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Integrating circular economy into business models

A study on B2B plastic products manufacturers and international customers

School of Marketing and Communication
Master's thesis in International Business

Vaasa 2024

UNIVERSITY OF VAASA
School of Marketing and Communication
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Title of the Thesis: Integrating circular economy into business models: A study on B2B plastic products manufacturers and international customers
Degree: Master of Science in Economics and Business Administration
Programme: International Business
Supervisor: Minnie Kontkanen
Year: 2024 **Pages:** 83

ABSTRACT:

Environmental issues have increasingly become a matter of concern for the general public and sustainability has emerged as a central topic for both producers and consumers. Therefore, industrial companies are pressured to innovate at business model level and integrate sustainability. A possible solution is the circular economy (CE), a "closed loop system" that is built on sustainable practices and its primary objective is to enhance resource efficiency and minimize waste by effectively managing materials and energy cycles. The adoption of CE principles and practices leads to circular business models (CBM). The existent literature does not analyse the transformation process that companies undergo to implement CBMs and how this transformation generates value, economic advantages and revenue at company level. Consequently, there is a need to deepen the understanding of how sustainability, in particular the environmental dimension, can be integrated in business models and used to create value for customers in international contexts.

This thesis focuses on the plastic industry, in particular on business-to-business (B2B) plastic products manufacturers operating internationally. The aim of the research is to answer the following question: "How do B2B plastic products manufacturers incorporate circular economy approaches into their business models to improve the value perception and willingness to pay of their international customers?". The objective is to explore how this type of companies, despite operating with plastic, a material often associated with pollution, are able to successfully implement circular business models and create customer value by leveraging environmental sustainability. The research is conducted as a qualitative multi case study. It considers three companies operating in the moulding of low-value plastic products and packaging industry. These companies are headquartered in Italy but operate with customers all over the world. The data is collected through five semi-structured interviews and by analysing companies' websites and sustainability reports.

The results indicate that B2B companies producing plastic products are gradually moving towards CBMs but they are facing many trade-offs which slow down the transition. The main CE practices adopted include substituting virgin raw materials with recycled ones and energy efficiency improvements. Companies aim at a CBM because it entails efficiency and reduced waste, allowing cost savings. However, at the same time, working with recycled materials involves higher production costs due to technical features. Customers are starting to value sustainability, especially in Europe, but they still prioritise characteristics such as quality of the product, delivery times and mostly the price. From the interviews it is clear that at the end customers still look at the price. Consequently, the adoption of circular economy practices does not always correspond to an increase in the willingness to pay of customers. They often demand sustainable products due to legal requirements and therefore are not willing to voluntarily pay a premium price. Therefore, it is fundamental the role of institutions which economically incentivise companies by providing the necessary funds for a transition.

KEYWORDS: Sustainability, Circular economy, Business models, Business-to-business commerce, Plastic products, Customer Value, Willingness to Pay

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1 Introduction

1.1 Background of the study

Environmental issues have increasingly become a matter of concern for the general public and sustainability has emerged as a central topic for both producers and consumers (European Commission, 2008). The former are implementing sustainable practices in their business models, while the latter demand products and services with sustainable characteristics. This awareness for environmental and social issues is affecting customers' purchasing decisions that are taken considering the value of a product or service, which is measured as "attribute-based desires (or preferences) that influence purchase" (Woodruff, 1997, p. 141).

Sustainability has been defined in 1987 by the United Nations Brundtland Commission as the capability of "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, n.d.). This definition reflects the need of addressing climate change and other environmental challenges, which have pressured industrial companies to integrate sustainability into their business models. In fact, it is necessary to innovate at the level of business models and leverage sustainable solutions (Geissdoerfer et al., 2018a). This innovation that is required concerns business model's value creation, delivery and capture (Teece, 2010).

This pressure caused by sustainability challenges has led to a new business approach called circular economy (CE) (Ranta et al., 2020). The circular economy offers an alternative to the traditional linear economy, a model of resource consumption based on the "take-make-dispose" pattern (Ellen MacArthur Foundation, 2012, p. 6). The CE is built on sustainable practices and its primary objective is to enhance resource efficiency and minimize waste by effectively managing materials and energy cycles (Ranta et al., 2020). It is a "closed-loop system" which aims at achieving zero waste by "maximizing reuse, repair, remake and, recycling practices paired with minimizing consumption practices" (Fehrer & Wieland, 2021, p. 610). The circular economy is defined as an "industrial system that is restorative and regenerative by design" (Ellen MacArthur Foun-

dation, 2012, p. 7). It aims at extending the life-cycle of products and maintaining their value in time (Urbinati et al., 2017).

According to Sairanen et al. (2024) the circular economy affects value creation and subsequently influences how customers perceive value. It introduces novel approaches for companies to generate value that was previously unrealized, benefitting both customers and the firm itself (Ellen MacArthur Foundation, 2012). Circular business practices are not uniform and involve a wide range of approaches, known as Circular Business Models (CBMs), which include tangible actions like recycling (e.g., substituting virgin materials with recycled ones) as well as more intangible strategies (e.g., offering products as services, or extending product lifespan through repair or new market platforms) (Ranta et al., 2018). Consequently, the CE has the potential to revolutionize the approach to value creation across different industries, either through radical shifts, such as transitioning from selling and buying physical products to offering desired outcomes as services, or through incremental changes, like increasing the incorporation of recycled materials into products (Ghisellini et al., 2016).

The concept of circular economy has attracted attention from both the private and institutional sector, becoming increasingly important on the agendas of policymakers and gaining traction in the academic world (Geissdoerfer et al., 2020). Scholars analyse circular economy from different points of view: from its theoretical concept to its practical implementation. Researchers have explored the roots and origins of CE, its principles and limits and CE models (Ghisellini et al., 2016). Many studies concern how circular economy can be implemented at micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond) (Ghisellini et al., 2016). However, as suggested by Chabowski et al. (2023), existing research on CE and sustainable business models in an international context is limited and requires further development.

The extant literature on circular economy is focused on examining business models per se and does not study the transformation process that existing firms undergo to move to a circular business model (Frishammar & Parida, 2019). There is not an all-

compassing framework for how companies should embed sustainability in their business models (Bocken et al., 2014). Therefore there is the need to explore further circular economy implementation strategies (Kalmykova et al., 2018). Moreover, as underlined by Ranta et al. (2018), there is a gap in the literature examining circular economy: scholars do not delve into how the CE generates value, economic advantages and revenue at company level.

The literature has paid little attention to which transition strategies are more effective to implement circular business models and this gap is especially pronounced in the plastic industry, which is under pressure to adopt radical changes to achieve sustainability (Zucchella et al., 2022). The focus in the analysis surrounding the circular economy revolves around resource scarcity and environmental impacts, neglecting the economic benefits for industrial actors (Lieder & Rashid, 2016). This gap in the existing research landscape is significant, given that key activities crucial for successful CE implementation, such as business models, product design, supply chain design, and material selection, are under the control and influence of manufacturing companies, primarily driven by their desire to attain economic gains (Lieder & Rashid, 2016). In this scenario, a shift towards the circular economy might not seem advantageous for manufacturing companies. Instead, it could be viewed as a restriction on industrial operations rather than an opportunity for sustainable business practices and growth (Lieder & Rashid, 2016). Therefore, based on prior studies, it is necessary to deepen the understanding of how sustainability, in particular the environmental dimension, can be integrated in business models and used to create value for customers in international contexts.

1.2 Aim and research question

This thesis aims at understanding how sustainability can be used to create value for international customers. The concept of sustainability is very wide and it has multiple dimensions. It is characterised by three pillars: economic, environmental and social sustainability (Elkington, 1997). This research focuses on the environmental aspect, which is connected to environmental pollution. This topic is especially relevant to busi-

ness-to-business (B2B) manufacturing companies as they heavily rely on natural resources in their operations and are often held responsible for evident environmental impacts (Vesal et al., 2021). The focus is on international manufacturing companies that have adopted circular business models. The selection is centred on manufacturing companies because they significantly utilise materials and energy and generate considerable amounts of waste (Rashid et al., 2013).

The thesis aims at answering the following research question: "How do B2B plastic products manufacturers incorporate circular economy approaches into their business models to improve the value perception and willingness to pay of their international customers?".

The objectives of the thesis are:

1. Identify circular economy principles and different types of circular business models.
2. Identify the components of a circular business model.
3. Identify the barriers and facilitators faced by B2B manufacturers in different countries while transitioning to a circular business model.
4. Define the concept of customer value.
5. Explore how Italian B2B plastic manufacturers have adopted circular business models to improve customer value and willingness to pay for their international customers.

The thesis plans to achieve these objectives by comparing different international companies and their strategies. It wants to investigate B2B companies active in the manufacturing industry that have adopted circular economy characteristics. The choice of manufacturing companies is due to the fact that they are identified as key contributors to unsustainable consumption and production (Bjørnbet et al., 2021) and are urged to transition towards circular economy (Parida et al., 2019). In particular, the study focuses on international manufacturers of plastic products with a strategy strongly oriented towards sustainability. The aim is to explore how this type of companies, despite operating with plastic, a material often associated with pollution, are able to successfully

implement circular business models and create customer value by leveraging sustainability.

1.3 Delimitations

Sustainability has a broad meaning and various dimensions. This thesis delimits its attention to the environmental one, overlooking, for example, the social component. This study focuses on companies that are transitioning towards a circular business model. It analyses how circular principles and practises are implemented. The research is limited to already established B2B manufacturing firms that operate internationally with multiple customers.

1.4 Structure of the study

The thesis is structured in five main chapters. First, in Chapter 1, it introduces the topic and the background of the study, identifying the research gap and formulating the research question. The second chapter is dedicated to constructing the theoretical framework for the thesis by conducting a literature review. It introduces the extant theory on circular economy principles, circular business models, barriers and facilitators to transitioning to circular business models and the concept of customer value. This chapter includes also the theoretical framework and its description. Chapter 3 presents the methodology used for the empirical part. It focuses on the research approach and explains how the case companies have been selected and how data has been collected. It discusses also the rigorousness of the study by analysing its validity and reliability. The fourth chapter reports the findings obtained from the data collection and the fifth section compares them with the theoretical framework of the thesis. This last chapter includes also the conclusions of the study, the theoretical and practical implications, and the limitations and suggestions for future research.

2 Literature review

This chapter of the master thesis is dedicated to the presentation of the topics necessary to understand the theoretical background on which the research question is developed.

2.1 Environmental sustainability and principles of circular economy

Environmental sustainability, from a business perspective, revolves around pollution prevention, waste reduction, and the minimization of energy and raw material usage (Vesal et al., 2021). This definition implies that environmental sustainability is characterised by both environmental remediation and economic efficiency. The former involves reducing air emissions, wastewater, solid waste, consumption of hazardous materials, and environmental accidents while the latter is focused on an efficient consumption of energy and resources (Vesal et al., 2021). Tackling environmental sustainability challenges is particularly crucial for B2B manufacturers of plastic products due to the polluting nature of the raw materials they use. Furthermore, producers must integrate sustainable practices into their marketing activities, as these can significantly impact stakeholders' perception of the company and brand image, thereby creating a competitive advantage (Sheth & Sinha, 2015).

To address environmental challenges and move to a more sustainable international economic system it is required innovation at the business model level of companies (Geissdoerfer et al., 2018a). Modern society is based on a “take-make-dispose” model of production and consumption (Ellen MacArthur Foundation, 2012, p. 6). This model is growth-oriented and has become unsustainable (Ghisellini et al., 2016). The circular economy offers an alternative to the traditional linear economy, by offering a “closed-loop system” (Fehrer & Wieland, 2021). This shift from a linear to a circular model affects value creation processes and B2B customers’ value perception (Sairanen et al., 2024).

The concept of circular economy is connected to the one of sustainability, but they have both similarities and differences. Similarities include: a global perspective which enhances the importance of coordination between multiple actors, a multidisciplinary approach which considers also non-economic aspects, the necessity of regulations and incentives as implementation tools, and business model innovation as a key element for industry transformation. However, there are also some differences. For example, in terms of goals, sustainability includes a wider range of objectives while the CE aims at a closed loop that reduces resource consumption and waste production. The priority of the circular economy is the economic system and the beneficiaries are the economic entities that implement it. On the other hand, sustainability prioritises the society at large and not only its economic dimension. (Geissdoerfer et al., 2017).

The circular economy is usually positively associated to sustainability but some scholars underline also the negative relationship between them. Andersen (2007) highlights the costs associated with a circular system, which must be balanced against the benefits to prevent a negative value creation. Similarly Allwood (2014) suggests that on a technical point of view is not possible to have a completely closed loop due to an increasing demand and issues related to the energy consumption necessary for recycling materials. Sometimes the environmental impact caused by recycling processes is greater than the one generated by the extraction of raw materials. Allwood's (2014) view is supported also by other authors like Zotti and Bigano (2019) and Skene (2018).

The notion of circular economy is based on sustainability but also on other concepts like "stock optimization" (Kalmykova et al., 2018, p. 194). This principle refers to maximising the value of the resources and it is the result of the understanding that Earth's resources are limited. Stock optimization is linked to various well established concepts such as: "spaceman economy", "steady-state economy", "limits to growth", "industrial ecology" and "cradle-to-cradle" (Kalmykova et al., 2018, p. 194). The spaceman economy envisions Earth as a spaceship with finite resources, requiring humans to adopt a circular system that enables continuous material regeneration (Boulding, 1966). Steady-state economy refers to an economy with a constant stock of capital and people,

an economy that does not grow over time (Daly, 2005, as cited in Kalmykova et al., 2018). The limits to growth concept has been theorised by Meadows et al. (1972) and is based on the idea that the Earth is finite, it has limited resources, and therefore there are trade-offs. For example, if the population keeps growing and all the arable land is used there is a trade-off between more people or more food per person (Meadows et al., 1972). The industrial ecology perceives the industrial ecosystem as a biological one where materials are internally recycled and the only external output is energy (Kalmykova et al., 2018). Last but not least, the cradle-to cradle concept, which is the opposite of the cradle-to-grave or linear economy, envisions products that are designed and manufactured to be used, recycled and reused without compromising the quality of the materials and without harming the environment (McDonough & Braungart, 2002).

