



Waves of circularity

How can companies in the wetsuit industry
transition to circular business models?

Jonas Jascha Stora

Dissertation written under the supervision of Professor Laure Leglise

Dissertation submitted in partial fulfilment of requirements for the
M.Sc. in Management – Strategic Marketing, at the Universidade
Católica Portuguesa, Thursday, June 1st, 2023.

Abstract

This study explores the transition from linear to circular business models of wetsuit companies, addressing the question "How can companies in the wetsuit industry transition to circular business models?" To answer the research question, I adopted a qualitative approach and conducted a multiple case study on seven international wetsuit brands and material suppliers from the watersports industry. The research identifies eight dimensions of transition that influence the adaptation and innovation of circular business models of companies in the wetsuit industry. The transitional dimensions are reflecting complex challenges and impelling strategies at work in the process of change. The research reveals that the path to circularity is hindered by issues such as manufacturing monopoly, consumer unawareness and a lack of circular practices. At the same time, the study identifies strategic actions such as multi-stakeholder collaboration, greater material innovation as well as transparent communication and education to realize a transition to circularity. Emphasising that a collective effort is crucial to the transition to circularity, the study provides insights to drive innovation and systemic change and positions the wetsuit industry as a potential sustainability leader for the watersports industry.

Dissertation Title: How can companies in the wetsuit industry transition to circular business models?

Author: Jonas Stora

Keywords: sustainable development, circular economy, circular business model innovation, business transition, watersports industry, wetsuit industry

Sumario

Este estudo explora a transição de modelos de negócio lineares para circulares de empresas de fatos de mergulho, abordando a questão "Como podem as empresas da indústria de fatos de mergulho fazer a transição para modelos de negócio circulares?" Para responder à questão da investigação, adotei uma abordagem qualitativa onde realizei um estudo de caso múltiplo em sete marcas internacionais de fatos de mergulho e fornecedores de materiais da indústria dos desportos aquáticos. A investigação identifica oito dimensões de transição que influenciam a adaptação e a inovação dos modelos de negócio circulares das empresas da indústria de fatos de mergulho. As dimensões de transição refletem desafios e estratégias complexas em ação. A investigação revela que o caminho para a circularidade é acentuado por questões como o monopólio de fabrico, o desconhecimento dos consumidores e a falta de práticas circulares. Ao mesmo tempo, o estudo identifica ações estratégicas como a colaboração entre vários intervenientes, a inovação de materiais, assim como a comunicação e a educação transparentes para realizar uma transição para a circularidade. Sublinhando que um esforço coletivo é crucial para a transição para a circularidade, o estudo fornece informações para impulsionar a inovação e a mudança sistemática e posiciona a indústria de fatos de mergulho como um potencial líder de sustentabilidade para a indústria dos desportos aquáticos.

Titulo da Dissertação: Como as empresas do setor de fatos de mergulho podem transicionar para modelos de negócio circulares?

Autor: Jonas Stora

Palavras-chave: desenvolvimento sustentável, economia circular, inovação do modelo de negócios circular, transição de negócios, indústria de desportos aquáticos, indústria de fatos de mergulho

Acknowledgement

I would like to express my profound appreciation to my supervisor Laure Leglise, for consistently offering assistance and providing helpful feedback throughout the process of composing the thesis. Additionally, I would like to give special thanks to the representatives of the watersports industry, for contributing to my research in a particular extend. I truly value the dedication of support for my work and the engagement to enable a productive exchange. Finally, my friends and family deserve a special mention for their encouragement and advice over the past few months.

Table of Contents

List of abbreviations	VI
List of figures	VII
List of tables	VIII
1 Introduction	1
2 Literature review	4
2.1 Circular economy in the context of sustainable development	4
2.2 Circular business model innovation as enabler for circular economy.....	7
2.3 Limitations and drivers of circularity.....	9
2.4 Sustainable progression of the wetsuit industry	11
2.5 From Linear to Circular, a transitions perspective.....	14
3 Methodological approach	16
3.1 Research design.....	16
3.2 Data collection.....	18
3.3 Data analysis.....	20
4 Empirical settings	24
5 Findings of the research.....	28
5.1 Industry ecosystem	31
5.2 Eco-conscious market demand	33
5.3 Innovation-driven infrastructure development	35
5.4 Collective action and collaborative partnerships.....	37
5.5 Sustainable compliance and certification	38
5.6 Circular strategies for sustainable success	39
5.7 Building sustainable awareness	40
5.8 Advancing circular practices	42
6 Discussion of results	43
7 Conclusion.....	47
7.1 Concluding remarks	47
7.2 Limitations and Critical review.....	49
7.3 Future research.....	50
List of References	IX
List of Appendix	XX
Appendix	XXI

List of abbreviations

UN	United Nations
EU	European Union
SDG	Sustainable Development Goals
CE	Circular Economy
SBM	Sustainable Business Models
CBM	Circular Business Models
BMI	Business Model Innovation
R&D	Research and Development
LCA	Life cycle assessment
CSR	Corporate Social Responsibility
ESG	Environmental, Social and Governance

List of figures

Figure 1: Process model of the master thesis.....	3
Figure 2: The butterfly diagram, circular economy system	6
Figure 3: Key elements of a linear & circular business model	8
Figure 4: A transitions framework for circular business models.....	15
Figure 5: Transition framework to circular business models for companies in the wetsuit industry	29
Figure 6: Interplay, dimensions of transition to circularity	44

List of tables

Table 1: Overview of selected cases.....	18
Table 2: Overview of interviews	20
Table 3: Example of coding process, “Gioia Method”	22
Table 4: Data coding tree	23
Table 5: Introduction of industry cases	24
Table 6: Outline, dimensions of findings	30

1 Introduction

*“There’s no such thing as any sustainable economy.
There are just levels of it. It’s a process, not a real goal.
All you can do is work toward it.”*
(Yvon Chouinard, Founder of Patagonia, Interview NBC News 2004)
(Little, 2004)

In an era of growing concerns by climate change, resource scarcity, and exceeding waste levels, the traditional linear take-make-waste model of production and consumption is no longer sustainable. The international consensus and societal calls for sustainable economic development, is driving countries across the globe towards more sustainable and circular practices. The approaches of new circular systems and problem-solving frameworks emerging to tackle the concerning global challenges (MacArthur, 2013; Stahel, 2016).

This sentiment is particularly suitable for the wetsuit industry, as sustainable development has increasingly become a fundamental aspect. Most of the industries neoprene products are petroleum- and plastic-based, harmful to the environment, and are often without a recycling or upcycling solution (Machado & Toth, 2015). Beyond the harmful production materials and the necessity for innovation in eco-design and alternative materials, the most significant challenge, which is facing the industry is the management of wetsuits at the end of their lifecycle. Globally, approximately 8,380 tonnes of old and used wetsuits are discarded into landfills every year (Kay, T., 2023). Although the wetsuit industry has started adjusting and adopting more circular practices, it hasn't yet made any appreciable progress in all the facets of the industry (Machado & Toth, 2015).

Drawing from the existing literature the importance of transitioning from linear to circular business models (CBM) to foster sustainability is widely recognized. Studies have particularly emphasized the role of circular business model innovation (BMI), enabling a circular economy (CE) at the micro-level, which involves enterprises and consumers (Kirchherr et al., 2017; Geissdoerfer et al., 2017; Prieto-Sandoval et al., 2018).

Despite the understanding of these general circular principles, the body of academic literature only entails limited research on business organisation and management theories on

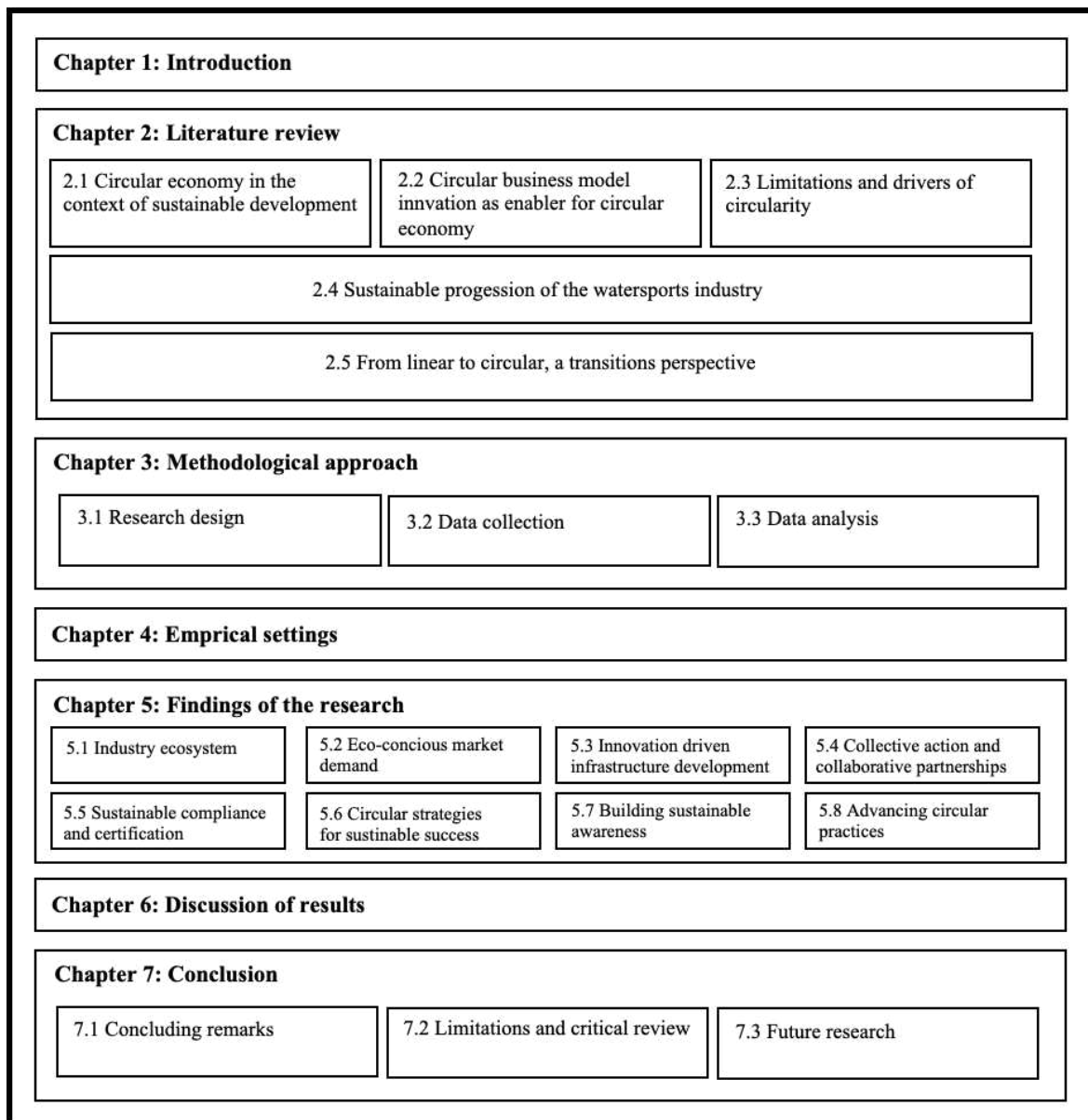
circular economy and circular business model innovation and solely a small number of reputable studies on sustainable development of the watersports industry. Hence, there is a noticeable gap in the specific application and implementation of circular business models within the wetsuit industry. To promote a sustainable transition of the wetsuit industry, it becomes crucial to comprehend how companies can adapt their business strategies for greater circularity. This research is therefore answering the central question: "*How can companies in the wetsuit industry transition to circular business models?*"

To address the research question, I designed a qualitative research approach, entailing multiple cases. I conducted a multiple case study on 7 international companies, wetsuit brands and material suppliers operating in the wetsuit industry. The data collection process was facilitated by using a transition framework to circular business models from the existing literature as a guideline (Susur & Engwall, 2023).

The findings of the study contribute to the understanding of sustainable transition to circular business models within the wetsuit industry, offering both theoretical and practical implications. It extends the literature on circular business models and their implementation in the context of a specific industry case. Moreover, the results give implications at eight dimensions of transition, which underscore the most significant factors, driving and challenging the companies transition towards more circular business models (CBM & SBM). The dimensions implicate actionable insights to foster innovation and systematic change.

To outline the structure of this study, the following figure is illustrating the procedure of the research.

Figure 1: Process model of the master thesis



(Own illustration by the author).

2 Literature review

The following literature review presents the current state of research on the transition to circular business models and the wetsuit industry. The different research topics are presented as precisely and comprehensibly as possible. Research findings on sustainable development, circular economy, circular business model innovation, the wetsuit industry and a transitions perspective, are presented in a result-oriented manner. Based on this, potential research gaps are identified and further explored.

2.1 Circular economy in the context of sustainable development

Drawing from the global consensus, which is exemplified by international agreements and common development objectives, countries worldwide are increasingly directing their focus towards the Circular Economy. The CE framework is highly aligned with the environmental, social, and economic goals, which are the three fundamental pillars of sustainable development, as outlined in the United Nations (UN) “Sustainable Development Goals” (SDG)¹ objectives and targets (United Nations, 2015). Correspondingly, the section will elaborate CE in the context of sustainable development in a more detailed way.

Given its potential for economic expansion and advancement, the circular economy is attracting significant attention as a means of promoting the idea of sustainable development. Research shows a strong correlation between the CE model and the fulfilment of the SDGs (Rodriguez-Anton et al., 2022). At the European level, most of the SDGs are linked to the orientation towards a CE, indicating that concrete actions aimed at transforming the linear economy into a circular economy, will facilitate the realization of the 2030 Agenda for Sustainable Development². Moreover, the interrelationships among most of the 17 SDGs suggest that a CE, directly or indirectly, can enable these objectives to be attained within the European space. Consequently, significant correlations between a CE implementation and

¹

² The 17 Sustainable Development Goals (SDGs) are part of the UN “2030 Agenda for Sustainable Development” a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere (United Nations, 2015).

the achievement of the common global sustainable development goals are evident (Abdallah, 2023, Rodriguez-Anton et al., 2022).

