

**ENTREPRENEURIAL DYNAMICS AND SUSTAINABILITY INTEGRATION IN
BORN-SUSTAINABLE FASHION STARTUPS: A FRAMEWORK FOR
INNOVATIVE BUSINESS MODELS**

by

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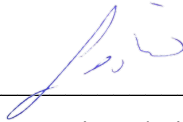
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ABSTRACT

Environmental and social issues are increasingly being highlighted as a problem in the global fashion industry, which is characterized by heavy resource extraction, waste production, carbon emissions, overexploitation of products, lack of transparency across the supply chain, and exploitation of labour. In response, “fashion for the better” has become a business and ethics value. In this context born-sustainable fashion startups are a unique category of companies since they incorporate sustainability in their business model, identity and mission from the very beginning, rather than later as an activity of compliance or fashion branding.

This paper presents an analysis of the approaches born-sustainable fashion startups are taking to sustainability within their business model and how they are trying to overcome the problem of scalability, complexity of operation, sustainability's economic viability and competitiveness. This study employs a qualitative research design based on literature review, where the data sources are secondary data which consist of academic articles, industry reports, sustainability publications and policy related documents. Twenty-two documents were hand selected for analysis using themed analysis with the assistance of NVivo.

Seven main themes were identified: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. The findings reveal that founder motivation and leadership orientation is key to the development of sustainability-oriented business models. The operational efficiency, transparency of the supply chain and engagement of consumers are enhanced by digital technologies, including artificial intelligence, blockchain and digital platforms. Mechanistic approaches to waste reduction and resource efficiency such as recycling, upcycling, repair, resale, reuse and extension of product life cycle offer ways to practice the circular economy.

The study also revealed that the start-ups do encounter the following hurdles: Limited funds, high sustainable material costs, large number of regulations and certification requirements, and consumer price sensitivity. The study shows that integration of sustainability is a multi-dimensional process, which needs to be aligned with entrepreneurial leadership, digital innovation, principles of circular economy, and business model innovation.

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

Fashion has become one of the most impacted industries in the world in terms of environmental and social impact in the modern economy. The industry is known for its fast fashion, heavy resource usage and long global supply chains, which result in a significant impact on carbon emissions, water pollution and textile waste. The pressures on the environment are especially severe due to the prevalence of fast fashion business models, which have encouraged overproduction, short product life cycles and the consumption of disposable products (Niinimäki et al., 2020; Arrigo, 2020). Beyond the environmental impact, fashion also has a long history of social problems such as labour exploitation, unsafe working conditions, wage inequalities, particularly in developing countries where production is outsourced (Joy et al., 2012).

These challenges have made sustainability a growing priority in the fashion industry, both from a strategic and ethical standpoint. Sustainable fashion aims to reduce the environmental impact while ensuring social responsibility and sustainable economic practices. This includes the use of environmentally friendly materials, ethical sourcing and resource-saving manufacturing (McNeill and Moore, 2015; Yang et al., 2017). However, more recently academics and practitioners have claimed that sustainability in fashion involves not only incremental change, but also more radical changes in the business models and industry practices (Caniato et al., 2012).

In this changing scenario, a new group of companies (born-sustainable fashion startups) has emerged. These startups integrate sustainability into their business from the beginning; it is kind of built into their business model and their organizational identity. What distinguishes these startups from traditional ones, which think about sustainability in an additional or compliance mode, is that sustainability is built into their business from the beginning; it is part of their mission, their organizational identity and their value proposition (Henninger et al., 2021). Social entrepreneurship ventures usually start from mission-oriented entrepreneurs who want to tackle environmental and social issues by developing innovative market-based solutions (Pedersen et al., 2018; Gurova and Morozova, 2018). This has made sustainability a key part of their business models, and not just an operational issue.

One of the strategies these start-ups have taken is to apply the circular economy principles. The circular economy is a paradigm that moves away from the linear “take-make-dispose” economy to systems that focus on resource efficiency, waste reduction and value retention. At the level of fashion, it means recycling, upcycling, product life extension and closed-loop production systems (Ellen MacArthur Foundation, 2017; Ramírez-Escamilla et al., 2024). These practices are designed to conserve virgin resources and to minimise environmental impact and ensure that businesses are in line with sustainable goals.

At the same time, digital technologies have become essential to the fashion industry to ensure sustainability. The Internet, blockchain, and artificial intelligence (AI) are among the technologies with the potential to help businesses become even more efficient, transparent, and directly connected with consumers. AI can, for example, assist with demand forecasts and inventory optimization, minimizing overproduction and waste (Abbate et al., 2023; UNEP, 2020). Likewise, the blockchain can be used to create transparency and traceability in the supply chain, assisting companies in demonstrating responsible sourcing and combating the practice of greenwashing (Papamichael et al., 2021; Burnstine et al., 2025). Digital platforms also give startups the opportunity to express their sustainability values and foster trustful relationships with consumers (D'Itria, 2023).

Born sustainable fashion startups have the potential to create change at a system level but there are significant challenges for them to integrate and scale sustainability into their business model. These are complex challenges and entail a lack of financial resources, financial costs of sustainable materials, and the lack of economies of scale (Bick et al., 2018; Schiaroli et al., 2024). Other factors related to operation complexities, such as inefficient supply chain and uncertainty related to demand, make it more difficult to keep sustainability commitments and get on track for the growth (Fletcher and Tham, 2019). Moreover, dispersed regulatory structures and high level of certification requirements hinder market access and growth, especially for small and emerging companies (Testa et al., 2020; Papamichael et al., 2021).

One crucial aspect of these challenges is the balance between sustainability and profitability. It is common for startups to have strong sustainability intentions at the outset, but they also need to become profitable to make it to the next level and stay in business. Strategic decision making and innovative business model design are necessary to balance these competing objectives, as very little literature has been available to date to understand these aspects of this problem (United Nations, 2015; Schiaroli et al., 2024).

Theoretically, the literature on sustainable fashion, entrepreneurship and digital innovation is still fragmented. Existing research concentrates on specific aspects, e.g. circular economy practices, technological uptake, or sustainability performance, but does not address the extent to which this works together within the framework of startups (Testa et al., 2020; Pedersen et al., 2018). Moreover, entrepreneurial motivation and identity of leadership are considered to be key factors to drive sustainable entrepreneurship, but their influence on sustainable business models and scalable business models has not been sufficiently investigated (Henninger et al., 2021; Gazzola et al., 2025).

This fragmentation is a reminder of the importance of considering sustainability as an integrated and holistic concept in born-sustainable fashion startups. In particular, there is a lack of conceptual clarity regarding how the dynamics of entrepreneurship, the use of digital technology and the principles of circular economy can be brought together to support sustainability and scalability. The present gap in theoretical understanding and practical application is critical to developing the knowledge, and to offer guidance for fashion entrepreneurs, industry members and policy makers to encourage sustainable innovation in the fashion industry.

1.2 Problem Statement

With the growing importance of sustainability in the global fashion industry, a number of academic and industry-based studies have emerged. Most of this research has however been largely geared towards large established fashion firms with substantial financial means, advanced infrastructure and established supply chains. In contrast, these companies appear to be more likely to implement sustainability actions and to bear the resulting expenses, as they are not constrained by limited resources like startups are in the early stages (McNeill and Moore, 2015; Bocken and Geradts, 2020).

Born Sustainable fashion companies are different, however, because they are fashion startups with sustainable origins. They include sustainability in their business model from the beginning, but are constrained in their structures and operations. They face less competition in the market due to limited access to capital, high costs of sustainable raw materials, and the lack of economies of scale (Bick et al., 2018; Abdelmeguid et al., 2024). Such difficulties are compounded when a startup scales, as they need to grow their businesses at the same time while maintaining their sustainability commitments.

Not only that, but there is also a significant challenge in terms of operational inefficiencies. Startups face problems in the supply chain, demand uncertainty and inventory management challenges, potentially resulting in overproduction or waste, which impedes their sustainability goals (ironically) (Bos-Brouwers, 2010). Moreover, the adoption of high-tech digital tools can be advantageous, but only for companies that have the technical skills and funding needed to support this process (De Aguiar et al., 2021; Schiaroli et al., 2024).

In addition to operational issues, regulatory and institutional considerations also create complexity when integrating sustainability. There are also a number of fragmented, regional sustainability standards and certification schemes, which can make it more challenging and costly for start-ups to comply with them. These certifications provide an extra layer of credibility but are often expensive and complex, and therefore not easily accessible for smaller companies (Testa et al., 2020; Papamichael et al., 2021). This leaves startups in a dilemma when it comes to which standards to use and how to make their sustainability practices understandable to stakeholders.

A more basic question is the dispersal of the current academic literature. Current research focuses predominantly on aspects of sustainability separately, for example the dimension of circular economy practices, digital technologies or business model innovation. For instance, research on circular economy tends to focus more on recycling and upcycling practices without giving enough attention to how these practices have strategic implications for entrepreneurial decision making and scalability (Ramírez-Escamilla et al., 2024). Likewise, digital technologies are frequently discussed in terms of their technical features (transparency, efficiency, etc.) without considering how they facilitate the integration of sustainability in the business model of startups (Dissanayake and Weerasinghe, 2021; Burnstine et al., 2025).

Moreover, the role of entrepreneurial motivation and entrepreneurial identity as a form of entrepreneurial leadership is not sufficiently explored in this context. Although mission-driven entrepreneurship is a well-recognized key trait of born-sustainable startups, there is limited understanding of how mission values are manifested in practices such as operational strategies, business model configurations, and long-term growth decisions (Merli et al., 2018; Ranta et al., 201). This is especially important because the decisions made as leaders will be a critical part of the trade-offs that must be made between sustainability goals and financial metrics.

As a result, there is no common and comprehensive understanding that connects the dynamics of entrepreneurship, digital innovations and circular economy principles to drive sustainable and scalable business results for "born-sustainable" fashion startups. Lack of such frameworks not only restricts the theoretical development of the field of sustainable entrepreneurship, but also provides the lack of practical guidance for entrepreneurs and policy makers seeking to foster sustainability inspired innovation in the fashion industry.

This challenge needs an interdisciplinary and holistic perspective to understand sustainability integration as a dynamic process and not just fragmented analyses.

1.3 Problem Statement and Purpose of the Study

1.3.1 Problem Statement

Born sustainable fashion startups are one of the vital routes to alter the fashion industry in the direction of sustainability and responsibility. These startups, in contrast to traditional companies that approach sustainability as a response to a 'call to action' or a compliance issue, actually integrate environmental, social and ethical considerations into their initial business models. This is an essential integration that places them at the forefront of the changes that the industry is facing and is widely criticized for its environmental damage and social injustice (Henninger et al., 2021; Boons and Lüdeke-Freund, 2013).

Despite their strategic positioning, born-sustainable fashion startups are still challenged by large and multidimensional issues to effectively operationalize and scale sustainability. From a structural perspective, there is a lack of financial capital available to these companies and increased costs of using sustainable materials and ethical sourcing methods. These constraints affect their competitiveness compared to large companies that can leverage from economies of scale and already existing supply chain efficiencies (Stubbs and Cocklin, 2008; Abdelmeguid et al., 2024). These financial and structural limitations only increase when startups try to scale up, providing notable obstacles to growth.

The integration of sustainability poses additional challenges due to operation issues. Startups are typically not yet equipped with established systems for their supply chains, and have to deal with unpredictable demand, which results in inefficiencies like overproduction, inventory mismanagement, or inadequate utilization of resources. These inefficiencies are in direct

opposition to sustainability goals, which can lead to conflict between operational performance and environmental goals (Fletcher and Tham, 2019; Stubbs and Cocklin, 2008). Furthermore, the advanced application of digital technologies, which may provide answers in sectors like demand forecasting, transparency and efficiency, are technologies that early-stage businesses might lack in technical capabilities and investment (Abbate et al., 2023; Schiaroli et al., 2024).

The institutional and regulatory challenges increase the difficulties. Sustainability standards and certifications are necessary for ensuring credibility and differentiation in the market, but they tend to be scattered, expensive, and complex. This leaves start-ups unsure about compliance and hinders them in their communication of sustainability claims to consumers and stakeholders (Testa et al., 2020; Schaltegger et al., 2016). As a result, startups are in a context of ambiguity, complexity and limited resources.

These are practical problems, but there is a more basic one, namely the fragmentation of current research at the theoretical level. The existing literature on sustainable fashion and entrepreneurship tends to focus on distinct areas. The studies on the circular economy practices emphasize particularly on waste reduction and the efficiency of the use of resources, while the implications of these practices for the scalability of the corresponding business model are not sufficiently addressed (Ramírez-Escamilla et al., 2024). Likewise, studies on digital technologies focus on efficiency and transparency, with limited attention given to their strategic use in sustainability-focused start-ups (Burnstine et al., 2025). Motivation and mission, meanwhile, are important variables in entrepreneurship literature (Pedersen et al., 2018; Nosratabadi et al., 2019), but they do not explain how these become business models that are operational and scalable.

Consequently, there is a profound lack of an integrative perspective that links entrepreneurial dynamics, digital innovation and circular economy principles in an integrated way. The space between theory and practice is a constraint in theoretical development and application; there is a lack of structured guidance for entrepreneurs to balance the goal of sustainability with economic performance. At the same time, policy makers and industry players are limited in their capacity to create successful policies and schemes for supporting sustainability-focused start-ups.

To this end, the question that was raised in this study is how born-sustainable fashion start-ups can successfully relate entrepreneurial intent, digital technologies and circular economy to sustainability and scalable growth.

1.3.2 Purpose of the Study

The main aim of this research is to build a comprehensive and theoretically grounded conceptual framework as a theoretical explanation of the process of 'born sustainable' fashion startups embedding sustainability into their business models and facing the challenges of scaling up. The study aims to make a leap from fragmented analyses to integrating insights across several theoretical areas: sustainable entrepreneurship, circular economy theory, and digital transformation.

In particular, the research seeks to create a conceptualization of sustainability integration as a process rather than a static list of practices, understanding this process as a multi-dimensional activity that is shaped by interactions between internal and external factors. Entrepreneurial motivations, leadership identity and values within the organisation drive strategic priorities and decision making (Schaltegger et al., 2016). External factors such as technological developments, regulatory framework and market dynamics affect the viability and success of sustainability programs.

The study seeks to understand how these interactions can help startups achieve a balance between these competing goals: environmental sustainability, social responsibility, and economic viability. In startup environments, where resources are limited and market pressures dictate the need for an equilibrium, this balance can be especially pronounced between sustainability promises and business results (Nosratabadi et al., 2019; Schiaroli et al., 2024).

Moreover, the study also seeks to make a contribution to the body of knowledge, which is currently disjointed and to offer an integrated theoretical understanding on sustainability driven entrepreneurship. Concurrently, it aims to provide concrete insights that can be used for the policy-making process by entrepreneurs, industry players and policy makers. The framework is designed as a decision support tool that aids startups in developing and adapting their business model to be sustainable and in dealing with complex issues in scaling in a competitive market.

1.3.3 Exploratory Research Focus

The study will use an exploratory and integrative approach to achieve its purpose, and will emphasize the interaction between these three important dimensions:

1. Entrepreneurial Dynamics

The dimension looks at the impact of entrepreneurial motivations, leadership identity and mission-driven values on the design and implementation of sustainability-oriented business models. Born-sustainable startup founders are often motivated by ethical values and sustainability concerns that influence their decision-making and workplace culture (Pedersen et al., 2018; Gazzola et al., 2025). Knowledge about how such motivations is reflected in operational practices is crucial to explain sustainability integration.

2. Digital Technologies

The study explores the role of digital technologies such as artificial intelligence, blockchain, and digital platforms as enablers of sustainability. These technologies can help drive efficiency, increase transparency, and enable stakeholder engagement. Despite the potential of adoption in startup settings, however, due to financial and technical constraints, it is crucial to understand how they can be strategically implemented (Abbate et al., 2023; Papamichael et al., 2021).

3. Circular Economy Practices

This dimension is related to the application of circular economy principles, such as recycling, upcycling and product life extension. These practices play a key role in minimizing the environmental footprint and meeting sustainability goals. Their scalability and their cost implications are not yet certain, though, especially for startups with limited resources (Ellen MacArthur Foundation, 2017; Ramírez-Escamilla et al., 2024).

This study aims to combine these three dimensions to create a sustainable integration of sustainability in born-sustainable fashion start-ups. This integrative view is the basis for the concept of the study, which serves as a way to answer the identified research gap.

1.4 Research Aim and Research Questions

Research Aim

The main object of this research is to create a complete and theoretically based conceptual model that can explain why born-sustainable fashion start-ups introduce sustainability in their business model and how they overcome scaling issues.

The study aims to contribute to the field by rethinking sustainability integration as a multi-dimensional and dynamic process, instead of a collection of distinct practices. It seeks to explore the interactions between the three key dimensions – entrepreneurial dynamics, digital technologies and principles of the circular economy – and their impact on startups' ability to be sustainable and economically viable.

Moreover, the research seeks to establish a link between theory and practice, in line with the existing gap, by presenting a synthesis of sustainable entrepreneurship, literature on digital transformation and literature on the circular economy. The aim of this integrative approach is to create a framework that will not only produce academic knowledge, but will also provide practical recommendations for those who work within the sustainable fashion system, including entrepreneurs, industry and policy makers.

Research Questions (RQs)

RQ1: How do born-sustainable fashion startups integrate entrepreneurial motivations and leadership styles with sustainability-driven business models to achieve long-term success?

This research question is on the internal strategic drivers for integrating sustainability in fashion startups. Born-sustainable ventures generally have ethical values and mission-oriented objectives that guide their business models from the outset. Motivations of entrepreneurs, including environmental consciousness, social responsibility, and long-term value creation, are important factors that shape the priorities and strategic approach of an organisation (Johnson and Schaltegger, 2020; Schaltegger and Wagner, 2011; DiVito and Bohnsack, 2017)

Furthermore, leadership styles can shape how these motivations are manifested in the form of actionable business strategies. Leadership identity shapes the way firms balance sustainability and profitability, especially when the firm is growing or scaling up. The purpose of this question is to gain insights into the relationship between the entrepreneurial intent and the leadership behavior in sustainability-oriented business models and its relation to the long-term success of the organization.