The CE is based on the triple bottom line which is composed of: people, profit and planet (Elkington, 1997). This value system incorporates environmental, societal and economic dimensions which mutually affect one another (Geissdoerfer et al., 2017). These three dimensions are conceptualised as equal and balanced but in reality the CE prioritise economic systems that are primarily beneficial for the environment, with social advantages being secondary and less directly addressed (Geissdoerfer et al., 2017). In fact, at enterprise level, circular economy practices include meeting environmental requirements by adhering to the principles of reduction, reuse, and recycling (known as the 3Rs), with a focus on achieving both environmental and economic performance objectives (Zhu et al., 2010).

Circularity is viewed as one of several approaches to promote sustainability, with the ultimate goal of decoupling economic growth from the depletion of natural resources and environmental degradation (Geissdoerfer et al., 2017; Liu et al., 2009). The CE is built on sustainable practices and its primary objective is to enhance resource efficiency and minimize waste by effectively managing materials and energy cycles (Ranta et al., 2020). The Ellen MacArthur Foundation defines the circular economy as an “industrial system that is restorative and regenerative by design” (2012, p. 7). This definition

underlines the importance of the CE not only as a preventive approach but also as a tool to design better systems and repair the damage previously caused (Murray et al., 2017). Value is obtained by redesigning manufacturing systems and supply logics.

The concept of the circular economy can be schematised as in Figure 1. This figure captures the economic and business logic embedded in the framework of circular economy. It describes the life cycle of a product which is extended through circular economy practices such as reuse, remanufacturing and recycling. The aim is to retain the highest economic value of the product as long as possible. The inner circles represent more economic solutions that demand less resources and energy. Consequently, material should be initially recovered for reuse, refurbishment and repair, then for remanufacturing and last for recycling. (Korhonen et al., 2018).

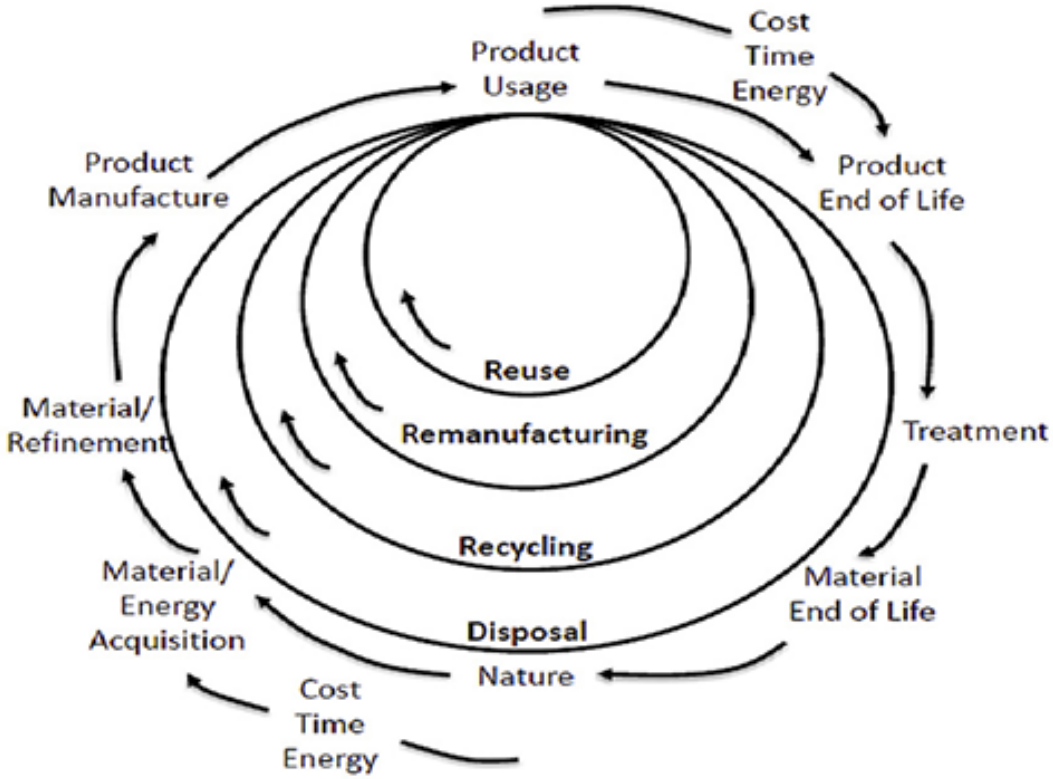

Figure 1. Implementation of CE principles in the life cycle of a product (Mihelcic et al., 2003).

2.2 Circular business models

Organisations aiming to embrace the circular economy model need to adopt a new type of business model (Geissdoerfer et al., 2020). It is necessary to introduce change at the core of business models, targeting unsustainable practices at their source (Bocken et al., 2014). A business model is a conceptual tool that outlines the framework through which a company creates, delivers and captures value (Chabowski et al., 2023). It is composed of three main elements: value proposition, value creation and delivery, and value capture (Richardson, 2008). Business models can vary depending on how extensively they incorporate sustainability-related demands and can be considered sustainable business models (SBMs) when they "aim at solutions for sustainable development by creating additional monetary and non-monetary value by the proactive management of multiple stakeholders and that incorporate a long-term perspective" (Geissdoerfer et al., 2018a, p. 713).

A subcategory of SBMs are circular business models (Geissdoerfer et al., 2018a). In fact, an archetype of sustainable business models is circularity (Bocken et al., 2014). It is considered a prerequisite for sustainable manufacturing (Rashid et al., 2013) and it has been identified as a crucial requirement for sustaining economic growth in an environmentally sustainable manner (Geissdoerfer et al., 2017). The concept of circular business model emerged for the first time in 2006 in an article written by Schwager and Moser (2006) that investigated various types of business models for circular value creation (Geissdoerfer et al., 2020). Then the topic started gaining always more traction especially thanks to the publications of the Ellen MacArthur Foundation and the World Economic Forum (Ellen MacArthur Foundation, 2012; WEF, 2014). The following table, Table 1, shows how circular business models have been defined in the literature.

Table 1. Circular business model definitions (adapted from Geissdoerfer et al. 2020).

Publication	**Definition of CBM**
(Mentik, 2014)	"A circular business model is the rationale of how an organisation creates, delivers and captures value with and within closed material loops" (p.24)

Publication	Definition of CBM
(Bocken et al., 2016)	"business model strategies suited for the move to a CE [based on the] taxonomy of slowing, closing, and narrowing resource loops" (p. 317)
(Nußholz, 2017)	"A circular business model is how a company creates, captures, and delivers value with the value creation logic designed to improve resource efficiency through contributing to extending useful life of products and parts (e.g., through long-life design, repair and remanufacturing) and closing material loops" (p. 12)
(Linder & Williander, 2017)	"We define a circular business model (CBM) as a business model in which the conceptual logic for value creation is based on utilising economic value retained in products after use in the production of new offerings. Thus, a circular business model implies a return flow to the producer from users, though there can be intermediaries between the two parties. The term circular business model therefore overlaps with the concept of closed-loop supply chains, and always involves re-cycling, remanufacturing, reuse or one of their sibling activities (e.g. refurbishment, renovation, repair)" (p. 183)
(Urbinati et al., 2017)	"i.e. different modes of adoption of CE by […] single firms […] as they adopt any of the circular practices (e.g., redistribution and reuse, remanufacturing or recycling of products) in their internal activities" (p. 487)
(Geissdoerfer et al., 2018a)	"CBM can be defined as SBMs [sustainable business models] - which are business models that aim at solutions for sustaina-ble development by creating additional monetary and non-monetary value by the pro-active management of a multiple stakeholders and incorporate a long-term perspective - that are specifically aiming at solutions for the CE [i.e. closing, nar-rowing, slowing, intensifying, and dematerialising resource loops] through a circular value chain and stakeholder incentive alignment" (p. 713-714)
(Manninen et al., 2018)	"CE businesses aim to apply [the] CE principles […] preserving and enhancing natural capital, optimising yields from re-sources in use, and fostering system effectiveness (minimising negative externalities) […] to their business models and shift from a linear business to more circular one" (p. 414)
(Oghazi & Mostaghel, 2018)	"The rationale of how an organisation creates, delivers, and captures value with slowing, closing, or narrowing flows of the resource loops" (p. 3)
(Lahti et al., 2018)	"we propose a circular business model definition to explain how an established firm uses innovations to create, deliver,

Publication	Definition of CBM
	and capture value through the implementation of CE principles, whereby the business rational are realigned between the network of actors/stakeholders to meet environmental, social, and economic benefits" (p. 3)
(Lüdeke-Freund et al., 2019)	"as a means to redefine how companies create value while adhering to CE principles" (p. 37)
(Zucchella & Previtali, 2019)	"The business model's key role is to incorporate the CE principles into a design or redesign of business activities and partnerships and to create a cost and revenue structure, which is compatible both with sustainability and with profitability" (p. 275)

Most of the definitions in the table above are based on the concept of value. They align with the value logic framework proposed by Richardson (2008) which includes value proposition, value creation, value delivery and value capture. The value concept is then combined with principles of the circular economy (Manninen et al., 2018; Lüdeke-Freund et al., 2019; Zucchella & Previtali, 2019) or transposed into circular business model strategies (Bocken et al., 2016; Geissdoerfer et al., 2018a; Geissdoerfer et al., 2018b; Oghazi & Mostaghel, 2018). (Geissdoerfer et al., 2020).

This study understands the concept of circular business model by combining the definitions of Mentik (2014), Geissdoerfer et al. (2018a) and Zucchella and Previtali (2019). Circular business models are intended as a "rationale of how an organisation creates, delivers and captures values with and within closed material loops" (Mentik, 2014, p. 24). They are built on circular economy principles (Geissdoerfer et al., 2018a) and their purpose is to "incorporate the CE principles into design and redesign of business activities and partnerships and to create a cost and revenue structure, which is compatible both with sustainability and with profitability" as explained by Zucchella and Previtali (2019, p. 275). Therefore, this research integrates the theoretical concepts of value and circular economy principles.

The literature has identified multiple CE principles. Bocken et al. (2016) outlines three CE principles: slowing, narrowing and closing. “Slowing” denotes the practice of extending the life of products, through for example repair or remanufacturing, to slow-down the consumption of resources (Bocken et al., 2016). “Narrowing” comprises improvements in efficiency to use less resources for each product (Bocken et al., 2016). This approach can also be adopted in linear business models, it may represent an initial strategy for gradually moving towards circular business models (Zucchella et al., 2022). “Closing” refers to the use of recycling practices to create a closed loop and circular flow of resources (Bocken et al., 2016). Activities like waste collection and management and the design of new products from waste are key to implement this strategy (Zucchella et al., 2022).

For the principles of slowing and closing the literature identifies specific circular business model. The “slowing” principle is translated into four CBMs: access and performance model, extending product value, classic long-life model and encourage sufficiency. The access and performance model is based on prioritising the provision of a service rather than the ownership (Product as a Service System). The producers retains the ownership of the product and is responsible for its maintenance, while the customers can enjoy the benefits that come from the use. Some examples of this business model include car sharing, launderettes, clothing hire and phones leasing. The extending product value business model implements the remanufacturing principle. This activity is carried out by the original manufacturer and is typical of automotive and refurbished electronics industries. The classic long-life model is a business model focused on delivering long lasting products that are designed to be durable and repaired. It is used by producers of white goods and luxury products like watches (e.g. Rolex). The encourage sufficiency CBM aims at reducing the consumption by producing product that last as long as possible and are against the planned obsolescence. This model is implemented by companies such as Patagonia and Vitsœ. (Bocken et al., 2016).

The ”closing” principle is implemented in two CBMs called: extending resource value and industrial symbiosis. The first model is based on the idea of collecting resources

that are considered waste and turn them into new forms of value. An example is the company named Interface, which collects used fishing nets and produces carpets with them. The second model, industrial symbiosis, is a process-oriented solution which turns waste outputs of processes in inputs for another one. (Bocken et al., 2016).

Circular business models are put into practice by implementing various CE strategies, which include several sustainability concepts. Kalmykova et al. (2018) realise a database of practical circular economy strategies that are used to implement CE. The strategies are divided according to which part of the product lifecycle they refer to and summarised in Table 2.

Table 2. Circular economy strategies (adapted from Kalmykova et al., 2018).

Phase of the product life cycle	**Circular economy strategies**
Material sourcing	• Establishment of industry standards to promote cross-sector collaboration • Energy production from waste • Green procurement of goods and services • Life Cycle assessment (LCA) to quantify emissions and resources consumed • Material substitution • Taxes on products associated with the generation of negative externalities • Subsidies
Design	• Tailor-made products to prevent over-production and enhance customer loyalty • Designing product considering repair, refurbishment or recycling • Design for modularity with modules that can be individually repaired • Eco design • Reduction in use of materials and harmful substances
Manufacturing	• Energy efficiency • Material productivity • Reproducible and adaptable manufacturing
Distribution and sales	• Optimised packaging design • Redistribute and resell
Consumption and use	• Community involvement (e.g. sharing platforms) • Eco-labelling • Product as a Service system • Product label transparency • Re-use (second hand)

Phase of the product life cycle	**Circular economy strategies**
	• Sharing • Socially responsible consumption • Taking responsibility in protecting a resource (stewardship) • Virtualise
Collection and disposal	• Extended Producer Responsibility (E. P. R.) • Incentivised recycling • Infrastructure building for post consume collection and disposal • Separation of biological and inorganic components • Take-back and trade-in systems
Recycling and recovery	• Use of by-products use of other companies as raw materials • Cascading • Downcycling • Element/substance recovery • Energy recovery (conversion of waste into heat, electricity or fuel) • Extraction of bio-chemical • Functional recycling • High quality recycling • Industrial symbiosis (exchange/sharing of resources and services between companies) • Composting • Upcycling
Remanufacture	• Refurbishment (replacing defective components) • Maintenance
Circular inputs	• Bio-based materials regeneration

The implementation of CE principles by international firms appears to be still in its early stages and it varies from country to country (Ghisellini et al., 2016). Indeed, it depends on multiple factors such as: level of economic development, social structure, culture, infrastructure, institutions, and geography in both home- and host-country markets (Chabowski et al., 2023). Home- and host-country governments play a critical role since the regulations they establish are highly effective in incentivizing international firms to be more sustainable and circular in their operations (Lieder & Rashid, 2016). However, circular economy laws and regulation are seldom consistent across nations and therefore companies must adapt their strategies and international business models across markets (Chabowski et al., 2023).