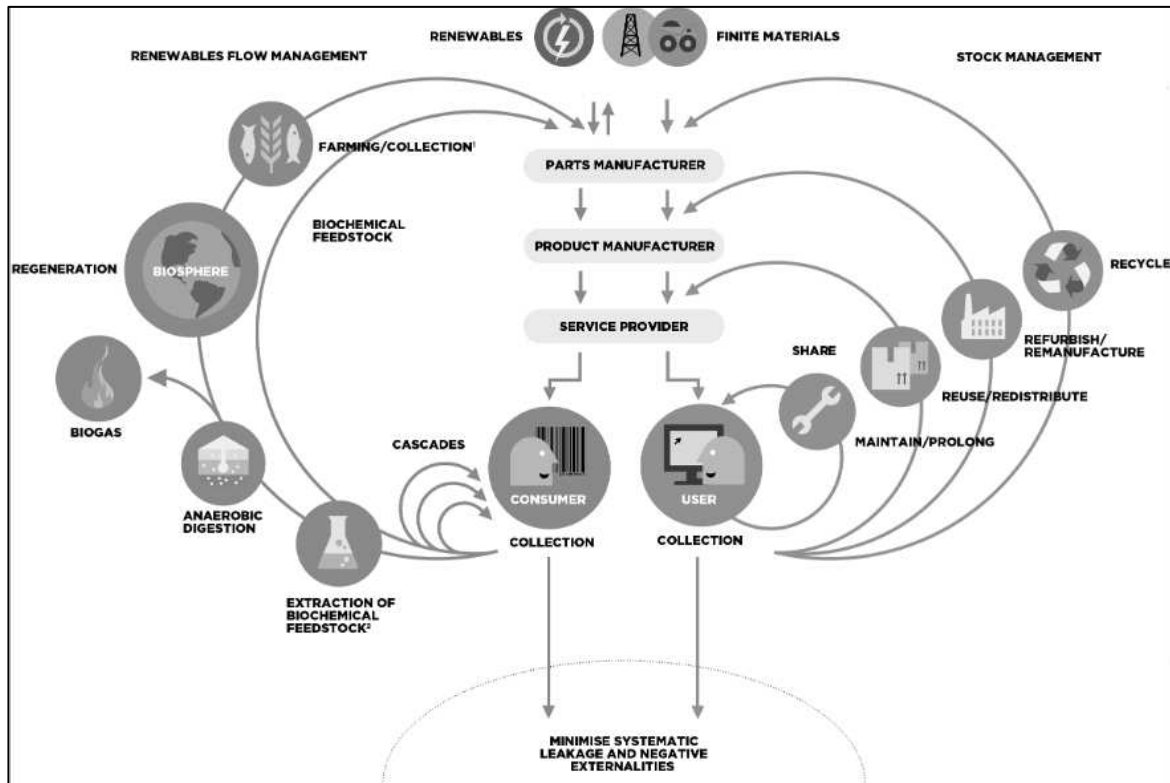
Acknowledging the integral relevance of circular economy for the global sustainable development, the term will be defined, to ensure a concrete common understanding.

Delimitation of the term circular economy

The increasing importance of the circular economy as a means of achieving sustainable development has encouraged scholars to propose various understandings of the concept. Given the high quantity of research conducted on the circular economy, different interpretations, and varying perspectives as well as numerous applications of the concept, can be examined in the considerable body of literature. To develop a coherent definition of the CE, renditions and definitions of existing academic research has been analysed (Abdallah, 2023; Dodick & Kauffman, 2020; Kirchherr et al., 2017; MacArthur, 2013; Rodriguez-Anton et al., 2022; Susur & Engwall, 2023). In addition to that, research on the consensus on the circular economy has been incorporated (Geissdoerfer et al., 2017; Prieto-Sandoval et al., 2018).

Simplified, the circular economy can be characterized as a problem-solving framework that tackles concerning global challenges such as climate change, waste/ waste management, loss of biodiversity, and all forms of pollution (MacArthur, 2013; Stahel, 2016). The fundamental elements of circular economy can be declared by four primary components that are essential in its definition: Recirculation of resources and energy, reduction of resource consumption, and the recovery of value from components and waste. A multi-level approach that demonstrates its importance as a pathway to sustainable development and its relevance to societal innovation. (Prieto-Sandoval et al., 2018). In reference to the mentioned primary components and the various differentiated understandings of the framework, CE can be exemplified as an economic system that entails a shift in the paradigm of the relationship between human society and the natural and technical world (Kirchherr et al., 2017; Geissdoerfer et al., 2017; MacArthur, 2019).

Figure 2: The butterfly diagram, circular economy system



(Ellen MacArthur Foundation, 2015, p.6).

According to the pioneering interpretation of CE, “the butterfly diagram”, first published by the Mac Arthur Foundation in 2013, there are two main cycles, the technical cycle and the biological cycle. Products and materials in the technical cycle do not biodegrade, therefore the system recirculates these by processes such as reuse, repair, remanufacture and recycling. The objectives to forestall resource depletion, foster the circulation of energy and materials, and promote sustainable development are therefore more likely to be accomplished. The biological cycle does biodegrade, the utilized and processed materials are returned to the soil to regenerate (MacArthur, 2013). By the acknowledgement of the circular model and the adoption at micro-levels (enterprises and consumers), meso-levels (symbiotic economic agents), and macro-levels (cities, regions, and governments), circular and regenerative innovations in production, consumption and in the legislation are feasible for society

(Kirchherr et al., 2017; Geissdoerfer et al., 2017; MacArthur, 2013; Prieto-Sandoval et al., 2018).

Condensed, various interpretations and definitions of the CE concept exist in the literature. The research shows that the economic system implies many circular loops within two main cycles (Biological & Technical), which must be adopted at micro, meso, and macro levels of society, to achieve its objectives. To enhance the understanding, the following part will break down the micro level, which entails enterprises, their business models, and the urge for innovation.

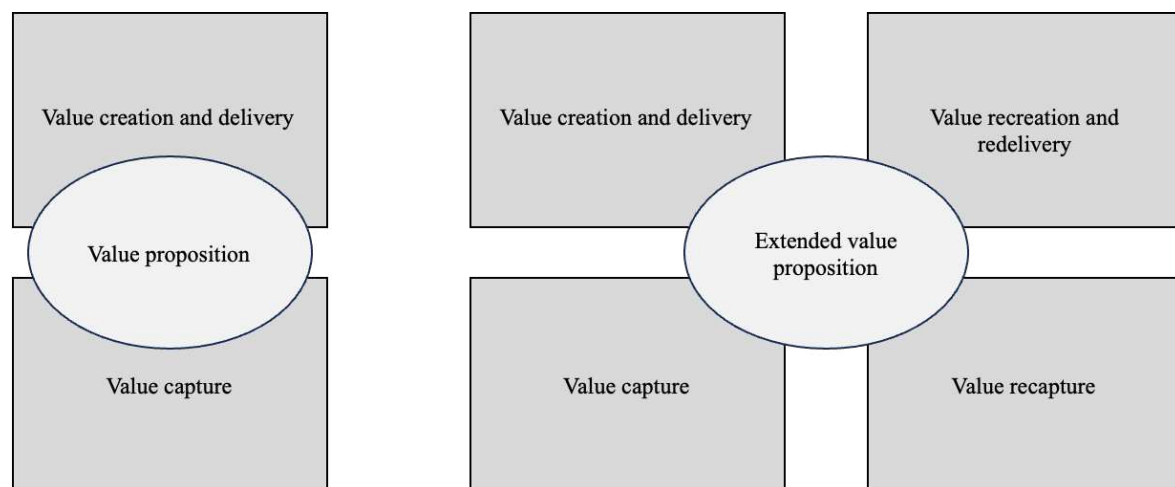
2.2 Circular business model innovation as enabler for circular economy

The contemplated studies on circular economy highlight the economic system as a multi-level framework, with regard to the crucial significance of sustainable and circular business models on the systems micro level (enterprises and consumers), which will be consolidated hereafter (Kirchherr et al., 2017; Geissdoerfer et al., 2017; Prieto-Sandoval et al., 2018). The basic theory of a business model is outlined beforehand.

A business model can be perceived as a companies organizational construct, including all processes employed to generate value (Richardson, 2008). Frequently referred by scholars is the definition from Osterwalder and Pigneur (2010), who propose that a business model is the fundamental rationale of how a company creates, delivers, and captures value (Osterwalder & Pigneur 2010; Wirtz et al., 2016). The main business model elements are distinguished between Value proposition, value creation and delivery and the value capture (Richardson, 2008). As the drive for more sustainability in businesses has increased, research has emphasized the requirement for sustainable and innovative “circular business models” that can facilitate the transition towards a more circular economy (Geissdoerfer et al., 2018; Nußholz, 2017). The fundamental premise of this argument is based on the idea that the adoption of circular practices for production and consumption are necessary to replace the predominant linear models (Bocken et al., 2016). Therefore, the business model innovation

is gradually being acknowledged as an indispensable process to facilitate this transition (Susur & Engwall, 2023). The innovation of circular business models is viewed as an effective instrument for driving a socio-eco centric process of “creative destruction” (Schumpeter, 1934) that replaces linear production and consumption patterns with those that integrate circular principles. CBM have the potential to disrupt existing industry structures, reorganize supply chains, and even generate new markets. Scholars are increasingly agreeing on the definition of circular business model innovation as the process of modifying existing business models to develop circular configurations that (re)create, (re)deliver, and (re)capture value, or create entirely new circular business models that generate value in an innovative way (Guldman & Huulgaard, 2020). The key elements of a linear business model as well as the elements of a circular business model are exemplified in the style of Richardson, (2008) and Bocken et al. (2016).

Figure 3: Key elements of a linear & circular business model



(Bocken et al., 2016; E. Guldman, R.D. Huulgaard 2020; Richardson, 2008).

Research indicates that circular business models can emerge through three types of business model innovation (Bocken et al., 2016; Hofmann & Jaeger-Erben, 2020; Nußholz, 2017).

CBM Adjustment - refers to maintaining the linear model. The adjustment process is gradually altering the company's current operations and assets. Adjustments such as minimizing manufacturing waste and making changes to processes to increase energy efficiency are an example for this type of CBM. (Bocken et al., 2016; Hofmann & Jaeger-Erben, 2020; Nußholz, 2017).

CBM Adaptation - entails conforming to the standards and requirements of the social environment. The adaption of value creation activities, networks, resources are the main objectives for this CBM type. The adaption includes recycling waste products or substituting recycled materials for other raw materials. (Bocken et al., 2016; Hofmann & Jaeger-Erben, 2020; Nußholz, 2017).

CBM Innovation - shapes industries, markets, and the society by establishing new, sustainable flows between the systems of production and consumption. The development of new business models in an established organization can be described as CBM innovation. The implementation or change of the value generation processes, networks and other assets are part of the transformation process. (Bocken et al., 2016; Hofmann & Jaeger-Erben, 2020; Nußholz, 2017)

In order to facilitate the transition towards a more circular economy, the innovation of business models becomes increasingly important for businesses. Circular business model innovation, the modification of the existing models to create circular configurations as well as the development of entirely new business models is indispensable for a sustainable transformation from linear to circular. However, the innovation and transition to circular business models is not completely seamless. The body of literature is demonstrating certain limitations and gaps in the transition process, as the next chapter will demonstrate.

2.3 Limitations and drivers of circularity

The adaption and implementation of business models which are in line with the principles of the CE directives are crucial for sustainable business transition. Although circular economy is already an established research topic and represented by a comprehensive body of literature, the economic system still faces many great challenges. (Blomsma & Brennan,

2017; Dzhengiz et al., 2023; Korhonen et al., 2018). Therefore, it's essential to carefully evaluate the underlying concepts and assumptions of the academic research, that potentially shape the pathways to circularity and sustainability (Dzhengiz et al., 2023).

According to Geissdoerfer et al., (2023), there has been extensive research on what motivates organisations to create, develop and use CBMs and what barriers they face. From the existing literature on barriers and challenges, it can be deduced that the economic system still lacks in conceptual clarity for the management. (Blomsma & Brennan, 2017; Dzhengiz et al., 2023; Korhonen et al., 2018). Especially in the business management, a lack of profound reflection and the organizational structure for the execution of CE fundamentals is often absent. (Dzhengiz et al., 2023). This leads to a limited application of CE principles and a relatively low rate of market uptake of CBMs (Bocken et al., 2018). Furthermore, a comprehensive literature review by Guldmann & Huulgaard, (2020), shows that companies are mainly facing barriers at four socio-technical levels, market and institutional, organizational level, value chain and the employee level (Guldmann & Huulgaard, 2020). These include regulatory and financial difficulties, obsolete sustainability strategies, lack of knowledge and skills, the complexity of cross-organizational collaboration, reluctant and new value chain structures, as well as the lack of an internal incentive structures (Bocken et al., 2018; Guldmann & Huulgaard, 2020; Geissdoerfer et al., 2023.) Complementary, impelling components for CBM are mentioned in many recent publications.

Generally, the transition to circular business models is firmly rooted in “innovation” (Kiron et al., 2013). As an extension to innovation, a contemporary “circular economy agenda” that is aligned with defined goals and resources can provide a valuable advantage in competitive business markets. Studies indicate that firms are able to increase revenue streams and taking advantage of new market opportunities, when the sustainable “vision” is followed accurately in the long-term (Neligan et al., 2022; Rattalino, 2018). Furthermore, research indicates that “business growth” and “cost reduction” are additional drivers for the transition to circular business models. Moreover, “changing market demands” and “trends” are driving the development of higher “Corporate Social Responsibility” (CSR). Apart from the previously mentioned drivers, governmental/ institutional “regulations and incentives” as well as evolving “digital and technological standards and infrastructure” can enhance

strategies for greater circularity (Geissdoerfer et al., 2023; Neligan et al., 2022; Susur & Engwall, 2023).

The transition to circular business models is surrounded by various limitations, challenges and drivers. Financial and regulatory barriers, obsolete sustainability strategies, and the lack of knowledge is in many cases decelerating the transition and innovation processes. Particularly in management and business organization, a lack of studies on how to transition to more sustainable business models can be observed. This aligns with the difficulty management faces, in realisation of sustainable practices. The challenges of circularity are often pointed out, but without the consideration how to overcome these. Nevertheless, certain individual strategies of CBM innovation can navigate businesses towards a successful transition to circularity and reap the potential benefits and business opportunities. To utilize the existing potentials, it is essential to understand and evaluate the barriers and drivers and derive concrete actions for each case individually.

Building upon the foundation of insights compiled from the general academic research on sustainable development, circular economy and circular business model innovation, it is feasible to apply the implications of the literature within the wetsuit industry. It is important to note that sustainable development is not just a buzzword in the global discourse. With the rising environmental consciousness and global demands for sustainability, it is a major challenge concerning all industries. So is the wetsuit industry called upon, to strive for a sustainable development and a transition to more circular practices.

2.4 Sustainable progression of the wetsuit industry

The following paragraph is evincing the current state of sustainable businesses and practices in the wetsuit industry as well as the development of the market environment. Moreover, the section outlines the importance for the industry to transition its practices and broaches the correlated opportunities of sustainable and circular change. However, the conducted review of literature demonstrates that the existing body of academic work on the sustainable development and circular innovation of watersports is limited to a manageable

number of studies. Only a small extent of recognized studies has been published, which already highlights the consisting gap in the research field.

Progression of the wetsuit industry

As part of the watersports equipment market and an integral part of the surfing equipment industry, the global wetsuit industry has evolved and changed significantly over the past few decades. New product features and technologies, in-depth material research and a drive towards sustainability have all been challenging the industry in recent times.

The first neoprene wetsuits appeared in the 1950s, developed by Californian surfers and divers who wanted to protect and insulate their bodies and stay warm in cold water environments (Chouinard, 2006). Early wetsuits were simple one-piece designs, traditionally made from petroleum-based neoprene, a synthetic rubber material that combined flexibility, durability and excellent thermal insulation (Appendix 1: Introduction to wetsuit rubber materials). However, as the popularity of watersports grew, so did the demand for higher performance wetsuits (Borne & Ponting, 2015; Machado & Toth, 2015). With the increasing popularity of outdoor recreation and sporting activities, significant advances in material research and technological innovation have led to great performance improvements and market growth (Borne & Ponting, 2015; Chouinard, 2006). Today, there are numerous companies producing wetsuits for a variety of water sports and activities, making the global wetsuit industry a multi-billion-dollar industry. Rip Curl, Billabong, O'Neill, Quiksilver and Patagonia are some of the leading brands in the market, enhancing functionality and comfort with advanced features such as UV protection, layering, quick drying and improved flexibility. The expansion of the industry has led to a 5.9% growth in global wetsuit sales through 2021 (Future Market Insights, 2021). According to a market analysis by Future Market Insights, 2021, the wetsuit market will exceed US\$1.78 billion in 2021, with an expected CAGR of 6.5% between 2021 and 2031 (Future Market Insights, 2021).