RQ2: What role do digital technologies, such as AI, blockchain, and digital platforms, play in enabling sustainable practices and scaling operations in fashion startups?

This question looks at how digital technologies can enable sustainability and scalability. Artificial intelligence (AI), blockchain, and digital platforms are some of the technologies that offer tools to streamline operations, increase transparency, and enable stakeholder engagement. AI can aid in demand forecasting and inventory optimization, hence minimizing overproduction and waste (Badhwar et al., 2023; Parmentola et al., 2022; Narayan and Tidström, 2020).

Blockchain technology offers a solution to improve transparency and traceability in supply chains, ensuring that companies can verify their sustainability claims and instill confidence among stakeholders (Papamichael et al., 2021; Burnstine et al., 2025). It's through digital platforms, such as e-commerce and social media, that direct communication with consumers is possible and the promotion of sustainability values. (D'Itria, 2023).

It aims to understand how these technologies work together for sustainable practices and how they help start-ups to address their operational challenges and expand their growth.

RQ3: How do circular economy principles, including recycling, upcycling, and design for longevity, influence the business models and sustainability practices of born-sustainable fashion startups?

This question is about embedding the principles of the circular economy into business models of start-ups. The principle of the circular economy is to move away from linear production processes and to reduce resource consumption, minimise waste. Recycling, upcycling, longer fashion life and designing for longevity are key elements of fashion's environmental sustainability (Geissdoerfer et al., 2017; Ghisellini et al., 2016; Urbinati et al., 2017).

The question is about how these principles are integrated in the design of business models and their relationship to the resulting value creation, sustainability effects, and procedures of operation. It also takes into account the difficulties related to the implementation and scaling of circular practices, especially in a resource-constrained startup environment.

RQ4: What are the key barriers and drivers (e.g., regulatory pressure, consumer demand, resource availability) affecting the integration of sustainability practices into the business models of born-sustainable fashion startups?

The external and contextual factors that influence sustainability integration are addressed in this question. However, various barriers like financial constraints, costs related to sustainable materials, and regulatory complexities can impede sustainable practices (Bocken and Geradts, 2020; Ranta et al., 2018).

On the other hand, factors like growing consumer consciousness, the demand for ethical products and enabling policy measures can drive startups toward sustainable practices. When these barriers meet the drivers, it is a dynamic environment for the startups to make decisions strategically. This question aims to identify and analyse these factors and understand their impact on the integration and scalability of sustainability practices.

RQ5: How can a comprehensive framework that integrates entrepreneurial identity, digital innovation, and circular economy principles provide actionable insights for born-sustainable fashion startups to scale sustainably?

This is the integrative and outcome of this research question. It aims to synthesize the results of the foregoing questions in order to propose a common conceptual framework to account for sustainability integration in an integrated way. The framework is designed to integrate the three dimensions in a cohesive and interconnected model, considering how they interrelate and their combined effect on sustainability and scalability.

This is an important question because it goes beyond analysis, making the link between theory and practice, particularly from a contribution point of view. This will lead to guidelines and actionable insights for entrepreneurs, industry stakeholders and policy makers to develop sustainable business models that can meet environmental and economic goals (Teece, 2010; Zott et al., 2011; Evans et al., 2017)

1.5 Research Objectives

Based on the research aim and research questions raised from the previous section, the following research objectives are set as guides in conducting the investigation of this study.

These goals represent a blueprint for analyzing the central elements of sustainability integration in born-sustainable fashion startups and for formulating a holistic conceptual framework.

RO1: To explore the role of entrepreneurial motivations and leadership styles in shaping the sustainability-driven business models of born-sustainable fashion startups.

This objective aims at analysing the internal dynamics of entrepreneurship that influence the initiation and realization of sustainability business models, such as the motivations of the entrepreneurs, their ethical values or their leadership. Born-sustainable fashion start-ups are typically designed from the start with sustainability as an integral component of the design; therefore, entrepreneurial intention is an important factor in determining the direction of the business. The environment and social aspects are also central to mission-driven founders, which has an impact on the company's culture, decision-making process and long-term vision (Henningar et al., 2021; Pedersen et al., 2018).

Moreover, leadership styles are essential in the process of converting sustainability values into the processes. Leadership identity influences management of trade-offs between sustainability and profitability, especially at scaling stages. This objective, therefore, aims at providing insights into the impact of entrepreneurship's motivation and leadership on designing sustainable and scalable business models.

RO2: To investigate the impact of digital technologies (AI, blockchain, digital platforms) on the operational efficiency, supply chain transparency, and consumer engagement of sustainable fashion startups.

The focus of this objective is analysis of the role of digital technologies as an important enabler of sustainability in the fashion start-ups. The use of technologies like artificial intelligence (AI), blockchain, and digital platforms have enormous potential to boost operational efficiencies, increase transparency, and improve stakeholder engagement. An example of this is AI's ability to aid in demand forecasting and inventory optimisation, which decreases waste and improves resource utilization (Abbate et al., 2023; Schiaroli et al., 2024).

In enhancing supply chain transparency and traceability, blockchain technology allows for the creation of verifiable records of sourcing and production processes, which enhances trust and decreases the risk of greenwashing (Papamichael et al., 2021; Burnstine et al., 2025). Digital

platforms also allow startups to connect directly with customers, express their sustainability ideals, and foster brand trust (D'Itria, 2023).

This objective is to gain insight into the combined impact of these technologies on the sustainability impact and scalability, as well as to the limitations that startups place on the adoption and integration of these innovations.

RO3: To examine how circular economy principles such as upcycling, recycling, and design for longevity are integrated into the business models of born-sustainable fashion startups and how they contribute to environmental sustainability.

This objective investigates how the principles of the circular economy are used to create the business models of fashion startups that are more sustainable. The circular economy aims to shift the paradigm from linear production models to regenerative and resource-efficient production systems that aim to reduce waste and prolong the life cycles of products. Upcycling, recycling, and design for longevity are fundamental components of this strategy and are becoming more common among start-ups aiming to combat environmental impact (Ellen MacArthur Foundation 2017; Ramírez-Escamilla, et. al., 2024).

But as these practices become business models, there are issues of cost of such models, complexity of operations, and scalability. This goal will assess the extent to which startups adopt circular approaches to their operations, and the extent to which these approaches help them meet sustainability targets, such as resource efficiency and waste reduction.

RO4: To identify the barriers and drivers that influence the integration of sustainability practices in fashion startups, including consumer demand, regulatory pressures, and resource constraints.

The aim of this objective is to gain insight into external and situational aspects that enable or impede the integration of sustainability practices. Startups often face challenges like financial constraints, regulatory intricacies, and certification costs that hinder their ability to effectively pursue sustainability initiatives (Testa et al., 2020; Schiaroli et al., 2024).

Meanwhile, a range of factors, including a growing awareness by consumers, the need to produce ethical products and favourable policy frameworks, can push towards their uptake of sustainable practices. These barriers and drivers create a dynamic environment where startups

have to deal with conflicting pressures. This aim is to offer a holistic perspective on these aspects and how they affect sustainability integration and business model development.

RO5: To propose a comprehensive framework for born-sustainable fashion startups that integrates entrepreneurial dynamics, digital innovation, and circular economy principles to scale sustainably while achieving both environmental and economic goals.

This goal is the main contribution of the study. It seeks to combine the learnings from the first objectives to create an integrated conceptual framework that will explain how sustainability can be effectively embedded and scaled in the startup business model. The framework aims to integrate three elements: entrepreneurial dynamics, digital innovation and circular economy principles into a structured approach to sustainability integration, based on the complexity of the process.

The framework is designed to offer both theory and practice by tackling the relationships between these dimensions. From a theoretical point of view, it can help to close the existing gaps in the literature by providing a comprehensive view of sustainability-oriented entrepreneurship. In practice, it becomes a tool for decision-making by entrepreneurs, industry actors and policy makers to foster sustainable innovation and scalability in the fashion industry (Henninger et al., 2021; Schiaroli et al., 2024).

1.6 Significance of the Study

The value of this work lies in the fact that it can have a positive impact on academic research, decision making, and methodological development in the dynamic field of sustainable entrepreneurship, specifically in the fashion industry. The topic of sustainability is emerging as a key issue in both the research and practice communities, and a need for research that helps to define the problems, as well as offer integrative and actionable solutions. In this context, the present research fills an important gap in the literature since it provides a multidimensional and comprehensive understanding of the integration of sustainability in born-sustainable fashion startups.

1.6.1 Theoretical Significance

Theoretically, this study fills the gap of the fragmented research in the field of sustainable fashion, entrepreneurship, digital innovation and circular economy practices. Although

previous research has focused on each of these domains separately, there is a lack of integrated frameworks that explain how these dimensions interact in the context of startups (Pedersen et al., 2018; Testa et al., 2020).

This research contributes to the theoretical understanding by conceptualizing sustainability integration as a dynamic and multi-dimensional process that is developed through the interaction of entrepreneurial motivations, technological capabilities, and circular operational practices. The study combines these various, but interrelated areas of research and adds to the broader and more systemic understanding of sustainable entrepreneurship that goes beyond isolated analyses (Henninger et al., 2021).

In addition, the study contributes to the circular economy literature by addressing the implementation of the CE approach in situations where resources are limited, such as in the context of startups, where scaling up and profitability are important challenges. Likewise, it enriches the existing knowledge on digital innovation, as it takes into account the strategic dimension of emerging technologies (e.g., artificial intelligence, blockchain) as enablers of sustainability integration and transparency in business models (Abbate et al., 2023; Papamichael et al., 2021).

In this way the study contributes theory that cuts across various research streams and provides a more holistic understanding of the development of sustainability-based business models in fashion.

1.6.2 Practical Significance

The research does not only have a theoretical contribution to make; it is also of great practical value to various actors involved in the sustainable fashion ecosystem. The study provides a valuable framework for entrepreneurs, especially those running born sustainable fashion startups, to design and implement business models that are based on sustainability. The study highlights the importance of entrepreneurial intent, digital technologies, and circular economy practices, offering valuable insights for strategic decisions and long-term sustainability of sustainable ventures.

The report offers insights to industry players—such as investors, supply chain partners and sustainability-oriented organisations—on the challenges startups encounter during their operation and development. This knowledge is key to encouraging collaboration, establishing

support systems, and innovation in the field. The study also emphasizes the relationship between sustainability and scale, which provides guidance to investment and partnership decisions.

The research provides some key insights from a policy perspective on barriers and drivers for adopting sustainability. Issues such as regulatory complexity, certification costs, and resource constraints are identified as critical challenges, while factors such as consumer demand and policy support act as key enablers (Schiaroli et al., 2024; Testa et al., 2020). The findings can shape the creation of better regulatory policies and policy measures to encourage sustainable entrepreneurship and barriers to entry and growth.

1.6.3 Methodological Significance

Apart from the theoretical and practical implications of this study, the research methodology employed is also of significance since it provides a model for how a conceptual and integrative research approach can be applied in the context of Doctor of Business Administration (DBA) research. Thematic synthesis and conceptual mapping are used in the study to systematically synthesize and map the findings from different bodies of literature to create a coherent, theoretically grounded framework (Braun and Clarke, 2019; Jaakkola, 2020).

The methodological approach is especially suitable for solving research problems that are complex and multi-dimensional, in which classic empirical methods are not enough to demonstrate the interactions between the variables. The study demonstrates the application of an integrative and interdisciplinary approach, showing how conceptually-based research can lead to valuable insights that are both academically sound and practically applicable.

Furthermore, the framework that has been created in this study serves as a basis for future empirical studies. It provides a framework for testing and validation of relations between important constructs in various contexts and sectors, and is useful for advancing knowledge in the realm of sustainable entrepreneurship.

1.6.4 Overall contribution of study

The study has contributed to the overall world of learning in the following ways:

The overall contribution of this study is that it helps to connect several theoretical fields together with the challenges of implementation in the field of sustainable fashion startups. The

research combines the concepts of entrepreneurial dynamics, digital innovation and circular economy into one concept to provide a holistic understanding of embedding and scaling sustainability within startup business models.

The study not only contributes to the academic conversation but also provides valuable insights for stakeholders aiming to contribute to the sustainable transformation of the fashion industry. In this regard it is aligned to the general goals of research in DBA that focus on the combination of theory and practice to solve real world business problems.

1.7 Scope of the Study

This study is restricted to the scope to convey the boundaries and focus of the research along with maintaining the alignment of the research aim and objectives. As sustainability is a multidisciplinary concept in fashion, it is important to highlight the domains in which the study is based. This will allow a structured and coherent approach for analysing the integration of sustainability in born-sustainable fashion startups without conceptual ambiguity and methodological incoherence during the research.

The study has a focused approach, addressing sustainability integration as a multi-dimensional process shaped by entrepreneurial, technological and operational aspects. The research clearly defines the scope, creating a clear framework that gives theoretical exploration and practical relevance. The delimitation also guarantees that the study is analytically sound and that it is focusing on a particular and meaningful research problem within the sustainability discussion.

1.7.1 Industry Scope

The research is embedded in the international fashion system, and focuses on born-sustainable fashion start-ups. These startups are unique in that they bring the concepts of sustainability into business from the ground up, rather than as an add-on feature. It is a basic commitment to sustainability that renders them especially important for the discussion of how sustainability can be integrated into the organizational structure and strategic decisions of organisations.

The emphasis on startups is intentional, because they are businesses constrained by resources, dynamic market conditions, and limited resources. Startups are different from established organisations, so they have to find the right balance between sustainability goals and economic viability and scalability. This focus is designed to provide insights that are representative of the

challenges of new sustainable businesses and add to the growing body of knowledge on sustainability-influenced innovation in the fashion industry.

1.7.2 Conceptual Scope

This study is based on the conceptual level of integration of sustainability in business models, instead of the level of isolated sustainability practices. Sustainability is considered a multidimensional concept, with environmental, social and economic dimensions, in line with the concept of the Triple Bottom Line (Elkington, 1997). This provides opportunities to consider sustainability as a cohesive and strategic part of a business practice instead of a collection of separate activities.

The study focuses on the entrepreneurial dynamics, digital innovation, and the circular economy practices, as significant factors in the integration of sustainability. These dimensions are considered in terms of their impact on the design, implementation and scaling of business models that are integrated with sustainability concerns. This integrative approach aims to offer a comprehensive perspective on the interplay of these various factors in determining sustainability in startup settings.

1.7.3 Geographical Scope

The study has a global perspective and is not confined to a geographical area. It is a reflection of the international nature of the fashion industry, which has international supply chains, cross-border production systems, and markets spread throughout the world. The global scope allows the study to reflect on the different sustainability integration practices and challenges in various contexts.

It is recognised, however, that different geographical regions may have different regulatory environments, culture and markets that may affect the implementation of sustainability. The study is not specific to a particular region, but rather it acknowledges that there are regional variations and views the study's results as conceptual ideas that can be applied to a broader region.

1.7.4 Scope of Data and Research Approach

The study is a conceptual and qualitative research design which is a secondary data source. Some of the sources used are peer-reviewed academic papers, industry reports, and policy papers, which offer a holistic picture of how sustainability is integrated in fashion startups. This strategy aligns with the study's goal to create a conceptual framework using the synthesis of existing knowledge (Jaakkola, 2020; Saunders et al., 2019).

It is not research that gathers primary data or tests empirically, but rather one that aims at the development of theories and the clarification of concepts. The study draws on a broad range of perspectives and insights provided by the secondary data, which ensures its academic rigor and relevance. This method also gives an underlying structure for future experimental studies which can be built on the proposed structure.

1.7.5 Delimitations of the Study

Some areas are omitted from the study because they are not in the scope of the main objectives of the study. It does not discuss big and established fashion companies as their operational structures and resources are very different from startups. Furthermore, the study does not emphasize consumer behaviour or marketing aspects which are not directly linked to the business model development and integration of sustainability.

In addition, the research leaves out details of the technical implementation of the digital technologies, since the focus is on the strategic application of these technologies within the business models. Learning from other industries can be referred to for context and to help understand the study, but the study has a focus on fashion. The boundaries of the study help to keep the research focused and give it a coherent analysis that allows it to be integrated into the central goal of the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The chapter reviews the literature in detail related to entrepreneurial dynamics and integrating sustainability in born-sustainable fashion startups. This chapter furthers the research background, problem statement, research aim, research questions and objectives presented in Chapter 1 and focuses on the important academic discourses that inform the development of sustainable and scalable business models in the context of the fashion start-up. The review discusses the connection between sustainable fashion, entrepreneurial motivation, leadership identity, digital transformation, principles of the circular economy, sustainability frameworks, and barriers and drivers affecting sustainability integration. This chapter does not only outline the existing studies; it also critically analyzes the scholarship of different strands and how they relate to the primary concern of this study: how born-sustainable fashion startups can infuse sustainability into their business models to become scalable and sustainable in the long run.

The fashion sector is one of the greatest concerns these days due to its environmental and social effects worldwide. The industry is known for short production cycles, large amounts of resources consumed, textile waste, carbon emissions and long-distance supply chains. With the advent of ‘fast fashion’ these issues have become even more acute, with overproduction, short product life cycles and disposable consumption habits. As previously noted in existing literature, the areas of carbon emissions, water pollution, landfill pollution are all significant contributors to environmental degradation associated with fashion, and labour exploitation, unsafe working conditions and wage inequality are all associated with the production of fashion items in outsourced settings (Niinimäki et al., 2020; Fletcher and Tham, 2019; Joy et al., 2012). This has generated significant academic and industry interest in other fashion models that are environmentally responsible, socially ethical and economically sustainable.