The integration of circular economy principles and practices in the design of business models leads to circular business model innovation. Some authors define circular business model innovation simply as the transition from a linear to a circular business model (Bocken et al., 2018; Linder & Williander, 2017; Rizos et al., 2016). Geissdoerfer et al. (2020) synthesises the various definition present in the literature and explains that circular business model innovation is the "conceptualisation and implementation of circular business models" (p.8). They identify four types of circular business model innovation: (1) circular business model transformation, (2) circular start-ups, (3) circular business model diversification and (4) circular business model acquisition (Geissdoerfer et al., 2020).

1) Circular business model transformation modifies an existing company's business model by incorporating circular economy strategies.
2) Circular start-ups describe the creation of a company that adopts a CBM from the beginning.
3) Circular business model diversification refers to the introduction of a circular business model that supports the traditional one, the two business models co-exists.
4) Circular business model acquisition involves the identification and integration of an existing CBM into the company.

These different types of CBM innovation can also be combined together. For this study the relevant types of innovation are number (1), (3) and (4). The "circular start-ups" circular business model innovation is excluded because the empirical section takes into account already established companies that are transitioning from a linear model to a circular one.

2.2.1 Value proposition

As explained in chapter 2.2 business model are composed of three main elements: value proposition, value creation and delivery and value capture (Richardson, 2008).

Companies, to communicate customer value, utilise a strategic tool called customer value propositions (CVPs) (Eggert et al., 2018). This tool is used to explain how the

company intends to provide value to customers (Payne et al., 2017). The value proposition of a company includes the offering, the target customers and the strategy that the company plans to use to obtain customers and competitive advantage (Richardson, 2008). In order to adopt a circular economy model firms need to rethink their value proposition (Geissdoerfer et al., 2020). CVPs are useful to demonstrate how a firm's offering is able to create more value for the customer compared to a competitor with a less sustainable business model (Ranta et al., 2020). As explained by Mouazan (2019) circular value propositions are designed to create products or services that "maintain, maximize or recover economic and environmental value embedded in products, parts and materials" (p. 19). A circular value proposition can, for example, prioritise the delivery of the service rather than the ownership of a product (product as a system model), highlighting the high quality and longevity of the product (Bocken et al., 2016). The value proposition can also be built around the extension of the value of a product and the exploitation of the residual value (Bocken et al., 2016). Another key element of circular value propositions can be the take-back of products and materials, which enables reverse manufacturing processes like repair, remanufacture, refurbish and recycling (Geissdoerfer et al., 2020).

In sustainable business models a key element is a value proposition that delivers quantifiable environmental and/or social value together with economic value (Laukkanen & Tura, 2022). It combines together the environmental, social and economic dimensions. A sustainable value proposition allows a concurrent creation of value for various stakeholders and it considers both short-term profit and long-term sustainability (Bocken et al., 2014).

2.2.2 Value creation and delivery

The second component of a business model is the value creation and delivery. It concerns how value is provided to customers (Bocken et al., 2016). It describes how the company is organised and which are its sources of competitive advantage (Richardson, 2008).

Value creation aims at understanding how value comes to be (Gummerus, 2013). Value creations processes involve the analysis of activities, resources and interactions that result in value creation. The literature shows a divergence on how value is created and who is involved in value creation activities (Gummerus, 2013). Value can be generated by firm activities, through co-creation of the company and other parties or by the customer. In order to understand these different views it is first necessary to make a distinction between two visions of value. Indeed, it can be intended either as "value-in-exchange" or "value-in-use", terms that illustrate two different ways of thinking about value and value creation (Vargo et al., 2008, p. 146).

Value-in-exchange reflects a traditional view named "goods-dominant (G-D) logic" (Vargo et al., 2008, p. 146). In G-D logic value is manufactured by the company and distributed in the market through an exchange of goods and money (Vargo et al., 2008). Therefore, value creation is the result of a series of activities executed by the firm. A company creates value by manufacturing a product which is then exchanged on the market for money. The G-D logic incorporates value into a good, whose value is represented by the market price or consumer's willingness to pay for that specific product. Value is based on "units of firm output" (Vargo et al., 2008, p. 149).

The alternative view, which was first presented by Vargo and Lusch (2004), is based on value-in-use and is called "service-dominant (S-D) logic" (Vargo et al., 2008, p. 146). According to this logic, value is co-created by producers and consumers, they interact with each other and do not have distinct roles. Value creation occurs when the product created is used and integrated with other resources. Therefore, value is co-created by a "reciprocal and mutually beneficial relationship" (Vargo et al., 2008, p. 146). In the S-D logic viewpoint every exchange relies on service, "goods are service-delivery vehicles" and value is the result of "processes that integrate resources" (Vargo et al., 2008, pp. 148–149).

In the S-D logic every business becomes a service business. It considers goods as a method of providing services. The function of goods is to deliver a service. In this perspective the supplier assumes the role of "resource integrator" and the value is deter-

mined by the customer as value-in-use. Companies do not adopt a service-dominant logic by introducing services to their offer but by including their customers in value creation, tailoring their offer to customer needs. (Kowalkowski, 2010).

Similar to the service-dominant logic is the service logic envisioned by Grönroos (2008). From this perspective companies can be seen as contributors to the creation of value since they provide customers with resources for their use. In this way firms lay the foundation of value and facilitate its creation, then, when customers use the good or service and integrate it with additional resources and their own skills, the value potential is developed into value-in-use. Consumption can be considered as a "means for value creation" (Grönroos, 2011, p. 8). According to Grönroos (2008) value-in-use is more important than value-in-exchange. The latter is a function of the former. In fact, if customers are not able to make use of a good, the value-in-exchange for them is zero. Value-in-use is a fundamental concept not only for customers but also for suppliers. A low value-in-use decreases value-in-exchange since unsatisfied customers are less inclined to return, leading to a decline in long-term revenue. Therefore, producers have to focus on creating value-in-use. (Grönroos, 2008).

Suppliers can be considered value facilitators and the more they facilitate the more value-in-use can be created (Grönroos, 2008). This value creation model, where the firms' part is of value facilitator only, is presented by Grönroos (2008) and is called "value facilitation model" (p. 305). The supplier provides the foundation for value creation in the form of resources, then the customer adds its own skills and additional resources to form value-in-use. This model is based on the goods logic and firms cannot directly generate value (Grönroos, 2008). However, when companies adopt a service logic they can have a greater role in the customer value creation process (Grönroos, 2008).

According to Grönroos (2008), companies, regardless of whether they provide services or produce manufacturing goods, have to behave as a service business. In this way they can contribute to create value by supporting customers in the value creation process. Firms become co-creator of value with their customers (Grönroos, 2008). In a service

logic the creation of value-in-use is built upon Grönroos' "value fulfilment model" where customers are value creators and suppliers cover the role of both value facilitators and value co-creators (Grönroos, 2008, p. 308).

This thesis adopts the vision of Grönroos (2008), a service logic. In this context producers should "find a way in to the customer's arena for value creation rather than to try force the customer to fit into the service provider's processes" (Grönroos, 2011, p. 10). Companies have the possibility to interact with customers and they have to try to understand customer's value creation and provide resources and support (Grönroos, 2011).

The extant literature on circular business models identifies various value creation logics. Sheth (2020) analyses value creation in B2B contexts and identifies seven types of value co-creation: growing the customer business, also known as customer business development (CBD) where supplier and customer collaborate to grow the latter's business; regulation compliance; collaboration for corporate social responsibility (CSR) and triple bottom line; conscious capitalism, where the focus is on the company's financial performance; public policy reforms, used to create new markets; breakthrough innovations, which are promoted by the collaboration between governments and the private sector; and public-private relationships. The co-creation occurs when both suppliers and customers cooperate and share resources and capabilities. It improves the well-being of the ultimate consumer with a positive outcome for both the supplier and the customer. (Sheth, 2020).

Another classification, specific to the circular economy context, is the one proposed by Ranta et al. (2020). They identify four value creation logics used in B2B markets: resurrect, share, optimise and replace value. Value propositions based on resurrecting value create value by recycling and restoring disposed materials and products and returning them to the market. This logic is based on the closing principle of circular economy. Share value logic focuses on broadening the number of users. It aims at narrowing resource loops and it is at the base of the sharing economy. The third value creation logic is called optimise value and is also based on the narrowing principle of the circular

economy. Value can be created by optimising resource use, creating more value from fewer resources. The replace value logic is based on the idea of replacing existent product with better alternatives. The new products have longer life cycles, therefore value is generated by slowing resource loops and extending usage periods. (Ranta et al., 2020).

Fehrer & Wieland (2021) classify four logics of value creation: efficient material-technical loops, effective product-service loops, social-collaborative loops and symbiotic ecosystems. In efficient-material-technical loops value creation is done by closing, slowing and narrowing biological and technical lifecycles. They maximise material and energy efficiency through both forward- and backward-integrated processes: delivering goods produced in a sustainable manner and retrieving products at the end of their lifecycle to recycle them. Effective product-service loops generate value by substituting product ownership with access to products and services. Social-collaborative loops underline the importance of collaboration, leading to a more systemic perspective. Lats but not least, symbiotic ecosystems create value by closing resource loops and adopting a holistic perspective. (Fehrer & Wieland, 2021).

Ranta et al. (2020) and Fehrer & Wieland (2021) are quite similar and can be combined together for the purpose of this study. Ranta et al.'s (2020) share logic is reflected in Fehrer & Wieland's (2021) social-collaborative loops logic. Indeed, they both emphasise collaboration and sharing as necessary elements to create value. There are similarities also between the optimise logic and the efficient material-technical loops one. The latter can also be associated with resurrect since both aim at retrieving products to restore them and return them to the market. Therefore, this study considers five value creation logics: efficient material-technical loops, which includes resurrect and optimise logics; effective product-service loops; replace; social-collaborative loops, based on sharing principles; and symbiotic ecosystems.

2.2.3 Value capture

Value capture refers to how a company produces revenue and obtains profit. It includes the revenue model, which outlines the sources of revenues and how the company earns money, and the economic model, which includes financial aspects of the firm such as costs and margins. The economic model reflect also the capability of the company to gain a competitive advantage and generate profit. Therefore, value capture explains how the firm makes money. (Richardson, 2008).

In circular business models companies can capture new forms of values. Value can be captured by optimising materials usage and reducing waste, which leads to cost reduction (Bocken et al., 2014). Companies can reduce economic and environmental costs by reusing materials and turning resources that are considered waste into new forms of value (Bocken et al., 2014). They can capture value thanks to the possibility of applying a premium price to customers and thanks to the greater market share that comes from offering better product that last longer. However, it is necessary to consider that companies are not always able to capture all the value that they create, they often share it with other stakeholders like employees, competitors or society (Lepak et al., 2007).

2.3 Barriers and facilitators to the transition of circular business models

Businesses are resistant to change and they can encounter barriers and challenges in the process of implementing a circular business model (Zucchella et al., 2022). These barriers can be classified into various ways. de Jesus and Mendonça (2018) analyse the literature and aggregate the previous findings with the aim of creating a framework of circular economy barriers. They make a distinction between hard and soft barriers. Hard barriers are connected to technical and economic factors, while soft barriers refer to institutional and social factors (de Jesus & Mendonça, 2018). The barriers identified by these authors are described in Table 3.

Table 3. Types of barriers to the CE (adapted from de Jesus and Mendonça, 2018).

Hard barriers	Technical factors	• Inappropriate technology • Lag between design and diffusion • Lack of technical support and training
	Economic factors	• Large capital requirements • Significant transaction costs • High initial costs • Asymmetric information • Uncertain return and profit
Soft barriers	Institutional/Social factors	• Misaligned incentives • Lack of a conducive legal system • Deficient institutional framework • Rigidity of consumer behaviour and business routines

One of the economic factors mentioned by de Jesus and Mendonça (2018) is the necessity of high investments. This barrier brings up the problem of having enough resources to invest in a transition to sustainability and the uncertainty of the returns, which are difficult to predict (Zucchella et al., 2022). Companies tend to postpone their transition and wait to see the economic gains that other companies obtain (Kirchherr et al., 2018) It is challenging to forecast the market potential of circular initiatives and the customers' willingness to pay (Linder & Williander, 2017).

Another classification is the one proposed by Kirchher et al. (2018). They divide barriers in four categories: cultural, regulatory, market and technological. The elements of these categories are presented in Table 4 and are similar to the ones identified by Jesus and Mendonça (2018). In particular, the authors underline the importance of two core cultural barriers: "lacking consumer interest and awareness" and "hesitant company culture" (Kirchherr et al., 2018, p. 265). In fact, their research indicates that these two barriers are the most critical and they can, potentially, slow down and jeopardize the successful transition towards a CE (Kirchherr et al., 2018). Customer's awareness is changing slowly, due to the limited education about the circular economy and the options it provides (Zucchella et al., 2022). To raise awareness is necessary a consistent

effort from regulatory bodies, public institutions and companies themselves through their marketing and communication strategies (Zucchella et al., 2022).

Table 4. Categories of barriers to the CE (adapted from Kirchher et al., 2018).

Types of barriers	**Examples**
Cultural	• Hesitant company culture • Limited willingness to collaborate in the value chain • Lack of consumer awareness • Operating in a linear system
Regulatory	• Limited circular procurement • Obstructing laws and regulations • Lack of global consensus
Market	• Low prices of virgin materials • Lack of standardisation • High upfront investment costs • Limited funding for CBM
Technological	• Lack of the ability to deliver high quality remanufactured products • Limited of circular designs • Too few large-scale demonstration projects • Lack of data (e.g. on impacts)

If barriers are the elements that hinder the implementation of circular economy, drivers are those that facilitate it. They can be divided in the same way as barriers, into hard and soft drivers. Hard drivers include technological factors, which are considered fundamental in the transition to a CE. Companies need the technical knowledge and the support of technology to develop their business in a circular way. Having access to technical solutions is crucial for designing product with an extended life-cycle, to recycle waste and to balance quality and efficiency. Hard factors include also economic, financial and market drivers. However, the CE is driven particularly by soft factors. These drivers can be social, regulatory or institutional. Social drivers include: cultural acceptance of CBMs, social awareness of environmental issues and customers' preferences. The transition towards a circular economy is affected also by regulatory and institutional factors. Indeed, it is facilitated by an environment characterised by conducive policy measures such as taxes, legal frameworks, incentives and infrastructure de-

velopment. Other examples of soft drivers are: education, training and support of R&D. (de Jesus & Mendonça, 2018).