In addition to the flourishing market, the water sports industry has become more aware of the natural environment in recent years, with new sustainable innovations at the forefront of the wetsuit brands (Borne & Ponting, 2015; Machado & Toth, 2015). In collaboration

with material suppliers and manufacturers, companies from the industry are developing new materials and technologies. The first alternatives to the petroleum-based neoprene rubbers have been introduced to the market. The brands Yulex and Patagonia introduced a carbon neutral biodegradable raw material, the Yulex natural rubber, which is an organic alternative for the wetsuit production (Appendix 1: Introduction to wetsuit rubber materials), (Chouinard, 2006; Yulex 2023). Other brands such as Rip Curl and Soöruz are attempting to find a way to recycle wetsuits (Rip Curl 2023; Soöruz 2023). The companies are working on a collection system for wetsuits at the end of the product life cycle, with a circular and scalable second life cycle solution.

Such approaches to innovate their business model in a sustainable way are crucial for the reduction of the industry's environmental impact and are leading the way for sustainable future change. As watersports are expected to continue to grow, the academic literature anticipates continued innovation and development within the wetsuit industry (Borne & Ponting, 2015).

Moving towards a sustainable transition

The efficient use of resources as well as improving natural, non-toxic and recycled materials, to reach similar performance levels as the products based on chemical materials is an inevitable business model innovation for the wetsuit industry (Borne & Ponting, 2015; Machado & Toth, 2015). To fully understand the benefits of sustainability, the businesses should change their approach and understanding of sustainable transition. Instead of seeing sustainable development and innovation as a risk or problem, it should be welcomed as an opportunity for growth and progress rather than seen as a challenge (McCullough et al., 2016). Although the wetsuit industry has started working toward sustainability, it hasn't yet made any appreciable progress in all the facets of the industry (Machado & Toth, 2015). Certain individual cooperation's have achieved progress in specific areas such as material, waste and philanthropy, but the sector as a whole has not made a concerted transformation to lead in sustainability (Chouinard, 2006; McCullough et al., 2016; Sabori, 2015; Yulex 2023).

Besides this small number of individual progresses of specific cases in the industry, the academic pursuit on the sector is a relatively new field of research (Borne & Ponting, 2015). A small number of reputable studies has been published, on the topic, which were referred in paragraph above. The body of literature on sustainable development of water-sports, is published in the context of tourism (O' Brien, D., & Ponting, J., (2013); Román, C., et al.,2022; Ruttenberg, 2022), which is an important research field to achieve sustainable management and preservation of local culture and environment. However, the corporate perspective on the micro level, the business-organisation and management, which is driving innovation and transition of the companies in the industry is not a substantial part of the present state of the literature. With the regard to the referred literature on circular economy in the setting of sustainable development and circular business models, as well as the detailed breakdown of literature on the development of the wetsuit industry, the comprehensive review elaborates the consisting research gap on *“How can companies in the wetsuit industry transition to circular business models?”*.

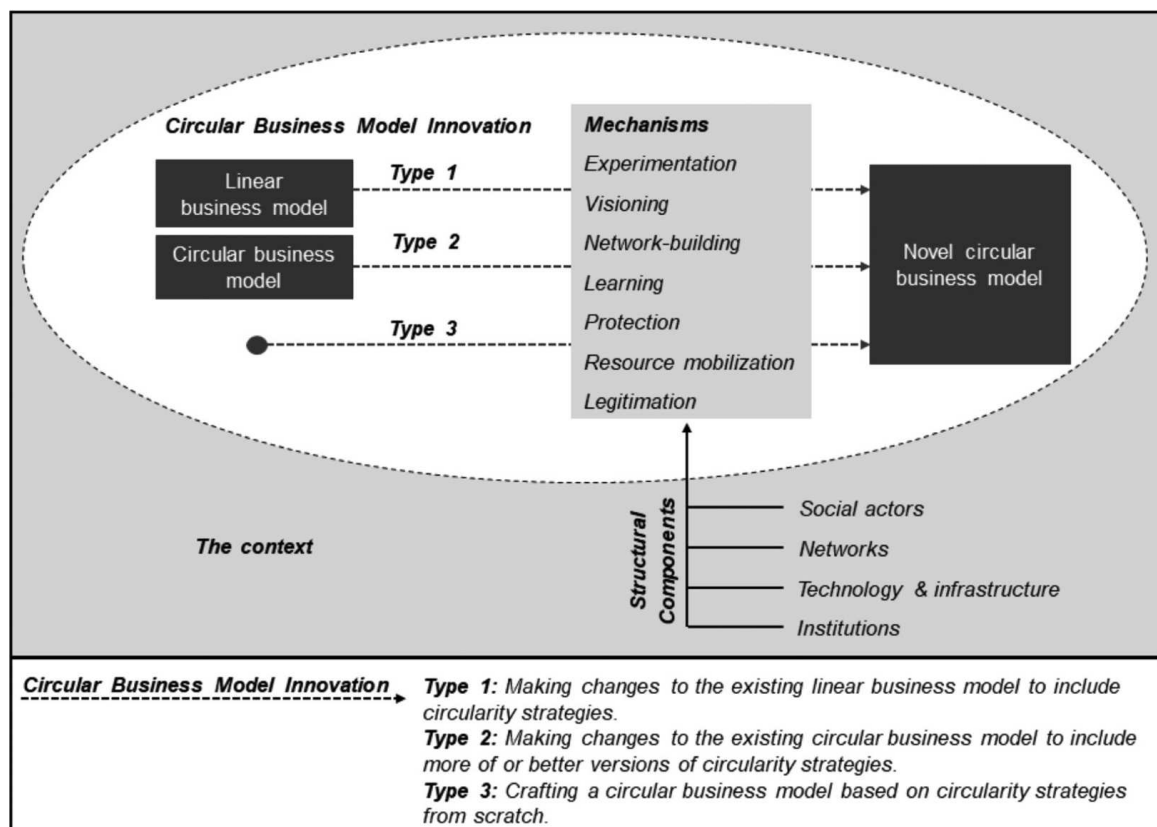
2.5 From Linear to Circular, a transitions perspective

The transition towards sustainable and circular business models has emerged as a crucial innovation activity for businesses in response to sustainability challenges. Corporations are increasingly exploring the integration of societal issues into their business model innovation process, which entails expanding the notion of value beyond just economic considerations to include social and environmental factors (Bocken & Geradts, 2020). To get a transitions perspective on the outlined paradigm shift, sustainable and circular business model innovation is contextualized with the growing field of transition studies (Susur & Engwall, 2023).

Two of the most significant frameworks in this area of transition research are Technological Innovation Systems (TIS) (Bergek, Jacobsson, Carlsson, et al., 2008) and Strategic Niche Management (SNM) (Schot & Geels, 2008). While the TIS focuses on structures and functions that might affect innovations in a system, the SNM framework focuses on how to drive the success of developing innovations. These two frameworks complement each other

and offer a theoretical foundation for understanding how innovations drive and emerge within the context of socio-technical transitions. By linking the field of transitions studies and applying the two systems on circular business model innovation, as Susur & Engwall did in 2023, key contextual features and mechanisms for the transition to circular business models are identified and conceptualized. Based on a comprehensive literature review, a deductive conceptualization of structural components and innovation mechanisms resulted in a multi-level framework. (Susur & Engwall, 2023). The research points out, that the shift towards the new or adjusted business models requires changes in social, technological, and institutional contexts, which should be reflected in the design of the transition and innovation process.

Figure 4: A transitions framework for circular business models



(Susur & Engwall, 2023).

The framework defines the stage of innovation for each individual business model case, before adopting the structural components and innovation mechanisms. The classification into three different innovation types aligns with the definition of CBM innovation, defined in chapter 2.3 (Adjustment – Type 1, Adaptation – Type 2, Innovation – Type 3). This validation of literature acknowledges the academic consensus on circular business model innovation (Bocken et al., 2016; Geissdoerfer et al., 2020; Hofmann & Jaeger-Erben, 2020; Nußholz; Susur & Engwall, 2023).

To answer the research question of this study and thereby filling the existing research gap, I used the frameworks identified structural components and innovation mechanisms as orientation to construct the interview-guideline for the collection of primary data. Further details regarding the adaptation and integration of the transition’s framework for circular business models are provided in the methodology chapter.

3 Methodological approach

The methodology chapter outlines the research design, the rationale for selecting the data collection method, explains the data collection procedures and defines the settings for the qualitative data analysis.

3.1 Research design

Based on the lack of existing business organisation and management theories in the study field of Circular Economy and CBM innovation and the small number of reputable studies on sustainable development of businesses from the wetsuit industry, I adopted a qualitative research approach, to understand the vaguely studied phenomenon. The qualitative approach allowed me to create an in-depth understanding of the phenomenon, grasped it in its natural settings and surrounding environment (Abdallah & Langley, 2011; Rynes & Gephart, 2004). The open-ended research style creates a more flexible and exploratory approach for the data collection, often leading to detailed and rich data, that can provide a

comprehensive illustration of the subject being studied (Birkinshaw et al., 2011; Graebner et al., 2012). Furthermore, building on these underlying characteristics, qualitative research can give insight into human behaviour, motivations and attitudes, which helps to explore the reasoning behind decisions and actions (Rynes & Gephart, 2004). The qualitative approach fits the interpretive stance of the thesis, as the objective is to comprehensively understand how companies in the industry can transition to sustainable and circular business models.

To answer the research question, I conducted a multiple case study analysing 7 companies from the wetsuit industry. The analysis of multiple cases has the advantage of exploring the phenomenon of interest across different contexts and conditions and thereby increasing the robustness of our findings (Eisenhardt, 1991; Eisenhardt & Graebner 2007). A comparison of multiple cases enables me to draw broader conclusions that may be more applicable to other business cases and more representative for the actual industry situation. Furthermore, the replication of data across different cases is great evidence of the validity of the findings (Stake, 2006). Additionally, the approach enables me to triangulate the data, ensuring a comprehensive understanding of the phenomenon through different lenses (Eisenhardt & Graebner 2007).

Most of the cases studied were selected by industry affiliation. Firms with a business background in the wetsuit industry have a privileged perspective on the topic in question and contribute to increasing knowledge about the subject. In addition, I identified companies which are considered as progressive in the industry by conducting prior research using secondary sources. Moreover, I strived to select the industry representatives with the respect to multi nationality, to obtain information on a global industry level and to cover the differences of certain market segments or standards.

To establish the contact, I connected with most industry representatives via LinkedIn, a business and employment-focused social media platform. This approach enabled the direct contact to potential preselected interview partners. Further contacts were made through the networks of the wetsuit brands, which connected me directly with industry representatives from other firms, to support the purpose of the research. I selected a total of 7 companies, comprising 5 wetsuit brands and 2 material suppliers. I chose five international and popular wetsuit brands which operating in the global wetsuit market. To create encompassing research and diversify the perspectives of the study, I determined the two major material suppliers of the industry, to gain fundamental insights for the thesis.

The following table gives an overview of the selected cases, their origin as well as their industry positioning.

Table 1: Overview of selected cases

Company	Origin	Industry Stakeholder
Deeply	Portugal	Wetsuit Brand
Needessentials	Australia	Wetsuit Brand
Rip Curl	Australia	Wetsuit Brand
Srface	Netherlands	Wetsuit Brand
Soöruz	France	Wetsuit Brand
Yamamoto	Japan	Material Supplier
Yulex	USA	Material Supplier

(Own illustration by the author).

3.2 Data collection

For an adequate data base, I collected primary and secondary data. I conducted multiple semi-structured interviews with representatives from the wetsuit industry. To achieve comprehensive perspectives from all levels of the industry, I involved representatives from wetsuit brands and from the largest material suppliers. In addition to the primary source of data, I collected secondary data for each of the exanimated companies. The sources of secondary data included newspaper articles, websites, documentaries and general media articles about the wetsuit industry and the field of sustainable development. The review of the secondary data has mainly taken place prior to the collection of the primary data, but also to

contributed to the understanding of the specific cases. Furthermore, I compared the secondary sources with the collected primary data, this triangulation of data was an essential method to increase the reliability and validity of the findings. Apart from that, a review of secondary data was substantial to understand the context of the organisations, including their development, history, performance and current strategy. It enabled me to fully comprehend the dynamics as well as the background of the selected companies.

The primary data was collected in 2023, In a period of three months from March to May. To compile insights from the chosen representatives, I conducted 8 in-depth interviews, which were guideline-orientated, with the aim to obtain high-quality data from the perspective of the selected interview partner (Hesse-Biber et al., 2011). The structure of the interview-guideline is orientated towards the “Transition Framework for Circular Business Models”, by Susur & Engwall in 2023, which I introduced in chapter 2. Consequently, the interviews broached certain structural components as well as innovation mechanisms, which are essential to transition a business model from linear to circular (Appendix 2: Guideline of the expert interview). All the interviews were conducted in online video meetings, recorded as audio files with the consent of the interview partner and transcribed subsequently. The transcription was written in standard orthography (Kowal and O'Connell, 2007). Non-verbal utterances, such as laughter or clearing of the throat, were only transcribed if they gave a different meaning to the statement (Gläser and Laudel 2010). The interviews lasted between 42 and 81 minutes.

Table 2: Overview of interviews

Case	Interview partner	Position	Date	Length
Deeply	Thiago Lemos	Creative Director	06.04.23	00:56
Needessentials	Ryan Scanlon	Founder & Director	21.04.23	00:46
Rip Curl	Léa Duquay	Product development Wetsuits & Accessories	05.05.23	01:21
Srface	Reinier Korstanje	Co-Founder & CEO	11.04.23	01:04
Soöruz	Paul Le Guen	Project Manager, Wetsuit 2nd Life & CSR	12.04.23	01:10
Yamamoto	Yudai Yamamoto	Director	25.04.23	00:57
Yulex	Jeff Martin	Founder & CEO	06.04.23	01:06
Yulex	Kyrrha Martin	Director of Sales	22.03.23	00:42

(Own illustration by the author).

To obtain the highest nature and quality of information, I chose the interviewees according to their Job position, in alignment with the research question. In many cases I was able to connect with the Founder/ CEO of a company, to get the most holistic insights and information (Srface, Needessentials, Yulex, Yamamoto). If the accessibility of the top management of a company was not possible, I selected the interview partners based on their proximity to the research direction (Deeply, Rip Curl, Soöruz). An overview of the data collection based on primary and secondary data for each individual company case can be found in the appendix (Appendix 3: Table of data collection).

3.3 Data analysis

To systematically analyse the collected data from primary and secondary sources, I applied the “Gioia Method” as pattern-inducing technique (Corley & Gioia, 2004; Gioia et al., 2013). The qualitative research approach can be classified as a form of content analysis with the aim of analysing data following a theoretical and rule-based procedure (Corley &

Gioia, 2004). Gioia provides a structured framework for organising, capturing and modelling informant meanings from qualitative data, following the characteristics of a content analysis. The method specifically focuses on developing concepts, themes and dimensions through a coding and synthesis process, before drawing conclusions about certain aspects (Abdallah & Langley, 2011; Corley & Gioia, 2004).

