spüntrup, F., Heerink, M. J., & Hartley, K. (2023). Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions. *Resources, Conservation and Recycling*, *194*, 107001. https://doi.org/10.1016/j.resconrec.2023.107001

Koval, V., Abramović, N., Đurović, S., Crvenica, D., & Arsawan, I. W. E. (2025). Fostering Technology Adoption and Management Advancements in Environmental Performance: Mediation of Circular Economy and Sustainability-Oriented Innovation. *Sustainability*, *17*(5), 1848. https://doi.org/10.3390/su17051848

Kowalska, K., & Jankowska-Mihułowicz, M. (2025). Cooperation of Manufacturing Companies with Business-to-Business Stakeholders in Poland in the Field of Circular Activities. *Sustainability*, *17*(17), 7859. https://doi.org/10.3390/su17177859

Mathews, J. A., & Tan, H. (2011). Progress Toward a Circular Economy in China. *Journal of Industrial Ecology*, *15*(3), 435–457. https://doi.org/10.1111/j.1530-9290.2011.00332.x

McDowall, W., Geng, Y., Huang, B., Barteková, E., Bleischwitz, R., Türkeli, S., Kemp, R., & Doménech, T. (2017). Circular Economy Policies in China and Europe. *Journal of Industrial Ecology*, *21*(3), 651–661. https://doi.org/10.1111/jiec.12597

Moktadir, M. A., Rahman, T., Rahman, M. H., Ali, S. M., & Paul, S. K. (2018). Drivers to sustainable manufacturing practices and circular economy: A perspective of leather industries in Bangladesh. *Journal of Cleaner Production*, *174*, 1366–1380. https://doi.org/10.1016/j.jclepro.2017.11.063

Mont, O. (2008). Innovative approaches to optimising design and use of durable consumer goods. *International Journal of Product Development*, *6*(3/4), 227. https://doi.org/10.1504/IJPD.2008.020395

Mont, O., Plepys, A., Whalen, K., & Nussholiz, J. (2017). *Business model innovation for a circular economy drivers and barriers for the Swedish industry – the voice of REES companies*. https://lup.lub.lu.se/search/ws/files/33914256/MISTRA_REES_Drivers_and_Barriers_Lund.pdf

Nye, J. S. (1990). Soft Power. *Foreign Policy*, 153–171. https://doi.org/10.2307/1148580

Nye, J. S. (2006). *Think Again: Soft Power*. https://foreignpolicy.com/2006/02/23/think-again-,soft-power/

Porter, M. E., & Linde, C. van der. (1995). Toward a New Conception of the Environment-Competitiveness Relationship. *Journal of Economic Perspectives*, *9*(4), 97–118. https://doi.org/10.1257/jep.9.4.97

Preston, F. (2012). *briefing paper A Global Redesign? Shaping the Circular Economy*. www.mckinseyquarterly.com/The_second_economy_2853.

Ranta, V., Aarikka-Stenroos, L., Ritala, P., & Mäkinen, S. J. (2018). Exploring institutional drivers and barriers of the circular economy: A cross-regional comparison of China, the US, and Europe. *Resources, Conservation and Recycling*, *135*, 70–82. https://doi.org/10.1016/j.resconrec.2017.08.017

Ranta, V., Keränen, J., & Aarikka-Stenroos, L. (2020). How B2B suppliers articulate customer value propositions in the circular economy: Four innovation-driven value creation logics. *Industrial Marketing Management*, *87*, 291–305. https://doi.org/10.1016/j.indmarman.2019.10.007

Rizos, V., Bryhn, J., Alessi, M., Righetti, E., Fujiwara, N., & Stroia, C. (2021). *Barriers and enablers for implementing circular economy business models. CEPS Research Report.* www.ceps.eu

Rizos, Vasileios., Behrens, Arno., Kafyeke, Terri., Hirschnitz-Garbers, Martin., & Ioannou, Anastasia. (2015). *The circular economy: barriers and opportunities for SMEs*. [Centre for European Policy Studies].

Russell, J. D., & Nasr, N. Z. (2023). Value-retained vs. impacts avoided: the differentiated contributions of remanufacturing, refurbishment, repair, and reuse within a circular economy. *Journal of Remanufacturing*, *13*(1), 25–51. https://doi.org/10.1007/s13243-022-00119-4

Saunders, Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (M. N. K. Saunders, P. Lewis, & A. Thornhill, Eds.; 9th Edition). Pearson.