According to de Jesus and Mendonça (2018) drivers and barriers are not mutually exclusive and they should be considered as a mix of facilitating and constraining factors that derive from local conditions. Barriers and enablers are strictly connected to the context in which the company operates (Agyemang et al., 2019). For example, challenges differ in developed and developing countries (Kalmykova et al., 2018). In an international context business models need to be adapted to regulatory, infrastructural and market differences between countries (Chabowski et al., 2023). The value proposition has to be adapted according to market conditions, which are influenced by the type of demand, the capabilities of suppliers and intensity of competition (Tallman et al., 2018). Value creation can be modified according to the diverse needs of customers in host countries. These needs are influenced by differences in culture, economic development, social structure, national institutions, and geography. Similarly, value delivery may be adjusted according to the local market infrastructure, which may alter delivery options and costs. Value capture may have to be changed according to infrastructural and legal differences in target markets. In fact, it is affected by issues such as inflation, exchange rate exposure, currency restrictions, tax arbitrage, corruption, local partners and opportunities of reinvestment (Tallman et al., 2018).

It is possible to conclude by saying that the literature identifies various barriers and drivers but, as explained by Zucchella et al. (2022), it is not always clear how firms can overcome these barriers and transition towards the circular economy. Moreover, to successfully implement circular economy initiatives it is necessary a collaboration between the various stakeholders (Lieder & Rashid, 2016). Partnerships and collaborations are considered enablers of CBM adoption and should be used to overcome barriers (Assmann et al., 2023).

2.4 Customer value

As previously explained in chapter 2.2 circular business models are intertwined with the concept of value. The business model framework is characterised by value proposition, value creation and delivery system, and value capture (Richardson, 2008). Indeed, a business model answers to the questions: what is offered (value proposition), how is the value created and how are processes implemented to deliver the promised value (value creation and delivery dimension), why is the revenue model financially feasible (value capture dimension) and who are the target customers (potential customers) (Frishammar & Parida, 2019). In this section I explore first what value is and then how it is created, delivered and captured.

Market driven companies' fundamental purpose is to create value for customers (Saliba & Fisher, 2006). In order to understand how companies can create value it is first necessary to analyse the concept of customer value itself. There is not an universally accepted definition of customer value and its typologies (Smith & Colgate, 2007). In the literature there are multiple definitions of customer value. Zeithaml (1988) states that "value is the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given" (p. 14). Many authors define customer value as a trade-off between quality and price (Sweeney & Soutar, 2001). For example, Monroe (1990) affirms that "Buyers' perceptions of value represent a trade-off between the quality or benefits they perceive in the product relative to the sacrifice they perceive by paying the price" (p. 46) while for Gale (1994) customer value refers to the "market perceived quality adjusted for the relative price of your product" (p. xiv). However, other scholars have argued that considering value only as a trade-off between quality and price is too simplistic (Sweeney & Soutar, 2001). These two measures are not enough to understand how customers value products and services.

Zeithaml (1988) underlines that what constitutes value is subjective and idiosyncratic, every consumer perceives value differently. Indeed, in their research, they found that some respondents equated value with low price, others as a trade-off between what they give (price) and what they receive (quality) and some consumers conceptualized it

in the sentence “value is what I get for what I give” (Zeithaml, 1988, p. 13). Value can be confused with quality, but these two concepts differ for two reasons. First, value is more individualistic and personal than quality and second it involves a trade-off of give and get components. Moreover, quality is not the only attribute associated with value. Between the benefit components (get) of value there are also intrinsic and extrinsic attributes, characteristics of a product or service which are considered by consumers during the purchasing phase. While among the sacrifices, give component, there are both money and other resources such as time, energy and effort. (Zeithaml, 1988).

According to Woodruff (1997) customer value can be defined in multiple ways but all definitions include some common elements. They all refer to the perception that customers have towards the seller’s products and services. They are linked to the use of a product or service and they involve a trade-off between the benefits that the customer receives and what she/he has to give up to obtain and use the product. Despite the various similarities between the definitions, there are also a number of divergences. For instance, these definitions are constructed on terms like utility, benefits and quality which are themselves not defined and are therefore difficult to compare. Moreover, the concept of customer value differs depending on circumstances: customers may consider value when deciding whether to buy a product or when experiencing its performance and quality during or after its use. In the first scenario the customer has to consider alternative products and services, by evaluating their characteristics, and determine which one is better; while in the second case what is relevant are performances. (Woodruff, 1997).

The value of the same product can be perceived differently at different times and it is possible to distinguish between “desired value” and “received value” (Woodruff, 1997, p. 141). During the decision-making process, customers experience the desired value and try to predict the received value, which is only confirmed during the actual use of the product. Woodruff’s (1997) definition of customer value includes both desired and received value and adopts the customer perspective. They link the product with its use and the related consequences. They define customer value as a “customer’s perceived

preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purpose in use situations" (Woodruff, 1997, p. 142).

There are various classification of types of value. For example, Sheth et al. (1991) identify five dimensions of value that influence the consumer choice behaviour. These types of value are: functional, social, emotional, epistemic and conditional. While Sweeney and Soutar (2001) consider four categories: quality, price, emotional value and social value.

Functional value is considered the primary driver of consumer choices and it is measured by attributes (Sheth et al., 1991). According to Sheth et al. (1991) functional value corresponds to the perceived utility that the customer derives from these attributes. Sweeney and Soutar (2001) suggest quality and price as two functional attributes and they argue that they should be considered as two separate subcomponents of functional value. Quality has a positive effect while price a negative one, therefore it is necessary to measure them separately (Sweeney & Soutar, 2001).

Social value refers to the perceived utility acquired from the association of a product with one or more social groups (Sheth et al., 1991). A product has social value when it is associated, either positively or negatively, with a specific demographic, socioeconomic and cultural-ethnic group. This type of value is particularly important for "highly visible products (e.g., clothing, jewellery) and goods or services to be shared with others (e.g., gifts, products used in entertaining)" (Sheth et al., 1991, p. 161).

Emotional value is defined as the ability of a product to provide utility through feelings and affective states (Sheth et al., 1991). A product has emotional value when it is associated with particular emotions and feelings. For example, a lit candle during a dinner arouses a romantic mood, or a specific food can be linked to childhood experiences and therefore convey a sensation of comfort. Moreover, Sweeney and Soutar's (2001) study demonstrates the importance of this dimension by underling the positive effect of emotional value on consumer's willingness to pay.

The forth type of value identified by Sheth et al. (1991) is called epistemic. It refers to the value of a product connected to its ability to "arouse curiosity, provide novelty, and/or satisfy a desire for knowledge" (Sheth et al., 1991, p. 162). A product with epistemic value is able to offer new experiences to the customer and is chosen when the consumer is bored of the typical brand he or she chooses, when he or she is curios or when there is a desire to learn.

Last but not least, there is conditional value. This type of value is connected to the circumstances in which the decision-making process happens (Sheth et al., 1991). It refers to the influence that a specific situation has on the perception of value (Sweeney & Soutar, 2001). In fact, the presence of physical or social factors can increase the functional or social value of a product (Sheth et al., 1991). According to Sweeney and Soutar (2001) conditional value can be seen as a "specific case of other types of value" (p. 208).

According to Sheth et al. (1991), these values are independent of one another and they contribute incrementally to choices. Although it is preferable to maximise all five values, it can be impractical and customers have to accept a trade-off: in order to obtain more of one value they have to compromise on less of another one (Sheth et al., 1991). Sweeney and Soutar (2001) agree with Sheth et al. (1991) on the idea that value is multidimensional but they question the independence of the dimensions. Sweeney and Soutar (2001) believe that value dimensions are interrelated. For instance, conditional value is the result of a moderating effect caused by functional and social value.

These customer value dimensions have been analysed especially in the consumer realm and with a limited attention to the business-to-business context. A more specific study, focused on the B2B world, has been conducted by Sairanen et al. (2024). They identify, from the existent literature, four value dimensions: economic value, functional value, relationship value and symbolic (or identity) value. These dimensions are then analysed in a circular context and implemented with new ones because circular offerings reshape customer value and value creation processes. The three new dimensions are: ethical, strategic adaptation and systemic. (Sairanen et al., 2024).

Economic value is connected to the financial performance. Sairanen et al. (2024) consider the price of a product or service as an indicator of customer value rather than as one of its components. In a circular context it involves cost savings, obtained thanks to the extension of the products lifetime and optimisation; an increase in revenues, because companies can either charge customers with a sustainability premium or monetise waste; and financial stability, due to more transparency and lower-risk. In a circular B2B context functional value is characterised by a subdimensions called “customer specific utility”, which is connected to changes in a product specifically adopted to satisfy the needs of a customer (Sairanen et al., 2024, p. 329). Relationship value is the result of interactions between supplier and customer. It is characterised by two subdimensions: co-development of circularity, and reporting and transparency. The first subdimension refers to the relationship between suppliers and customers that are collaborating to innovate products and services. The second dimension, reporting and transparency, is essential to build trust within the relationship and obtain the data-driven benefits connected to a circular offering. Identity value includes both the external and internal image of a brand and its connection with sustainability. The external brand and image subdimension concerns the potential benefits or drawbacks that a collaboration with a supplier may have on the customer’s image. While internal branding can be used to favour sustainable innovation and motivate employees. Identity value is fundamental to make circularity visible and allow customers to perceive it. It helps generate an emotional response to circularity. (Sairanen et al., 2024).

These four value dimensions are integrated with three novel ones. The first new dimension of value introduced by Sairanen et al. (2024) in a circular setting is ethical value. It enables customers to achieve their moral objectives connected to social and environmental sustainability. Therefore, it is characterised by two subdimension that consider the scale and scope of environmental and social impact of products and services. Strategic adaptation emerged as the second new dimensions. This type of value is connected to the desire of customers to adapt to ever-evolving environments. In particular, to the necessity of change driven by concerns for environmental sustainability. Customers perceive value in the capacity to anticipate policy changes and proactively

adapt their company's strategy. Indeed, being ahead of regulation enables companies to avoid being forced to implement expensive last-minute adjustments. The third value dimension identified is called systemic value. Customers perceive this type of value because they see the circular economy as a systemic transition that can affect customers' stakeholders. It enables customers to achieve their sustainability goals by promoting a favourable business ecosystem. Sustainability oriented customers are able to shape the business ecosystem in which they are active and promote the development of norms. (Sairanen et al., 2024).

2.5 Summary of the theoretical framework

Companies are pressured to be more sustainable and to start implementing circular economy practices. The literature has identified multiple strategies adopted by firms to put the circular economy into practice, all of which can be traced back to the principles of slowing, narrowing and closing loops. The implementation of CE principles by international firms appears to be still in its early stages and it varies from country to country (Ghisellini et al., 2016). Indeed, as explained by Chabowski et al. (2023), it depends on multiple factors such as: level of economic development, social structure, culture, infrastructure, institutions, and geography in both home- and host-country markets. The adoption of CE principles and practices leads to a transformation at the level of the business model, leading to circular business models.

As presented in chapter 2.3 the literature identifies various types of barriers that hinder the transition to circular business models. This thesis adopts the distinction between hard and soft barriers proposed by de Jesus and Mendonça (2018) but takes into account also the types of barriers presented by Kirchher et al. (2018). In fact, the two classification are similar and include the same elements. Therefore, this study considers two main groups: hard and soft barriers. The former is composed of technical factors and economic/market factors while the latter is characterised by institutional/regulatory factors and social/cultural factors.

Opposite to barriers there are those elements that favour the transition to CBM. They can be divided between hard and soft drivers. Unlike barriers, which are dominated by hard factors, the transition is primarily promoted by soft drivers (de Jesus & Mendonça, 2018). The literature analysed identifies soft drivers as social, cultural, regulatory and institutional factors. On the other hand, the hard drivers are technical, economic and market factors.

As explained by Richardson (2008), business models are characterised by value proposition, value creation and delivery, and value capture. Therefore, the adoption of a new business model, based on circular principles and practices, affects also these three elements. Companies need to rethink their value proposition and use it to deliver environmental value together with economic value (Laukkanen & Tura, 2022). For value creation and delivery the analysis of the extant literature has revealed multiple possibilities. This thesis adopts Grönroos's (2008) vision, a service logic, in which supplier and customer collaborate to co-create value. The creation occurs following five different logics which are the results of the combination of the views of Ranta et al. (2020) and Fehrer & Wieland (2021). Therefore, this study considers five value creation logics: efficient material-technical loops, effective product-service loops, replace, social-collaborative loops and symbiotic ecosystems. Last but not least, the value capture part of the business model is influenced by the possibility, for companies, to capture new forms of value thanks to a circular business model. This can be seen in the revenue model, which outlines the sources of revenues and how the company earns money, and in the economic model, which includes financial aspects of the firm such as costs and margins (Richardson, 2008).

Ultimately the adoption of circular economy practices and the adoption of a circular business model affect the value perception and willingness to pay of international customers. All these concepts summarise the literature analysed, on the basis of which a theoretical framework was constructed, presented in Figure 2.

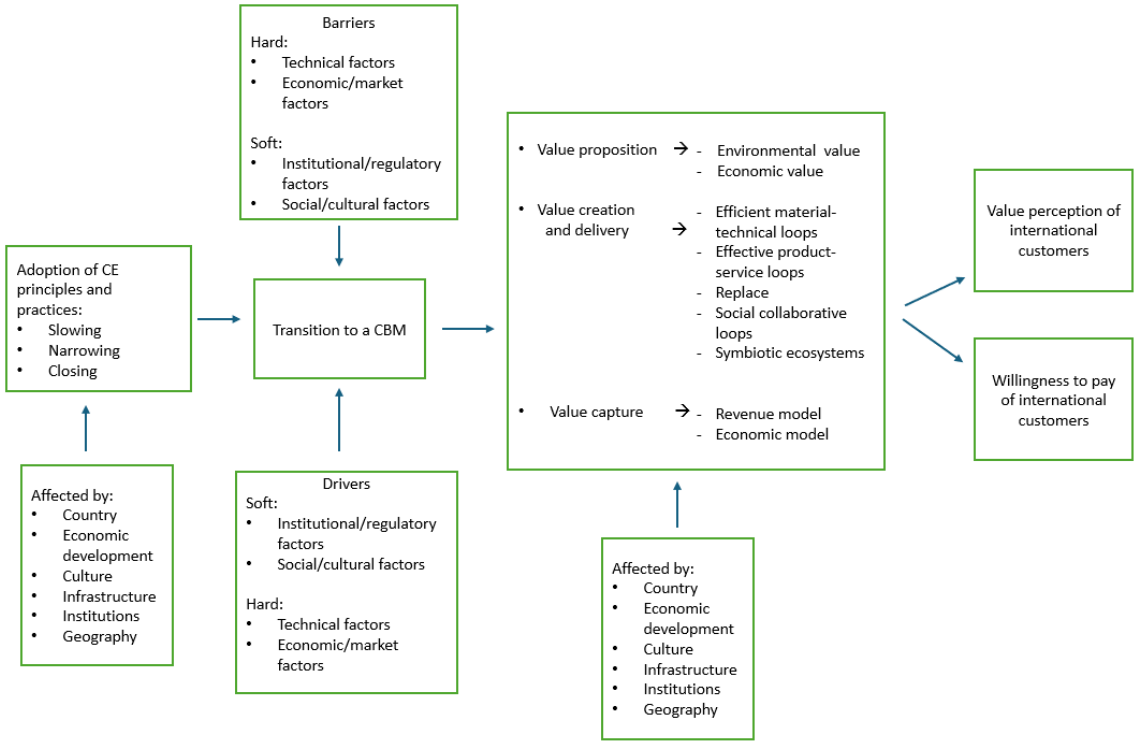

Figure 2. Theoretical framework.