As a result of these problems, sustainability is now a key concept in the academic discussion and in business practice of fashion. Sustainable fashion is a form of fashion consumption that is designed with the intent of reducing the negative effects that clothing has upon the environment, as well as focusing on ethical labor practices, sustainable sourcing methods, resource efficiency and long-term economic viability. This encompasses the use of eco-friendly materials, transparency in the supply chain, ethical sourcing, waste minimisation and circular production processes (McNeill and Moore, 2015; Niinimäki et al., 2020). But the literature

indicates that there are differences in the extent of sustainability adoption by firm types. Sustainability is gradually introduced into existing business practices, sometimes as part of a corporate social responsibility plan or compliance with regulations, in large and established fashion organisations. Born-sustainable fashion startups, on the other hand, start their businesses with sustainability at heart, from their mission to their identity and value proposition and their operations, business model and beyond (Henninger et al., 2021; Pedersen et al., 2018).

Born-sustainable fashion start-ups are therefore a unique sector of businesses in the sustainable fashion arena. As opposed to the traditional fashion companies which could try to incorporate sustainability within their current systems, those startups start with sustainability values. They are established by mission-driven entrepreneurs who are seeking to solve social injustice and environmental degradation by innovative business models. In these endeavors sustainability is not considered as an independent operational function but rather a key guiding principle that drives product design, sourcing, stakeholder engagement and relationships, brand strategy, and future business directions. This renders born-sustainable startups particularly relevant to the understanding of how sustainability can be integrated as early as possible in business models during the process of organisational development.

One of the major issues described in the literature is how the sustainability-driven business models are influenced by entrepreneurial dynamics. Born-sustainable startups' goals and strategic choices are greatly shaped by the motivations of its entrepreneurs, its founder identity, and the dominant type of leadership. The drivers behind the founders' motivation are often environmental concerns, ethical responsibility, social issues and the intent to question the unsustainable practices of 'mainstream fashion' (Henninger et al., 2021; Pedersen et al., 2018). In startup environments, the role of the leader is critical as founders can directly shape the organisation's culture, vision, and decision-making regarding resources. Hence, entrepreneurial personal values and sustainability orientation can influence the management of the conflict between social responsibility, environmental performance and financial viability by start-ups.

The other important stream of literature is the one related to circular economy principles and their usage in sustainable fashion. The circular economy is an alternative economic model to the traditional linear “take-make-dispose” model that supports resource efficiency, waste minimisation, material reuse, recycling, upcycling, product life extension and closed-loop production systems (Ellen MacArthur Foundation, 2017; Ramírez-Escamilla et al., 2024). These concepts hold special importance in the fashion industry, as it is very raw material

intensive and creates a large quantity of waste. Born-sustainable fashion startups frequently use recycled fabrics, upcycled garments, repair service, rental models, resale systems and longevity-focused designs to incorporate circular practices to their companies. The aforementioned strategies not only minimize environmental footprint but also foster opportunities for innovation and value creation and customer engagement.

In the sustainable fashion literature, digital transformation becomes more and more significant. AI, blockchain, and digital platforms are considered to have the potential for enhancing efficiency, transparency, and stakeholder involvement, making them potential enablers of sustainability. AI can provide valuable insights for demand forecasting, inventory management, and sustainable design choices, which can benefit startups by minimizing overproduction and optimizing resource use (Abbate et al., 2023; Schiaroli et al., 2024). For supply chain transparency, blockchain technology can offer traceable and verifiable information regarding sourcing, production and material movement, minimize the risk of greenwashing and boost stakeholder trust (Burnstine et al., 2025; Papamichael et al., 2021). Besides, digital platforms like e-commerce websites and social media platforms provide an additional opportunity for startups to showcase sustainability values, engage and educate consumers, and build a stronger bond with sustainability conscious consumers (D'Itria, 2023).

But it's not easy to adapt to digital technologies, especially for start-ups. Born-sustainable fashion startups frequently possess very limited financial means, small teams and limited technical capabilities. This creates barriers to implementing technologies like blockchain and AI, as they may require specialized skills, infrastructure, and expertise, and may be costly. It means that digital innovation is not simply a technical solution, but a strategic competence and should be linked to the decisions of the entrepreneur, the resources of the organization and their sustainability goals. So, in this review, we will discuss digital technologies from both the side of the benefits and the practicality of it within start-up structures.

It's also important to note that there are a number of structural, regulatory, operational and financial hurdles that impact born-sustainable fashion startups, as noted in the literature. These companies do not have the necessary capital, production facilities, working labour force, and economies of scale in their structural setup. They are facing difficulties in competing with bigger fashion companies, which already have established supply chains and cost benefits (Bick et al., 2018; Abdelmeguid et al., 2024). Functionally, startups can struggle to find materials that are sustainable, to manage inventories, to predict future demand, and to manage

supply chains. Such inefficiencies can lead to higher expenses and could even lead to waste, running counter to the sustainability goals of such companies (Fletcher and Tham, 2019; Schiaroli et al., 2024). What adds to the complexity is the regulatory landscape, including the sustainability standards and certification systems, which are often fragmented, costly and inaccessible for small businesses (Testa et al., 2020; Papamichael et al., 2021).

One of the common issues in the literature is sustainability vs profit. Born sustainable fashion startups are typically established with high ethical and environmental ideals but they need to compete in the fashion market as well. Circular production models and using sustainable materials and sourcing ethically and transparently can come with a higher price tag. Meanwhile, consumers are not necessarily willing to pay a premium price for sustainable products. This poses a dilemma for start-ups that want to remain sustainable but also financially stable and sustainable in the long-term (McNeill and Moore, 2015; Schiaroli et al., 2024). Significantly, the Triple Bottom Line framework can be applied in this context to help understand sustainability from the social, environmental and economic aspects. But this can be challenging in startup situations as there are sometimes tough choices to be made between people, planet and profit due to finite resources.

In general, the literature surveyed offers useful information on digital innovation, sustainable fashion, entrepreneurship, sustainability frameworks and circular economy practices. However, it is still splintered. While there are various studies that deal with each of these areas individually, few studies provide an explanation of how these dynamics, technologies, principles, and frameworks connect and interact within born-sustainable fashion startups. This gap is crucial as Sustainability integration in start-ups is also a multi-dimensional process influenced by internal, namely founder motivation, identity of the entrepreneur and external, namely consumer demand, regulatory pressure, availability of resources, and technological change.

As a result, this chapter is broken up into key sections. It starts with a brief look at sustainable fashion and the rise of born sustainable fashion startups. It then discusses structural, regulatory and operational constraints before digital transformation, entrepreneurial dynamics and business models based on the circular economy and sustainability frameworks. The chapter subsequently reviews the literature, pinpoints the gaps and sets the foundation for the conceptual framework of the proposed framework. In the process, the chapter offers theoretical insights into the workings of born sustainable fashion startups and how they can embed

sustainability into their business model, while seeking to scale and achieve sustainable business success.

2.2 Sustainable Fashion and Born-Sustainable Fashion Startups

In response to the environmental and social issues caused by traditional fashion production and consumption systems, sustainable fashion has become an important issue. Traditionally the fashion industry has been a linear system of extracting, producing, consuming and discarding resources. The growth of fast fashion has had a significant influence on this model, with increased buying, low product lifespan, low cost of production, and high waste volumes of textiles. The environmental impacts of this model are: carbon emissions, water pollution, over-consumption of resources, and the amount of discarded clothing that goes to landfills, which has been discussed in the approved Chapter 1 and the literature review base (Niinimäki et al., 2020; Arrigo, 2020). Apart from that, social issues of the traditional fashion production are also related to the problem of labor exploitation, poor working conditions, and wage inequalities, especially in countries with the fashion production outsourcing, which are mostly developing countries (Joy et al., 2012).

In this context, sustainable fashion means moving away from business models which are only profit-driven and consumption-heavy towards those that take environmental protection, social responsibility and long-term economic viability into account. Sustainable fashion includes some of the following practices: environmentally friendly materials, ethical sourcing, minimizing waste, responsible manufacturing, and transparent supply chains. It also encompasses a broader vision aimed at the redesign of fashion systems to ensure the least possible impact on the environment and society throughout the design, production, consumption, and disposal of the product (Yang et al., 2017, 2015; Niinimäki et al., 2020). Sustainable fashion is not just about creating eco-friendly clothes, it is also a shift in the way value is added, created, delivered and retained in the fashion industry.

There is also growing consumer, business, policy and research awareness of the importance of sustainable fashion. Fashion consumers are more informed about the environmental and ethical impact of their clothing choices, and companies are under increasing pressure to demonstrate responsible sourcing, reduce waste and transparency. Governments and regulators, meanwhile, are increasingly focusing on environmental requirements, working conditions and the sustainability reporting process (Muthu, 2020; Gurova and Morozova, 2018). The

developments have seen fashion companies taking steps towards sustainability projects, but it varies significantly in depth and genuine across fashion companies.

Born sustainable fashion startups should be differentiated from established fashion firms that are gradually taking steps towards sustainability. A lot of large fashion companies are adding sustainability as a new strategy within their established business models. In these instances sustainability may be related to corporate social responsibility, brand reputation, regulatory compliance or consumer demand. But these companies tend to follow the traditional business model, which is heavily influenced by scale, cost efficiency and mass consumption. In this regard, they may not be as deep and sustainable in some instances, and in others, their actions can be decried as greenwashing if they do not create greater structural change (Claxton and Kent, 2020).

Born-sustainable fashion startups are not that way, because sustainability is integrated into the very business model, identity and mission of the brand from the start. These startups are not just modifying existing systems to incorporate values and practices of sustainability; they're built from the ground up on sustainability. They are founded, for example, to create businesses that are both for-profit and environmentally and socially responsible (Henninger et al., 2021; Pedersen et al., 2018). Born sustainable fashion startups are thus key actors in the broader shift towards a more sustainable fashion industry as they demonstrate how sustainability can be integrated from the start of the business model.

Born-sustainable” is the idea that sustainability isn't just a secondary, or “nice-to-have,” attribute. Rather, it shapes the business strategy of the startup from the product design stage, selection of materials, supply chain management, manufacturing, pricing, marketing, consumers to long-term growth planning. For instance, a clothes company that is born sustainable can opt for recycled or organic materials, source from ethical providers, design for longevity, minimise packaging waste and transparently communicate with consumers regarding sourcing and production. Such practices are an attempt to get business activity in line with Environmental and Social values.

Born-sustainable fashion startups are highly influenced by entrepreneurial motivation. Many such startups are established because the entrepreneur is personally passionate about sustainability, ethical production, social impact or environmental protection. They may pursue goals that are more than just the maximisation of profit and might involve doing something to

solve issues at the industry level, like waste, pollution, exploitation, and irresponsible consumption. Because this mission-driven foundation affects the way that the startup measures success. Born-sustainable startups will view other metrics of success, such as reducing environmental footprint, building an ethical supply chain, expanding consumer knowledge, and helping to shape the sustainable transformation of industry.

Born sustainable fashion startups' business models are closely related to the principles of Circular Economy. To sustain materials for longer periods, and reduce waste, circular practices like recycling, upcycling, product life extension, repair, re-sale, rental and closed-loop production are often employed (Ellen MacArthur Foundation, 2017; Ramírez-Escamilla et al., 2024). The textile industry and its overproduction and waste are especially significant sustainability concerns in fashion, which is where these practices are relevant. Born-sustainable startups try to get rid of the "disposable mentality" of fast fashion and seek to implement circular economy principles: durability, reuse and resource efficiency.

Digital technologies also are helping to boost the emerging born-sustainable fashion startups. Opportunities are emerging with the integration of AI, blockchain and digital platforms to enhance operational efficiency, transparency and consumer engagement. AI can also be used for demand forecasting and inventory management, which can help startups minimize overproduction and waste (Abbate et al., 2023; Schiaroli et al., 2024). One of the blockchain's potential applications in the food supply chain is to verify the origin of materials and ensure ethical sourcing practices, which can help companies establish greater trust with their consumers (Papamichael et al., 2021; Burnstine et al., 2025). Digital platforms, such as ecommerce and social media can enable startups to send their sustainability story straight to consumers and to establish trust-based relationships (D'Itria, 2023).

Born sustainable fashion startups, however, have some drawbacks, especially when it comes to their innovative potential. These companies typically have limited capital, manpower, and access to advanced technologies or production capabilities. Sustainable materials can be costlier than traditional materials; ethical sourcing can also be a cost driver. Further, start-ups can face challenges in finding trustworthy suppliers, optimizing stock management, gaining a competitive edge over more established firms due to economies of scale (Bick et al., 2018; Abdelmeguid et al., 2024). These constraints can make it challenging for startups to scale up without compromising on their sustainability efforts.

One of the other significant issues is the balancing of sustainability and profitability. In order to stay alive, born-sustainable startups have to be cost effective and efficient, but many sustainability practices are more expensive and complex in operation. For instance, the adoption of certified sustainable materials, ethical labour practices or circular systems could be more expensive than traditional production methods. At the same time, not all consumers are willing to pay premium prices for sustainable fashion products. This puts startups in a challenging strategic position as they strive to address both environmental and social concerns, while also maintaining their economic viability and expansion (McNeill and Moore, 2015; Schiaroli et al., 2024).

As a result, there is a general change in the fashion industry that needs to be understood, whether in the context of sustainable fashion or born-sustainable fashion startups. Sustainable fashion can be the moral and eco-basis for transformation and born sustainable start-ups will be the proof that the principles of sustainable fashion can be integrated straight into business models. But the literature also reveals that these start-ups are not only to be understood in terms of their sustainability intentions. Sustainability will be the main factor determining their long run profitability, as well as their ability to deal with entrepreneurial motivations, constraints on resources, circular economy, digital technologies, market pressures, and profitability challenges. Born sustainable fashion startups are therefore an important field of study that can provide valuable insights into how sustainability can be practically and economically incorporated into business models on a scalable level.

2.3 Structural, Regulatory, and Operational Constraints

Born-sustainable fashion startups have a great potential to play their role in the transformation of the fashion industry, however there are a number of structural, regulatory and operational challenges which affect their ability to grow sustainably. They impact the business model design, supply chain management, resource access, sustainability measures, and scaling up of startups. Sustainability is at the heart of the business of such startups, but the lack of resources, competitive pressures, conflicting regulations and lack of operational efficiency are huge challenges in this space. It is therefore important to understand these constraints to be able to provide explanations on why sustainability integration is often challenging in practice where sustainability is integrated into business core mission.

2.3.1 Structural Challenges

Structural challenges are the factors that inhibit born-sustainable fashion startups' growth and ability to compete. An important structural constraint is the access to financial capital. Startups are typically not as well funded as large fashion companies and do not have a large network of investors or have a strong negotiating position in the market. This is challenging them to invest in sustainable materials, developments of new technologies, skilled workers, product development and certification processes. Environmentally friendly materials and ethical sourcing is usually more expensive, which makes it difficult to make sustainable fashion affordable. (Bick et al., 2018; Abdelmeguid et al., 2024)

Another structural restriction is that there are no economies of scale. The established fashion companies can save money by making it in bulk, getting good discounts from suppliers and employing traditional distribution channels. Born sustainable fashion startups, unlike other fashion companies, generally come in smaller sizes and thus have less of a capacity to decrease production costs. This is especially difficult if the startups are using sustainable raw material, ethical suppliers or small batch production. This inevitably means that their products are likely to cost more, and they will not be able to compete with fast fashion brands that are cheaper. This price gap creates a challenge for startups to provide their consumers with more sustainable value in their pricing, quality, transparency, and ethical branding (Bos-Brouwers, 2010).

Structural challenges also exist due to human resources limitations. Most startups are small in size and founders and employees have to handle various roles like sourcing, design, production, marketing, finance, etc. and even customer engagement. This can impact the potential of the firm to create customised sustainability plans, or use more sophisticated digital systems. Technical knowledge is one of the most essential forms of knowledge for sustainable fashion, as companies must be aware of how materials can be sustainable, design them to be circular, and ensure they come from ethical sources, meet certifications, and are transparent about their supply chains. If they lack the necessary know-how, startups can find it difficult to translate their sustainability goals into action (De Brito et al., 2008).

Another key structural issue is infrastructure. Born Sustainable fashion businesses might not have access to a reliable producer, sustainable material suppliers, waste recycling system, repair system, or logistics partners. This is particularly relevant for startups aiming to implement new circular economy principles like recycling, upcycling, rental, resale and closed-loop production. The practices do need supporting infrastructure which may not be readily available or cost effective. For instance, the start-up would like to pick up used garments and

put them back into production – it would require systems for collections, sorting, cleaning, redesigning and re-distribution. Circularity is not going to be easy at scale without the proper infrastructure.

Scalability is thus one of the key concerns at the structural level. As start-ups expand, they need to produce more, sell more products to more people, and have more complex operations. But, there is tension that can arise between sustainability values and pressures. Growth can depend on greater production volumes, quicker delivery and widening supply chain relationships which can have a negative impact on ethical and/or environmental commitments. There are many start-ups that are not able to grow without compromising on their sustainability values. This will make sustainable scaling a complex process that will need careful planning, strategic partnerships and good governance.

2.3.2 Regulatory Complexities

Apart from all the structural problems, born sustainable fashion startups face a lot of problems with the regulation. The fashion industry is a global industry and production, sourcing, distribution and consumption takes place in different countries. Consequently, startups need to deal with various regulations, labor laws, environment regulations and sustainability norms in various markets. It leaves room for uncertainties and makes administration more complex for small businesses which may lack the legal/compliance skills of larger companies.

One big challenge is the lack of harmonization of sustainability standards. The concept of sustainable fashion does not have a uniform definition. On the contrary, startups might be subjected to various certification systems, labelling programmes, ethical sourcing standards and environmental compliance programs. Certifications like Global Organic Textile Standard, Fair Trade, and OEKO-Tex can add to the credibility and consumer trust, but are expensive and time consuming to obtain. These expenses can prove to be a hurdle for small startups, particularly when budgets are constrained (Testa et al., 2020; Papamichael et al., 2021).

Uncertainty around the regulations may also influence the way startups communicate their sustainability statements. Consumers are more aware of greenwashing in a market; start-ups need to be able to demonstrate that their products and practices are truly sustainable. If there are inconsistencies between standards, or if the standards are vague, it is hard for start-ups to know what claims can be made, that can be measured, and that are credible. This poses reputation risk when sustainability information isn't backed by supporting evidence or is not

clear. Trust is especially critical for born-sustainable startups as sustainability is a key component of their brand and value proposition (Perry and Towers, 2013; Kozlowski et al., 2015).