I analysed the data following the three-step procedure, developing concepts, themes and dimensions. I identified initial first order concepts and assigned these to provisional categories, primary based on the structural components and innovation mechanisms from the introduced theoretical framework (Susur & Engwall, 2023). First-order concepts are simple descriptive codes which represent a full phrase from an interview, refined through iterations (Bocken & Geradts, 2020). The first order concepts were generated from the theory, but also evolved from the collected data. Based on the interviews I created new codes which had not been operationalized. First order concepts such as “*CSR Practices, Involvement of Government and Knowledge*” resulting from the theory (Bocken et al., 2018; Guldmann & Huulgaard, 2020; Geissdoerfer et al., 2023.) New generated codes such as “*Breaking existing monopolies, Industry commitment to sustainable Innovation and Learning from other industries*” evolved from the interview data.

To create higher-order themes, I conducted the axial coding to find interrelations between the first-order concepts. By clustering the codes into more abstract definite categories, the second-order themes, I identified barriers and strategies influencing the transition to circular business models. In the ultimate phase of the framework, I set second-order themes into relation to each other, to generate the aggregate dimensions.

The upcoming table illustrates the coding process, following the method of Gioia, based on two examples.

Table 3: Example of coding process, “Gioia Method”

Predefined Code, provisional Category “Visioning”			
Quotations	First-Order Concepts	Second-Order Theme “Drivers”	Aggregate Dimensions
<i>*It is important that we follow ESG principals and standards in all parts of the Company.</i>	*Integrate ESG principles throughout the company	Sustainable long-term Vision	Circular Strategies for Sustainable Success
<i>*Sustainability as Brand value since day one. We knew that we could not enter the market without setting the focus on sustainability.</i>	*Incorporate sustainability as brand value		
<i>*To achieve a circular industry, we have to adopt the cradle-to-cradle philosophy, our thinking has to become circular.</i>	*Adopt a cradle-to-cradle philosophy		
New Code, provisional Category “Materials”			
Quotations	First-Order Concepts	Second-Order Theme “Barriers”	Aggregate Dimensions
<i>*The R&D and innovation is out of reach for small wetsuit Brands, it depends on the big brands, material suppliers and manufacturers</i>	*Sustainable innovation depends on Material & Manufacturing R&D	Material Innovation Limitations	Innovation-Driven Infrastructure Development
<i>*Unfortunately, we can’t afford high investments into the Material research, but we are trying our best to collaborate with manufacturers and suppliers.</i>	*R&D investment on material out of reach for small brands		
<i>*Until Yulex is not reaching the same performance levels as Limestone material, it won’t replace the environmentally harmful materials.</i>	*Trade-off at Material, Yulex / Limestone		

(Own illustration by the author).

Finally, I concentrated the data into 8 aggregated dimensions, encompassing the second-order themes, both barriers and strategies converged into the following eight transitional dimensions: *Industry ecosystem, Eco-conscious market demand, Innovation driven infrastructure development, Collective action and collaborative partnerships, Sustainable compliance and certification, Circular strategies for sustainable success, building sustainable awareness, Advancing circular practices.*

The upcoming table illustrates the complete coding process for all eight transitional dimensions of findings. The coding tree presents the pattern inducing technique from first order concepts to second-order themes (barriers and strategies), to the final aggregate dimensions. The table of total data collected is presented in the appendix (Appendix 4: Table of total data).

4 Empirical settings

In order to comprehend the upcoming chapter of findings extensively, contextual information is provided as empirical settings. Necessary information on the companies studied, as well as market conditions are given.

For the research, 7 companies from the wetsuit industry were selected. Based on primary and secondary data, the sustainability practices and transition initiatives to more sustainable and circular business models are observed. Moreover, general information of the companies is disclosed. All companies interact and compete in the watersports market, some exclusively in the wetsuit market. The companies operate globally, nevertheless some with a higher concentration in the European Union (EU). The companies, “*Deeply, Need Essentials, Rip Curl, Srface, Soörüz, Yamamoto and Yulex*” will be introduced in the following sections. To reduce the size of the chapter, general facts and information about the companies are summarized in a table.

Table 5: Introduction of industry cases

Brand	Industry Stakeholder	Established	Origin	Business Model	CBM Innovation	Size, Employees	avg. Annual Revenue
Deeply	Wetsuit Brand	2004	Portugal	D2C	Adjustment	33	4.97 M EUR (2019)
Need-Essentials	Wetsuit Brand	2013	Australia	D2C	Adjustment	16	n.d.
Rip Curl	Wetsuit Brand	1969	Australia	D2C & Retail	Adoption	> 1500	311.8 M EUR (2022)
Srface	Wetsuit Brand	2017	Netherlands	D2C	Adjustment	11	n.d.
Soörüz	Wetsuit Brand	1999	France	D2C & Retail	Adoption	23	n.d.
Yamamoto	Material Supplier	1964	Japan	B2B	Adoption	58	n.d.
Yulex	Material Supplier	1997	USA	B2B	Innovation	22	2.0 M EUR (2022)

(Own illustration by the author, sources: Similarweb, 2023; Iberinform, 2019; Crunchbase, 2023)

Deeply

Deeply is a Portuguese water sports brand with the vision of producing high quality, environmentally friendly wetsuits at an affordable retail price. The brand operates in the European market, with the strongest sales in the local Portuguese market (Similarweb, 2023). The "Deeply" brand is part of the corporate holding Bright Brands Sportsgoods, S.a., which operates from its headquarters in Porto, Portugal (Iberinform, 2019). In order to reduce the impact on the environment, Deeply claims to be constantly improving its wetsuits towards more organic and sustainable materials. The company uses eco-friendly materials such as "Mineralprene" (a mixture of limestone and oyster shell) and "Yulex" (biodegradable natural rubber). Mineralprene material is described as a revolution for the wetsuit production, as the new material reduces the environmental impact of production by adding recycled oyster shells (oxide powder). The brand is distancing its products from traditional petroleum-based neoprene, which is more environmentally questionable than limestone neoprene (Deeply, 2022).

NeedEssentials

Need Essentials is a popular wetsuit brand, specialized on the production of high-quality neoprene wetsuits for primarily surfers and watersports enthusiasts. Need Essentials has gained recognition in the market for its commitment to simplicity, affordability and the great functionality. In regard to sustainability, Need Essentials strives to minimise its environmental impact throughout all operations. The company shifts to the use of eco-friendly materials in their wetsuit production, such as recycled polyester fabrics and limestone-based neoprene, which is considered to be a more sustainable alternative to the petroleum-based neoprene (Appendix 1). While the brand doesn't have a circular process for up- or recycling wetsuits, they do promote responsible consumption by focusing on product durability. (Needessentials, 2023).

Rip Curl

Rip Curl is one of the biggest brands in the wetsuit industry, specialising in apparel & fashion, neoprene wetsuits, surf equipment and accessories. The company has become a global player of the industry with strong reputation and presence in Australia, Asia, Europe and North America (KMD Brands, 2022). As a reaction to the rising environmental concerns, Rip Curl has actively incorporated sustainable practices into its operations. The brand has partnered with Terracycle, a recycling company that promotes up- and recycling of wetsuits as well as other rubber materials (Rip Curl, 2023). In addition, Rip Curl's European headquarters started another local recycling project in the south of France, trying to find scalable use cases for the remanufacturing of wetsuits (Interview Rip Curl, 2023). Besides the upcycling and recycling programs, Rip Curl offers a comprehensive wetsuit repair service, encouraging customers to extend the life of their wetsuits, rather than disposing them right away. By incorporating eco-friendly materials, promoting repair services and focusing on the end of life/ waste management, Rip Curl strives to minimise its environmental impact and contribute to a more sustainable future (Rip Curl, 2023).

Soöruz Wetsuits

The French water sports brand Soöruz has its core business in the sale of neoprene wetsuits, surfing/kitesurfing equipment and other accessories. The brand started in the segment of fashion/ apparel and changed its business model on eco-friendly wetsuit production in 2013 (Interview Soöruz, 2023). Soöruz is one of the sustainability driven companies in the industry, constantly working on less polluting solutions, natural material compositions ("Oysterprene" and "Biöprene"), product life cycle extensions and circular business model adaptation to reduce and reuse neoprene waste. In 2019, the brand invented a label, the "ocean protect label". The objectives of the label are focused on the product line, working on reducing the environmental footprint, integrating lifecycle performance, as well as promoting the most eco-responsible products. Soöruz has also launched a second life/recycling programme for neoprene wetsuits. After the wetsuits are collected, the material is shredded and upcycled to be used as cushion filling or boxing bags. In 2022, the brand published the

companies sustainable goals: 100% of our products to be labelled Ocean Protect Soöruz, 40% reduction of our carbon footprint and the recycling of 20,000 suits (Soöruz, 2023).

Srface

The Dutch water sports company Srface specialises in neoprene wetsuits, surfing accessories and further surfing equipment. Srface operates primary in Europe, with the local Dutch market accounting for the majority of sales (Similarweb, 2023). The brand claims that sustainability is an integral part of its moral compass and business strategy (Srface, 2023). By using environmentally friendly materials such as "Yulex" (biodegradable natural rubber), "Eco Carbon" and "Aqua-a", a water-based adhesive component, the brand is getting closer to its sustainability goals (Appendix 1). In addition, Srface's shipping is carbon neutral, with no emissions, and it provides a recycled plastic shipping bag which the customer can reuse as a waterproof wetsuit bag. The company also engages socially, by supporting charities and foundations such as "The Ocean Clean-up" (Srface, 2023).

Yamamoto Corporation

The Yamamoto Corporation is a leading manufacturer of high-quality limestone neoprene materials. The company works with renowned water sports companies and manufacturers to supply the industry with neoprene to produce wetsuits, water sports equipment and other neoprene-based accessories. Limestone neoprene is the most used material in the wetsuit industry. Its proprietary manufacturing process ensures the production of neoprene with exceptional durability, flexibility and thermal insulation properties (Appendix 1). The company actively works to ensure responsible sourcing of raw materials and follows ethical and moral standards. Yamamoto Limestone Neoprene maintains its commitment to sustainability throughout the supply chain. Their commitment to sustainable manufacturing and product excellence has positioned them as a reliable and reputable player in the market (Interview Yamamoto, 2023).

Yulex Corporation

Yulex Cooperation is a bio-based materials and chemicals company that produces natural rubber materials. The brand supplies watersports companies and manufacturers in the industry with the rubber to produce more sustainable wetsuits, equipment and other watersports accessories made from natural materials (Yulex, 2023). A patented process for producing guayule latex³ and products is exclusively licensed by Yulex. All products are plant-based and made from natural rubber, which is a sustainable resource, unlike synthetic rubber, which is a petroleum-based product. The company is committed to eliminating deforestation and working with farmers who follow Yulex's ethical and moral business practices (Interview Yulex, 2023). The brand acts as one of the main drivers for sustainability in the wetsuit industry. Yulex is currently the most sustainable material option to produce wetsuits and other rubber-based watersports equipment (Yulex, 2023).

5 Findings of the research

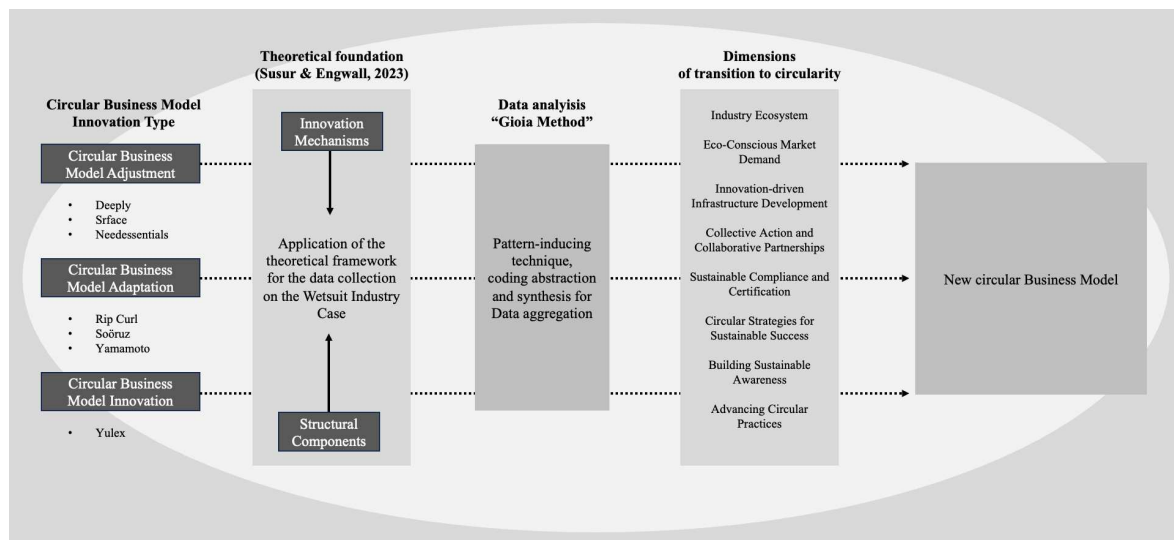
This chapter presents the findings from the qualitative analysis of the data, which I collected to elicit a grounded understanding towards a sustainable business model transition and circular economy practices in the wetsuit industry. The study analyzed insights from seven companies, five wetsuit brands and two material suppliers, representing the industry on different levels, from different perspectives. To answer the research question: "How can companies in the wetsuit industry transition to circular business models?", I consulted a theoretical framework from the body of literature, indicating structural components and innovation mechanisms for a business transition (Susur & Engwall, 2023). However, the dimensions of findings do not follow the structure of the theoretical framework by Susur & Engwall, (2023), the model only served as structural foundation for the analysis of the primary data. The collected data got further abstracted and synthesized for the specific case of the wetsuit industry, following the "Gioia Method". The findings result in eight case-specific dimensions of transition that influence the adaptation and innovation of circular business

³ Raw material from the guayule plant, growing north/middle America.

models of companies in the wetsuit industry. Each sub-sections of this chapter indicates the main strategies to realize the dimension as well as the barriers which hinder this achievement of the operating companies.

The following framework illustrates a case specific transition process to circular business models, which is the foundation for the subsections of the findings.

Figure 5: Transition framework to circular business models for companies in the wetsuit industry



(Own illustration by the author, in the style of Susur & Engwall, 2023).

The findings of the research are leading to guidance for companies in the wetsuit industry on how to transition to circular business models. To give a summarized outlook of the findings, the following table outlines strategies to successfully realize the transitional dimensions for circular business models.

Table 6: Outline, dimensions of findings

Dimension of transition to circularity	Outline of findings
<i>Industry Ecosystem</i>	Disrupt the existing monopoly, collaboration & cooperation, rebalance market structure, investement in transparency
<i>Eco-Conscious Market Demand</i>	Integrate eco-innovation into products, operations and communications, increase education,
<i>Innovation-driven Infrastructure Development</i>	Investment in material research, manufacturing and LCA, enhance technological advancements, Eco-Design, Up-Recycling solution for the end of a lifecycle, supply chain optimization
<i>Collective Action and Collaborative Partnerships</i>	Information exchange with other sectors, collaboration within the industry, collective R&D projects,
<i>Sustainable Compliance and Certification</i>	Cooperation with government and regulatory institutions, Certifications, knowledge exchange
<i>Circular Strategies for Sustainable Success</i>	Sustainable long-term vision, internal CSR Team, Certifications, KPI's of sustainable development
<i>Building Sustainable Awareness</i>	Compliant communication, education of consumers, delimit greenwashing, simplifying information flow, community building
<i>Advancing Circular Practices</i>	Collaborative r&d projects, technological adaption, investment in LCA, Up- and Recycling solutions, repair and maintainance

(Own illustration by the author).