3 Methods

This chapter presents the research method adopted by the study.

3.1 Research approach and methodology

Research can be approached in three different ways: deductively, inductively or as a combination of both (Saunders et al., 2007). The deductive research approach is based on the analysis of the existent theory, which leads to the formulation of hypotheses that are then tested with the empirical part (Saunders et al., 2007). On the other hand, the inductive approach formulates theory from the data collection and analysis. This master thesis adopts a deductive approach, which is the most suitable for the topic of circular economy due to the abundance of literature and the possibility of defining a theoretical framework. However, contrary to what indicated by Saunders et al. (2007) this thesis does not formulate any hypothesis due to its exploratory nature. It wants to better understand the implementation of circular business models and their effects on international customers. The purpose of the research is to clarify the understanding of how plastic products manufacturers implement circular practices in their strategy and operations and the formulation of hypotheses would have limited the research. The scope of this study is to validate and expand the theoretical framework in the context of B2B plastic products manufacturers.

The research strategy employed is the multiple case study. A case study is “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robson, 2002, p. 178, as cited in Saunders et al. 2007). In particular, this study uses a multiple case study. Therefore multiple organizations are taken into account in order to establish whether the findings can be generalised. The literature review has identified gaps in the extant theory on the implementation of circular business models that needs further exploration and since multiple case studies allow theory development by comparing different cases, they have been selected as research strategy for this thesis (Eriksson & Kovalainen, 2015).

The thesis adopts a qualitative research method. Addressing a “how” research question requires a comprehensive perspective, which can only be attained through qualitative case studies (Eisenhardt & Graebner, 2007). Qualitative data refers to all non-numeric data and it is sensitive to the social and cultural context (Yin, 2009). It allows to understand the phenomenon as a whole. The empirical part is conducted by collecting primary data through semi-structured interviews. The interviews are conducted one-to-one following a list of questions which can be varied during the interview. Due to time constraints the study’s time horizon is cross-sectional, it analyses a specific phenomenon at a particular time (Saunders et al., 2007). Moreover, also secondary data is used as support for the research. I analysed the information available on companies’ websites and in particular their sustainability reports.

3.2 Case selection and data collection

The case companies have been selected through a non-probability sampling technique. In particular, by using purposive sampling. This technique allows the researcher to use their own judgement to select cases that best fit their study, facilitating the achievement of the objectives and enabling them to answer the research question (Saunders et al., 2007). As explained by Yin (2009) purposeful sampling is appropriate when cases are selected for their rich information and because they represent a valuable example of the phenomenon of interest. The thesis adopts this sampling technique because it is essential that the plastic product companies analysed are adopting a strategy focused on sustainability and are implementing a circular business model.

In order to select the companies a set of criteria was used. First of all, the study focused on companies producing plastic products for the B2B market. Then the organizations had to be Italian but operating internationally. Another criterion was the establishment year, companies had to be at least three decades old. Only firms that were founded when there were no regulations about plastic waste and the environmental impact were selected. This choice was made because the aim of the research is to analyse how companies are transitioning towards a more sustainable business model by incorporating circular economy principles and practices. The fourth criterion was cor-

porate strategy: I selected firms that explicitly communicated their focus on sustainability in their website. Indeed, these companies are leveraging sustainability and structuring their business model around it. This criterion is important for the thesis because I want to explore whether these organizations are just exploiting sustainability in their favour or are really committed to it. These criteria led to the selection of three case firms. For privacy reasons, the name of each company is not mentioned and they are referred to as company A, B and C. Key information about each companies are described in Table 5 below.

Table 5. Summary of case companies.

	Company A	**Company B**	**Company C**
Products	Expanded polystyrene and corrugated cardboard for the packaging and construction markets.	Moulding of plastic articles for oenology, agriculture, plant nursery, industry, construction, garbage collection, garden and home.	Food and industry packaging.
Number of employees	170	70	250
Foundation year	1969	1973	1972
Headquarter	Northern Italy	Northern Italy	Northern Italy
Sustainability report	From 2022	From 2025	From 2021

The data for the study was gathered through interviews. Interviews can be formalised and structured or informal and unstructured (Saunders et al., 2007). This thesis has collected the primary data by using semi-structured interviews. This type of interviews is based on a list of themes and questions that can vary from interview to interview, allowing some flexibility to better explore the research question (Saunders et al., 2007). Semi-structured interviews enable the exploration of both “what” and “how” questions, to collect data in a systematic way and to use a tone that can be conversational (Eriksson & Kovalainen, 2015).

In selecting the interviewees, the goal was to have two representatives from each company: one from the sustainability team and another from the sales department.

This choice was due to the necessity of interviewing someone familiar with all the sustainability practices implemented by the company, but also someone engaged with customers to understand how environmental value is delivered to them and whether it is perceived and appreciated or not. However, only in one case it was possible to do so: for company A, interviews were conducted with both the Sustainability Manager and the Sales Manager while for the other companies employees in other positions were questioned. For company A and C two people were interviewed while for company B only one person was interviewed but for a longer time-span and by asking questions from both questionnaires. This decision was made because the interviewee, being the CEO, had comprehensive knowledge of all relevant areas of the research. Furthermore, given the smaller size of his company compared to the other two, a second interviewee was deemed unnecessary for further investigation. For company C, it was possible to interview the Quality Health Safety and Environment (QHSE) Manager and the Communication Specialist. These two people are part of the company's Sustainability Committee and therefore they were considered suitable for the study.

The interviews were conducted one-to-one using Microsoft Teams. The questions were prepared in advance but, when necessary, additional ones were asked and others omitted. Two different set of questions were prepared: one for interviewees that were part of a sustainability team and one for sales department representatives. In the first case, questionnaire A, the questions were intended to explore more deeply the perception and adoption of circular business model, while in the second one, questionnaire B, the focus was on how sustainability is delivered to customers and captured internally by the company itself. The main questions can be seen in Appendix 1 and Appendix 2. The interviews were conducted in Italian, as it was the mother tongue of the interviewees and they were more comfortable speaking. The themes covered during the interviews include the importance of sustainability for the company, the adoption of circular principles and practices, barriers and facilitators to the implementation of a circular business model and the effect of this transition on international customers. The interviews were recorded, with the consent of the participant, and then transcribed. This method allowed the researcher to maintain the concentration during the interview, without

having to think about taking notes. A summary of the information regarding each interview is presented in Table 6.

Table 6. Summary of interviews.

Company	Interviewee	Role	Duration	Questionnaire	Channel
Case A	1	Sustainability Manager	42 min	A	Microsoft Teams
	2	Sales Manager	35 min	B	Microsoft Teams
Case B	3	CEO	50 min	A+B	Microsoft Teams
Case C	4	QHSE Manager	34 min	A	Microsoft Teams
	5	Communication Specialist	34 min	B	Microsoft Teams

For the analysis of qualitative data there is not a standardised method to follow (Saunders et al., 2007). In this research, the analysis of the collected data started with the transcription of the audio-recorded interviews. Then, in order to improve the accuracy of the transcripts the data was cleaned by removing all the repetitions and unnecessary words. After the data cleaning, a preliminary analysis was conducted by highlighting the most important information and key words. The first phase of the coding process was the identification of categories in which to classify the data. These categories were derived from the theoretical framework and included: transition to a CBM, circular practices adopted, barriers, drivers, differences between international customers, value proposition, value creation and delivery, and value capture. Afterwards, the transcripts have been analysed again and colour-coded according to the various categories. This coding system simplified the comparison between the various interviews and facilitated the analysis. Thereafter, the empirical data was compared with the theoretical data derived from the literature to test the findings and eventually revise the theoretical framework.

3.3 Reliability and validity

As mentioned above, the thesis uses qualitative data and it is therefore necessary to acknowledge its limitations. Indeed, connected to the use of semi-structured inter-

views, there can be data quality issues related to: reliability, validity and generalisability. According to Saunders (2007) reliability "refers to the extent to which your data collection techniques or analysis procedures will yield consistent findings" (p. 149). Therefore a reliable research can be replicated and the findings would be consistent with the previous ones. Validity relates to the accuracy of the results and generalisability concerns the possibility of extending the findings to other research settings, like other organisations. (Saunders et al., 2007).

In order to deliver a reliable research the study was conducted in a transparent and systematic manner. The data collection process was consistent throughout the whole study. The interviews were all conducted through the same channel and were recorded. They took place online and each interviewee was in a location where they were comfortable speaking without being disturbed. Before the interviews, participants were provided with relevant information and a list of themes that would be covered. To avoid observer error and observer bias, questions were asked in a neutral way, without suggesting or directing the respondent towards an answer. Another threat to reliability is the response bias, which is connected to disclosing sensitive information. In order to reduce this threat participants were assured about the anonymity of the information provided. The confidentiality is delivered by keeping the personal data separate from the answers.

Another aspect to be considered is the validity, which can be defined as "whether the findings are really about what they appear to be" (Saunders et al., 2007, p. 150). This dimension of validity can be referred to as internal validity while external validity concerns the generalisability of the findings. As explained by Saunders (2007) there are some concerns on the generalisability of qualitative research, due to the use of a small number of cases. The generalisability of the study is also limited by the use of purposive sampling because it cannot be regarded as statistically representative of the entire population (Saunders et al., 2007). The thesis focuses on plastic product manufacturers, aiming to explore the dynamics within this specific industry, it does not intend to draw

conclusions or develop theories that can be generalized to other industries. However, the findings can be applicable to other companies operating in the same field.

4 Empirical findings

The following chapter outlines the findings of the empirical study. It presents the data collected through the semi-structured interviews and its analysis.

4.1 Company A

The first company considered as a case study is company A. It has its headquarter in Northern Italy and it was founded in 1969. It produces expanded polystyrene and corrugated cardboard for the packaging and construction markets. The company operates internationally and its major clients are located in Turkey, United Kingdom, Sweden and Italy.

Company A attributes a lot of importance to sustainability and is making an effort towards reducing its environmental impact. The effort is first visible in its website, where they explain what goals they have and what they are doing to achieve them, and is then verified through the interviews. The Sustainability Manager of the company describes sustainability as an *"essential"* element of their business model.

> *"In recent years our packaging industry has been hit very hard by sustainability policies, especially here in Europe. Our biggest customers want to become carbon neutral in 2050 and therefore from 2027 they have decided to remove all suppliers that do not have a minimum of environmental criteria, so for us sustainability is essential." (Interviewee 1)*

Both interviewees of company A, interviewee 1 and 2, explain that their company is experiencing a **transition** towards a more circular business model. This transition is characterised by technical and structural improvements like the use of recycled raw materials or the installation of photovoltaic panels, which allow to satisfy the 20% of their energy requirements. The company, to reduce its carbon footprint, has some collocations within its customers, which allow to reduce transportation and fuel consumption. It is investing in research and development to create products from alternative materials with a lower environmental impact. However, the Sustainability Manger explains that the main action include the participation in various projects. Therefore the transition is not formalised but is put into practice by taking part in circular economy

initiatives. These projects are active at European level and are: Operation Clean Sweep, an international program designed to prevent the loss of plastic granules during handling by the various entities in the plastics value chain; EcoeFishent, a program that aims at achieving a climate-neutral circular economy in the fishing sector of Genova (Italy); and Recotrace, the first comprehensive data system to monitor both plastic recycling volumes and the use of recycled plastic for all major polymers. The participation in these programs is fundamental because they provide the necessary funds for the transition towards a CBM but also a direction to follow. The company is also publishing a yearly sustainability report to keep its stakeholder updated about its practices and initiatives. The commitment towards the environment is also visible in the form used to evaluate suppliers and in a series of certifications and awards. The suppliers forms takes into account ESG criteria, setting a minimum score to be satisfied to be considered eligible. Company A has received the Sustainability Award, promoted by Kon, which rewards companies that have successfully integrated environmental, social and economic sustainability within their strategies; and it uses second life plastic (PSV certification) for its products. The PSV (Plastica Seconda Vita) certification is based on European standards, it certifies materials and products obtained from the recovery of plastic waste emphasizing the importance of the quality and traceability of recycled materials.

During the interviews various **drivers** that promote the transition towards a circular business model emerge. First of all, there is a personal interest from the owner of the company, who is also a university professor of circular economy, that is leading the whole company in this direction. Then the Sustainability Manager identifies new legislations and market pressure as determining factors for the transition. For example, in the United Kingdom there is a regulation which requires companies that produce plastic products with less than 30% of recycled plastic to pay a tax. This tax incentivises companies to increase the amount of recycled raw material used. Interviewee number 2 identifies also climate change as a driver: the environmental impact that we experience everyday help understand the importance, urgency and necessity of change in the way business is done.

Through the interviews, it was possible to identify the **challenges** that the company encounters in implementing the circular economy. The main obstacle are economic barriers, to achieve certain objectives it is necessary to invest.

> *"Company A is a medium-sized company so obviously we would like to do a lot of things, but we also lack the budget. To get to certain points you need investments and sometimes you have to choose between one or the other, because you simply don't have the economic capacity to do both. The economic barrier exists, you can't deny it." (Interviewee 1)*

Recycled products have an higher cost and therefore an higher price. The higher cost are due to the need to collect, reprocess, and rework the raw material. Customers are still very sensitive to the price.