Other compliance needs could also drive-up operating expenses. Any startup company that purchases materials from abroad needs to make sure that the materials' suppliers comply with the labour, environmental and ethical standards. These can include audits, documentation, certification, traceability and continuous monitoring. These are essential to uphold the sustainability integrity, but the resources they need may not always be available in startups. This can make it difficult for markets to open up, grow and have the flexibility to use verified sustainability claims as a means of distinguishing themselves from competitors.

2.3.3 Operational Inefficiencies

Born-sustainable fashion startups also face numerous limitations due to operational inefficiencies. This is frequently due to problems in the sourcing, production scheduling, inventory control, forecasting and coordination of the supply chain. Sustainable raw material is not always readily available and, when available, might be more costly or be limited in availability. It can also be difficult for startups to find suppliers that are both sustainable and fulfilling production needs. This may cause delays, higher expenses and inconsistencies in quality of the products.

Another, equally crucial operational challenge is inventory management. Demand for fashion has been unpredictable, with shifts in consumer preferences being commonplace, and start-ups may not have enough data to forecast demand based on past sales. Overproduction by a startup could lead to waste, which runs counter to sustainability goals. It may not be able to satisfy market needs if it is insufficient. More than anything, this tension has a particular significance to born-sustainable startups, given that overproduction is in direct opposition to the environmental goals of their mission (Fletcher and Tham, 2019; Schiaroli et al., 2024).

For small sustainable fashion businesses, coordination of the supply chain can also be challenging. Bricks are made using sustainable methods and the suppliers, manufacturers and distributors must be coordinated in order to achieve ethical sourcing, sustainable production and transparent logistics. However, startups can be in a position of less bargaining strength and have few suppliers. This reliance can leave companies vulnerable to price hikes by suppliers, delivery issues, and products that don't comply with sustainability requirements. Also, in the

case of sustainable supply chains, extra verification and monitoring is frequently necessary, adding to the complexity (Choi and Luo, 2019; De Aguiar et al., 2021).

There are some aspects of the operational inefficiencies that can be addressed by technology, but there are also new challenges that arise from the adoption of technology. AI can enhance demand forecasting and inventory optimisation, blockchain can help with the transparency of the supply chain. But the technology adoption needs to be financial, technical and capacity to integrate. The potential benefits of digital technologies may be understood by many start-ups, but they do not have the financial or human resources to effectively implement these technologies (Abbate et al., 2023; Burnstine et al., 2025). Thus, technology can be a blessing, as well as a burden, for a startup, depending on its capacity.

2.3.4 Impact on Innovation and Sustainable Growth

Overall, the impact of structural, regulatory and operating constraints is directly felt in terms of innovation and sustainable growth. Born-sustainable fashion startups are expected to be innovative, as they will challenge traditional fashion systems, and present alternative business models. But it takes time, investment, trials and adaptability to become innovative. If a company is in a panic to save money and time, comply with regulations or overcome daily issues, it is unlikely to have the resources to facilitate innovation in materials, technologies or circular systems (De Aguiar et al., 2021).

This can lead to incremental and not transformative innovation. Startups can create sustainable products or small-scale practices for circularity but might have difficulty scaling those innovations, particularly to larger markets. A start up, for instance, might be able to effectively develop upcycled clothing in pilot scale production but struggle with the logistics, labour and material challenges of scaling up the model. Likewise, a start-up might wish to implement blockchain transparency for the supply chain but may not be able to do so for all suppliers (De Brito et al., 2008).

So, these constraints are not distinct but rather are interlinked challenges that affect the overall sustainability journey of born-sustainable fashion startups. Finance is a barrier to access of technology and certification. The more complex the regulation, the higher the compliance expenses. The problem of operational inefficiencies results in waste and loss in profits. Combined together, all these factors heighten the sustainability-scalability conflict. This is indicative of the fact that born sustainable fashion startups need to construct resilient structures,

maneuver through regulations, optimize their processes, and create scalable business models, in addition to their sustainability mission. This section therefore highlights the need to consider sustainability integration as a multi-dimensional process, and not merely a case of sustainable practices.

2.4 Digital Transformation in Sustainable Fashion

Given the opportunities it presents to fashion companies in enhancing efficiency, transparency, decision-making and stakeholder engagement, digital transformation has come into the spotlight of sustainability in fashion. Born-sustainable fashion start-ups are especially relevant to digital technologies because they typically must reach the outcomes of sustainability without a lot of resources. The technologies employed, including AI, blockchain and digital platforms, can help startups in a variety of ways to cut waste, enhance visibility in the supply chain, convey sustainability messages and connect directly with consumers. Some of the literature also reveals that digital technology use in startups contexts is not easy, as startups can also have financial, technical and organisational constraints. Hence digital transformation is not just a technological revolution, but also a strategic skill, required in order to integrate sustainability into the business model and future goals of a start-up.

2.4.1 Artificial Intelligence and Sustainable Decision-Making

Artificial Intelligence (AI) has been increasingly seen as a useful tool to make fashion industry decision making more effective. AI can aid in a variety of sustainable fashion operations and strategies, such as demand forecasting, inventory management, design optimisation, production planning, and consumer trend analysis. Such functions are particularly significant as overproduction and unsold stock are still significant issues in the fashion industry. AI-driven predictive analytics can help startups more accurately forecast customer demand, thus minimizing the risk of overproduction and potential waste (Abbate et al., 2023; Schiaroli et al., 2024).

AI can also play a role in sustainable design for startups, as they can use it to analyse consumer preferences, material characteristics, and market trends. AI tools can aid designers in choosing materials that meet both design and environmental requirements, for instance. It is important for born-sustainable fashion start-ups as they need to keep sustainability in balance with customer demand and business' viability. The failure of sustainable products to deliver on their

design, quality and price could make it difficult for start-ups to get products accepted in the market. Therefore, AI can be a tool to help in a more informed design process, connecting sustainability goals to consumer demand (Abbate et al., 2023).

An additional vital role of AI is inventory optimization. When it comes to fashion startups, they may have limited historical data or consistent sales trends. For fashion startups, there might be uncertainty because they may lack large historical datasets, or consistent sales patterns. Underestimate the demand and it'll result in waste because not enough products will be manufactured; overestimate the demand and it will result in loss of revenue and loss of customer satisfaction. This uncertainty can be mitigated with the aid of AI tools that can analyse sales trends, seasonality, online behaviour and customer preferences. That helps startups to determine more precisely the quantity of productions and stocks. By doing so, AI can play a vital role in promoting sustainability by minimizing waste and enhancing overall efficiency and profitability (Badhwar et al., 2023).

But the adoption of AI poses problems for born sustainable fashion startups, too. There are considerations of funding, data, expertise and organisation to consider when implementing AI systems. Such high-tech AI solutions could be inaccessible for many startups due to limited resources. Moreover, AI systems require accurate data and startups in their early stages might not have adequate data to make accurate predictions. While AI holds great promise, its implementation in sustainable fashion startups could be constrained by the size, resources and technological level of the company. Therefore, the use of AI must be seen as a facilitator and not a magic bullet.

2.4.2 Blockchain for Transparency and Traceability

The blockchain technology has attracted interest in the field of sustainable fashion, with potential applications in enhancing supply chain transparency and traceability. An issue that is very important in the fashion industry is transparency, which is difficult due to long, complex and hard to track global supply chains. The fashion industry is now held increasingly accountable by consumers and stakeholders for giving "proofs" of where materials are sourced, how they are produced, and if they are produced in accordance with labour and environmental standards. This need can be met by a secure and traceable record of transactions and material flows through the supply chain, provided by blockchain (Papamichael et al., 2021; Burnstine et al., 2025).

Blockchain can serve as a way to fortify credibility for born-sustainable fashion startups, in the sense that it can allow them to verify sustainability claims. As sustainability is a key component of their brand, these startups will have to prove that their sourcing and production processes are indeed sustainable and responsible. Blockchain can be used for this purpose to provide details on the raw materials, suppliers, production processes, certifications, and logistics. This can assist consumers to ensure the sustainability path followed by a product and minimize potential green washing (Parmentola et al., 2022).

Blockchain can also enhance supply chain partners' accountability. The more transparent and inaccessible the recording system, the more likely suppliers and manufacturers will follow ethical and environmental standards. This can be crucial for startups relying on external suppliers for materials and production. A better visibility along the supply chain can help startups to track suppliers' actions and guarantee that they keep their sustainability promises outside the company (Narayan and Tidström, 2020).

Moreover, blockchain can aid in building consumer trust. Sustainable consumers of fashion want to know that their clothing is ethically sourced and environmentally friendly. Blockchain technology can be adopted by start-ups to enable product information on QR codes or product passports, thus allowing consumers to know more about the product lifecycle, material origin or production process. This helps build trust and confidence between the startup and its customers by providing greater transparency and verifiability around sustainability claims (Narayan and Tidström, 2020).

While all this is great, there are some drawbacks in blockchain adoption as well. The cost of blockchain systems can be high and can need the participation of a number of players in the supply chain. The effectiveness of blockchain might be diminished if suppliers are not digitally capable or don't want to share information. Moreover, startups might not have the technical expertise to run blockchain-primarily based systems. Thus, though blockchain is capable of enhancing transparency, its application in the born-sustainable fashion startup affects cost, suppliers' participation, technical capacity and availability of adequate digital infrastructure.

2.4.3 Digital Platforms and Consumer Engagement

Born-sustainable fashion startups are at the heart of the development and visibility of digital platforms. Startups don't always have the same reach as big brands in the retail network or advertising budgets. Digital channels, such as e-commerce websites, social media and online

marketplaces, are cost-effective tools for startups to connect with customers, convey their message and establish a brand identity. Born-sustainable startups rely particularly on these platforms, as the sustainability concept needs to be conveyed to the consumer in a clear and transparent way; for these platforms, sustainability is a story to be told and not a product attribute (D'Itria, 2023).

Through social media, startups can directly engage and effectively share their sustainability message in an interactive way. These social media platforms, including Instagram, Facebook, and TikTok, enable startups to disseminate details regarding materials, production methods, ethical sourcing, circular practices, and the environmental footprint. This form of communication is one way that consumers can grasp the value of sustainable fashion and can even promote the adoption of more sustainable consumption practices. Digital story telling is thus a crucial element in creating emotional connections, trust and loyalty among sustainability-conscious consumers (McKinsey and Company, 2023).

E-commerce platforms also have the capability to enable startups in communicating about sustainability, as they can share in-depth data about their products. For instance, product pages can feature details about material composition and sourcing, certifications, care instructions, and end-of-life considerations like repair, resale, or recycling. This helps to inform consumers and increases transparency. Born sustainable startups are interested in such information as higher prices could be called for from consumers for sustainable products. Such communication can be used to rationalize these costs and prices by communicating the ethical and environmental worth of the product (McKinsey and Company, 2024).

Digital platforms also enable us to build communities. Online platforms can be utilized to involve consumers in campaigns on themes such as recycling, slow fashion, ethical consumption, or product care for sustainable fashion start-ups. These activities take the consumer relationship out of mere transactions and bring the consumer to the sense of shared responsibility. Through this, digital platforms have the potential to enable startups to create communities around sustainability values, fostering brand loyalty and customer retention potential in the long run.

But there are digital platforms that pose challenges. The world of online fashion is a competitive one and it's crucial for startups that they stand out from both sustainable and traditional brands. Moreover, the digital landscape can make it more difficult for startups to

escape the spotlight particularly when consumers doubt the authenticity of sustainability claims. Accordingly, communication via digital channels should be clear, uniform and fact-based. Vague or exaggerated sustainability claims can pose a risk to the reputation of startups. This is because digital communication is no longer a marketing tool but a strategic task.

2.4.4 Digital Technologies as Enablers of Sustainable Scaling

Digital technologies play a vital role in the scaling of born-sustainable fashion start-ups, in particular. Scaling involves scaling up production, expanding markets, handling more customers and managing more complex supply chains. If not, scaling can result in inefficiencies and can reduce commitment to sustainability. In the era of digital tools, startups can overcome this complexity, with better planning, monitoring, communication and transparency.

AI can help with scaling by enhancing forecasting and minimizing waste when scaling up. Blockchain can be used for scaling by enabling startups to have their supply chain traceability for a wider network of suppliers and markets. Digital platforms can be used as a means to scale, as it reaches wider markets without a significant investment in physical retail stores. Complementary technologies can support start-ups' growth and remain sustainable (Badhwar et al., 2023).

However, care must be taken when using digital scaling. When it is not aligned with the startup capabilities and strategy, it can result in extra cost and complexities. For instance, the deployment of blockchain if suppliers are not ready for it, can have limited benefits. Similarly, if the data used for AI is not accurate, then the decisions made will be incorrect. Thus, the digital technologies should be analysed from the perspective of their startup's maturity, finances and sustainability goals.

The literature indicates that digital transformation of sustainable fashion should be considered as an integrated process. Technologies are not just business model neutral but are intertwined with entrepreneurial motivation, circular economy measures, supply chain structures and consumer engagement strategies. Born sustainable fashion startups benefit from digital transformation when it helps to achieve the main sustainability goal and brings about environmental and economic results (Narayan and Tidström, 2020).

To conclude, born sustainable fashion startups have a lot to gain from digital transformation. AI can improve forecasting and optimize inventory management and design choices; blockchain can enhance transparency and traceability; and digital platforms can help engage consumers and communicate sustainability. But they also need investments of money, know-how, data, and strategy. Thus, digital transformation must be considered as more than a mere technical answer, but rather as a strategic enabler that can help integrate sustainability in the startup's business model and support it for scaling up.

2.5 Entrepreneurial Dynamics in Born-Sustainable Fashion Startups

The role of entrepreneurs in the dynamics of born-sustainable fashion startups is central in their formation, direction and orientation for sustainability. Born-sustainable startups are startups that are built by entrepreneurs whose values are strong and deeply tied to sustainability, social responsibility, and ethical business practices, as opposed to conventional fashion companies that may initiate sustainability as a response to market demand, regulatory demands, or corporate social responsibility expectations. In these businesses, entrepreneurship goes beyond the seek and generate of market opportunities and profits – it also involves the generation of positive environmental and social impact. Therefore, the entrepreneurial motivation, identity of the entrepreneur, the leadership style and the interplay between sustainability and profitability are key to understanding how born sustainable fashion startups build their business model and achieve long-term success.

2.5.1 Entrepreneurial Motivation

One of the key factors shaping born-sustainable fashion startup creation and development is entrepreneurial motivation. The values of the founders of these businesses are usually more than just about the money. They are often motivated by aspects such as the environmental, ethical and labour concerns, or by the wish to question the negative impact of fast fashion. According to the literature, many entrepreneurs who are involved in sustainable fashion consider business to be a tool for solving social and environmental issues, not just to make money (Henninger et al., 2021; Pedersen et al., 2018).

This mission-driven motivation is especially relevant in the fashion industry, as it has been heavily criticized for its overproduction, waste, pollution, and exploitation of labor practices. Born-sustainable fashion entrepreneurs look to solve these problems directly, by developing

business models that focus on responsible sourcing, sustainable materials, ethical production and circularity. This way, entrepreneurial motivation decisively becomes the core of the company's character and strategy. It affects both product and product development, as well as product marketing, distribution and consumption (Johnson and Schaltegger, 2020).

Whereas entrepreneurs in traditional fashion businesses might measure success based on profit, those of a born sustainable business define it in a wider sense. Financial performance is only one of the yardsticks for measuring the success of the business; others include the reduction of the environmental impact, social contribution, consumer awareness, and the creation of value in the longer term. This more holistic idea of success is characteristic of these ventures, which are sustainable. It also reveals that entrepreneurial motivation influences the way that start-ups consider the balance between commercial considerations and ethical and environmental responsibilities (Rosário and Raimundo, 2022).

The literature also suggests that sustainable product demand can support entrepreneurs' motivation. Changing values and expectations of consumers could create opportunities for sustainable entrepreneurs to develop products that are aligned with changing values and expectations. But sustainability does not only constitute a market opportunity. Born sustainable startups typically have a market opportunity that is entwined with personal conviction. Founders can also have a vision to create a sustainable business, as well as the vision to change the way fashion is done. Ethical purpose and commercial awareness are one of the characteristics of 'sustainability' entrepreneurship (Schaltegger and Wagner, 2011).

But the will to be an entrepreneur is not enough for a sustained success. Although a strong set of values may lead to the formation of the venture, start-ups need to build their operations, their financial plans, and their scalable business models. While a founder could be passionate about sustainability, if they do not have enough resources, supply chain capabilities and market positioning, their startup may not be able to survive. Hence, entrepreneurial motivation should be translated into practical strategies which can support the sustainability and viability of entrepreneurial businesses.

2.5.2 Entrepreneurial Identity and Leadership

Entrepreneurial identity is the perception of entrepreneurial role, purpose and responsibility of the founding persons. Born-sustainable fashion startups are frequently associated with an entrepreneurial identity that is closely connected to ethical values and commitments toward

sustainability. Founders can envision themselves as a transformer of an industry that needs to change, rather than just a business owner. This identity affects their way of making decisions, relating to stakeholders, product design, supplier choice and communication with consumers.

Leaders play a specific role in startup environments where founders might have significant influence on the organisation's culture and strategic direction. In more established organisations, it is possible for decisions on sustainability to be taken by multiple departments or impacted by formal governance structures. However, startups can be defined by the vision, values, and style of leadership of their founders. Thus, the sustainability issue may be closely linked to the identity of the founder and their perspective on sustainability influencing the sustainability concept in the business as it evolves (Gazzola et al., 2025; Henninger et al., 2021).

Some of the literature indicates that founders with a focus on sustainability tend to engage in leadership practices that are focused on collaboration, transparency, responsibility and long-term thinking. Leadership can be different from the traditional “chain of command” or “profit maximization” models. For instance, a founding team that is dedicated to sustainability can persuade employees, suppliers and consumers to join the company's sustainability program. This can foster a common organizational culture in which sustainability concerns are built into the organizational fabric (Wagner, 2012).