5.1 Industry ecosystem

Barriers of an industry ecosystem

The wetsuit industry in general can be described as unsustainable (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023). The industry's traditional linear business models and market structures, as they stand, did not support sustainability and were therefore indicated as a significant barrier. One factor for this unsustainable industry structure was the pervasive issue of a manufacturer monopoly. According to the industry experts, the Taiwanese manufacturer SHEICO Group produced two out of three wetsuits used globally (Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023). This monopoly exacerbated the power imbalance between competitors and further inhibited the industry's dynamic and transition approach. Brands within the industry found themselves in a position without coequal alternatives, dependant on certain manufacturers (Interview Co-Founder & CEO Srface 2023). The monopolistic structure in the manufacturing enabled a significant control over the newest production technology and often engaged with obscure business practices, including the withhold of key information and the disparate treatment of business partners (Interview Creative Director Deeply, 2023; Interview Director Yamamoto, 2023; Interview Founder & CEO Yulex, 2023). Furthermore, the lack of transparency hampered efforts by brands and material suppliers, towards innovation and sustainability (Interview CSR Manager Soörüz, 2023; Interview Founder & CEO Yulex, 2023).

“Generally, the Brands don't understand the materials, the technology or the aspects of circularity, what they know comes usually from the manufacturer and the information that the manufacturer is sharing is certainly not complete” (Interview Founder & CEO Yulex, 2023).

Another notable issue was the apparent lack of collaboration and partnership within the industry. According to industry representatives, collaboration between the wetsuit brands was minimal, resulting in duplication of effort and missed opportunities for shared learning (Interview Creative Director Deeply, 2023; Interview Co-Founder & CEO Srface, 2023). In

addition, the claim of patents by bigger brands were indicated as a tool to enable competitive advantages and prevented the uptake of competing smaller brands, which are more dynamic and rather encourage sustainable innovation (Interview Creative Director Deeply, 2023; Interview CSR Manager Soöruz, 2023).

“Let’s look at Rip Curls innovation of flash-lining, they have exclusivity for the new product feature for around 2 years. After, all other brands can integrate the product feature into their wetsuit design. It’s patent agreement of Rip Curl with the producing manufacturer” (Interview CSR Manager Soöruz, 2023).

Strategies for an industry ecosystem

Despite these barriers, several drivers within the industry ecosystem that can catalyse the shift towards circularity and sustainability. In particular, collaboration and cooperation between different industry stakeholders could significantly drive change. Some respondents pointed to the Euro-Sima cluster, based in France (Surf Industry Manufacturing Association). The Association provides a collaborative platform for watersports companies, guiding towards innovation and joint economic development (Interview CSR Manager Soöruz, 2023; Interview Manager Product Development Wetsuits Rip Curl, 2023). Approaches like these, could lead to higher transparency in the industry and rebalance the market structure. In addition, collaborative research and development (R&D) projects with other stakeholders or different industries as well as close cooperation’s with material suppliers, were highlighted as the potential benefits of cross-industry collaboration (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023). Respondents highlighted the importance of encouraging industry change, by breaking down the existing manufacturer monopoly (Interview Director Yamamoto, 2023; Interview Founder & CEO Yulex, 2023). Opening the industry, encouraging industry commitment to sustainable innovation as well as the learning from other industries and academic institutions were identified as key actions (Interview Founder & Director Needessentials, 2023; Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Founder & CEO Yulex, 2023). Furthermore, the investment in transparency

was also indicated as a key strategy (Interview Founder & CEO Yulex, 2023). For example, ensuring that manufacturers adhere to sustainability standards, monitored by compliance could lead to a change of industry.

5.2 Eco-conscious market demand

Barriers of an eco-conscious market demand

The industry experts noted that customer demand was driving the market, with the primary purchasing decision largely based on product performance rather than environmental impact (Interview Creative Director Deeply, 2023; Interview Founder & Director Needessentials, 2023; Interview Co-Founder & CEO Srface, 2023). This focus on performance posed a significant challenge to the adoption of more sustainable products, as customers may overlook green alternatives if they perceived a trade-off in performance. A mentioned example is the trade-off between the natural rubber Yulex and the synthetic rubber Limestone (Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023). Limestone Neoprene enabled a greater performance by higher flexibility. Apart from that, wetsuit brands alleged that synthetic materials like limestone or petroleum-based neoprene had a price advantage over the innovative natural rubber material (Interview Creative Director Deeply, 2023; Interview Founder & Director Needessentials, 2023). This statement was partly reviled by the natural rubber supplier Yulex, as the Founder stated that the purchasing price of their rubber is competitive with the prices of synthetic rubber (Interview Founder & CEO Yulex, 2023).

“Yulex is seen as expensive option, but the Foam is competitive in pricing. The price differences for the end consumer only occur because of the high margin of the manufacturers” (Interview Founder & CEO Yulex, 2023).

As a complement to that, respondents expressed in the interviews that consumers often made purchasing decisions based on a complex interplay of price, sustainability and performance. This triangular relationship illustrated how the high cost of sustainable alternatives

and perceived performance differences can hinder environmentally conscious consumer choices (Interview Creative Director Deeply, 2023; Interview Co-Founder & CEO Srface, 2023). The impact of non-sustainable factors influencing consumer decision-making reappeared at the end of a wetsuit lifecycle. According to the industry representatives, the end-of-life phase of wetsuits was a significant issue, as there were no scalable solutions for the up- or recycling of wetsuits (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Founder & CEO Yulex, 2023).

Strategies for an eco-conscious market demand

Apart from the mentioned barriers, some encouraging signs of a slowly growing eco-conscious market demand were defined. An increase in consumer awareness of sustainability was mentioned by several respondents, especially the D2C operating wetsuit brands identified a more sustainable consumer behaviour (Interview Creative Director Deeply, 2023; Interview Founder & Director Needessentials, 2023; Interview Co-Founder & CEO Srface, 2023).

“We can infer from our website data, that consumers look for more sustainable solutions. It seems as they are better educated and getting more sensitive in their consumption behaviour” (Interview Creative Director Deeply, 2023).

This sensitivity of consumers provides an opportunity for companies to integrate eco-innovation into their products, operations and communications. In addition, increased education on product sustainability can further drive demand for environmentally friendly wetsuits. Besides the mentioned drivers, another indicator for a slowly started environmental awareness among consumers was the willingness to donate wetsuits at the end of their life cycle (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soörüz, 2023).

5.3 Innovation-driven infrastructure development

Barriers for an innovation-driven infrastructure development

The ability of the wetsuit industry to become sustainable and circular relies heavily on innovation-driven infrastructure development. One of the main barriers identified were the limitations of material innovation. Sustainable innovation in industry depends heavily on research and development on materials and manufacturing technology (Interview Director Yamamoto, 2023; Interview Founder & CEO Yulex, 2023). However, the financial investment required for R&D were often out of reach for the smaller wetsuit brands (Interview Creative Director Deeply, 2023; Interview Founder & Director Needessentials, 2023). These complications were compounded by the limited research and development into alternative materials. At the time of the data collection, the natural rubber Yulex was the most sustainable option on the market (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Founder & CEO Yulex, 2023). Further, the insufficient uptake of sustainable materials by the manufacturing industry was another major challenge. The lack of R&D on these materials, combined with the complexity of eco-design and limited collaboration on eco-solutions, created a complicated environment for sustainable innovation (Interview Co-Founder & CEO Srface, 2023; Interview Director Yamamoto, 2023; Interview Founder & CEO Yulex, 2023).

“The biggest challenge is not necessarily the materials. It's the design. Multiple materials that all have different ways to recycle or reuse them, and you stitch or glue them all together. How do you separate all those materials so you can efficient, efficiently in some way, reuse those in a circular fashion?” (Interview Founder & CEO Yulex, 2023).

In extend, the industry faced a significant infrastructure gap in terms of repair and recycling. The end-of-life phase of wetsuits was a significant problem due to the lack of scalable solutions for upcycling or recycling processes (Interview Founder & CEO Yulex, 2023). Challenges such as the complexity of separating materials in the recycling process,

the infeasibility of devulcanization⁴ and missing large-scale repair services exacerbate this problem (Interview CSR Manager Soörüz, 2023; Interview Founder & CEO Yulex, 2023).

Strategies for an innovation-driven infrastructure development

To facilitate innovation and infrastructure development, financial investment in material research, manufacturing and life cycle assessment played a critical role (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Director Yamamoto, 2023). Technological advancements were stated as possible support for the innovation processes and could help make sustainable innovation more accessible to all brands (Interview Co-Founder & CEO Srface, 2023; Interview Director Yamamoto, 2023).

“We often work with various parties for research and co-development, to push our technology towards the limitation” (Interview Director Yamamoto, 2023).

The advancement of manufacturing and eco-design were further important drivers for the interviewed industry experts (Interview CSR Manager Soörüz, 2023; Interview Founder & CEO Yulex, 2023). Some experts highlighted the importance of R&D into alternative materials and eco-design, incorporating more recycled materials and breaking down the complexity of eco-design (Interview Founder & CEO Yulex, 2023). By focusing on these areas, the industry could solve the issues of the up- and recycling at the end of a wetsuits lifecycle. Finally, supply chain optimisation has the potential to revolutionise the wetsuit industry (Interview Director Yamamoto, 2023; Interview Founder & CEO Yulex, 2023). Actions such as switching to renewable energy to power factories and offices, working with Fair Trade certified companies, and using consultants to optimise supply chain and business models were identified as promising strategies.

⁴ Devulcanization is a procedure that reverses the properties imbued by vulcanization. Vulcanization is a chemical process used to transform rubber or similar polymers into materials with enhanced durability (Interview Founder & CEO Yulex, 2023).

5.4 Collective action and collaborative partnerships

Barriers for collective action and collaborative partnerships

A prominent barrier that emerged from the data was the collaboration gap in the wetsuit industry. Collaboration between brands was a recurring theme in the interviews, with respondents pointing to the limited number of joint R&D projects with other brands and industries (Interview Creative Director Deeply, 2023; Interview Founder & Director Needsessentials, 2023). Low levels of collaboration with material suppliers and unilateral relationships to the manufacturers were also identified as barriers that exacerbate the collaboration gap (Interview Co-Founder & CEO Srface, 2023). Apart from that, missed opportunities for sustainability-driven initiatives in collaboration with academics and scientists were noted. The wetsuit industry appears to engage only in small-scale R&D projects with scholars, limiting its potential to innovate at the most recent level of research (Interview CSR Manager Soöruz, 2023; Interview Co-Founder & CEO Srface, 2023).

Strategies for collective action and collaborative partnerships

The interview data suggested that the industry could benefit from information exchange with other sectors, as this potential remained largely untapped (Interview Co-Founder & CEO Srface, 2023). To achieve a more sustainable actions, the experts noted a slowly emerged culture of collaboration within the industry. Evidence of this was seen in the Euro-Sima cluster in France, a network of watersports sports companies that promoted the collaboration and interaction of companies (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023). The collaboration in certain R&D projects with other industries, material suppliers, and academics and scientists, could improve knowledge sharing and learning, to further emphasise the growing collaborative spirit within the industry (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023).

“We had a university cooperation for the research on wetsuit recycling. We tried to mechanical recycle the wetsuit by shredding it into small particles and separate the neoprene

from the other materials. We used water as neoprene floats and lining sinks. Unfortunately, only 20% of the foam was recovered” (Interview Co-Founder & CEO Srface, 2023).

5.5 Sustainable compliance and certification

Barriers for sustainable compliance and certification

The limited scope of government regulations and standards emerged from the collected interview data. Industry experts identified a lack of government regulation for the wetsuit production, noting that the few existing EU material regulations were insufficient (Interview CSR Manager Soöruz, 2023; Interview Founder & CEO Yulex, 2023). As a complement, the governments involvement in promoting sustainable development was minimal, which left the industry to self-regulation, often resulted in fragmented and inconsistent sustainability standards (Interview Manager Product Development Wetsuits Rip Curl, 2023; CSR Manager Soöruz, 2023). The EU sales regulations, chemical directives and REACH⁵ agreements, at the time of the data collection, did not provide a clear framework for the wetsuit industry to follow (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023). Furthermore, the prospect of future EU regulations for wetsuits added uncertainty, which made it difficult for the industry to plan and adapt (Interview CSR Manager Soöruz, 2023).

Strategies for sustainable compliance and certification

To overcome the mentioned barriers the interview data revealed the opportunity to shape future regulation and industry standards collaborating with the government (Interview CSR Manager Soöruz, 2023).

⁵ REACH, “Registration, Evaluation, Authorisation and Restriction of Chemicals Agreement” Regulation of the European Union (Interview CSR Manager Soöruz, 2023).

“Our production department works together with the French authorities, together we work on an EU-Norm for Wetsuits. As we think, the future will bring regulations, because wetsuits can be seen as life vest/ security for the person using it. Diving wetsuits already have construction and performance requirements” (Interview CSR Manager Soöruz, 2023).

Greater government involvement in sustainable development, leveraging existing EU materials legislation and possible future EU wetsuit legislation could provide the industry with a clearer and more comprehensible regulatory landscape. (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023). Beyond that, the industry experts indicated that the pursuit of certifications, for example the B-Corporation⁶ certification, could enhance the competitive drive and increase the sustainability standards of the industry (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Founder & CEO Yulex, 2023). This could enable additional learnings from certification companies and potentially strengthen the corporate compliance of industry players (Interview CSR Manager Soöruz, 2023).

5.6 Circular strategies for sustainable success

Barriers for circular strategies and sustainable success

The industry representatives pointed to a lack of corporate social responsibility within the businesses, claiming that existing sustainability efforts by most of the brands were often driven by public relations rather than a genuine commitment to sustainability (Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023). Often this missing genuine commitment to sustainability was linked to limited knowledge and the dependence on material research and the manufacturers (Interview Founder & CEO Yulex, 2023). Furthermore, the representatives identified the lack of CSR, connected to the limited life cycle assessments of wetsuits (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023).

⁶ B Corp Certification is a recognition given to businesses that demonstrate high standards of verified performance, accountability, and transparency in various areas.

Strategies for circular and sustainable success

Besides the indication of barriers, potential drivers for the adoption of circular strategies were identified. A sustainable vision for long-term success was indicated as essential by most experts (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023).

“We want to drive the sustainable change of the watersports industry, therefore we implemented ESG practices in all parts of the company” (Interview Manager Product Development Wetsuits Rip Curl, 2023).

“Our business philosophy follows the Cradle-to-Cradle philosophy, we will find ways to design our materials and wetsuits fully biodegrade, without negative carbon impact” (Interview Founder & CEO Yulex, 2023).

To implement a comprehensive sustainable vision, the companies noted their commitment by embedding sustainability as a core brand value, establishing an internal CSR team (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview Co-Founder & CEO Srface, 2023). Besides that, experts suggested that pursuing a sustainability certification such as B-Corporation and setting a zero emissions target could significantly contribute to a companies sustainable success (Interview CSR Manager Soörüz, 2023; Interview Founder & CEO Yulex, 2023).

5.7 Building sustainable awareness

Barriers for sustainable awareness

The industry representative pointed out that many sustainability claims of brands were primarily driven by public relations (Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023). Some representatives also highlighted instances of green-

washing by manufacturers and wetsuit brands, which potentially lead to consumer scepticism and confusion about what constitutes as truly sustainable practices (Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023).