> *"So, let's say that, all things being equal in terms of performance, they prefer the cheaper product until they are forced to switch to other options." (Interviewee 2)*

Another challenge is the research and development. It is not always easy to find new solutions to comply with the regulations, which are different from country to country.. For example, the company has used a lot of resources to develop a new packaging material made of pulp for a specific client. However, the customer has then decided to block the project due to its high costs. Moreover, from the interviews it emerges the problem of collecting polystyrene for its recycling.

> *"The issue with polystyrene is that, being a product that is very bulky but extremely lightweight, no one wants to collect it because the collection costs would be too high relative to the value of the material." (Interviewee 2)*

According to the Sustainability Manager of company A **customers** value sustainability and circular economy practices but there are significant differences in the level of appreciation depending of the country of origin of the clients. The firm does business especially in Italy, within the European Union and in Turkey. Europeans are more attentive towards sustainability and are willing to pay an higher price.

> *"European customers are much more stringent compared to Turkish customers. In Europe, they are more willing to pay a bit extra for a more sustainable product. End consumers here in Europe are more concerned about the origins of what they purchase. […] On the other hand, Turkish customers are far more price-sensitive, so when it comes to sustainable materials—which are typically more expensive than virgin materials—they tend to reject them, at least for now.*

> *However, in my opinion, this will change soon because the Turks are eager to enter the European market with force." (Interviewee 1)*

From Interviewee 2, a sales representative, emerged that also Asian countries are not really interested in sustainable products and prioritise other characteristics.

4.2 Company B

The second company analysed is always located in the north of Italy. Company B produces plastic containers such as baskets, vases, bins and tanks for the house or the garden. It operates internationally all over the world but it sells primarily within Europe, in particular in Germany. The percentages of its sales are: 60% abroad and 40% Italy. They started **transitioning** towards a more circular business model 30 years ago. The CEO explains that sustainability is intrinsic in their business model, they produce *"low margin products*" and therefore there is a commercial need to use recycled materials. However, there has been a change in customer perception: at first, the company's products were seen as second class because they were made of 'rubbish', whereas now the company is perceived as virtuous because it is using recycled raw materials. The interviewee explains that 80% of the materials used come from recycled plastic, plastic that comes from post-consumer and therefore from separate waste collection.

In addition to utilizing recycled raw materials, the company also implements various **practices** that align with circular economy principles. Company B has invested in a photovoltaic system. The plastic industry is energy-intensive and it is essential to invest in energy efficiency. The CEO explains that thanks to the new installation of photovoltaic panels they are able to produce 1.300.000 KWH of clean energy and satisfy 30% of their energy need. Investments have also led to improvements from an efficiency point of view.

> *"Over the years we used 1.6 kilowatt hours of electricity to produce 1 kg of plastic, today we are down to 0.3" (Interviewee 3)*

Moreover, the company has started to measure its carbon footprint. By setting a benchmark, it is trying to reduce its carbon emissions through corrective actions. It has already obtained a few certification in terms of environmental sustainability: ISO 14001,

an internationally recognized standard for environmental management systems that ensures proactive steps are being taken to reduce environmental impact, adhere to legal requirements, and meet environmental goals; ISO 50001, which certifies the adoption of an energy management system, focused on increasing energy efficiency, reducing energy consumption, and minimizing environmental impact; and Plastica Seconda Vita (PSV). The latter is a certification based on European standards, it certifies materials and products obtained from the recovery of plastic waste emphasizing the importance of the quality and traceability of recycled materials. Company B has also committed to publish a sustainability report by next year, which reflects its commitment to the safeguard of the environment and transparent business practices.

For company B, the main **driver** for the adoption of circular economy principles and practices is a commercial need.

> *“Due to the destination of our products on the market and their selling prices we couldn’t produce them with let's say more noble plastics, which is more expensive, a first-choice material .” (Interviewee 3)*

The CEO explains that the raw material used has a big impact on the final cost because it is responsible for 40-50% of the value of the product. Therefore, company B uses recycled materials primarily for an economic reason, in order to stay in the market, be competitive and make a profit.

> *“If you produce these products with first-choice raw materials or with regenerated raw materials, the cost difference is almost one to three, or even one to two. So, by costing 50%, 60%, or 70% less than virgin raw materials, we manage to stay competitive in the market." (Interviewee 3)*

Being sustainable and adopting the circular economy is also a market driven need. The firm makes certain decisions driven by various certifications, aligning with the 2030 Agenda. There is a demand from corporate clients to meet certain sustainability standards.

> *"The large chains, in their purchasing processes, are increasingly selecting suppliers who implement and apply good practices within their own companies to ensure that the products they offer have, throughout the entire supply chain, aspects that are not only virtuous but also responsible." (Interviewee 3)*

Among the drivers emerged also ethical reasons and the attainment of certifications.

Barriers that slow down the implementation of circular business models include technical factors. The use of recycled materials involves different production processes that can affect the production itself and productivity.

> *“Recycled raw material are very heterogeneous compared to virgin plastic which has defined, certified technical characteristics that are the same from the beginning to the end. Whereas with remanufactured materials you have impressive variables, […], the productivity of the production process decreases by 30% and there is an even higher increase in consumption.” (Interviewee 3)*

However, the CEO of company B explains that his company is advantaged because it has started using recycled raw materials earlier than competitors and has gained experience during the years. The firm is already used at utilising this type of materials and is one step ahead: when large retailers look for sustainable products, company B already has items that meet the required characteristics.

The market is challenging because it changes very fast and there is a lot of competition. There is a constant need to adapt to new market dynamics, which require continuous investments. This means allocating funds that cannot be used to grow the company itself. Moreover, the competition is often not fair due to the presence of large multinationals that have access to substantial amounts of money and funds. Company B also faces challenges related to costs and people. Transitioning to a circular business model or switching old practices for new circular ones is challenging because change requires money.

> *"If you want to move from one point to another, you definitely need to have a vision, a mission, and clear ideas. But you also need the right people, the right timing, and the necessary resources." (Interviewee 3)*

Producing sustainable products is more expensive due to lower technical features of the raw materials, the necessity of printing at higher temperatures, and a lower productivity and efficiency of the production process. Moreover, nowadays every company is trying to turn sustainable and therefore everyone is looking for recycled raw materials which are getting more expensive and harder to find. Among the barriers to the implementation of a CBM there are also transportation costs. Company B produces

voluminous items and therefore transportation costs are significant and obstacle the adoption of circular models such as a take back system.

People, both inside and outside the company itself, can also be an obstacle to the adoption of circular economy. Employees often do not consider significant certain environmental issues and see change only as a challenge and not an opportunity. There are also difficulties connected to a lack of competences which slow down the transition towards a circular business model. External people, like policy makers, often draw up excessively restrictive laws without taking into account the efforts that companies need to put into practice to comply with them. Moreover, regulations are different all over the world and international companies, like company B, need to adapt their product according to the country they are doing business with.

> *“For example, in the United States you need to use a specific type of pallet, made and treated in a certain way. Other countries want less packaging because it becomes a disposal cost for them. Then there are countries with specific rules like Italy that wants to apply the plastic tax.” (interviewee 3)*

As mentioned above, company B produces items with a low margin and the price has a big influence on **customers**’ decisions. The CEO explains that sustainability is appreciated and always more companies are starting to give importance to it. It is gaining relevance among European customers, where regulations are more strict, while other countries like China have different policies and requirements, consequently they look at other characteristics that do not include sustainability or circularity. Overall, what matters the most is still the economic competitiveness. Being a B2B company, company B deals with distributors that have no interest in purchasing a product more sustainable than another, the influence comes from the final client. What matters is the quality of the product, delivery times and the price.

> *"In essence, I buy from you because you deliver the goods within the timeframe I require and with the quality that meets my needs at the agreed-upon prices. The aspect of sustainability, however, is not yet being fully recognized as it should be." (Interviewee 3)*

4.3 Company C

The third case study analysed is Company C. It is located in Northern Italy and it is operating internationally, with more than 500 clients, in the food and industrial packaging market. 60% of the sales are done in Italy and 40% abroad. The major foreign customers come from United States, Asia and North Africa.

Three years ago, Company C made an explicit commitment to sustainability and environmental stewardship. This commitment is clearly reflected in their sustainability report, which has helped the company set actionable objectives and engage stakeholders in their pursuit. The report is one of the most downloaded documents from the company's website and it captures the attention of both customers and competitors. The latter are interested in it for understanding the company's strategies. The company's efforts are evident in the certifications it has successfully obtained. These certifications are: ISO 14001 (from 2002); Plastica Seconda Vita (from 2019), which certifies the use of post-consumer recycled materials (PCR); ISCC Plus (from 2021), the International Sustainability and Carbon Certification; and BRC Packaging Materials Global Standards (from 2021) which demonstrates that their products meet the highest standards of quality and safety. In the BRC certification company C has obtained the maximum grade AA+. Other sustainability awards and recognitions that the company can proudly showcase include the EcoVadis silver medal for corporate social sustainability.

Interviewee 4 explains that the company is experiencing a **transition** towards a CBM, even though a fully circular one is not possible. They are trying to reduce the consumption of virgin raw material by functionalising and valorising production residues and reintroducing them as byproducts.

> *"We deliver waste to selected partners who are able to recycle our materials and then reintroduce them into authorised industrial processes or even into our own industrial process. […] We are trying to enhance the value of secondary raw materials […] 80% of our products are 100% recyclable." (Interviewee 4)*

The company is trying to increase the use of mono-materials which are perfectly recyclable. It has established quantitative KPIs to monitor the type of raw material used

and therefore the sustainability of its products. The packaging sector is energy intensive therefore improving energy efficiency is fundamental. Company C has installed a trigenerator, which allows to self-produce electricity and use thermal energy to generate cooling energy. The organisation is also replacing old electrical equipment with more energy efficient ones and is taking part in the European project Operation Clean Sweep.

From the interviews emerged a sense of consciousness of what is the nature of the impact that an industrial activity, as the one of company C, can have on the environment. These consciousness represents an ethical and value-based motivation for the transition towards a CBM. Company owners are driven towards innovation, which implies the adoption of new technologies and being up to date with the market trends like sustainability. The major **driver** identified is the economical one, the goal of a circular economy is efficiency. Therefore, company C is adopting a circular business model also for personal gains, for economic reasons. It believes it can combine reducing environmental impact with production process optimisation, thereby achieving greater efficiency and lower costs.

> *"There is always a need for savings to reduce waste and optimize resources." (Interviewee 4)*

The transition is also driven by the market and international legal requirements.

It is **challenging** to implement a circular business model because not every country has appropriate standards and requirements, reducing the efficacy of circularity. According to Interviewee 5, outside Europe there is not the same sensibility nor community or legal objectives.

> *"In the multinational context, particularly outside the European Union, such as in America or Asia, the same level of sensitivity and attention is not being applied. European regulations are somewhat fragmented and, to date, do not provide consistent guidelines. […] The Italian regulations, which can be more restrictive than European ones, are indeed a significant obstacle." (Interviewee 4)*

The sensibility is affected both by culture and legislation. Where there is an higher sensibility towards sustainability it is easier for companies to leverage the circularity of

their products while where there is a lower attention for the environmental impact it is more challenging because competition is based on the price. The production cost of sustainable products is higher, consequently the ability of the salesmen lies in enhancing the value of these products and ensuring that the additional effort is clearly recognized.

> *"The real challenge lies in conveying the value of a more sustainable product compared to a less sustainable one. […] Circularity is not always synonymous with cost-effectiveness." (Interviewee 5)*

Therefore company C adopts different strategies for different countries. They develop products with different characteristics depending on the area in which they are marketed. From the interviews it emerges that clients who have a greater interest in sustainability are located in Italy. Interviewee 5 explains that they develop product lines for specific customers in Italy that have certain recyclability features, which are not relevant to other clients around the world. Italian customers are driven not only by the need to comply with regulations, but also by personal values and as a matter of brand image.

Another issue is the scarcity of secondary raw materials, as when everyone demands sustainable products, due to legal requirements, the availability of these materials becomes a challenge. An higher demand for secondary raw materials leads to an increase in prices. Sustainable products have higher production costs and therefore higher prices. However, even though the demand for this type of products is increasing it does not mean that customers are willing to pay an higher price. In fact, the growth of the demand is often led by a necessity of complying with regulations.

Company C co-creates value with its **customers**. The firm collaborates with clients to develop products according to their needs. In particular, there is a close relationship between the sales department and customers, both in terms of identifying needs and collaborating on the development of new products. Company C collaborates not only with its customers but also with the manufacturers of industrial machinery. The benefit is mutual, because machine manufacturers can test them before putting them on the

market, and plastic products companies are sure that they will work well with their plastic film.

4.4 Summary of findings

All the three case companies analysed are located in Italy and operate worldwide. They do business especially in Italy and Europe but some of their major customers also come from Turkey, United Kingdom and Sweden for company A and United States, Asia and North Africa for company C. According to the findings, all three companies are strongly committed to sustainability and are modifying their business model to integrate it in their operations. The various activities implemented can be seen summarised in Table 7. It is possible to notice that all three case companies are reducing the consumption of virgin raw materials and using secondary raw materials instead. Another common practice is energy efficiency: company A and B have installed photovoltaic panels, while company C has adopted a trigenerator system. Company A and C are already publishing a sustainability report while company B aims at publishing its first one in 2025. This document allows companies to transparently communicate to the stakeholders their environmental and social impacts. It helps building trust and demonstrate the organisation's commitment towards the environment and society. Among the other practices adopted, it emerged that company A is participating in many circular economy projects and, in particular, both companies A and B are taking part in the Operation Clean Sweep project. Companies B and C have both established KPIs to measure their environmental impact, while company A is evaluating its suppliers with a form based on ESG criteria.

Table 7. Summary of findings: Country of origin of major clients and CE principles and practices.