The role of the leader also influences the way that startups make trade-offs. Born sustainable fashion startups are often faced with scenarios where the most sustainable is not the cheapest/easiest. For example, certified sustainable materials could be more expensive, ethical suppliers could mean production delays and recycling systems could need extra infrastructure. In these instances, values of leadership make a difference to the focus of the startup – whether it is short-term profitability or long-term sustainability. Ethical business practices might be better reinforced in organizations that have a sustainability identity, regardless of the pressure of the economic situation (Lüdeke-Freund, 2020).

Born sustainable startups, on the other hand, need flexibility and adaptability. Founders have to have a balance between ideals and business realities. But if the sustainability commitments are followed without consideration of financial viability, the startup has no chance of lasting. On the other hand, if profits are the main concern, the start-up may endanger its sustainable identity. Thus, a good leader within a born sustainable fashion start-up is one who is able to

integrate the duality of purpose and pragmatism. It is crucial for leaders not only to safeguard the sustainability mission but also to devise plans that will enable the business to stay competitive and scalable.

2.5.3 Sustainability-Driven Business Model Development

The entrepreneurial dynamics are in direct link to business model development. The business model in born-sustainable startups is determined by the values, leadership and knowledge of sustainability of the founder. A sustainability driven business model is not just about selling 'green' products, it's about embedding sustainability into value creation, value delivery and value capture. This implies that sustainability needs to have an impact on product design, the choice of materials, the source of materials, the manufacture of products, product pricing, distribution, customer relationships, and product revenue (Lüdeke-Freund, 2020).

A startup can, for instance, add value by producing clothes with recycled or upcycled material. It can provide value via clear supply chains and through direct-to-consumer digital channels. It can achieve this by branding its products as ethical, long lasting and environmentally friendly. Thus, sustainability is woven into the business logic and is not just an additional marketing statement. The entrepreneur's function is very crucial in the design and maintenance of this logic (Johnson and Schaltegger, 2020).

The principles of circular economy are frequently embedded within a business sustainability model. Founders can choose models of repair, re-sale, rental, recycling, or product life extension. These types of models have an impact on changing the mindset behind fast fashion for more sustainable consumption. But circular business models take effort in operational planning, consumer involvement and financial viability. Entrepreneurs thus need to create models which are both environmentally relevant and commercially viable (Rosário and Raimundo, 2022).

Sustainability-inspired business models can also be assisted by digital technologies. Digital platforms can be a tool for entrepreneurs to share their mission, connect with consumers, and sell products directly. AI could assist in better production planning, and blockchain could enhance traceability and transparency. However, the decision to adopt such technologies is a result of leadership vision, resources available and priorities set. This illustrates again the functionality of entrepreneurial dynamics in determining the form of integration of sustainability and innovation.

2.5.4 Balancing Sustainability and Profitability

The challenge of balancing sustainability and profit is one of the main challenges that born-sustainable fashion startups need to address. These businesses are established with great ethical and environmental intentions but still need to compete in markets. Survival and growth, and long term impact, relies on financial viability. Without generating enough income, a startup cannot continue to work on its mission of sustainability. So profitability is not a matter of "against" sustainability, but of "with" sustainability for a period of time (Schaltegger and Wagner, 2011).

The challenge is balancing sustainability and profitability; however, being sustainable is difficult to accomplish. However, sustainable materials tend to be more expensive than traditional materials, ethical production can drive up labor costs, and having a transparent supply chain might involve more oversight and record-keeping. Logistic and operational expenses can also be associated with circular practices like repair, resale and recycling. These factors can add to the cost of products, and make it difficult for startups to compete with the fast fashion brands that produce on the low-cost, high-volume model (McNeill and Moore, 2015; Schiaroli et al., 2024).

There's another layer of complexity for consumer behaviour. While many consumers are interested in sustainable fashion, not everyone is willing or able to pay a premium for sustainable fashion. This is a disconnect between sustainability awareness and buying behaviour. It is important for start-ups to convey the importance of sustainable fashion, explaining the rationale behind ethical sourcing, longevity, and environmental awareness, which may seem more expensive. If education and trust are key to solving this problem, the use of digital media and transparency in storytelling can be effective (Wagner, 2012).

Strategic tactics can also be implemented to address the sustainability-profitability trade off. There are certain startups that choose to position themselves as premium, looking for customers that appreciate ethical and sustainable products. Others can lower costs by going direct to the consumer, and generate better margins. Some might adopt circular approaches like repair or resale to further lengthen customer life cycles and generate extra value for customers. The strategies demonstrate the importance of a business model innovation to achieve a balance between sustainability and financial sustainability (Rosário and Raimundo, 2022).

However, it is not possible to completely remove the tension. It is essential for born sustainable start-ups to make ongoing decisions which entail balancing the environmental, social and economic aspects. The Triple Bottom Line is useful here as it draws attention to the necessity to balance people, planet and profit. In reality, however, achieving balance between these dimensions depends on having solid leadership and clear strategies, together with a certain operational discipline. Businesses have to determine when they can accept compromise and when they cannot when it comes to sustainability values.

2.5.5 Entrepreneurial Dynamics and Long-Term Sustainability

The dynamics of entrepreneurship impact not only the emergence of born-sustainable fashion start-ups, but they also impact long-term growth. Motivation can be a force that helps launch the company, but as the company grows, sustainability must continue to be at the centre of their decisions, values and identity in order for them to lead the business. In its early stages, the founder's values can be kept easily, as the company is small and manageable. But as the startup grows it can begin to feel the pressure from investors, suppliers, customers and competitors. These pressures can put the original mission of sustainability to the test (Johnson and Schaltegger, 2020).

Because of this, it is important to embed sustainable values into institutions for born-sustainable startups. This involves embedding sustainability into business processes, relationships with suppliers, performance measures, product design systems and organisational culture. Sustainability hinges on the passion of the founders alone, and this could lead to the collapse of the business if the founders lose their drive. Good entrepreneurial leadership, then, has to be able to bring about this change from motivation to capability at an organisational level (Schaltegger and Wagner, 2011).

There is a lack of literature discussing this process. Although there are studies that identify entrepreneurial motivation and leadership identity, the current studies are not sufficiently informed about the interaction of these three elements with digital innovation and circular economy practices and scalability. This gap matters because there are dynamics of entrepreneurship that are not stand-alone. They shape the manner in which startups are technoliterate, react to regulations, use resources and plan their sustainable business model (Wagner, 2012).

To sum up, the entrepreneurial dynamics play a pivotal role in the understanding of born-sustainable fashion startups. Ethical aspects of the venture are supported by entrepreneurial motivation, strategic direction by leadership identity, and practical actions by business model development, as described above. As described above, entrepreneurial motivation is the ethical foundation of the venture, leadership identity the strategic direction, and business model development the practical operation of the values of sustainability. But these startups will have to strike a balance between sustainability and profitability and scalability. Born sustainable fashion companies are thus dependent on the skill of an entrepreneur in sustaining their efforts and creating a sustainable, viable, and resilient business. This section emphasizes the need to look beyond entrepreneurship as the genesis of startups, and to consider it as one of the major ways to integrate sustainability and achieve sustainable long-term growth.

2.6 Circular Economy and Business Models in Sustainable Fashion

The circular economy is one of the most relevant concepts in literature related to sustainable fashion, since it directly attacks the linear economy of production and consumption. Traditional fashion is largely 'take-make-dispose' in which raw materials are extracted, clothes are made, clothes are worn for a limited time and then thrown away. This model has helped to create a lot of textile waste, high resource consumption, environmental pollution, and pressure on landfills. The circular economy is a new approach that encourages the reuse and recycling of resources for as long as possible, and the reduction of waste and the increase of the value of the product throughout its lifecycle (Ellen MacArthur Foundation, 2017). Born sustainable fashion startups are especially important to consider the principles of the circular economy, as they are often looking to create business models that are eco-friendly from the start.

2.6.1 Circular Economy Principles in Fashion

Circular economy is grounded on the principle of 'waste prevention' and 'maximising the use of value from products, materials and resources' in economic activity. The circular economy approach recognizes waste as an outcome of the design processes and systems of production and consumption, and seeks to minimize waste by creating better systems, processes and business models. This is particularly applicable in the fashion industry since clothing is often made, bought, worn for a short time, and then thrown away. Circular economy principles are therefore a theoretical and practical basis to rethink the design, production, consumption, re-use and recovery of fashion products (Geissdoerfer et al., 2017).

The principles of key circular economy in fashion are recycling, upcycling, repairing, reusing, reselling, renting, extension of the life cycle of the products and closed-loop production. Recycling is when products are turned into other fibres or products while upcycling is the process of turning any waste or unwanted product into something of greater value or more useful. The goal of product life extension is to create garments which are durable, mended and appropriate for extended use. Closed-loop production systems have a goal of recovering materials and reintroducing them into the production system, rather than discarding them as waste (Ellen MacArthur Foundation, 2017; Ramírez-Escamilla et al., 2024).

For start-ups with a sustainable vision from the get-go, these principles go further than just environmental considerations, and are integral to their business models. Value can be added to a product by employing recycled fabrics, utilising waste materials for product design, providing repair services, and developing resale/repair or renting schemes for startups. These strategies contribute to minimizing the use of raw materials and the consumption of 'fast fashion'. In this respect, circular economy principles can enable startups to pursue their environmental objective and make innovative contributions to value creation (Ghisellini et al., 2016).

The circular economy is also contributing to a wider transition from owning products to using them and keeping their value. Traditional models of fashion have a major revenue stream from repeated product sales, potentially leading to overproduction and overconsumption. Circular models, on the other hand, offer businesses potential for value creation through re-use, repair, resale and/or rental, and extended product usages. This establishes an alternative connection among the company, the consumer and the product. Circular fashion promotes responsibility, durability and ongoing value rather than quick disposal.

2.6.2 Adoption of Circular Economy Practices by Fashion Startups

Born-sustainable fashion startups can also be seen as important adopters of the circular economy strategies, as they are less constrained by company size and therefore can be more flexible than established companies, and can build circular economy practices into their business models. While large companies might have to change their supply chain and production processes, startups can design circular practices from the outset of their products, sourcing and customer interaction. This gives them the chance to build what can be called business models with structural sustainability instead of with economic growth (Pieroni et al., 2019).

One of the most popular concepts of sustainable fashion startups is reusing. Waste fabrics, deadstock materials, or discarded garments can be used to make new fashion products in the process of upcycling which is suitable for startups. This practice helps to maintain sustainability of virgin raw materials and provides a new value to materials that may be discarded. It can also enable startups to develop novel products that can help differentiate them in the marketplace. Upcycling, however, can be labour-intensive and may be hard to scale as it can be difficult to find and maintain consistency of waste materials (Urbinati et al., 2017).

Another key circular activity is recycling. Recycled fibres or materials can be incorporated into products by fashion startups as a measure of environmental care. The use of recycled materials can contribute to decreases in the need to obtain new raw resources and textile wastes. But reusing fashion is technically challenging as garments are often made from multiple fibres which are difficult to separate and process, as well as finishes and dyes. This imposes constraints on the startups which desire to use recycled inputs heavily, particularly in the absence of recycling infrastructure.

One of the key issues in circular fashion is product's Life Extension. New businesses can create garments that are durable, have an extended lifespan, are capable of repair, and are more functional. This contradicts the logic of fast fashion: consumption based on fashion and short product life cycles. Born-sustainable startups can promote consumers to purchase fewer, but higher-quality garments, by focusing on durability and longevity. This also helps to achieve environmental sustainability, as it helps to decrease the need for change and the amount of discarded clothing (Dissanayake and Weerasinghe, 2021).

In addition to reuse, there are other circular models that are more relevant in the field of sustainable fashion: rental and resale. Rental models enable the consumers to wear clothes without having to own them for a long period since it can lower the tendency to buy the same garment repeatedly, especially in the case of clothes that are worn sparingly. Resale models help garments to prolong their life cycle by letting products go from one user to another. For start-ups, such models can generate additional business opportunities and help maintain the sustainability objectives. But they also need logistics, cleaning, quality control, reverse supply chain systems and consumer participation.

2.6.3 Circular Economy and Sustainable Business Model Innovation

Business model innovation is closely connected with the circular economy as it involves a change in how the value is created, delivered and captured by the businesses. Born-sustainable startups frequently go beyond product design and have circularity as a part of their business model. Thus, the materials and their origins, the design of products, consumer use of products, recovery of products and post-consumer value retention must all be taken into account by startups.

Value creation in a circular manner can be done by converting waste into a valuable product, using ethical and sustainable materials, and designing durable clothes. Value delivery can be through a transparent supply chain, digital platforms directly to consumers, repair services, rental systems and/or take-back programmes. Value can be captured in the sale of the product; in rental fees; in sale of used products or long-term customer relationships; in repair services. Thus, principles of the circular economy can not only reform the way the startup does business environmentally, but also the business logic itself (Reike et al., 2018).

Business model innovation is a key element to take into consideration as sustainability is not going to last if it is not financially viable. While waste reduction in a circular economy may be desirable, it is not necessarily an economically sustainable solution if it is not able to create the necessary revenue. Likewise, a lucrative business that causes environmental damage is not what is meant by sustainable fashion. Born sustainable fashion startups need to instead develop a business model that is sustainable and profitable. This balance is closely linked to the Triple Bottom Line approach that prioritises the fusion of social, environmental and economic value (Ostermann et al., 2021).

Digital technologies offer the possibility to enable circular business model innovation. Digital platforms can help to connect companies with consumers and make products traceable, thus enabling resale and rental systems and take-backs, for instance. AI can help with demand forecasting and minimize overproduction, and blockchain can offer transparency towards material origin and product life cycle information. These technologies can support a more circular business by fostering the coordination of circular practices, tracking them and engaging consumers. But, the effectiveness of these depends on the resources, technical expertise and strategic alignment of the startup.

2.6.4 Challenges in Implementing Circularity

While sustainability principles of the circular economy provide great opportunities for sustainable fashion startups, there are implementation challenges. The cost of one of the big obstacles is cost. The use of sustainable materials, recycled fibres, repair systems, take-back schemes and closed-loop production processes can be more costly than conventional production. First, startups have limited resources to begin with, and the extra expenses of circular systems can be a strain on finances. This can make scaling up circular practices difficult for startups and make them price competitive (Bocken et al., 2016).

The other difficulty is infrastructure. The circular fashion needs systems for collecting, sorting, cleaning, recycling, repairing, redistributing and waste management. There is not enough infrastructure in place to support these processes well, in many regions. For instance, if the recycling facilities are low or the textile waste is hard to recycle, a startup may face difficulties in collecting the used garments and recycling them into new products. Likewise, rental and resale schemes demand reverse logistics capabilities to control the products' return, cleaning and repair, and re-distribution (Pieroni et al., 2019).

Complexity of the supply chain is also a factor to consider when it comes to circularity. Circular fashion start-ups may be required to collaborate with suppliers that either offer materials or recycled inputs that are sustainable or offer ethical production service. But suppliers of this kind may be few in number, more costly, or may be located elsewhere. This can lead to delays, increased expenses and dependency risks. Further, if materials differences exist or they are not available, startups will face challenges in maintaining a consistent production. They pose a significant threat to small businesses, which may not have bargaining power and be unable to buffer supply shocks (Reike et al., 2018).

Keeping consumers is another key issue. But circular fashion requires consumer involvement as well as good practices at the firm level. Consumers need to be prepared to purchase upcycled, recycled, need repairs, take part in take-back programmes, rent garments, buy second-hand items etc. Despite the rising awareness of sustainability issues among consumers, there is a strong demand for the luxury of fast fashion that is convenient, affordable and trendy. This brings a disconnect between the awareness of sustainability and actual purchasing actions. Consumers need, however, to be made aware of and trust circular models, which is a challenge for startups (Ghisellini et al., 2016).

There might also be perception barriers. Recycled, upcycled, rented, and second-hand clothing might be less appealing than new clothes for some consumers. These perceptions can only be broken down by design quality, brand, stories and transparency for born sustainable startups. They must prove that it's possible to be stylish, durable, ethical, and valuable when it comes to circular fashion. Digital platforms can help with this by spreading the message of the sustainability value and unicity of circular products.

2.6.5 Circular Economy, Scalability, and Sustainability Integration

Scalability is one of the most important issues of circular fashion business models. Small-scale circular practice could be successful in a small business, but be hard to control in a larger business. Upcycling can be effective in making products, as long as it is done in small quantities; however, scaling up may involve having to have a consistent flow of waste material, skilled labour and efficient production systems. Scaling up can be a drawback, but it demands proper logistics, wash stations, product maintenance, inventory tracking and such. More effective recycling models can help reduce the environmental impact but are dependent on technological capability and availability of materials (Ghisellini et al., 2016).

To facilitate the adoption of a circular economy, its study needs to be carried out in relation to scalability. Born sustainable fashion startups are not only concerned about whether they can make circular practices happen, but if they can continue to do so without compromising the environmental purpose of their business. Operational readiness and resilience, digital support, strategic planning, and partnerships are essential to scaling up circularity. To establish efficient circular systems, startups need to partner with suppliers, recycling centers, technology solution providers, logistics providers and consumers (Pieroni et al., 2019).

The principles of a circular economy also relate to the dynamics of entrepreneurs. Circular practices are more likely to be part of the agenda, and the nature of the trade-offs considered, as well as the communication of mission of the startup, are all affected by the sustainability values of its founders. Leaders can play a role in helping to keep commitment to circularity high even in times of financial stress. The capacity of entrepreneurs, however, is needed to back their entrepreneurial commitment, such as access to resources, systems and market acceptance (Reike et al., 2018).

To conclude, the circular economy is an important enabler for sustainable fashion business models. Provides another way to avoid the linear, wasteful economy by encouraging recycling,

upcycling, reusing, repairing, extending the life of products and closed-loop systems. Born sustainable fashion startups are especially suited for taking on circular economy principles and will integrate circularity from the beginning. However, adopting circularity is complicated and demands financial investment, infrastructure, coordination of the supply chain, consumer involvement and operational systems that are scalable. Hence, thinking about circular economy practices must not just be related to sustainability initiatives, but also to the innovation of business models. The success of born sustainable fashion startups relies on the capabilities to put circular economy concepts into practice and make them economically viable and scalable.