“We see a lot of sustainability claims, especially on some new and innovative materials, to be honest, most of the claims are simply greenwashing an environmental harmful product” (Interview Co-Founder & CEO Srface, 2023).

Individual experts indicated that the volume and complexity of information from many different directions could overwhelm consumers and hinder their understanding of the sustainable practices (Interview Creative Director Deeply, 2023; Interview Co-Founder & CEO Srface, 2023). This would lead to a limited education about product sustainability, which was identified as a significant barrier (Interview Founder & CEO Yulex, 2023).

Strategies for building sustainable awareness

To overcome these barriers, transparent and compliant communication was indicated as key strategy. It promotes an easier differentiation between greenwashing and real sustainable approaches (Interview CSR Manager Soöruz, 2023; Interview Co-Founder & CEO Srface, 2023). This could be further enhanced by educating the market and target audience and ensuring effective compliance strategies (Interview Co-Founder & CEO Srface, 2023; Interview Founder & CEO Yulex, 2023).

“Further education brings the evolution of the industry, it reduces and clarifies greenwashing” (Interview Founder & CEO Yulex, 2023).

These strategies could help to promote a clearer understanding of sustainability in the industry and have a positive influence on the consumption behaviour of the consumers. To achieve a certain level of education and knowledge, the experts recommended strategies such as community building, simplifying the flow of information to consumers, and providing education on wetsuit usage and maintenance (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023).

5.8 Advancing circular practices

Barriers for advancing circular practices

The lack of investment in life cycle assessment emerged as a critical barrier for the successful implementation of circular practices. The end-of-life management of wetsuits had been defined as a significant issue, with non-scalable upcycling or recycling solutions exacerbating the problem (Interview CSR Manager Soöruz, 2023; Interview Founder & CEO Yulex, 2023). Another limitation along the life cycle of the wetsuit was the availability of repair services and maintenance support, which could ultimately lead to an extension of the wetsuit's life (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023). This limitation was closely linked to the material innovation and the eco-design manufacturing. The sustainable innovation relied heavily on materials and manufacturing R&D. However, investments remained out of reach for some of the wetsuit brands (Interview Creative Director Deeply, 2023; Interview Founder & Director Needessentials, 2023).

Strategies for advancing circular practices

In contrast, Industry experts noted that collaboration with material suppliers, learning from other industries and academic work, and the adoption of new technologies could accelerate sustainable innovation (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023).

“The Euro-Sima association is a great starting point for collaborations, as many watersports companies are part of it. We share the development of projects, network and find cooperations, together we move towards sustainability” (Interview Manager Product Development Wetsuits Rip Curl, 2023).

Moreover, an increase of investment in life cycle assessment was seen as critical to advancing circular practices. Such investments could encourage the extension of product life

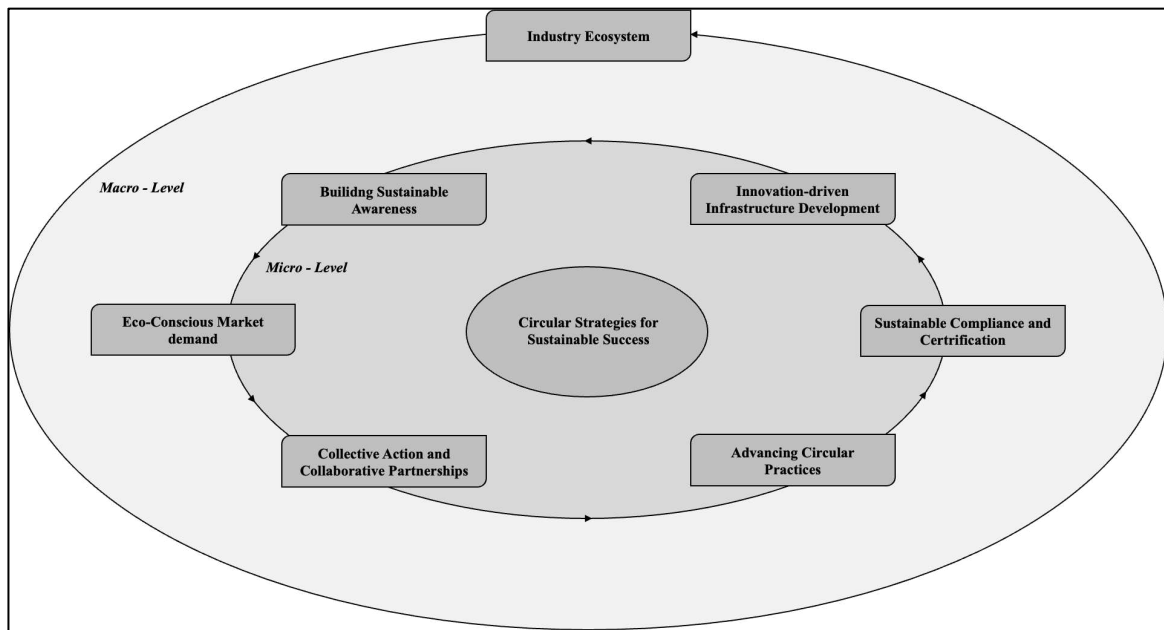
cycles by repair services, as well as promote upcycling, recycling and remanufacturing efforts (Interview Manager Product Development Wetsuits Rip Curl, 2023; Interview CSR Manager Soöruz, 2023). This includes not only addressing the significant issue of wetsuit disposal, but also offering large-scale repair services and implementing less costly but more sustainable downcycling strategies (Interview CSR Manager Soöruz, 2023; Interview Founder & CEO Yulex, 2023).

“We want to grow a new sustainable company out of the recycling program. Our vision is to manage the whole Lifecycle of the wetsuit, from the eco-friendly design to the end of life, Re- and Upcycling” (Interview CSR Manager Soöruz, 2023).

6 Discussion of results

The adoption and innovation of sustainable and circular practices of firms in the wetsuit industry is clearly a complex challenge. To simplify the complexity, this discussion will elucidate and interconnect implications, constraints, and driving strategies based on the research findings, as well as contextualize the results with the theoretical implications from the literature, surrounding circularity in the wetsuit industry. Furthermore, I aim to provide a comprehensive perspective on how the companies can progress towards their circularity goals.

Figure 6: Interplay, dimensions of transition to circularity



(Own illustration by the author).

The theoretical grounding and the analysed qualitative data agree that the wetsuit industry is at a turning point. Both indicated that brands are slowly moving from linear business models to more circular models, adjusting and adopting to more sustainable practices. Certain individual cooperation's have achieved progress in specific areas such as material, waste management and philanthropy, but the sector as a whole has not made a concerted transformation to lead in sustainability (Chouinard, 2006; McCullough et al., 2016; Sabori, 2015; Yulex 2023). As the literature review indicates, the ongoing transition entails challenges and barriers limiting the innovating companies.

Fundamentally, most of the identified challenges by the empirical research fit the theoretical implications and validate the statements of the literature. Companies which transition to circularity are mainly facing barriers at four socio-technical levels, market and institutional, organizational level, value chain and the employee level (Guldmann & Huulgaard, 2020). Apart from the employee level, all barrier levels were endorsed by the findings of the empirical research and are incorporated within the dimensions of findings. Focusing on the market structure of the wetsuit industry, the results point out a major challenge, inhibit the development of a balanced industry ecosystem. The existing manufacturing monopoly of

one industry player, creates great unilateral dependencies of the wetsuit brands. The restructuring of the market is essential, as the disruption of the manufacturing monopoly could lead to a more dynamic and competitive market environment. Often, a disruption of existing and fixed industry structures, activates new socio-eco centric drivers which enable new cycles of innovation (Schumpeter, 1934). By looking at the identified barriers at a lower level, the results provide new insights on the wetsuit industry, indicating a lack of consumer understanding about the benefits of sustainable products as well as a lack of transparency regarding the environmental impact of different wetsuits and materials. This is compounded by the consumer tendency to prioritize product performance and price over sustainability, highlighting a need for more explicit customer education on sustainability matters. By transparent, compliant and genuine communications strategy on sustainable practices, the brands can prevent consumer skepticism and confusion, which is possibly fueled by the instances of greenwashing. These findings build on existing theory of Geissdoerfer et al., (2023) and Susur & Engwall, (2023), stating that knowledge and education have great influence on the sustainable transition process. Companies need to prioritize consumer education on sustainability to foster a clearer understanding and make a lasting impact on consumption habits. With a higher consumer knowledge, the brands could observe an increase in the demand for sustainable wetsuits, further driving the sustainable and circular development as well as market coverage. Equally important is the material innovation, a driving force for circularity. However, the reliance on petroleum-based and limestone-based neoprene as well as challenges in developing a green high-performance alternative, limits the industries ability to innovate. Greater investment in material research and development is necessary.

“To overcome the current stage of the industry, the innovation of new sustainable products as well as the process of transition towards more circular and sustainable business models is unavoidable and considered as the next wave of industry change” (Borne & Ponting, 2015; Machado & Toth, 2015).

Reflecting the statement of the literature, industry players should consider partnering with academic institutions, collaborate with other brands or even other industries to facilitate this progress. Additionally the empirical data contributed to a clear perspective on the material compositions and the selection of more natural alternatives, which could help

identifying less apparent environmental impacts. This would pave the way for a more holistic approach to technical and material innovation. As a complement to the material innovation, eco-design principles are fundamental to sustainable and circular production processes. The integration of these principles into the design process facilitate the creation of products with less environmental impact. It enables an easier development of scalable up- and recycling solutions at the end of a wetsuits lifecycle, as the greatest hurdle of recycling is the composition and conjunction of multiple materials.

“The biggest challenge is not necessarily the materials. It's the design. Multiple materials that all have different ways to recycle or reuse them, and you stitch or glue them all together. How do you separate all those materials so you can efficient, efficiently in some way, reuse those in a circular fashion?” (Interview Founder & CEO Yulex, 2023).

However, the challenge lies in finding the balance between eco-friendly design and product performance. Overcoming this trade-off could be key to achieving widespread market acceptance of eco-designed performance wetsuits. Furthermore, the results provided new insights on the disconnection within the supply chain, which hinders the advancement towards circularity. Enhanced collaboration and co-creation across the value chain, from raw material suppliers, to manufacturers, to consumers could foster a shared vision for sustainability and drive innovative solutions. The strive for transparency, the integration of fair-trade agreements, close cooperation with certified partners and the exchange of knowledge and resources would result in the creation of a collective ecosystem that supports circularity and fair distributed economic benefits for all stakeholders. Existing associations like the Euro-Sima are great approaches and should be promoted by all industry stakeholders to further enhance its relevance and prevalence. While some industry experts feel the current regulatory framework is inadequate, opportunities for collaboration with authorities may offer a path forward. The academic literature and the results of the research agree on the potentials of collaborations between industry players and governmental bodies (Geissdoerfer et al., 2023; Neligan et al., 2022; Susur & Engwall, 2023). Close cooperation would lead to the formation of comprehensive, industry-specific regulations, setting a unified standard for sustainability. Depending on the regulatory framework, new rules and agreements would further catalyze the sustainable transition of the industry. Additionally, acquiring

certifications like B-Corporation could boost companies reputation and competitive advantage. Also, the findings highlight the importance for companies to demonstrate genuine commitment to sustainability and CSR. This requires strategies going beyond public relations and incorporating sustainable practices into the core values and strategic planning of the businesses. The results indicated that internal CSR teams, ESG practices, certifications and concrete targets like zero emissions contribute significantly to the industry's sustainable success and therefore a faster transition from linear to circular.

Finally, the lack of investment in life cycle assessment and limited repair services are considerable barriers to circular practices. Until the industry is not reaching certain material innovations and eco-design adoptions, which enable a fully circular product cycle, services along the wetsuit lifecycle, such as repair, maintenance, as well as up- and recycling projects at the end of life, are the most impactful circular practices. It's important for the industry to consider the entire lifecycle of the wetsuit, from the material sourcing to the design stage to the end-of-life management.

7 Conclusion

7.1 Concluding remarks

The research clearly underscores a significant shift the wetsuit industry, as the companies slowly transition from linear to more circular and sustainable business models. Guided by the central question, "How can companies in the wetsuit industry transition to circular business models?" the research addresses the hurdles and strategies within this transition, emerged from a distinct research gap in the body of literature and the limited comprehensive examination of the industries journey towards sustainable practices and circularity.

The findings result in eight case-specific dimensions of transition that influence the adaptation and innovation of circular business models of companies in the wetsuit industry. Each sub-sections of this chapter indicates the main strategies to realize the dimension and therefore a transition to circularity, as well as the barriers which hinder this achievement of the operating companies.

The transition is largely driven by the companies collective recognition of the ecological impact of its practices, as well as the acknowledgment of responsibility in addressing these environmental concerns. The empirical findings of this research align closely with the theoretical implications, elucidating the complex dimensions of transition that influence the adaptation and innovation of circular business models of companies in the wetsuit industry. The predominant manufacturing monopoly, consumer misconceptions about sustainability, supply chain fragmentation, and the lack of industry-wide regulations are among the barriers that restrain progress. Simultaneously, the research discloses strategies for the transition advancement. Material innovation, greater transparency in communication, and collaborations across different industry stakeholders, including governmental bodies, are essential in promoting the companies transformations.

However, the substantial conclusion of the research is the pursuit of circularity of firms in the wetsuit industry, which requires a collective and concerted effort by all industry actors. It calls for a strategic industry-wide collaboration approach, that extends beyond individual wetsuit brands to comprise all stakeholders, including suppliers, manufacturers, consumers, government bodies, academic institutions as well as other industries. This collective engagement is crucial to foster innovation, drive systemic change, and ultimately achieve circularity for the wetsuit companies.

While the path towards circularity presents complexities, the opportunities for positive change are appealing. As the companies of the industry navigate towards a sustainable transition, the wetsuit industry can emerge as a significant contributor to environmental conservation, acting as a model for other industries to follow. Conclusively, it is inevitable for the companies to leverage their collective strength, persist in the commitment towards sustainable development, continue to innovate in their practices and finally transition from a linear to a fully circular industry.

7.2 Limitations and Critical review

As with any academic research, this master's thesis does face certain limitations which restrict a complete, holistic research of the subjects matter. It is common understanding, that no study is entirely without limitations. A review of the research process is therefore essential for a full understanding of the results of this thesis.

Given the time constraints and word limitations of a master thesis, an encompassing review of the entire body of relevant literature was unfeasible. The theoretical foundations discussed in this thesis, only constitute a small part of the extensive body of literature. The empirical section of this research does primarily rely on qualitative expert interviews. A combination of qualitative and quantitative methods could have enabled more comprehensive insights. The results of the different methods could have been compared with each other, creating a more detailed understanding of the subject. The interviews for the qualitative data collection were conducted with experts from five wetsuit brands and two material suppliers, offering differentiated insights and perspectives from the industry. Unfortunately, I could not implement a manufacturer perspective, as I was not able to create a contact. Interviews with other industry stakeholders could have provided a richer perspective and expand the data base from differentiated perspectives. The experts chosen for the study were selected based on their specific knowledge of industry as well as their involvement in the wetsuit industry, therefore the selection process was somewhat subjective, as the representatives were selected by me. The insights derived from this study, on „how can companies in the wetsuit industry transition to circular business models” are not universally applicable to other industries. At most, these findings might be applicable within the watersports industry, taking into account the specific industry limitations. The wetsuit industry is in the early stages of the transition towards more sustainable and circular business models and practices, therefore the transition of the companies remains incomplete in several aspects. Currently, the firms are more focused on developing and implementing effective and efficient solutions to realize the potential of circular practices.