	Company A	**Company B**	**Company C**
Country of origin of major clients	Italy, Turkey, United Kingdom and Sweden	Europe (especially Germany and Italy)	Italy, Europe, United States, Asia and North Africa

	Company A	Company B	Company C
CE principles and practices	Narrowing: • Use of recycled raw materials • Installation of photovoltaic panels • Energy efficiency improvement of company facilities • Adoption of collocations within customers	Narrowing: • Use of recycled raw materials • Installation of photovoltaic panels	Narrowing: • Reduction of virgin raw material consumption • Use of recycled raw materials • Use of mono-materials • Reintroduction of residues as byproducts • Installation of a trigenerator • Energy efficiency improvement of existing electrical equipment
	Other: • Publication of the sustainability report • Participation in circular economy projects • Investing in R&D to develop alternative materials • Evaluation of suppliers with a form based on ESG criteria	Other: • Measurement of carbon footprint	Other: • Publication of the sustainability report • Establishment of quantitative environmental KPIs • Participation in circular economy projects

The three companies analysed demonstrate their commitment to sustainability through the numerous certifications and awards they have received. Companies B and C have both obtained the ISO 14001 certification, while company A is still working on obtaining it. Another similarity is the PSV certification, achieved by all three case companies. The other certifications and awards can be seen summarised n Table 8.

Table 8. Summary of findings: Certifications and awards.

	Company A	Company B	Company C
Certifications and awards	• PSV Certification • Sustainability Award	• ISO 14001 • ISO 50001 • PSV Certification	• ISO 14001 • PSV Certification • ISCC Plus • BRC Packaging Materials Global Standard • EcoVadis silver medal for corporate social sustainability

From the interviews emerged what drives companies to change their business model and move towards the circular economy. Both hard drivers and soft drivers were identified and they are shown in Table 9. Interviewees of company C explained that their company is driven towards CE by innovation and the adoption of new technologies. They consider sustainability innovative. A common hard driver are those factors connected to the market and price of products. Companies adopt CE due to economic reasons and to stay on the market and be competitive. Company B uses recycled raw materials because otherwise it would be too expensive to produce its products. Among the soft drivers there are two subcategories: institutional/regulatory factors and social/cultural factors. The first subcategory includes the necessity to comply with legal requirements for company A and C. Furthermore, as already mentioned above, all three companies have multiple certification but their achievement is only seen as a motivation to transition towards a more circular business model by company B. The second subcategory involves ethical reasons, for company B and C, and a personal interest of the owner himself for company A. In company A also the pressure of climate change is perceived as a driver.

Table 9. Summary of findings: Drivers.

Drivers	**Company A**	**Company B**	**Company C**
Hard drivers	Technical factors:	Technical factors:	Technical factors: • Innovation
	Economic/market factors: • Market pressure	Economic/market factors: • Commercial need • Lower cost of recycled materials • Market trends	Economic/market factors: • Economic reasons (personal gains) • Efficiency • Market trends
Soft drivers	Institutional/regulatory factors: • Legislations	Institutional/regulatory factors: • The attainment of certifications	Institutional/regulatory factors: • International legal requirements

Drivers	Company A	Company B	Company C
	Social/cultural factors: • Personal interest of the owner • Climate change pressure	Social/cultural factors: • Ethical reasons	Social/cultural factors: • Ethical and value-based motivation

The next part of the findings focuses on the barriers that slow down the implementation of CBMs. The barriers identified can be classified according to the theoretical framework in hard barriers and soft barriers. Among the hard barriers there are two subcategories: technical factors and economic/market factors. In the first subcategory, different challenges were identified in each company. They are connected to R&D, procurement, technical features and the processing of recycled raw materials. Economic/market factors include higher costs, a fast changing market and competition. Soft barriers are divided into institutional/regulatory factors and social/cultural factors. In the first group, from the interviewees of all three companies emerged that regulatory compliance, legislation and different standards and requirements in every country pose a challenge for the CE. The interview data indicates different social/cultural barriers in each case company. All the barriers identified in the empirical part can be seen summarised in Table 10.

Table 10. Summary of findings: Barriers.

Barriers	Company A	Company B	Company C
Hard barriers	Technical factors: • Research and development uncertainty	Technical factors: • Technical features of recycled raw material • Different production processes	Technical factors: • Scarcity of secondary raw materials
	Economic/market factors: • Economic barriers • Higher cost of materials • Higher production costs • Collection costs	Economic/market factors: • Fast changing market • Necessity of investments • Higher production costs	Economic/market factors: • Higher production costs

Barriers	Company A	Company B	Company C
		• Transportation costs • Competition	
Soft barriers	Institutional/regulatory factors: • Regulatory compliance	Institutional/regulatory factors: • Restrictive law and regulations • Different regulations in each country	Institutional/regulatory factors: • Different standards and requirements in every country • Legislation
	Social/cultural factors: • Customers' preferences	Social/cultural factors: • People and employees • Lack of competences • Need to adapt their product according to the country	Social/cultural factors: • Cultural differences • Different levels of sensitivity in different countries • Conveying the value of a more sustainable product

The following part of the findings concerns how the companies' business models have been affected by circular economy and the effect on international customers. From the data collected emerged that all three companies have embedded environmental value in their value proposition, which is built around the use of recycled materials and renewable energy. The importance of sustainability is also visible from their websites where they explain their commitment and show their actions. Moreover, company B has changed its bylaws to become a Benefit Corporation. All three companies collaborate with their customers to co-create value. Company C collaborates also with manufacturers of industrial machinery to develop specific machines. The empirical data revealed that all three companies studied are implementing efficient material-technical loops to maximise material and energy efficiency. Moreover, in company B, the respondent explained that they are able to create more value compared to their competitors because they started adopting CE practices earlier. Therefore, they have an early mover advantage due to their greater experience.

For the value capture emerged that all three companies apply an higher price to their sustainable lines of products. They capture value by reducing costs through the optimi-

sation of material usage and reduction of waste. Moreover, by implementing circular economy strategies they are able to keep up with market trends and retain customers. Among European countries, it has been found that Italy shows a stronger interest in sustainability and sustainable products. As a result, companies develop specific lines of more sustainable products tailored for Italian customers. These findings are summarised in Table 11.

Table 11. Summary of findings: Components of the business model.

	Company A	**Company B**	**Company C**
Value proposition	Environmental value: • Visible from the website • Built around the use of recycled materials and renewable energy	Environmental value: • Visible from the website • Built around the use of recycled materials and renewable energy • Sustainability embedded in their business model • Proactive company	Environmental value: • Visible from the website • Built around the use of recycled materials and renewable energy • Benefit Corporation
Value creation and delivery	• Co-creation • Efficient material-technical loops	• Co-creation • Early mover advantage • Efficient material-technical loops	• Co-creation • Efficient material-technical loops
Value capture	Revenue model: • Higher price	Revenue model: • Higher price	Revenue model: • Higher price
	Economic model: • Customer retention	Economic model: • Optimisation of material usage and reduction of waste • Customer retention	Economic model: • Optimisation of material usage and reduction of waste • Customer retention

The findings, summarised in Table 12, revealed also how value is perceived by international customers and their willingness to pay. The interviewees agreed that generally European customers are more interested in sustainability and value it more. In particular, in company C, it was underlined an higher interest in Italy. This value perception is reflected in an higher willingness to pay among Europeans. The interviewees of com-

pany A explained that Turkish and Asian customers prioritise other characteristics rather than sustainability. Company B deals with Chinese clients that are not interested in the sustainability of the product and therefore are not willing to pay a premium price for it.

Table 12. Summary of findings: Value perception and willingness to pay of international customers.

	Company A	**Company B**	**Company C**
Value perception of international customers	• Europeans value sustainability • Turkey and Asian countries prioritise other characteristics rather than sustainability	• Perceived as a virtuous company • Europeans value sustainability • Chinese customers are not interested in the sustainability of the product	• Lower outside Europe • Higher interest for sustainable products in Italy
Customers willingness to pay	• Europeans are more attentive towards sustainability and are willing to pay an higher price. • Turkish customers are price-sensitive	• Higher among Europeans • Lower in China	• Unchanged

5 Conclusions

This study focused on the implementation of circular economy practices and principles by B2B companies and how their business model is affected. In particular, the research was conducted on the plastic industry due to its high environmental impact. Companies operating with plastic are put under pressure, by the general public and legislative bodies, to achieve sustainability (Zucchella et al., 2022).

In this chapter I analyse and compare the findings with the theory of the literature review. The aim is to answer the following research question: “How do B2B plastic products manufacturers incorporate circular economy approaches into their business models to improve the value perception and willingness to pay of their international customers?”. To answer the research question and address the research gap, three case companies and how they embed circular economy in their business models were studied.

5.1 Discussion of key findings

From the data collection it emerged information in line with the literature review and the theoretical framework. The findings contributed to the understanding of how companies integrate environmental sustainability in their business model to create value for their international customers and increase their willingness to pay. The interviews allowed to understand how companies approach the transition towards a circular business model and the different practices in the various countries.

5.1.1 CE practices adopted

From the findings it was possible to identify multiple CE practices adopted by the companies in different phases of the product life cycle. These practices reflect the ones in the database realised by Kalmykova et al. (2018). The data collection part focused of the first four phases of the product life cycle: material sourcing, design, manufacturing, and distribution and sales. In the material sourcing phase, case companies’ interviewees explained that they are committed for a green procurement of goods and services

and they are acting on material substitution. They are rating their suppliers, through questionnaires based on ESG criteria, to determine whether they can be considered eligible or not. The most impactful practice is the material substitution. Plastic product companies are substituting virgin raw materials with secondary raw materials that come from post consume. Company A has also tried to switch to other materials, like cardboard, but it was found to be less performing and with an higher carbon footprint. In the design phase companies are considering the whole life cycle of their products and try to facilitate recycling by using, for example, mono-materials. The manufacturing stage is characterised by energy efficiency improvements and the use of energy that comes from renewable sources. In particular, plastic product companies, due to the energy intensive nature of their business, install photovoltaic systems to satisfy internally part of their energy demand. Companies are also trying to increase the productivity of their production process to reduce material consumption and waste. In order to optimise the distribution phase, one of the case companies has realised collocations within its customers. In this way they are able to cut transportation costs and emissions.

In the literature, circular economy practices are classified in three categories according to the CE principles of slowing, narrowing and closing (Bocken et al., 2016). The case companies analysed operate in the packaging industry, specifically companies A and C, as well as in the moulding of low-value plastic products, which is the focus of company B. Due to the nature of their business they are not able to adopt one of the four CBMs identified by Bocken et al. (2016) based on the “slowing” principle. These four CBMs are built on the idea of extending the life of a product through product as a service systems, remanufacturing or repairing the same product and none of the companies taken into account are currently implementing any of these business models. However, it is possible to affirm that the case companies are trying to slow down the consumption of resources, in particular virgin plastic, by preferring secondary raw materials for their products. This practice can be reconducted to the principle of “narrowing”, which is put into practice through efficiency improvements. The findings show that all three case companies are applying narrowing CE principles to reduce waste materials and

optimise the use of both raw materials and energy. It represents a first step towards a circular business model (Zucchella et al., 2022). The ”closing” principle is embodied in two CBMs called: extending resource value and industrial symbiosis. The first model is based on the idea of collecting resources that are considered waste and turn them into new forms of value while the second is a process-oriented solution which turns waste outputs of processes in inputs for another one (Bocken et al., 2016). The case companies implement both these model by collecting post consume plastic, derived from both domestic and industrial waste, and recycle it to create new products. However, it is not possible to have fully closed loop due to some technical restrictions. All three companies also produce packaging items for food and beverages and, due to health and safety regulations, cannot use recycled materials that may be contaminated. Therefore, for these products they need to use virgin plastic.

In addition to these activities, that can be classified according to the categories identified in the literature, the research revealed that companies are also implementing supporting activities. They include: publication of sustainability reports, establishment of environmental quantitative KPIs, evaluation of suppliers with forms based on ESG criteria and the participation in circular economy projects. These support activities do not directly affect the company’s business model or the production process but they influence the company’s overall commitment to sustainability. They enhance the business’ reputation and transparency and strengthen relationships with stakeholders.

5.1.2 Transition to a CBM

The adoption of circular economy practices is driving an innovation in companies’ business models. The three companies analysed are experiencing a circular business model transformation and diversification as explained by Geissdoerfer et al. (2020). They are incorporating circular economy practices in their operations. For some aspects they are transforming their business model from linear to circular, while for others they are adopting a CBM as a support to the traditional one. Indeed, from the findings it emerged that the transition is gradual and companies are developing line of products which are more sustainable than others, but at the same time they still have some

“traditional” products. At the moment, it is not possible for them to become fully circular.

By transitioning to a circular business model companies modify their current BM and therefore its components. As explained in chapter 2.2 business models are composed of three main elements: value proposition, value creation and delivery and value capture (Richardson, 2008). In order to adopt a circular economy model firms need to rethink their **value proposition** (Geissdoerfer et al., 2020). A sustainable value proposition considers both short-term profit and long-term sustainability (Bocken et al., 2014). From the findings it is visible that all three companies analysed embedded sustainability in their value proposition (environmental value), but always keeping in mind the necessity of making a profit (economic value). They are all trying to leverage it by emphasising their commitment towards the environment on their websites and by striving to obtain sustainability certifications. Their value proposition, at least for some line of products, prioritises the environmental sustainability of the product itself. It is built around the use of recycled materials and renewable energy. Companies are trying to combine environmental value and economic value. However, they do not implement any of the more radical activities identified in the literature. The companies analysed do not prioritise the delivery of the service rather than the ownership of a product (Bocken et al., 2016), or directly take back products and materials for repairing, remanufacturing, refurbishing and recycling (Geissdoerfer et al., 2020). These practices would be difficult to implement due to the nature of the business of the case companies. In fact, as emerged in the findings, they produce low value products and it would be uneconomic to take them back for repairing, remanufacturing or refurbishing rather than recycling the raw material. Moreover, they produce lightweight but bulking products whose collection costs would be higher than the value of the material itself. The major change of value proposition is the one of company C: it has changed its bylaws to become a Benefit Corporation.

The transition to a CBM has affected also the **value creation and delivery** activities. From the findings it emerges that all three companies are collaborating with their cus-

tomers to create custom products tailored on the client's needs. Value is co-created by a "reciprocal and mutually beneficial relationship" (Vargo et al., 2008, p. 146). Companies interact with customers and try to understand customer's value creation and provide resources and support (Grönroos, 2011). The theoretical framework combines together the value creation logics of Ranta et al. (2020) and Fehrer & Wieland (2021) and considers five value creation logics: efficient material-technical loops, which includes resurrect and optimise logics; effective product-service loops; replace; social-collaborative loops, based on sharing principles; and symbiotic ecosystems. The companies studied adopt an efficient material-technical loops logic because they resurrect and optimise value by recycling and restoring disposed materials and products and returning them to the market. They collect plastic from post consume, process it and give it a new life. They also optimise resource use, creating more value from fewer resources, by optimising production processes and reducing the percentage of waste.