2.7 Integrating Sustainability Frameworks

When it comes to born sustainable fashion startups, sustainability frameworks play a crucial role in helping them organise, assess and share their sustainability efforts. Many fashion entrepreneurs start off with ethical and environmental concerns, but they must be clearly communicated into a business plan. If there is no structure to it, sustainability could just be a value statement, rather than a key measure and component of the business model. When it comes to born-sustainable fashion startups, sustainability frameworks are tools that enable the linkage between environmental responsibility, social accountability and economic performance. This is especially valuable to note as these startups need to juggle their mission-driven commitments with the harsh realities of financial survival, market competition and scalable growth.

The literature review reveals one of the most relevant sustainability frameworks that can be used for born-sustainable fashion start-ups is the Triple Bottom Line framework. The Triple Bottom Line was coined by Elkington (1997) who proposed that the success of a business should be judged not just on its financial results, but on its social and environmental outcomes too. The three components of the framework are often referred to as People, Planet, and Profit. This framework is applicable in the case of a fashion startup because it demonstrates the importance of balancing ethical labour practice, safeguarding the environment and economic viability. The Triple Bottom Line offers a framework to include sustainability as a core part of the business plan for born-sustainable startups, instead of a parallel or secondary business.

2.7.1 Triple Bottom Line Framework

Sustainable fashion has three major aspects – social, environmental, and economic – which are particularly relevant to the Triple Bottom Line. The “People” dimension is related to social sustainability, encompassing ethical labour utilisation, just remuneration, working conditions, community involvement and social responsibility along the supply chain. In fashion, this dimension comes into play because of labour exploitation, wage inequality and unsafe working conditions, in particular in outsourced production environments (Joy et al., 2012). Born sustainable fashion startups must create a strategy to select their suppliers, ensure transparency in their labour practices and engage with their workers, artisans and production partners responsibly.

The “Planet” dimension is related to sustainable development of the environment. Fashion: Minimising textile waste, cutting down on carbon dioxide emissions, sustainable materials, water and energy conservation and circular economy. This aspect is typically addressed by born-sustainable fashion startups by recycling, upcycling, durability, low impact materials and closed loop systems (Ellen MacArthur Foundation, 2017; Ramírez-Escamilla et al., 2024). The environmental aspect is at the heart of these startups as their business models often take shape as a reaction to the environmental impact of fast fashion and traditional production systems.

The “Profit” dimension pertains to economic sustainability and financial viability. Born sustainable fashion startups are not about to see a profit; a business without finances can't continue to create environmental and social value. This isn't a statement that profit must come first for sustainability efforts to be sustainable; it's an acknowledgment that sustainability means having the financial means to make it sustainable in the long-term. Start-ups need to create enough cash flow to cover their costs, fund innovation, pay the ethical suppliers, use sustainable materials, and scale responsibly. Hence, the Profit dimension is closely connected with the sustainability of the startup itself in the long-term (Elkington, 2018).

The Triple Bottom Line is useful because it demonstrates the multi-dimensional nature of sustainability. All these materials are sustainable, but if they are being sourced from exploitation of labour, then it is not sustainable. Likewise, a startup could be socially and environmentally good, but could be financially unfeasible, and potentially prove to be unsuccessful even if it expands to the rest of the world. Hence, the Triple Bottom Line calls for startups to take into account sustainability as a balance between people, planet and profit.

2.7.2 Application of the Triple Bottom Line in Born-Sustainable Fashion Startups

Born sustainable start-ups can be approached in various parts of the business model by using the Triple Bottom Line. The Planet dimension can be expressed at the product design stage through the use of recycled fabrics, organic materials, low impact dyes and durable product design. The People dimension can be demonstrated through the involvement of ethical suppliers, artisan communities or fair labour production partners. The Profit dimension may be manifested in pricing, revenue, cost control, positioning, and so on that enable the startup to stay commercially viable (Boons and Lüdeke-Freund, 2013).

The Triple Bottom Line promotes start-ups assessing suppliers not just by price and delivery time but also by their environmental and social impacts at the supply chain level. This is because supply chains play a key role in the sustainability outcomes of the fashion industry. Any company claiming to be sustainable should be able to ensure the responsible sourcing of materials, ethical production practices and minimization of environmental impact across the value chain. This process can be facilitated and enhanced by the use of technologies like blockchain, which can generate evidence about ethical sourcing and environmental responsibility, such as tracking goods to and from the origin and ensuring transparency throughout the entire supply chain, even for startups (Papamichael et al., 2021; Burnstine et al., 2025).

The Triple Bottom Line can be used to inform consumers about the wider value of sustainable fashion at the consumer engagement level, helping to make it easier for startups to do so. One of the only things many consumers consider is the price, style or convenience. But, born-sustainable start-ups must be able to describe the social and environmental value of their product. Digital platforms and social media can contribute to this communication by enabling startups to communicate information on materials, manufacturing processes, labour standards, and circular practices (D'Itria, 2023; Stubbs and Cocklin, 2008). This aids consumers to understand why products that are sustainable can be more expensive and why their choices are not only economic and environmental, but social as well.

The Triple Bottom Line is used as a strategic tool to make long-term decisions. Sustainability vs profitability are trade-offs that often come into play with startup businesses, particularly when sustainable materials, ethical labour, and circular systems come at an extra cost. The Triple Bottom Line approach can assist entrepreneurs to better assess these trade-offs in a more systematic way. The framework is designed to consider long-term social legitimacy, environmental responsibility, customer trust, and brand reputation, in addition to the short-term

profit (Schaltegger et al., 2016). For born-sustainable start-ups, sustainability is part of their identity and value proposition, making it particularly important.

2.7.3 Systemic Integration of Sustainability

Initiating sustainable practices is not enough to integrate sustainability. Born sustainable fashion startups must consider sustainability as a core element of their business, whether in the design, production, sourcing, marketing, distribution, supply chain management and customer engagement. This system of integration is not a stand-alone product attribute or 'green marketing' statement but part of the business model.

Systemic sustainability integration in the field of product design refers to the creation of garments that are durable, repairable, recyclable and in line with the principles of the circular economy. This can range from sustainable materials, to modular design, waste pattern minimisation, to product life extension. Many environmental impacts occur at the design stage and the decisions made during design will affect them. A garment that is hard to recycle, repair or reuse from the start will have limited sustainability potential (Foss and Saebi, 2017).

In manufacturing, sustainability integration includes doing business with ethical labour practices and environmentally responsible production partners. This encompasses working in a safe environment, making fair wages, minimizing waste, conserving energy and water and using chemicals responsibly. Finding the right manufacturing partners for startups can be a tough decision when it comes to ethical and sustainable manufacturing, as it can come at a larger cost or be less readily available than traditional manufacturing methods. The decisions made in these areas are ones that are vital to keeping a born-sustainable business model credible (Teece, 2010).

Transparency and consistency are key in marketing and communication for sustainability integration. Born-sustainable fashion startups need to effectively convey their sustainability efforts without hyperbole. This is important as it means consumers are becoming aware of the risks of greenwashing and may be dubious of less specific sustainability statements. Clear communication can foster trust and further establish brand credibility. Digital platforms can serve a helpful role here as they enable startups to directly engage with consumer audiences, provide evidence of sustainable practices and foster communities of ethical consumers (Zott et al., 2011).

Systemic integration in supply chain management needs traceability, supplier accountability and circular resource flows. It is important for startups to be aware of the source of materials, the way in which products are manufactured, and the fate of garments post-use. This means having to have good relationships with suppliers, tracking systems that are enabled by technology and sustainability criteria that are clear. This can also be fostered through circular supply chain practices, like take-back schemes, repair services, recycling partnerships, resale models.

2.7.4 Barriers to Sustainability Integration

Born-sustainable fashion startups can be used as helpful material for reference to sustainability frameworks, yet there are a number of barriers to the inclusion of sustainability in their business model. The lack of financial resources is one of the biggest challenges. Ethical production and sustainable materials, certification and traceability systems, and circular infrastructure can be more expensive than conventional materials and production. These expenses may hinder deep and broad sustainability integration, particularly for start-up companies with limited resources (Bick et al., 2018; Abdelmeguid et al., 2024).

The second constraint is the complexity of the supply chains. Often these sustainable fashion startups are dependent on specialized suppliers, small production partners or recycled material suppliers. These supply chains can be less predictable, more costly, or more challenging to coordinate than traditional supply chains. There may be production delays, quality control issues, and an increase in operational costs due to limited suppliers. Such challenges make sustaining the sustainability standards a challenge as startups grow their operations (Zott et al., 2011).

A significant constraint is also regulatory complexity. There are many sustainability standards and certifications, and navigating markets to find the right ones or to identify which ones are relevant or credible can be difficult for startups. Certification procedures can be expensive, time-consuming and administratively burdensome (Testa et al., 2020; Papamichael et al., 2021). This poses a challenge for startups trying to prove their sustainability credibility but not have the resources to get formal certification.

Consumer behaviour may also be a barrier to sustainability integration. While consumers voice their approval of more sustainable fashion, factors such as price, style, convenience, and brand familiarity continue to impact their buying decisions. This presents a problem for startups with

sustainable materials or ethical manufacturing that might be required to set higher prices. Consumer resistance to these prices can put pressure on startups to cut costs, which could affect their sustainability commitments.

2.7.5 Drivers of Sustainability Integration

However, there are several factors that can push for sustainability integration in born sustainable fashion startups. Entrepreneurial commitment is one of the most important internal drivers. Strategically minded founders who are highly motivated to sustainability are more likely to integrate environmental and social values in the strategic decisions, product design, supplier selection, and company culture (Henninger et al., 2021; Pedersen et al., 2018). The pledge also helps to maintain a focus on sustainability even in the event of a financial or operational challenge in the startup.

Another important factor is organisational culture. If the values of sustainability are spread throughout the startup, they become part of the daily decisions and are not just in the hands of the founder. A culture that is designed to be sustainable promotes an environment where employees and partners are mindful of the environmental and social effects of their actions. This is particularly significant as the startup expands, as one might not achieve the same level of involvement in all decisions as the founder.

External drivers are also a significant factor. As consumers become more conscious of the importance of ethical and sustainable products, startups can focus their efforts on enhancing their sustainability initiatives. Born-sustainable fashion startups can find market opportunities with consumers who are focused on transparency, responsible sourcing and protecting the environment. This driver can be intensified by digital platforms, which enable startups to access consumers with comparable values and a willingness to buy on the basis of a sustainable business model (Foss and Saebi, 2017).

Sustainability integration can also be achieved through policy support and industry cooperation. Helpful policies, green funding, sustainability subsidies, certification help and collaborations with ethical suppliers and/or technology providers can help startups overcome resource constraints. Partnership is important as it may be that the start-up doesn't have the resources to build some or all sustainability capabilities on its own. Partners are a source of materials, knowledge, technology, logistics, and credibility.

2.7.6 Relevance of Sustainability Frameworks to the Present Study

The incorporation of sustainability frameworks is of direct relevance to the purpose of this study as it can be used to create a holistic framework for born-sustainable fashion startups. The Triple Bottom Line serves as a good framework for startups to consider social, environmental, and economic aspects. But there is also literature that indicates that there are some complexities in applying this model in startup environments, including resource constraint, scalability issues, and market pressures.

This study thus does not consider sustainability frameworks as ready-to-go and automatically applicable models. Rather, they are interpreted as guidelines to be modified to the actual context of born-sustainable fashion start-ups. Additionally, sustainability frameworks need to be linked to entrepreneurial processes, digital innovations and practices of the circular economy. Furthermore, the dynamics of entrepreneurship are important to understand why sustainability is put on the agenda, the potential of digital technology to enable sustainability and communicate that, and the principles of a circular economy to operationalise sustainability within the business model (Foss and Saebi, 2017).

To summarize, sustainability frameworks are very important to understand and organize sustainability integration into born-sustainable fashion start-ups as well as assess. The Triple Bottom Line framework is particularly significant since it emphasizes a balance between people, planet, and profit. Implementing these frameworks is successful, however, if the startup can embed sustainability into their design, sourcing, manufacturing, marketing, supply chain management and customer engagement. Barriers like financial, regulatory, supply chain and consumer price especially create the problems, drivers like entrepreneurial commitment, consumer demand, digital technologies and industry cooperation create the support for sustainability integration. Hence, the theoretical underpinning of the study is reinforced by the fact that the concept of sustainability in the born-sustainable fashion startups needs to be interpreted as a multi-dimensional, strategic and systemic process.

2.8 Thematic Synthesis of Literature

The literature reviewed shows that born-sustainable fashion start-up sustainability integration is a multidimensional process influenced by entrepreneurial, technological, circular, operational and institutional factors. Sustainability is not just a practice or a single activity in

these startups. Rather, it is woven into the very fabric of the business model, from design and sourcing to production and the supply chain, to consumer interaction and business growth. Hence, the literature is synthesized to summarise the key themes identified in this chapter and provide an understanding of how these themes are relevant to the development of an integrated framework for born-sustainable fashion start-ups (Evans et al., 2017).

The literature suggests that born sustainable fashion start-ups are not like typical fashion businesses as sustainability is already integrated into them since their inception. For established fashion businesses, sustainability is usually added on as a component of Corporate Social Responsibility, regulatory compliance or brand positioning in later life. Born-sustainable startups are, on the contrary, start-ups whose values are based on sustainability and who aim to confront the negative environmental and social effects of fast fashion. This puts sustainability firmly on the agenda for value creation – not as an extra business activity (Geissdoerfer et al., 2018).

The other significant theme is the role of entrepreneurial dynamics. Although the literature lacks many specific examples, it does indicate that people who launch sustainable fashion businesses frequently are driven by the vision of changing traditional practices in the fashion industry, social responsibility, ethical concerns, and environmental responsibility (Henninger et al., 2021; Pedersen et al., 2018). The motivations affect leadership style, organizational culture, sourcing, product design and strategic priorities. But it's not just about motivation; there's a need for something more. These values need to be embodied in a viable and scalable business model that can compete in the marketplace.

Digital technologies also come as enablers of sustainability and scalability. AI can be employed to aid predictive analysis, stock management, and product design to minimise overproduction and waste (Abbate et al., 2023; Schiaroli et al., 2024). Firms can use blockchain to ensure transparency and traceability by verifying sourcing and production practices (Papamichael et al., 2021; Burnstine et al., 2025). Digital platforms can help to engage consumers, communicate sustainability and to enable direct market access (D'Itria, 2023). The literature also stresses that startups can face challenges in implementing technology due to cost, lack of technical expertise and a lack of digital infrastructure.

Another issue that has been extensively covered in the literature is the circular economy. Waste reduction and resource efficiency can be achieved through circular principles including, but

not limited to, recycling, upcycling, repair, resale, rental, product life extension, and closed loop systems (Ellen MacArthur Foundation, 2017; Ramírez-Escamilla et al., 2024). Born sustainable fashion startups are positioned favourably to embrace circular practices, as they can build circular into their business model from day one. Scaling up circular practices can be a challenge, as it needs logistics, infrastructure, material availability, consumer participation, and financial investment.

The study also finds several factors that hinder and encourage sustainability integration in the literature. According to Bick et al., 2018, Testa et al., 2020, Schiaroli et al., 2024, some of the major obstacles are finance, high sustainable material cost, small scale, operational inefficiency, regulatory fragmentation, certification costs and limited technology capability. Concurrently, pivotal factors are entrepreneurship commitment, increasing consumer demand for sustainable products, digital platforms, ethical branding, policy support, green financing, and industry partnerships. They interact to determine the effectiveness of startups' incorporation of sustainability into their business models.

One of the many recurring problems that were found in the literature reviewed is the conflict between sustainability and profitability. Born-sustainable fashion startups typically have a strong moral purpose to protect the environment and social issues, but in addition, they need to be financially sustainable. The use of sustainable materials, ethical sourcing, certifications, digital technologies and circular practices can lead to higher cost. For this reason, startups are always striving to strike a balance among social responsibility, environmental protection and economic survival. The Triple Bottom Line (people, planet, profit) is relevant here as it highlights the importance of integrating people, planet and profit in business decision making (Nosratabadi et al., 2019).

In summary, the synthesis highlights the contributions made by the literature available for sustainable fashion, entrepreneurship, digital transformation, circular economy and sustainability frameworks. Usually, these areas are discussed individually, however. Its limitations lie in the lack of research that addresses how entrepreneurial motivation, digital innovation, circular economy practices, and sustainability frameworks relate and interact within born-sustainable fashion startups. The fragmentation necessitates a unified approach and framework that underpins the ability of these start-ups to integrate sustainability values with operational capacity, technology implementation, circular practices, and scalable growth.

To sum up, integrations of sustainability in born-sustainable fashion start-ups rely on a combination of dimensions as shown in the thematic synthesis. The internal motivation and leadership base is provided by entrepreneurial dynamics. The use of digital technologies enhances efficiency, transparency and consumer involvement. The principles of the circular economy offer some pathways to operate and for reducing waste and redesigning value creation. There are sustainability frameworks that you can use to balance your social, environmental and economic objectives, like the Triple Bottom Line. But there are challenges regarding financing, regulatory, operational, technical and scaling limitations. Hence, it is highly required to create a holistic framework that could help new fashion enterprises become sustainable and continue to operate in the long term.

2.9 Literature Gaps

The literature review reveals that sustainable fashion has gained more and more academic focus regarding the effects of fast fashion, the practices of the circular economy, use of digital technologies and ethical manufacturing. When looked at in the context of born sustainable fashion start-up companies however, there are certain gaps that need to be highlighted. These gaps call for the present study and underpin the development of an integrated framework of sustainability-driven business models.