In sum, the implications for firms from the wetsuit industry could be expanded requiring more extensive research. The implications provided for the firms in the wetsuit industry present first valuable strategies that could improve sustainable and circular practices, serve as

initial steps towards a successful transition and demonstrate the existing potentials when implemented effectively.

7.3 Future research

The wetsuit industry is at the beginning of a transformative era, likely to be driven by technical and material innovation as well as the integration of circular practices. These areas present the greatest potential for future research, offering promising pathways towards a more circular industry. It is worth mentioning that these research directions are rapidly becoming part of the scientific research field of engineering. Nevertheless, the strategic orientations of wetsuit companies as well as their sustainable long-term vision is anchored in the research field of strategic and sustainable management. Achieving progress in mentioned research fields however is dependent on the industries management approaches. It is truly affected by the industries willingness to actively cooperate and collaborate. Collective and transparent future research should involve a broad spectrum of stakeholders, from wetsuit brands, material suppliers, academic institutions to fellow industry players and even governmental stakeholders. United research efforts are the key to promote a cross-functional fusion of ideas. The unity enables more holistic solutions to solve the companies sustainability challenges, which is accelerating the shift towards more circular practices. The future could see a closed loop industry ecosystem, with wetsuits created from entirely biodegradable or fully circular materials, with minimal or negative carbon footprint.

List of References

- Abdallah C. & Langley A. (2011). Templates and Turns in Qualitative Studies of Strategy. *Research Methodology in Strategy and Management*, 6, 105–140.
- Abdallah, T. (2023). Circular Economy in the Context of Sustainable Development: The European Union Experience. *The European Union*, 26(1).
- Allied Market Research. (2020). Water Sports Gear Market. *Allied Market Research*, (last access: 26.05.2023). <https://www.alliedmarketresearch.com/water-sports-gear-market-A06301>
- Balch, O. (2007). Green' wetsuits: surf brands looking to renewable materials over neoprene. *The Guardian website* (last access: 26.05.2023). <https://www.theguardian.com/sustainable-business/2017/may/25/green-wetsuits-surf-brands-looking-to-renewable-materials-over-neoprene>
- Bergek, A., Jacobsson, S., Carlsson, B., Lindmark, S., & Rickne, A. (2008). Analysing the functional dynamics of technological innovation systems: A scheme of analysis. *Research Policy*, 37, 407–429.
- Biber, H., Nagy, S., Leavy, P. (2011). The practice of qualitative research. *Los Angeles: SAGE Verlag*.
- Birkinshaw, J., Brannen, M. Y. & Tung, R. L. (2011). From a distance and generalizable to up close and grounded: Reclaiming a place for qualitative methods in international business research. *Journal of International Business Studies* 42, 573–581
- Blomsma, F. & Brennan, G. (2017). The emergence of circular economy: a new framing around prolonging resource productivity. *Journal of Industrial Ecology*, 21, pp. 603–614.

- Bocken, N. M. P., & Geradts, T. H. J. (2020). Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities. *Long Range Planning*, 53(4), 101950.
- Bocken, N. M., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320.
- Bocken, N. M., Schuit, C. S., & Kraaijenhagen, C. (2018). Experimenting with a circular business model: Lessons from eight cases. *Environmental Innovation and Societal Transitions*, 28, 79–95.
- Bocken, N. M., Weissbrod, I., & Antikainen, M. (2021). Business model experimentation for the circular economy: Definition and approaches. *Circular Economy and Sustainability*, 1(1), 49–81.
- Borne G. & Ponting J., (2015). Sustainable Stoke: Transitions to Sustainability in the Surfing World. *Plymouth, UK, University of Plymouth Press*.
- Crunchbase, (2023). Srface organization report. *Crunchbase*, (last access: 26.05.2023). <https://www.crunchbase.com/organization/srface>
- Chouinard, Y. (2006). Let my people go Surfing, the education of a reluctant businessman. *New York, Penguin*.
- Corley K. G & Gioia D. A. (2004). Identity Ambiguity and Change in the Wake of a Corporate Spin-Off. *Administrative Science Quarterly*, 49, 173-208.
- Deeply. (2022). Sustainability, Mineralprene: New Eco-Friendly Neoprene Formula. *Deeply website*, (last access: 26.05.2023). <https://eu.deeply.com/blogs/deeply-stories/mineralprene-new-eco-friendly-neoprene-formula>

- Dodick, J., & Kauffman, D. (2020). A Review of the European Union's Circular Economy Policy. *Guilford Glazer Faculty of Management*.
- Dzhengiz, T., Miller, E. M., Ovaska, J., & Patala, S. (2023). Unpacking the circular economy: A problematizing review. *International Journal of Management Reviews*, 25(2), 270–296.
- Eisenhardt, K. M. (1991). Better stories and better constructs: The case for rigor and comparative logic. *Academy of Management Review*, 16: 620-627.
- Eisenhardt, K. M. & Graebner, M. E. (2007). Theory Building from Cases: Opportunities And Challenges. *Academy of Management Journal*, 50, 25–32.
- Future Market Insights. (2021). Wetsuit Market Report. *Future Market Insights*, (last access: 26.05.2023). <https://www.futuremarketinsights.com/reports/wetsuit-market>
- Geissdoerfer, M., Morioka, S. N., de Carvalho, M. M., & Evans, S. (2018). Business models and supply chains for the circular economy. *Journal of Cleaner Production*, 190, 712–721.
- Geissdoerfer, M., Santa-Maria, T., Kirchherr, J., & Pelzeter, C. (2023.). Drivers and barriers for circular business model innovation. *Business Strategy and the Environment*, 2023;1–19.
- Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768.
- Gioia D. A., Patvardhan S., Hamilton A. & Corley K. G. (2013). Organizational Identity Formation and Change. *The Academy of Management Annals*, 7, 123–192.

- Glaser, B. G., & Strauss, A. L. (1967). The discovery of grounded theory. *Chicago, IL: Aldine.*
- Gläser, J., & Laudel G. (2009). Experteninterviews und qualitative Inhaltsanalyse. *Wiesbaden: Springer Verlag*, 4. Auflage.
- Graebner, M.E., Martin, J. A., Roundy, P.T. (2012). Qualitative data: Cooking without a recipe. *Strategic Organization* 10(3), 276-284
- Guldmann, E., & Huulgaard, R. D. (2020). Barriers to circular business model innovation: A multiple-case study. *Journal of Cleaner Production*, 243, 118160.
- Hay, J. (2018). The founder of needessentials wetsuits. *Needessentials website*, (last access: 26.05.2023). <https://needessentials.eu.com/blogs/needessentials-wetsuits-stories/ryan-scanlon-the-founder-of-needessentials-wetsuits>
- Hofmann, F., & Jaeger-Erben, M. (2020). Organizational transition management of circular business model innovations. *Business Strategy and the Environment*, 29(6), 2770–2788.
- Iberinform. (2019). Deeply/ Bright Brands Sportsgoods, S.a. Company report. *Iberinform website*, (last access: 26.05.2023). <https://www.iberinform.pt/empresa/34035427/bright-brands-sportsgoods-s-a>
- Kay, T. (2023). Wetsuits from Wetsuits. *Finisterre Website*, (last access: 26.05.2023). <https://finisterre.com/pages/wetsuits-from-wetsuits>
- Kirchherr, J., Reike, D., Hekkert, M. (2017). Conceptualizing the circular economy: An Analysis of 114 definitions. *Resource & Recycling*, 127.

Kiron, D., Kruschwitz, N., Haanaes, K., Reeves, M., Goh, E., Diepenhorst, C., Woods, D. (2013). The innovation bottom line. *MIT Sloan Management Review Research Report*.

KMD Brands Limited. (2022). Annual Integrated Report. *KMD Brands Limited*, (last access: 26.05.2023). <https://www.kmdbrands.com/results-reports>

Korhonen, J., Nuur, C., Feldmann, A. & Birkie, S.E. (2018). Circular economy as an essentially contested concept. *Journal of Cleaner Production*, 175. 544–552.

Kowal, S., & O’Connell D. (2007). Zur Transkription von Gesprächen. *Qualitative Forschung*, Rowohlt Verlag, 437-447.

Laderman, S. (2015). Beyond Green: Sustainability, Freedom and Labour of the Surf Industry. In G. Borne and J. Ponting, *Sustainable Stoke: Transitions to Sustainability in the Surfing World*, Plymouth, UK, University of Plymouth Press, 80-83.

Lemos, T. (2023). Limitless wetsuits. *Designboom website*, (last access: 26.05.2023). <https://www.designboom.com/design/recycled-oyster-shells-limestone-minerals-deeply-sustainable-wetsuits-03-09-2023/>

Little, A.G. (2004). Patagonia clothing founder ponders politics, saving Earth. Interview NBC News website, (last access: 30.05.2023). <https://www.nbcnews.com/id/wbna6353516>

MacArthur, E. Foundation. (2013). Economic and business rationale for an accelerated transition. *Ellen McArthur foundation, Towards the Circular Economy*, Vol. 1.

MacArthur, E. Foundation. (2015). Business rationale for an accelerated transition. *Ellen McArthur foundation, Towards a circular economy*, Vol. 1.

- Machado, R. & Toth, J. (2015). Sustainability in the Surf Industry. *Sustainable Stoke: Transitions to Sustainability in the Surfing World*. Plymouth, UK, University of Plymouth Press, 60-69.
- Magicseaweed. (2018). Introducing: The New SRFACE Wetsuit. *Magicseaweed website*, (last access: 26.05.2023). <https://magicseaweed.com/news/introducing-the-new-srface-wetsuit/11086/>
- Martin, J. (2022). Did You Know That Carbon Is the Backbone of Your Wetsuit? *Yulex website*, (last access: 26.05.2023). <https://yulex.com/blog/carbon-is-the-backbone-of-your-wetsuit/>
- Mayring, P. (2015). Qualitative Inhaltsanalyse: Grundlagen und Techniken. *Weinheim und Basel: Beltz Verlag*.
- McCullough, B. P., Pfahl, M. E., & Nguyen, S. N. (2016). The green waves of environmental sustainability in sport. *Sport in Society*, 19(7), 1040–1065.
- Nag, R., Corley K. G & Gioia D. A. (2007). The intersection of Organizational Identity, Knowledge and Practice: Attempting Strategic Change via Knowledge Grafting. *Academy of Management Journal*, 50(4), 821-847.
- Neligan, A., Baumgartner, R. J., Geissdoerfer, M., & Schögggl, J.-P. (2022). Circular disruption: Digitalisation as a driver of circular economy business models. *Business Strategy and the Environment*, 2022; 1–14.
- Nußholz, J. L. (2017). Circular business models: Defining a concept and framing an emerging research field. *Sustainability*, 9(1810), 1–16.
- Nußholz, J. L. (2018). A circular business model mapping tool for creating value from prolonged product lifetime and closed material loops. *Journal of Cleaner Production*, 197, 185–194.

- O' Brien, D., & Pointng, J. (2013). Sustainable Surf Tourism: A Community Centered Approach in Papua New Guinea, *Journal of Sport Management* 27(2), 158-172.
- Osterwalder, A.; Pigneur, Y. (2010) Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers; *John Wiley and Sons: Hoboken, NJ, USA*; pp. 1–281.
- Pitchbook. (2023). Soörüz Surfwear and Neoprene Company. *Pitchbook website*, (last access: 26.05.2023). <https://pitchbook.com/profiles/company/166932-37>
- Prieto-Sandoval, V., Jaca, C., & Ormazabal, M. (2018). Towards a consensus on the circular economy. *Journal of Cleaner Production*, 179, 605–615.
- Rattalino, F. (2018). Circular advantage anyone? Sustainability-driven innovation and circularity at Patagonia, Inc. *Thunderbird International Business Review*, 60(5), 747–755.
- Recycling Product News. (2023). Rip Curl and TerraCycle give old wetsuits a second life. *Recycling Product News*, (last access: 26.05.2023). <https://www.recyclingproductnews.com/article/39732/rip-curl-and-terracycle-give-old-wetsuits-a-second-life>
- Richardson, J. (2008) The business model: An integrative framework for strategy execution. *Strateg. Chang.*, 17, 133–144.
- Rip Curl. (2023). Recycle your Wetsuit. *Rip Curl website*, (last access: 26.05.2023). <https://www.ripcurl.eu/en/company/recycle-your-wetsuits.html>
- Rocket reach. (2023). Yulex corporation profile. *Company profile*, (last access: 26.05.2023). https://rocketreach.co/yulex-corporation-profile_b5c45299f42e0dec

- Rodriguez-Anton, J. M., Rubio-Andrada, L., Celemin-Pedroche, M. S., & Ruiz-Penalver, S. M. (2022). From the Circular Economy to the Sustainable Development Goals in the European Union: An Empirical Comparison. *International Environmental Agreements: Politics, Law and Economics*, 22(1), 67–96.
- Román, C., Borja, A., Uyarra, M. C. & Pouso, S. (2022). Surfing the waves: Environmental and socio-economic aspects of surf tourism and recreation. *Science of the Total Environment* 826.
- Ruttenberg, T. (2022). Alternatives to Development in Surfing Tourism: A Diverse Economies Approach, *Tourism Planning & Development*, 50-54.
- Rynes, S. & Gephart R. P. (2004). Qualitative Research and the Academy of Management Journal. *The Academy of Management Journal*, Vol. 47, No. 4 pp. 454-462
- Sabori, D. (2015). Transitions to Sustainability. *Sustainable Stoke: Transitions to Sustainability in the Surfing World, Plymouth, UK, University of Plymouth Press*, 56-59.
- Saunders, M., Lewis, P., Thronhill, A. (2009). *Research Methods for Business Students, New York: Pearson Verlag, 5. Auflage.*
- Schot, J., & Geels, F. W. (2008). Strategic niche management and sustainable innovation journeys: Theory, findings, research agenda, and policy. *Technology Analysis & Strategic Management*, 20(5), 537–554.
- Schroeder, P., Anggraeni, K., & Weber, U. (2019). The relevance of circular economy practices to the sustainable development goals. *Journal of Industrial Ecology*, 23(1), 77-95.
- Schumpeter, J. A. (1934). *The theory of economic development. Cambridge: Harvard University Press.*

- Serong, J. (2017). Are we trashing the places we love? The toxic truths at the heart of surfing. *The Guardian website*, (last access: 26.05.2023). <https://www.theguardian.com/sport/2017/mar/17/toxic-truths-at-the-heart-of-surfing>
- Similarweb. (2023). Deeply.com, website analysis. *Similarweb website*, (last access: 26.05.2023). <https://www.similarweb.com/website/deeply.com>
- Similarweb. (2023). Srface.com, website analysis. *Similarweb website*, (last access: 26.05.2023). <https://www.similarweb.com/website/srface.com>
- Similarweb. (2023). Sooruz.com, website analysis. *Similarweb website*, (last access: 26.05.2023). <https://www.similarweb.com/website/sooruz.com>
- Snapes, L. (2019) The sustainable surfer. *The Guardian website*, (last access: 26.05.2023). <https://www.theguardian.com/world/2019/aug/08/the-sustainable-surfer-meet-the-man-behind-the-worlds-first-fully-recyclable-wetsuit>
- Soörüz, (2023). Environment. *Soörüz website*, (last access: 26.05.2023). <https://surf-wear.sooruz.com/organic-wetsuit/>
- Stahel, W. R. (2016). The circular economy. *Nature*, 531(7595), Article 7595.
- Stake, E. (2006). Multiple Case Study Analysis. *The Guilford press, New York*
- Stock, M. (2019). Surfing gets sustainable with first recyclable wetsuit. *Reuters website*, (last access: 26.05.2023). <https://www.reuters.com/article/environment-recycling-wetsuit-idUSL5N2684LZ#>
- Srface. (2023). Sustainability. *Srface website*, (last access: 26.05.2023). <https://srface.com/sustainability/>