Tura, N., Hanski, J., Ahola, T., Ståhle, M., Piiparinen, S., & Valkokari, P. (2019). Unlocking circular business: A framework of barriers and drivers. *Journal of Cleaner Production*, *212*, 90–98. https://doi.org/10.1016/j.jclepro.2018.11.202

Türkeli, S., Kemp, R., Huang, B., Bleischwitz, R., & McDowall, W. (2018). Circular economy scientific knowledge in the European Union and China: A bibliometric, network and survey analysis (2006–2016). *Journal of Cleaner Production*, *197*, 1244–1261. https://doi.org/10.1016/j.jclepro.2018.06.118

Vanner, R., Bicket, S., & Withana, P. ten. (2014). *Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains.* 5. http://www.eesc. europa.eu/resources/docs/scoping-study.pdf.

Xie, Q., Gao, Y., Xia, N., Zhang, S., & Tao, G. (2023). Coopetition and organizational performance outcomes: A meta-analysis of the main and moderator effects. *Journal of Business Research*, *154*, 113363. https://doi.org/10.1016/j.jbusres.2022.113363

Yin, R. K. (2009). *Case study research: Design and Methods* (4th ed.). Sage.

Zaoual, A.-R., & Lecocq, X. (2018). Orchestrating Circularity within Industrial Ecosystems: Lessons from Iconic Cases in Three Different Countries. *California Management Review*, *60*(3), 133–156. https://doi.org/10.1177/0008125617752693

Zhang, L., Yuan, Z., Bi, J., Zhang, B., & Liu, B. (2010). Eco-industrial parks: national pilot practices in China. *Journal of Cleaner Production*, *18*(5), 504–509. https://doi.org/10.1016/j.jclepro.2009.11.018

Zhu, Q., Geng, Y., Sarkis, J., & Lai, K. (2015). Barriers to Promoting Eco-Industrial Parks Development in China. *Journal of Industrial Ecology*, *19*(3), 457–467. https://doi.org/10.1111/jiec.12176

Appendices

Appendix 1. Introduction email

Dear Mr./Ms. Sales or Sales manager,

My thesis topic is focused on the barriers and enablers to Circular Economy in B2B business, the case of refurbished spare parts in the case company and its B2B customers. This research is part of completing my studies in master's program in Strategic Business Development at the University of Vaasa and at the same time I am doing this thesis with the case company with Mr. X, Manager, Packing & Sustainability as my supervisor. However, both university supervisor of the thesis and the case company's supervisor will receive only anonymized insights from the interviews.

The interview will be conducted via Teams about 45-60 minutes. The interview will be recorded and transcribed for analysis. In the thesis documents and any related communication, you will remain anonymous.

Do you agree that this interview would be recorded, transcribed and analyzed?

Would you like to receive thesis copy after it's completed?

Best regards,

Maria Soriano
Researcher

Appendix 2: Interview Questions

A. Knowing the Sales manager's portfolio

1.) As a Sales manager or Sales manager, what are your responsibilities in the company and how does your role relate to managing the refurbished spare parts. Please briefly describe the processes involved managing spare parts with your customer.

2.) What kind of customers do you usually handle? Please explain the size, the geographical location and how many refurbished spare parts are ordered in a particular amount of time.

3.) How do you understand the concept of "refurbished" spare parts? What is your opinion about this option of spare parts in your line of operations?

B. Barriers and Drivers to purchase refurbished spare parts

From your experience, what are the key enablers and barriers in offering refurbished spare parts to your customers?

1. How do you think the nature of **business,** B2B, affects your customer preference to purchase or not refurbished parts?

2. How do you think the nature of **products** affects your customer's preference to purchase or not refurbished parts?

3. How do technological factors serve as barriers or enablers in offering refurbished spare parts to your customers?

4. How do financial or market aspects hinder or drive your business by offering refurbished spare parts?

5. How do regulatory or institutional issues such as environmental standards or legislation hinder or enable your business to increase the usage of refurbished spare parts?

6. How important are social or cultural factors in slowing down or promoting the use of refurbished spare parts?

7. How are environmental factors motivating the use of refurbished spare parts?

8. What kind of organizational strategies do you think would motivate your customer in using refurbished spare parts or how the company can further develop this line of business.

9. How important are external stakeholders (i.e. suppliers, regulators, etc.) in driving the refurbished spare parts or hindering their adoption?

10. Are there any other barriers or enablers to purchase refurbished spare parts that we have not discussed (If any)

11. Are there any other specific business aspects that you think affect your customer preference to purchase or not refurbished parts?

12. Is there anything else related to the topic that you would like to share?