Second, the digital transformation of the fashion industry is not being driven by born-sustainable fashion startups but by other brands. Third, born-sustainable fashion startups are not the drivers of the digital transformation of the fashion industry. The current literature primarily focuses on larger or established fashion companies that are able to attract more financial resources, have more robust supply chains and have wider operational scope. Born sustainable startups on the other hand have to deal with low capital outlay, a small team, low bargaining strength, and the uncertainty of market adoption. Thus, the results from large companies cannot be expected to be directly transferable to startups that make sustainability a part of their mission and business model from the beginning (Rosário and Raimundo, 2022).

Second, the scientific literature is still divided into various sustainability aspects. Some include aspects of circular economy practices, others aspects of digital technologies, entrepreneurial motivations, sustainability frameworks or regulatory challenges. These areas are all significant, however little research has been performed to give an understanding of how they relate to each other in the context of born-sustainable fashion startups. The sustainability integration in start-

ups is not just driven by a single element, but is a result of entrepreneurial values, circular practices, technological skills, operational systems, and market pressure (Bocken and Geradts, 2020).

Third, there is a lack of knowledge around how to scale born sustainable startups while keeping their sustainability promises. Some research has highlighted some obstacles including high sustainable material costs, certification costs, lack of funding, and supply chain issues (Bick et al., 2018; Schiaroli et al., 2024). But less has been done on how the startups can practically clear these hurdles in their growth. The gap is significant because a startup can be viable at the beginning but will find it difficult to keep the same level of production, markets and supply chains once they grow.

Fourth, there is less research into the link between entrepreneurial motivation and business model design. The existing literature acknowledges that values such as environmental protection, ethical issues, and social responsibility are key drivers for the success of sustainable fashion start-ups (Henninger et al., 2021; Pedersen et al., 2018). But not much research has been done to clarify how these motivations are expressed in the real B2B business model decision, such as sourcing, price, product design, digitalisation, circularization and growth. This leaves a shortage in the identification of how founder values find their way to a scalable and sustainable business model.

Lastly, the digital technologies dimension is not sufficiently explored beyond consumer engagement and transparency. Artificial intelligence, blockchain, and digital technologies are being touted as effective tools for efficiency, traceability, and communication (Abbate et al., 2023; Papamichael et al., 2021; Burnstine et al., 2025). There is little discussion, however, as to how these technologies can be realistically adopted and integrated at startups that have limited resources. There are gaps in the literature on these other factors, including cost, technical expertise, data availability, supplier readiness, and capacity for implementation.

Sixth, little practical guidance for the implementation of the principles of circular economy in scalable ways. Whereas recycling, upcycling, repair, resale, renting, and extending the lifespan of products are extensively talked about, the operational needs of these are not as much. Infrastructure, logistics, the involvement of consumers, material recovery systems, and partnerships are essential for circular models. These demands can be challenging for start-ups,

as they often lack the resources and operational capacity to handle them (Lüdeke-Freund et al., 2019).

Lastly, there is a lack of a comprehensive framework that brings together entrepreneurial dynamics, digital innovation, principles of circular economy and sustainability frameworks for born sustainable fashion startups. Previous research offers valuable knowledge on individual themes, but these are not fully synthesized to describe the complex interplay between themes and elements for supporting sustainability and scalability. Hence, this study fills this gap by proposing a framework that can offer theoretical understanding and practical guidance to born-sustainable fashion startups.

To sum up, the main gap is the lack of a unified and start-up specific framework to understand the concept of integration in sustainability literature. The available literature is incomplete, dispersed, and unable to fully address how a born sustainable fashion business can integrate entrepreneurial motivation with digital technology, circular economy practices and sustainability goals in order to become scalable and sustainable over the long term.

2.10 Chapter Summary

The chapter discussed the significant literature on entrepreneurial dynamics and sustainability integration in born-sustainable fashion startups. It concluded that the global fashion industry is facing a major environmental and social crisis largely as a result of fast fashion, excessive resource usage, textile waste, carbon emissions and labour issues. To address these concerns, sustainable fashion has become a key area of study and practice, with a particular emphasis on eco-friendly materials, ethical sourcing, circular designs, and sustainability as a viable business model.

This chapter also talked about the unique characteristics of born sustainable fashion businesses. Born-Sustainable startups embed sustainability into their mission, identity and business model from the very start of their business, as opposed to traditional fashion companies that integrate sustainability into their business in a more gradual manner. Many of these startups are driven by mission-driven entrepreneurs who are inspired by social considerations, ethics, and the environment. The literature indicates that entrepreneurial motivation and leadership identity significantly impact the design of the products, sourcing, organisational culture, stakeholders' involvement and strategic direction over time.

In addition, the review covered the fashion and sustainable fashion issues in the context of digital transformation. Artificial Intelligence, blockchain, digital platforms, etc. were identified as key enablers of operational efficiency, transparency in the supply chain, consumer engagement, and communication of sustainability. AI can aid in demand forecasting and inventory optimisation, and blockchain technology can enhance the sustainability claims' credibility and traceability. Startups can directly interact with consumers and promote their sustainability values through digital platforms. There are, however, published evidence that startups can face issues with adopting such technologies because of lack of finance, technical skills, data availability and infrastructure.

Additionally, the principles of circular economy were explored as a main route for the integration of sustainability in fashion startups. The recycling, upcycling, repair, resale, renting, product life extension, and closed-loop production are practices that help to reduce waste and increase resource efficiency. The chapter pointed out, however, the difficulty in achieving circularity is not easy, especially for start-ups with limited resources. In addition, circular practices need logistics, infrastructure, availability of materials, consumer participation and scalable systems of operations.

The chapter also explored the role of sustainability frameworks, specifically the Triple Bottom Line, for supporting born-sustainable fashion start-ups in achieving a balance between social, environmental and economic goals. The review revealed that sustainability is not just about environmental practices, it is about ethical labour practices, environmental responsibility and financial viability. For startups, the key is this balance: to be economically viable, yet still uphold their social and environmental responsibilities.

Lastly, the chapter spied some gaps in the prevailing literature. These encompassed the narrow attention span on born sustainable fashion startups, the lack of comprehensive discussion on the dimensions of sustainability, low awareness of how to scale sustainably, inadequate consideration of entrepreneurs' motivation in designing business models, under-researched use of digital technologies in startups and low-enlightening practical advice on how to apply the concept of circular economy. The gaps demonstrate that the current literature offers informative but limited information on the ways that born-sustainable fashion startups can embed sustainability in viable business models that can be scaled up.

To sum up, the literature reviewed in this chapter showed that the process of integrating sustainability into born-sustainable fashion startups is a multi-faceted and complex process. It is influenced by entrepreneurial motivations, leadership identity, digital technologies, circular economy practices, sustainability principles and external barriers and drivers. Thus, a multi-faceted perspective is needed to understand how these start-ups can successfully balance their sustainability commitments with operational efficiency, competitiveness, and sustainability. In this chapter, the theoretical basis for the following phase of the thesis is explained, which will explain the main themes, problems and gaps that will guide the study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The methodology for the research work, which aims to develop a framework for innovative business models for Entrepreneurial Dynamics and Sustainability Integration in Born-Sustainable Fashion Startups, is presented in this chapter. The purpose of this chapter is to discuss the methodological decisions that have guided the study, such as the research philosophy, research approach, research design, data sources, data collection strategy, data analysis technique, ethical consideration, and research timeline. The methodology used herein is structured, literature-based and qualitative, given the focus on the sustainability integration of the business models of born sustainable fashion startups. Based on this, the chapter outlines the basis of the research problem examined and how the results are obtained from the secondary data.

The research field is at the crossroads of sustainable fashion, entrepreneurship, digital transformation, circular economy practices and sustainability business model innovation. In the previous chapters, we have already seen that the fashion industry, as a whole, is suffering from a number of environmental and social problems, such as high resource consumption, production waste, carbon emissions, lack of transparency in the supply chain, and exploitation of workers. To address these challenges, born-sustainable fashion startups have entered the scene as a unique kind of company, which makes sustainability a core element of their mission, identity and business model from the outset. Yet these start-ups can encounter a number of challenges, such as access to finance, the costs of sustainable materials, operational inefficiencies, regulatory complexity, no economies of scale and a lack of advanced digital technologies.

Because of the complexity of this research problem, the methodology needs to be able to capture the multi-dimensionality of sustainability integration. The concept of sustainability cannot be reduced to a single factor in born-sustainable fashion startups. Its form is influenced by entrepreneurial motivations, leadership identity, digital technologies, circular economy practices, sustainability drivers, barriers to implementing CE, and business model innovation. Thus, the research method is oriented to explore these interrelated dimensions systematically and academically. This is especially pertinent since the study is not focused on measuring any one variable or testing any statistical relationships between variables; the study is intended to

gain insight into the embedding and management of sustainability in the business models of start-ups.

This study uses a pragmatic research philosophy that is appropriate for research that wants to relate academic knowledge with practical relevance in a business context. Pragmatism is especially suitable for DBA level research as it enables them to concentrate on practical solutions and real-life business problems. Pragmatism is used for the purpose of this study to help examine the integration of sustainability as a theoretical and managerial problem. The research not only aims at analyzing the existing literature on sustainability, entrepreneurship, digital technologies and circular economy practices, but also at identifying how the findings can support decision making processes in entrepreneurship, management, policy making and stakeholder of the sustainable fashion ecosystem. This philosophical stance is aligned with the approved methodology that recognizes Pragmatism as suitable for problem-oriented research and applied research.

The research is deductive in nature with theory building aspects. This is due to the fact that the study starts with existing theories and literature on sustainable entrepreneurship, circular economy, digital transformation and sustainability frameworks. These are the sources that formed the basis for determining the themes and relationships that were important for born sustainable fashion startups. The study, however, makes no use of deduction in the form of testing a hypothesis or validation of the result by statistics. It, instead, leverages prior theory in a structured way to analyse secondary data and formulate a holistic understanding of sustainability integration. This is appropriate because the research conducted is literature synthesis and qualitative interpretation and not primary quantitative measurement (Saunders et al., 2019).

Conceptual and Qualitative (secondary data analysis) research design is used. This design is suitable since the study is not about the collection of primary data from respondents, interviews or surveys. In contrast, it uses existing academic articles, industry reports, policy documents and sustainability related sources to explore the research problem. The use of secondary data is appropriate as the research objective is to synthesize and interpret the previous information from various streams of literature. The methodology has been approved and provides secondary data sources, to support the study of sustainable fashion entrepreneurship in terms of richness of theory, methodological relevance and practicality.

The approved data analysis document also emphasizes that the study is based on secondary data analysis which will be analyzed with NVivo software. 100 documents were chosen and systematically analysed and coded using NVivo. They consisted of academic papers, sustainability reports, industry publications, and policy documents related to sustainable fashion, entrepreneurship, digital transformation, and business model innovation. NVivo helps to systematically structure and analyse qualitative data by enabling the researcher to label specific information as thematic nodes. This will increase transparency in the analytical process and not only will the findings be created through an informal reading process but also through a structured coding process.

Seven key themes emerged during the NVivo coding process: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. These themes are the most important aspects that affect the integration of sustainability in born-sustainable start-ups. Entrepreneurial Dynamics reflects the value, motive, leadership direction and decision making of the founder. Sustainability Drivers are factors that influence sustainability, including consumers' demands, awareness of the environment, regulatory expectations, pressure from stakeholders, etc. Digital Technologies include digital platforms, blockchain, and artificial intelligence to improve efficiency, transparency and engagement. Recycling, upcycling, product lifecycle extension and reuse are examples of Circular Economy Practices. Barriers to Sustainability include financial, operational, technological and regulatory challenges. Business Model Innovation is about the rethinking of value creation, value delivery and value capture in the context of sustainability, in the context of startups. Integrated Sustainability means the convergence of the environmental, social and economic dimensions in the business model.

The methodology is thus a synthesis of the steps of identification of structured literature, secondary data analysis, coding using NVivo, thematic interpretation and literature synthesis. This pairing is appropriate for the research, as it enables the researcher to discover patterns, make comparisons between sources, and draw conclusions about the relationships between the key themes. It also guarantees that the analysis will always be directly linked to the research aim and research goals. Thematic analysis is a method appropriate for organizing and interpreting the data in a meaningful way for a study where sustainability integration is a complex and multidimensional process.

Despite being a study of secondary data, with no direct involvement of human subjects, ethical considerations are still relevant. It is the ethical duty of the researcher to honestly represent the work of other researchers, not to use another person's work without giving proper credit or acknowledgment, to cite authors properly, and to interpret the literature fairly and balanced. The adopted method emphasizes Academic Integrity, Transparency and Responsible Use of Secondary Sources. Thus, it is imperative that all of the sources cited in the study be appropriately referenced in the final reference list and that the analysis not misrepresent the original meaning of the literature.

The whole chapter provides an explanation of the design and execution of the study in a systematic, transparent, and academically sound way. The research approach and research philosophy are followed by the research design, data sources, data collection strategy, and data analysis technique. Ethical aspects and the timeline of research also are discussed. All of these methodological elements provide a solid basis for the analysis and findings in the next chapter. The methodology is well suited to this study as it helps to provide a detailed discussion of how born-sustainable fashion start-ups consider sustainability in their business models, and address entrepreneurial, technological, circular, operational and strategic challenges.

3.2 Research Philosophy

The present study is based on a pragmatic research philosophy that is suitable for the engagement of a complex and practice-oriented research problem like sustainability integration in born-sustainable fashion start-ups. The philosophy of research is a set of assumptions which are used to comprehend, create and apply knowledge in research. The question being investigated in this research is not just a theoretical one, but an inter-disciplinary one that also involves subjectivity and objectivity. Rather it addresses a real-life business challenge, namely, born sustainable fashion startups and how they embed sustainability in their business model while also dealing with resource constraints, technological change, circular economy practices, and scalability challenges (Saunders et al., 2019).

This study is well suited to a pragmatic approach since it enables the researcher to emphasize the usefulness of knowledge. Pragmatism is not exclusive to any philosophical stance but is based on the use of strategies which are most appropriate to the research problem (Saunders, Lewis and Thornhill, 2019). The reason for this is the fact that sustainability integration in fashion startups encompasses several interrelated aspects, such as entrepreneurial motivation,

leadership identity, digital innovation, circular economy practices, regulatory pressures, consumer demand, and financial viability. These dimensions can't be captured in one philosophical prism.

The study has not a purely positivist philosophy since the study is not done to test statistical relationships and measure variables with numerical data. Objective measurement, hypothesis testing and quantitative analysis are typically linked to positivism. Such an approach could be beneficial for studies focussing on measurable relationships, but would not be suitable for a study examining the contextual and interpretative nature of sustainability integration in born-sustainable fashion startups. The present study is more about finding patterns, themes and relationships in the pre-existing literature and secondary data.

Concurrently, interpretivism is not the only approach to the study. Interpretivism is concerned with subjective meaning, experience and social interpretations, and typically uses primary qualitative data, such as observations and interviews. The present study is not based on the primary data of the participants in the study but it contains qualitative interpretation. Rather, it provides analysis of secondary sources such as peer reviewed academic articles, industry reports, policy documents and sustainability related literature. A purely interpretivist approach would also, therefore, be too limited for use in the present study (Bryman, 2016).

Pragmatism is a foundational perspective that is more balanced because it can incorporate knowledge traditions other than those of science and at the same time focus on the research problem. The study draws on existing theories in the fields of sustainable entrepreneurship, circular economy, digital transformation, and sustainability frameworks but also aims to create practical insights for entrepreneurs, managers, policy makers and industry stakeholders. This aligns well with the goal of DBA Research, which attempts to bridge the gap between research and business (Saunders et al., 2019).

Born sustainable fashion startups are particularly pragmatic as they are situated in complex and dynamic environments. They make decisions about sustainability that are influenced by their internal and external factors. The embedding of sustainability in the business model is affected by the values, orientation of the leadership and the motivation of the founders internally. On the outside, the market demand, the regulatory requirements, the technology available, the supply chain conditions and the financial considerations determine what is practical. This

approach is a pragmatic one which enables the study to consider these interacting factors, and not be constrained to a particular form of knowledge or explanation.

The applied nature of the research is also supported by the pragmatic position. The study aims not only to describe sustainability practices, but also to explore the capacities of using sustainability practices in scalable and viable business models. This practicality is crucial as born sustainable fashion startups often have a disconnect between what they want to do and what they actually can do. For instance, a start-up might seek to employ sustainable materials, adopt circular approaches, and ensure transparency in their supply chains, but could encounter challenges such as cost constraints, infrastructure limitations, or a shortage of technical expertise. The study takes these realworld constraints into account and maintains academic rigour through the use of pragmatism (Saunders et al., 2019).

Moreover, secondary data analysis and thematic synthesis are supported by pragmatism. Because the study is based on documents and literature, the purpose is not to collect primary empirical data but to find meaning in the many document and literature sources. A pragmatic orientation is further supported by using NVivo based coding in the approved analysis which offers a logical approach to organising and interpreting secondary data. In this process, themes are identified and discussed as Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability are examined in relation to the research goals (Saunders et al., 2019).

The other reason why pragmatism is suitable is because sustainability is a multi-faceted, practical, and actionable term. The balance of environmental protection, social responsibility and economic viability is key to sustainability. For born-sustainable startups, the balance is not so simple, as ethical and environmental considerations can be costlier, and financial survival is essential for eventual impact. To study this balance, pragmatism helps to turn to practical and meaningful explanations and insights.

The deductive method coupled with literature-based approach of the study is also in line with the pragmatic philosophy. Theories and concepts from the existing body of research are used as a foundation, with an open mind to incorporate ideas from other streams of literature. This is crucial because the research problem is interdisciplinary. It is based on the field of entrepreneurship studies, sustainability studies, fashion management, digital innovation,

literature related to the circular economy and business model innovation. These various components can be unified in a sensible and beneficial way with a pragmatic philosophy.

To sum up, the idea of pragmatic research philosophy is suitable because the study is applied, problem-based, interdisciplinary and practical based on acquiring understanding. Pragmatism helps the research to transcend the philosophical walls and look into sustainability integration within born-sustainable fashion startups as a complex business problem. It facilitates the use of secondary data, thematic analysis and literature-based synthesis, and will keep the study relevant to the academic discussion and real-life managerial practice. Thus, pragmatism offers a solid philosophical ground to discuss the possibilities of incorporating sustainability into the business model of born sustainable fashion startups, without compromising on the issues of scalability, innovation and sustainability.