- Surfbunker. (2018). needessentials Two Year Durability Review. *Surfbunker website*, (last access: 26.05.2023). <https://surfbunker.com/blog/needessentials-two-year-durability-review>
- Susur, E., & Engwall, M. (2023). A transitions framework for circular business models. *Journal of Industrial Ecology*, 27(1), 19–32.
- Taylor, J. (2022). Rip Curl expands wetsuit recycling to US, Europe. *Geelong Times website*, (last access: 26.05.2023). <https://timesnewsgroup.com.au/geelong-times/news/rip-curl-expands-wetsuit-recycling-to-us-europe/>
- Terracycle (2022). Rip Curl Wetsuit Recycling Program. *Terracycle website*, (last access: 26.05.2023). <https://www.terracycle.com/en-US/brigades/ripcurl>
- The Fair Cottage. (2022). Five amazing Eco Wetsuit innovations. *The Fair Cottage, website*, (last access: 26.05.2023). <https://thefaircottage.com/en/blog/post/five-amazing-eco-wetsuit-innovations>
- The Worldfolio Japan. (2023). Interview with Tomizo Yamamoto. *The Worldfolio, Japan website*, (last access: 26.05.2023). <https://www.theworldfolio.com/interviews/yamamoto-material-fo/5183/>
- Tonti, L. (2022). Surf's up: how to care for wetsuits and steamers. *The Guardian website*, (last access: 26.05.2023). <https://www.theguardian.com/life-andstyle/2022/apr/19/surfs-up-how-to-care-for-wetsuits-and-steamers>
- Tristats. (2022). Tri Going Green: The Sustainability of Wetsuits. *Tristats website*, (last access: 26.05.2023). <https://tri-stats.com/tri-going-green-the-sustainability-of-wetsuits/>
- United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. *General Assembly*, Seventieth session.

Wilson, J. (2015). Transitions to Sustainability: ‘If Not Us, Then Who?’. *Sustainable Stoke: Transitions to Sustainability in the Surfing World, Plymouth, UK, University of Plymouth Press*, 50-54.

Wirtz, B.W.; Pistoia, A.; Ullrich, S.; Göttel, V. (2016) Business models: Origin, development and future research perspectives. *Long Range Plan*, 49, 36–54.

Yamamoto. (2023). Material site. *Yamamoto website*, (last access: 26.05.2023).
<https://yamamoto-bio.com/material-e/>

Yulex. (2023). Sustainability. *Yulex website*, (last access: 26.05.2023).
<https://yulex.com/sustainability/>

Zieff, D. (2023). Alternatives to Petroleum-Based Neoprene. *Gear Junkie website*, (last access: 26.05.2023). <https://gearjunkie.com/boats-water/neoprene-alternatives-wetsuits-yulex>

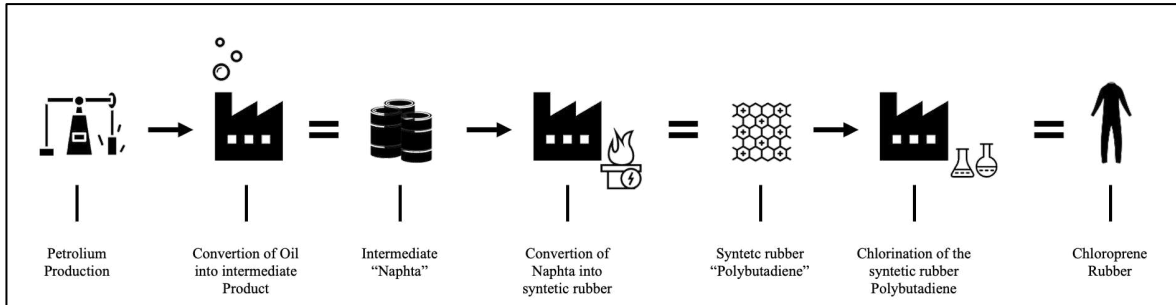
List of Appendix

Appendix 1: Introduction to wetsuit rubber materials	XXII
Appendix 2: Guideline of the expert interview	XXIII
Appendix 3: Table of data collection.....	XXVI
Appendix 4: Table of total data	XXVIII

Appendix

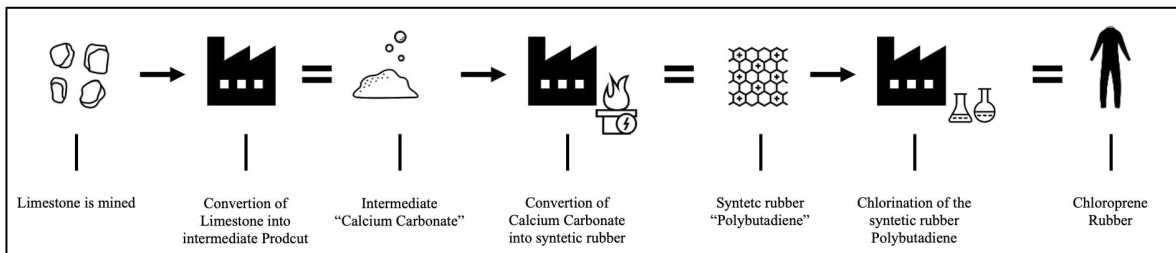
Appendix 1: Introduction to wetsuit rubber materials

Petroleum-based rubber



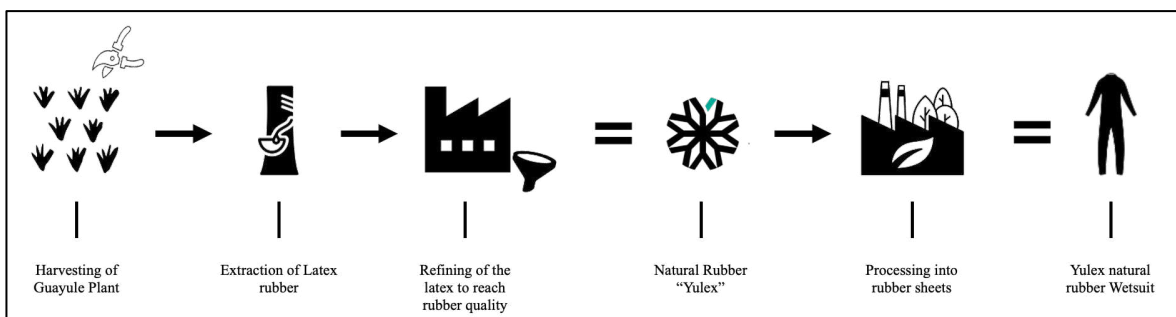
(Own illustration).

Limestone-based rubber



(Own illustration).

Yulex natural rubber



(Own illustration).

Appendix 2: Guideline of the expert interview

Guideline of the expert interview

Confidentiality agreement:

The interviewee has acknowledged that the personal information will be treated confidentially and will only be used in the context of Jonas Stora's master thesis, at the Universidade Católica Portuguesa.

Date & Signature

Date & Signature

Explanation of terms:

Introduction:

The watersports industry has experienced significant growth in recent years due to increasing demand for water-based leisure activities. The growth of the watersports industry can be attributed to several factors, including increased disposable income, technological advancements, and changing attitudes towards health and fitness.

Despite the significant growth of the watersports industry, industry stakeholders face several challenges. One of the major challenges is environmental sustainability. Watersports activities can have negative impacts on the environment, including pollution, toxic waste, non-recyclable waste, habitat destruction, and disruption of marine life.

This paper aims at a qualitative empirical analysis of “**How can firms in the watersports industry transition their business models sustainably?**” The questionnaire attempts to obtain information and opinions from selected experts on this topic.

This academic research aims to contribute to a reduced environmental impact of the industry.

Questionnaire:

Warm-up questions:

- How long have you been working at "Company" and what is your main business model?
- In which department do you work, what tasks do you fulfill?
- How does the firm deal with sustainability?

Main part of the interview:

Social actors:

- Tell me about the firms position in market?
- How did you enter the market, at what stage?
- How would you define your organizational structure and the company- culture?
- How does other social actors participate or interact with you?
 - o Governmental organizations, universities, research centers.

Networks:

- What kind of networks did you grow?
 - o Supply side, other players from the industry.
- Are you achieving some transformation/ innovation through partnerships?
 - o Entrepreneurial cooperation, collaboration or co-utilization of resources and capabilities
- What are the main barriers to have these kinds of partnerships?
- Is there any lack of transparency or conflicting interests?
- What about the cooperation's/ collaborations in the supply & value chain

Technology & Infrastructure

- Would you see technology and infrastructure as driver for innovation and sustainable business models?
- What does technology enable at your company?
- What is the importance of data you get from technology?
- How does this affect/ support sustainability or the transition to a new business model?

Innovation mechanisms enhancing sustainable business models:

Experimentation:

- Is there any space for experimentation within the business (with the focus on sustainability)?

Visioning:

- What is the long-term vision of the company?
- Did you define clear goals concerning sustainability or circularity?

Network-building:

- Do you have collaborations with other firms from the industry?
- Are there barriers that stop you from cooperating/ collaborating with other actors than suppliers & customers?

Learning:

- How do you learn about sustainability internally?
 - o Trainings, seminar, workshops?
- How do you communicate to your customers, is there a teaching approach for sustainability?

Protection:

This question block links to the experimentation block.

- Which main barriers are there, to enhance experimentation?
- What risks are there, or which resources are you lacking?

Resource mobilization:

- What kind of resources are you mobilizing, to achieve a more sustainable business?

End: Thank you for the interview and end the audio recording.

(Own illustration).

Appendix 3: Table of data collection

Table of data collection					
Case Deeply					
Primary Data					
Type of Data	Name Interviewee	Organization	Position	Date	Length
Interview	Tiago Lemos	Deeply Wetsuits	Creative Director	09.03.23	00:22
Interview 2	Tiago Lemos	Deeply Wetsuits	Creative Director	06.04.23	00:56
Secondary Data					
Type of Data	Name of Data	Organization	Author	Date of publication	
Article	Green' wetsuits: surf brands looking to renewable materials over neoprene	The Guardian	Oliver Balch	25.05.07	
Article	Are we trashing the places we love? The toxic truths at the heart of surfing	The Guardian	Jock Serong	16.03.17	
Article	Limitless wetsuits	designboom	Tiago Lemos	09.03.23	
Case Neecessentials					
Primary Data					
Type of Data	Name Interviewee	Organization	Position	Date	Length
Interview	Ryan Scanlon	Need essentials wetsuits	Founder & Director	21.04.23	00:46
Secondary Data					
Type of Data	Name of Data	Organization	Author	Date of publication	
Article	Surfing gets sustainable with first recyclable wetsuit	Reuters	Matthew Stock	18.09.19	
Article	The sustainable surfer: meet the team behind the world's first fully recyclable wetsuit	The Guardian	Laura Snapes	08.08.19	
Blog Post	neecessentials Two Year Durability Review	surfbunker	surfbunker	02.10.18	
Case Rip Curl					
Primary Data					
Type of Data	Name Interviewee	Organization	Position	Date	Length
Interview	Léa Duquay	Rip Curl Europe	Product development, Wetsuits & Accessories	05.05.23	01:21
Secondary Data					
Type of Data	Name of Data	Organization	Author	Date of publication	
Article	Green' wetsuits: surf brands looking to renewable materials over neoprene	The Guardian	Oliver Balch	25.05.07	
Article	Surfing gets sustainable with first recyclable wetsuit	Reuters	Matthew Stock	18.09.19	
Article	Rip Curl and TerraCycle give old wetsuits a second life	Recycling Product News	Recycling Product News Staff	24.01.23	
Article	Rip Curl expands wetsuit recycling to US, Europe	Geelong Times	James Taylor	25.09.22	
Article	Rip Curl Launches Project Resurrection Recycling Project	coolerlifestyle	coolerlifestyle	30.05.08	
Website	Rip Curl Wetsuit Recycling Program	Terra Cycle	Terracycle	2023	
Case Soörüz					
Primary Data					
Type of Data	Name Interviewee	Organization	Position	Date	Length
Interview	Paul le guen	Soörüz Wetsuits	Business Development 2 nd Life & Recycling programm	12.04.23	01:10
Secondary Data					
Type of Data	Name of Data	Organization	Author	Date of publication	
Article	Are we trashing the places we love? The toxic truths at the heart of surfing	The Guardian	Jock Serong	16.03.17	
Article	Surf's up: how to care for wetsuits and steamers	The Guardian	Lucianne Tonti	18.04.22	
Article	Five amazing Eco Wetsuit innovaitons	The Fair Cottage	The Fair Cottage	27.04.22	
Article	Tri Going Green: The Sustainability of Wetsuits	TriStats	TriStats	12.12.22	

Case Srface					
Primary Data					
Type of Data	Name Interviewee	Organization	Position	Date	Length
Interview	Reinier Korstanje	Srface Wetsuits	CEO & Founder	11.04.23	01:04
Secondary Data					
Type of Data	Name of Data	Organization	Author	Date of publication	
Article	Introducing: The New SRFACE Wetsuit	Magiceseaweed	Magiceseaweed	04.08.18	
Article	Surf's up: how to care for wetsuits and steamers	The Guardian	Lucianne Tonti	18.04.22	
Article	Five amazing Eco Wetsuit innovaitons	The Fair Cottage	The Fair Cottage	27.04.22	
Case Yamamoto					
Primary Data					
Type of Data	Name Interviewee	Organization	Position	Date	Length
Interview	Yudai Yamamoto	Yamamoto Cooperation	Director	25.04.23	00:57
Secondary Data					
Type of Data	Name of Data	Organization	Author	Date of publication	
Article	Interview with Tomizo Yamamoto	The Worldfolio, Japan	The Worldfolio, Japan	25.03.23	
Document	Yamamoto Material site	Yamamoto Corporation	Yamamoto Corporation	2023	
Case Yulex					
Primary Data					
Type of Data	Name Interviewee	Organization	Position	Date	Length
Interview	Khrrha Martin	Yulex Corporation	Key account manager	09.03.23	00:42
Interview	Jeff Martin	Yulex Corporation	CEO & Founder	06.04.23	01:06
Secondary Data					
Type of Data	Name of Data	Organization	Author	Date of publication	
Article	Surfing gets sustainable with first recyclable wetsuit	Reuters	Matthew Stock	18.09.19	
Article	Alternatives to Petroleum-Based Neoprene	Gear Junkie	Drew Zieff	21.03.23	
Article	The sustainable surfer	The Guardian	Laura Snapes	08.08 2019	
Documentary	The Big Sea, Cancer alley	The Big Sea	The Big Sea	Mar 23	
Podcast	Is Yulex the future of Wetsuits	Simply Scuba	Simply Scuba	Mar 21	
Blog Post	Did You Know That Carbon Is the Backbone of Your Wetsuit?	Yulex Corporation	Jeff Martin	28.12.22	

(Own illustration).