The third element of a business model is **value capture**. Value capture refers to how a company produces revenue and obtains profit (Richardson, 2008). As explained in the theoretical framework, it is characterised by the revenue model and the economic model. However, during the interviews, due to confidentiality reasons, it was not possible to explore the former. Respondents provided information only on the economic model of the organisation. Companies A, B and C are capturing value by optimising materials usage and reducing waste as suggested by Bocken et al. (2014). Sustainable products have a premium price but also entail higher costs and from the interviews it was not possible to understand if they have a higher margin. However, it emerged that by offering a line of sustainable products companies are able to retain customers, be competitive and attract new customers that abandon their old suppliers because they do not meet their sustainability standards.

5.1.3 Drivers and barriers

As found in the literature review, the transition to a CBM is affected by both drivers, that facilitate it, and barriers that obstruct it. Various **drivers** emerged from the interviews, reflecting those proposed by de Jesus & Mendonça (2018). Among the hard fac-

tors were economic reasons and market needs, while among the soft factors there were social factors like personal interest of the owner, ethical and value based motivation but also regulatory and institutional ones like laws, regulations and international legal requirements. The findings indicated that the most impactful drivers, in all three companies, are market and commercial needs. Companies are driven to change how they operate by the market. If customers desire sustainable products, organisation, in order to stay on the market and be competitive, are obliged to change. There is a demand from corporate clients to meet certain sustainability standards. Moreover, there are economic reasons behind the transition: virgin plastic is more noble and more expensive, therefore companies are looking for cheaper solutions that allow them to reduce production costs. However, even though secondary raw materials might be cheaper it is not always the case for the production process: recycled plastic is less performing and requires higher temperatures to be processed, increasing costs. Even though the literature affirms that soft drivers are the ones that promote the transition the most, the empirical research revealed that companies act according to the market and the demand. From the findings it is also clear that institutions play a crucial role. In fact, companies are participating in various projects promoted either by the European Union or other entities that provide the funds and an orientation for a transition towards a circular economy. They provide an economic incentive that motivates businesses.

It is not easy to transition to a circular business model due to multiple **barriers**. The study confirms the challenges already identified in the literature review. From the findings it is possible to underline the necessity of high investments to modify a business model and adopt CE practices, which are costly. Companies have limited resources available and have to decide how to allocate them. Moreover, the market changes rapidly and requires constant adaptation and thereby continuous investments. Another hard barrier, as classified by de Jesus & Mendonça (2018), consists of technical factors. It emerged that it is not always easy to develop new products that comply with the regulations and, at the same time, perform as well as the old ones. The use of recycled materials often requires an alteration of machines and production processes. Soft bar-

riers include social and cultural factors as well as institutional and regulatory factors. Interviews confirmed the hesitant company culture identified in the literature but also revealed a growing awareness on the topic (Kirchherr et al., 2018). In the cases analysed it was not the ownership mindset the obstacle but the one of the employees. They often do not consider significant certain environmental issues and see change only as a challenge and not an opportunity. Among worker, there is also a lack of competences necessary to facilitate the transition. Cultural elements do constitute a barrier in terms of implementation. Outside Europe it was detected a lower sensibility for the environmental impact of companies. Consequently corporate customers, who are influenced by a low level of interest from end consumers, do not value sustainable characteristics and are not willing to pay a premium price for it. Therefore, manufacturing companies selling in these countries have no incentive to adopt a CBM.

Companies find it challenging also to comply with all the laws and regulations. What makes it harder are the differences from country to country. There is not a global consensus and depending on where you are headquartered and on where you sell you need to satisfy different requirements. All three case companies analysed have their principal production site located in Italy and it emerged that Italian regulations are stricter compared to other European countries. They operate internationally, with worldwide clients, and explained that their sustainability strategy needs to be tailored for each country.

5.1.4 Types of value

In the empirical part various types of value have been identified. They align with the ones explored in the literature by Sairanen et al. (2024). First of all, products of companies that are transitioning to CBM acquire **economic value** for customers. They are sold at an higher price and considered more valuable. The products also have functional value thanks to the collaboration between the companies and the customers, which allows to develop custom product that satisfy specific needs. Due to this collaboration there is also a **relationship value** between the parts. It is the result of a continuous interaction for co-development of products. Sustainability enhances also **identity value**,

which is fundamental to make circularity visible and allow customers to perceive it (Sairanen et al., 2024). Sustainable products have an **ethical value** for the producers because they enable them and their customers to achieve their moral objectives connected to social and environmental sustainability (Sairanen et al., 2024). Customers perceive value in the capacity to anticipate policy changes and proactively adapt their company's strategy. Indeed, being ahead of regulation enables companies to avoid being forced to implement expensive last-minute adjustments.

5.1.5 Conclusions

It is possible to conclude that B2B companies producing plastic products are gradually moving towards circular business models. They face many trade-offs which slow down the adoption of a circular business model. In particular, economic reasons are both a driver and barrier. Companies aim at a circular business model because it entails efficiency and reduced waste, allowing cost savings. However, at the same time, working with recycled materials involves higher production costs due to technical features. From the interviews it is clear that at the end customer still look at the price. They are starting to value sustainability but they still prioritise characteristics such as quality of the product, delivery times and especially the price. Consequently, the adoption of circular economy practices does not always correspond to an increase in the willingness to pay of customers. They demand sustainable products due to legal requirements and therefore are not willing to voluntarily pay a premium price. Therefore, it is fundamental the role of institutions which economically incentivise companies by providing the necessary funds for a transition.

Based on the findings it is possible to elaborate a new theoretical framework. Figure 1Figure 3 is a modified version of Figure 2 and it shows how B2B plastic products manufacturers incorporate circular economy approaches in their business models. Compared to the generic theoretical framework, Figure 3 does not consider external factors, that depend on the home country of the manufacturing company, because the case companies analysed are all headquartered in Italy. Another difference are the CE principles that lead to a transition to a CBM: the adapted framework does not consider the

slowing principle because is not applicable due to the nature of the businesses analysed. The CBM box considers only the relevant value creation and delivery logic that has been identified in the empirical part: efficient material-technical loops. Last but not least in Figure 3 the value perception of international customers is affected by product features, quality, delivery time and price and influences the customers' willingness to pay.

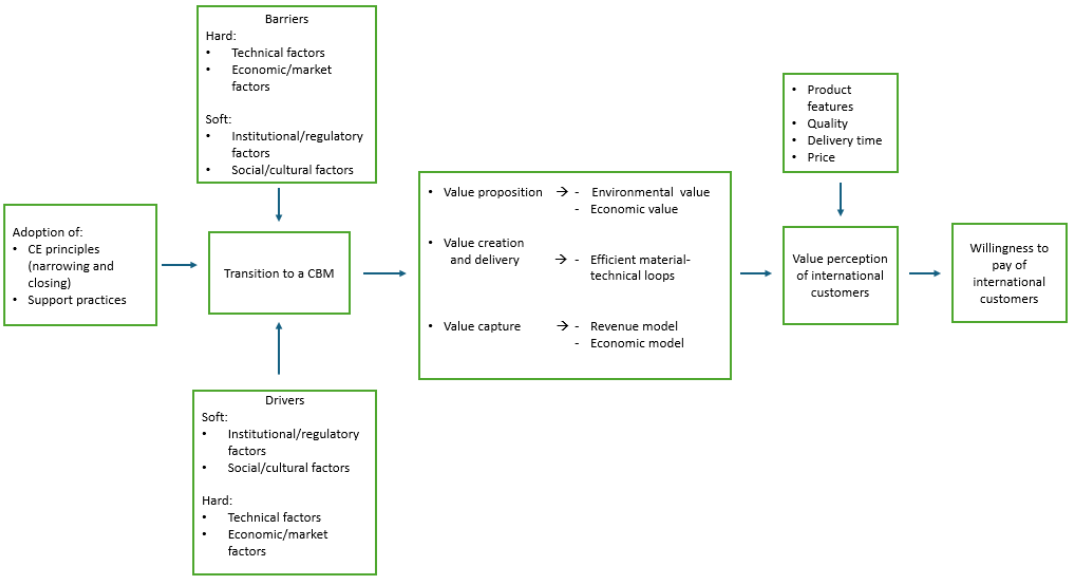

Figure 3. Theoretical framework adapted for B2B plastic products manufacturers.

5.2 Theoretical contributions and practical implications

The theoretical contribution of this thesis lies in its exploration of how B2B plastic products manufacturers incorporate circular economy approaches into their business models to enhance value perception and willingness to pay among international customers. By integrating existing theories on circular economy and circular business models, this research extends the understanding of how companies adapt to sustainability challenges and opportunities. This thesis contributes to the literature by identifying specific CE strategies that firms of the plastic industry employ and helps filling the gap on the transition process. It provides insight on how customers perceive the sustainability of a product and its manufacturer and how it affects their willingness to pay.

Therefore, it helps reducing the literature gap on how CE generates value, economic advantages and revenue at the company level (Ranta et al., 2018)

Besides its theoretical implications, the study offers valuable contributions for managers. The study identified the drivers and challenges to implementing a circular business model, which has several practical implications. First, understanding these drivers can help managers prioritise the factors that facilitate the transition to circular practices, such as institutional incentives, cost savings, market trends and customer demand for sustainable products. Second, recognising the challenges allows businesses to proactively address potential barriers, such as the need for technological innovation, law requirements, changes in consumer behaviour, lack of awareness among employees and economic resources. This knowledge enables companies to develop more effective strategies, allocate resources more efficiently, and improve their overall sustainability performance.

The practical implications of the study on customers' willingness to pay are significant. By understanding the differences from country to country and customers' priorities, companies can better align their products and services with customer preferences for sustainability. This alignment can enhance the perceived value of these offerings, potentially increasing customers' willingness to pay a premium for products that are environmentally friendly and sustainable. By effectively communicating how these practices contribute to environmental conservation and reduced waste, companies can influence customer perceptions and increase their readiness to pay more for sustainable products. Furthermore, understanding these dynamics enables businesses to segment their markets more effectively, targeting consumers who are more likely to value and pay for sustainability, and thereby optimising pricing strategies to capture this willingness to pay.

Additionally, businesses can leverage insights from the study to educate and engage their employees about the benefits of circular economy practices. They can raise awareness among employees and provide training to support the transition.

5.3 Limitations and suggestions for future research

As most studies, also this work has a number of limitations that need to be acknowledged. The first limitation lies in the sample selected for the empirical part. All three companies selected are headquartered and have their main production site in northern Italy. Therefore, a suggestion for future research is to include other companies, located in other countries, to be analysed and compared with the Italian ones. This would allow to investigate whether the adoption of CE principles and practices and the BM are affected by different levels of economic development, culture, infrastructure, institutions and geography of the host country. Moreover, it would be interesting to compare companies headquartered in different countries but dealing with customers of the same country. In this way it would be possible to determine whether there are cultural differences in applying environmental sustainability and complying with regulations. The second limitation connected to the sample selected concerns the dimensions of the case companies. They all are small-medium size enterprises, with a number of employees ranging from 70 to 250. For future studies it would be interesting to consider companies of greater dimensions, with greater amounts of money at their disposal, and do a comparison.

This study was conducted from the viewpoint of the B2B manufacturing companies, focusing on how they perceive what they are doing. For future research, it would be valuable to interview the respective customers of company A, B and C. The dyadic customer-supplier data would enable to verify whether there is an alignment between the supplier's and customer's perception of customer value and whether there is a difference from country to country. It would offer insight regarding the efficacy of the circular economy strategies implemented on the customers' willingness to pay, directly from the customers point of view. Indeed, this study is limited because it is only based on the perception of the supplier and does not have direct data from customers.

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Appendices

Appendix 1. Main interview questions A

1. Are you familiar with the terms Circular Economy (CE) and Circular Business Models (CBM)? (If the answer is no, a brief explanation and description of the context will be provided to the interviewee.)
2. How important is sustainability to the company you work for?
3. Is your company undergoing a transition towards a circular business model? If so, what practices have you currently implemented?
4. What is the reason for this transition? Do you see the circular economy as an opportunity or rather as a challenge/threat?
5. What are the factors that have driven this transition? (drivers)
6. What are the main challenges or barriers you face in integrating circular economy practices into your business model?
7. How do regulations and market conditions in different countries affect your ability to implement circular economy practices? Do you see significant differences between the various countries?
8. What do you communicate to your international customers about your circular economy initiatives? Do you think this has influenced their purchasing decisions?
9. Based on your experience, do your international customers appreciate and value sustainability and circular economy practices? Are there differences among customers from different countries? How does this influence their willingness to pay a premium for your products?
10. Do you collaborate with your customers to create value?
11. Has your value proposition been affected? Does it reflect your transition towards a more circular business model?
12. Has the implementation of circular practices affected your financial performance?
13. What are your future plans for incorporating circular economy approaches into your business model?

Appendix 2. Main interview questions B

1. Are you familiar with the terms Circular Economy (CE) and Circular Business Models (CBM)? (If the answer is no, a brief explanation and description of the context will be provided to the interviewee.)
2. How important is sustainability to the company you work for?
3. Is your company undergoing a transition towards a circular business model? If so, what practices have you currently implemented?
4. What is the reason for this transition? Do you see the circular economy as an opportunity or rather as a challenge/threat?
5. What are the factors that have driven this transition? (drivers)
6. What are the main challenges or barriers you face in integrating circular economy practices into your business model?
7. What are the main challenges you currently face in meeting the needs of your international customers?
8. How do regulations and market conditions in different countries affect your ability to implement circular economy practices? Do you see significant differences between the various countries?
9. What do you communicate to your international customers about your circular economy initiatives? Do you think this has influenced their purchasing decisions?
10. Based on your experience, do your international customers appreciate and value sustainability and circular economy practices? Are there differences among customers from different countries?
11. What pricing strategies do you adopt for products that incorporate circular economy approaches?
12. How has adopting a circular economy model impacted your international customer base and their willingness to pay?
13. Have there been instances where customers chose your products over competitors' due to your circular economy initiatives?
14. Do you collaborate with your customers to create value?

15. Has the implementation of circular practices affected your financial performance?
16. How do you measure the impact of your circular economy initiatives on sales and customer satisfaction?
17. What are your future plans for incorporating circular economy approaches into your business model?

Appendix 3. AI disclaimer.

This thesis was written using Chat GPT as a support tool. It particular, the free version of the AI was used to double check the translations from Italian to English and to proofread some of the paragraphs.