3.3 Research Approach

This present study is deductive in nature, involving theory building. Research approach is a method used to guide research from known facts to analysis and interpretation. A deductive approach is suitable for this study since the research starts with existing theories, concepts, and scholarly debates on the topics of the sustainable entrepreneur, sustainable business model, sustainable circular economy practices, digital transformation, and sustainability frameworks. An existing body of knowledge allows the examination of how sustainability is incorporated into born sustainable fashion startups.

A deductive strategy is usually followed when a researcher uses existing theories to direct the research process. The main theoretical and conceptual pillars for this study are: Sustainable entrepreneurship, the circular economy, digital innovation, and the Triple Bottom Line perspective. These areas give a starting point in the understanding of the major dimensions which can have an impact on sustainability integration. For instance, sustainable entrepreneurship literature assists in understanding entrepreneurial motivation and entrepreneurial leadership identity, circular economy literature with the scope of recycling, upcycling, reuse and product life extension, digital transformation literature with the role of artificial intelligence, blockchain and platforms, and the Triple Bottom Line can help in the analysis of social, environmental and economic sustainable elements.

It is appropriate to use the deductive approach because this study does not start from exploring the unknown phenomenon in a totally open-ended manner. On the contrary, it draws on existing literature which has already identified important factors that influence sustainable fashion startups. There have been previous discussions about the motivations of founders, ethics, sustainable materials, digital technologies, circular practices, regulatory complexity and scalability challenges. These areas are usually talked about individually, though. Thus, the study adopts deductive logic to structure these concepts and analyzes them to understand how they collectively explain sustainability integration in born-sustainable fashion startups.

The study also contains elements of theory building since it is not an exact repetition of the literature. The research is based on well-developed theories but aims to provide a more in-depth and holistic understanding of the links between the main themes. The study fails to test hypotheses and/or measure cause-and-effect relationships. Instead, it critically combines current knowledge and explains how the various aspects interrelate in the particular case of born sustainable fashion start-ups. This is because it is a method that is suitable for a qualitative and literaturebased study.

The methodology approved confirms the research is based on existing literature of the fields related to sustainable entrepreneurship, circular economy, digital transformation and the Triple Bottom Line. These pieces of literature serve as a basis to develop analytical themes and to structure an interpretation of sustainability integration. The method thus shifts from the general to the specific, from theory to a more concrete description of the embedding of sustainability in the startup business models.

Similar to the nature of the research aim, this approach is also appropriate. The study seeks to gain insight into the way born sustainable fashion startups incorporate sustainability into their business and how they deal with challenges concerning scaling, innovativeness, and viability. It is important for the study to structure the knowledge in a systematic way and to relate it to the research questions in this aim. A wholly inductive approach would be less suitable as it would not be collecting concepts through primary field data. Rather, it is drawing upon existing literature and secondary data sources for patterns, themes, and connections.

The deductive method lends support to the use of secondary data analysis, as the researcher can analyze the existing documents in theoretically-derived categories. The documents used for the analysis in this study are 100 documents that were selected and analysed using NVivo

software. The coding process resulted in the seven main themes: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. These themes were not arbitrary, but rather were directed by the research goals and by the central theoretical areas analyzed found in the literature.

The methodology thus offers structure and direction for the analysis. Entrepreneurial Dynamics is a reflection of the literature on founder motivation, identity of entrepreneurs and entrepreneurship for sustainability. The literature covered for Digital Technologies is about the field of artificial intelligence, blockchain and digital platforms. Circular Economy Practices is the result of literature on recycling, upcycling, re-use and extension of product lifecycle. Barriers to Sustainability and Sustainability Drivers are based on the literature of external and internal factors which affect implementation. Business Model Innovation and Integrated Sustainability represent the overall interest of sustainable embedding within value creation, value delivery and value capture.

The second motivation for taking a deductive approach is to ensure that the research aim, the research questions, the literature review, the methodology and the analysis are aligned. Each of the research questions is related to an existing body of literature. For example, the question of “motivation in entrepreneurship” and the question of “entrepreneurial leadership” are related to literature on sustainable entrepreneurship. The question of AI, blockchain and digital platforms is related to the topic of digital transformation in literature. The discussion of recycling, upcycling and longevity is associated with the literature of the circular economy. The question on barriers and drivers is related to the sustainability implementation literature. So, the deductive approach makes sure that the analysis is focused and coherent.

The theory building aspect of the approach is demonstrated in the way the various streams of literature are integrated in the study. Previous studies generally view entrepreneurship, technology, circular economy and sustainability frameworks as distinct fields. But, in the present study, they come together to describe sustainability integration in born-sustainable fashion start-ups. This is significant, since these dimensions are not independent, but rather interact in the complex environment in which startups are embedded. Founder motivation drives the uptake of circular practices, digital technologies enable transparency and scalability, barriers and drivers drive implementation and business model innovation enables to make sustainability economically viable.

The deductive approach also facilitates the academic rigour to the analysis since the interpretation is not unsupported. Instead, it is based on sound theories and verifiable evidence from sources. The use of NVivo also adds to strengthening the process as the data is coded and organised systematically. This minimises the likelihood of informal or selective interpretation and creates a stronger connection between the literature, themes and findings.

To sum up, this research is deductive with theory building since it started from theories and literature and then extended the understanding of sustainability integration in born-sustainable fashion start-ups. The approach is appropriate since it was conceptual, qualitative, and the use of secondary data analysis. It helps the research to organize the existing information, explore themes, analyse how themes relate to each other, and develop a result which is both theoretical and applicable. As a result, the chosen research approach has a solid basis of logic for studying the integration of sustainability into the business models of born sustainable fashion start-up businesses and their ability to overcome challenges of scalability, innovation and long-term viability.

3.4 Research Design

The present research makes use of a conceptual and qualitative-driven design, which is suitable when investigating the integration of sustainability in born-sustainable fashion startups. Research design is the general scheme which dictates the way in which the research should be designed, the selection of data and the manner in which the data should be analyzed. The research problem is complex, multidimensional, and is tightly related to the literature on sustainable entrepreneurship, circular economy practices, digital transformation and business model innovation, which dictates the research design for this study (Yin, 2018).

The study will not collect primary data from the respondents and will not test statistical relationships, so a conceptual research design will be appropriate. Instead, the study is about synthesizing and interpreting previous research, so as to gain insight into how sustainability is being used in the business models of born sustainable fashion start-ups. This is relevant as a huge amount of the existing literature is distributed across various fields such as sustainable fashion, entrepreneurship, circular economy, digital technologies, sustainability drivers and barriers to implementation. These elements of literature can be discussed in a purposeful and cohesive manner using a conceptual design (Creswell and Poth, 2018).

The qualitative driven approach to design is also suitable as the integration of sustainability is not a numerical or measurable matter. It includes values, motivations, strategic choices, operational practices, institutional pressures and business model choices. These are not just measures, but must be interpreted. A number of factors are needed to understand entrepreneurial motivation, such as the values of entrepreneurs, the orientation of entrepreneurial leadership, and the priorities of sustainability. Likewise, the understanding of circular economy practices and digital technologies should be considered in relation to their contribution to sustainability, their ability to decrease waste, their transparency and their impact on the growth of startups.

This study is conceptual and qualitative based as it aims to synthesize the existing knowledge, explain the relationships between key constructs and develop an integrated understanding of sustainability integration rather than empirically test causal relationships. This is consistent with the study's aim of evaluating the integration of sustainability into the business model of born sustainable fashion start-ups, and understanding the challenges associated with scaling the business, limited resources, technology uptake, and market pressures.

The research design is also suitable for the use of secondary data analysis. The design is based on academic articles, industry reports, policy documents and sources related to sustainability, which makes systematic review and interpretation of existing documents possible. This enables the research to be based on a variety of theoretical and applied resources. Theoretical and empirical evidence comes from academic sources and practical experience from industry and policy sources, giving the reader an insight into the operational challenges that a sustainable fashion start-up may face.

The data analysis document approved confirms the number of documents that have been selected for analysis in the study is 100 documents. All these documents were coded and then analysed in NVivo, and seven main themes emerged from the coding process: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. This is proof that the research design is not just literature but it also has a systematic organization using qualitative coding and thematization.

The following design allows the study to go beyond description of literature. The study does not just review and summarise previous research; it categorises the literature into relevant

analytical groups. Entrepreneurial Dynamics is one theme that explains the importance of the entrepreneurs' values and leadership orientation, for instance. The theme of Digital Technologies offers an explanation of how AI, Blockchain and Digital Platforms can contribute to sustainability. This theme is Circular Economy Practices, which gives insights into how recycling, upcycling, product lifecycle extension and reuse can help to achieve sustainability. Financial, operational, technological and regulatory constraints are all addressed under the theme of Barriers to Sustainability. These themes will enable the study to gain a more profound understanding of sustainability integration in the context of startups.

The research design is also appropriate as it indicates the interdisciplinary nature of the research topic. Born-sustainable fashion start-ups cannot be examined just from one academic angle. They are related to entrepreneurship, sustainability, innovation, operations, technology, consumer engagement and business strategy. A conceptual and qualitative-based design allows for flexibility in the integration of these areas, while simultaneously not forcing the study to be based in one theory. This becomes crucial in the field of DBA research where a practical relevance, while being expected, is still backed up with academic rigour.

One of the advantages of this design is that it allows for synthesis of essential content. The study does not consider all literature to be equally complete or sufficient. Rather, it looks for patterns, inconsistencies, and omissions in various sources. For instance, while there is extensive literature on the topic of circular economy, few publications offer practical advice on scaling up circular economy practices in the context of start-ups. Likewise, digital technologies can be described as beneficial but challenges for adoption in SMEs might not be sufficiently examined. The research design enables the gaps to be identified and discussed systematically.

The design also allows for alignment of the research questions and analysis. Research questions relate to one or more themes generated in the coding process in NVivo. The question regarding motivations and leadership styles of entrepreneurs is related to Entrepreneurial Dynamics. The questions regarding AI, blockchain and digital platforms are related to Digital Technologies. The recycling, upcycling and design for longevity question is related to the Circular Economy Practices question. The questions about barriers and drivers are related to Sustainability Drivers and Barriers to Sustainability. The main question for sustainability integration relates to Business Model Innovation and Integrated Sustainability.

This way, a research design provides coherence throughout the thesis. The literature review reveals the key academic discussions, while the methodology outlines the process for choosing and analysing the sources, and the analysis chapter summarizes the issues that emerge from the chosen sources. This provides a clear connection between theory, method and findings.

To sum up, the study is conceptual, research design is literature-based, and qualitative driven since it is most appropriate for the study of research problems which are complex in nature. The design enables the study to build on the state of the art, distil important themes, and analyze how entrepreneurial dynamics, digital technologies, circular economy practices, drivers and barriers of sustainability and business model innovation affect sustainability integration in born sustainable fashion startups. The design is based on a framework of secondary data and thematic coding, which is systematic and academically sound to provide the basis for the study.

3.5 Data Sources

In the present research, secondary data sources were used as the major source of data. It is fitting since this is conceptual research based on a qualitative approach and wants to investigate ways in which born sustainable fashion startups have incorporated sustainability into their business model, based on the interpretation of existing knowledge. This study is not a primary research study in that it does not directly gather information from interviews, questionnaires, focus groups, or observations and thus the credibility of the study relies greatly on the quality, relevance, and diversity of the secondary sources selected.

As the research problem is already discussed in various academic and professional fields, secondary data was found appropriate for this study. They encompass sustainable fashion, sustainable entrepreneurship, circular economy, digital transformation, business model innovation, sustainability drivers and barriers to sustainable growth. Often, however, these areas are separately described in the literature. Secondly, by leveraging secondary data, the study is able to draw together a range of knowledge streams and analyse how they can comprehensively explain sustainability integration in born-sustainable fashion startups. The methodology approved further validates use of secondary data for this study as it is not intended to provide primary empirical data but about synthesizing and integrating the already existing knowledge.

Some of the primary data sources for this research are academic journal articles that have been peer-reviewed, industry reports, policy documents, sustainability reports, and institutional publications. The academic base of the study was the peer-reviewed journal articles. It was from these sources that scholarly insights were gained on key topics highlighting sustainable fashion, entrepreneurial motivation, circular economy theory, digital transformation, sustainability frameworks, and business model innovation. Academic sources were also relevant, as these helped to formulate the theoretical basis of the study and to provide a strong explanatory backing for the key themes in the study.

Secondary Data were also obtained from industry related reports. These reports contained actionable and market-driven information about the fashion industry, such as sustainability challenges, supply chain issues, consumer expectations, innovation trends, and operational barriers to fashion startups. The use of industry reports was helpful as the research looks at sustainable fashion as much as it is an academic topic; it's also a business problem. These sources contributed to the theoretical discussion being brought into the real world conditions of industry.

To gain insight into the broader level of regulations and institutions in which born-sustainable fashion start-ups function, policy documents and institutional publications related to sustainability have been included. These documents offered insight into the sustainability standards, ethical sourcing needs, certification systems, environmental compliance, and policy pressures. The relevance of this was that the complexity of regulations and certification expenses are significant obstacles to the effective implementation and communication of sustainability practices by startups.

The approved analysis document includes the confirmation of 100 selected documents used for secondary data analysis. The documents consisted of academic research, sustainability reports, industry publications, and policy-related materials related to sustainable fashion and entrepreneurship. The sources were chosen due to their direct relevance with sustainability integration, circular economy practices, digital innovation and business model development in fashion startups.

Selection of data sources was directed by the research aim, research objectives and research questions. If they fit into one or more of the four main analytical areas of the study, they were deemed to be relevant sources. These areas encompassed entrepreneurial dynamics, drivers for

sustainability, digital technologies, circular economy practices, barriers to sustainability, business model innovation and integrated sustainability. This meant that every document that was chosen was able to add substance to the analysis, and answered the research questions.

The first type of sources was on entrepreneurial dynamics. The role of founders' values, motivations, leadership orientation, sustainability identity, and strategic decision-making in shaping business models were explored in these sources. Born sustainable fashion startups are fashion businesses that are developed by mission driven entrepreneurs; these sources are important because they are fashion businesses that incorporate sustainability in their inception. These documents assisted in explaining the impact of entrepreneurial values on the design of the product, sourcing and organisational culture, and long-term sustainability strategy.

The second category of sources was related to sustainability drivers. These papers addressed issues relating to the influence of internal and external "motivators" for sustainable practice. Founder commitment, organisational values, environmental awareness were all internal drivers. External drivers were: consumer demand, regulatory pressure, stakeholder expectations, competitive pressure, and market opportunities. These sources proved useful to gain an understanding of the reasons behind startups' sustainability practices and the influence of pressures on their strategic priorities.

The third type of sources was around digital technologies. The sources explored the potential of AI, blockchain, digital platforms and data-driven solutions to assist with sustainability. They had a major significance because digital technologies have the potential to enable startups to enhance their inventory management, supply chain visibility, demand forecasting, consumer engagement, and sustainability communication. These sources contributed to the understanding of how technology can enable the integration of sustainability issues, but also raised concerns about cost, technical expertise, and capacity to implement technology.

The fourth source type was related to practices on circular economy. Recycling, upcycling, reuse, repair, resale, closed-loop production, and extending the product life were discussed in these documents. These sources were a key element of the study given that born-sustainable fashion startups are one of the main means of implementing a circular economy. They assisted in clarifying how start-ups minimize waste, maximize the value of materials and question the linear fashion production and consumption system.

The fifth category of sources was related to barriers to sustainability. These sources discussed the obstacles inhibiting implementation and scaling up of sustainability. The barriers included limited finance, cost of sustainable materials, lack of economies of scale, regulatory complexity and certification costs, limited infrastructure, technological constraints and supply chain inefficiencies. These sources were relevant as they contributed to the understanding of the disconnect between intention and adoption of sustainability in startup settings.

The 6th type of source was related to the business model innovation. These papers explored the rethinking of value creation, value delivery and value capture in startups to embed sustainability in the business. They were relevant because born-sustainable fashion startups can't just go with the mainstream fashion business model. Rather, they may require creative solutions like circular models, direct-to-consumer platforms, clear pricing, repair options, resale, sustainability-based value propositions and more.

The last group of sources were related to integrated sustainability. These documents helped to establish the concept of sustainability as a whole encompassing environmental, social and economic aspects. This was related to the Triple Bottom Line approach to sustainability, which centres on the balance between people, planet and profit. These sources provided some insight as to why sustainability integration should be beyond the individual practice and should be integrated across the entire business model.

Use of multiple types of secondary data provided a broad and balanced understanding of the research problem, thereby enhancing the study. Both theoretical and empirical foundations were drawn from academic literature and practical and contextual information from industry and policy sources. This mix minimized the danger of using just one source of information, and increased the amount and complexity of thinking. It also reinforced the applied aspect of the study, which is crucial in DBA research since the research results should be applicable to academic knowledge as well as for decision-making in business.

Selected sources were also appropriate for qualitative coding using NVivo. The acceptable analysis verifies that the 100 selected documents have been systematically analysed in NVivo. These themes emerged from the coding process: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. These themes captured the main

dimensions as identified in the selected sources and were the foundation for the findings chapter.

The use of secondary data reinforced ethical research practice also. There were no direct risks to informed consent, confidentiality, anonymity and personal data protection in the study, as there were no human participants. Ethical responsibility was, however, still a significant factor when it came to correctly representing the material and avoiding plagiarism as well as making sure that all sources cited had been properly acknowledged. This means that all the citations that are used in the thesis should be in the last reference list.

To conclude, the information sources used for this research were well-chosen secondary sources such as academic journal articles, industry reports, policy documents, sustainability reports, and institutional publications. The sources chosen were because they specifically tackled the research theme, sustainability integration in born-sustainable fashion startups. The thematic analysis that used NVivo software analysis of the final set of 100 documents allowed for an examination of the interaction between entrepreneurial dynamics, sustainability drivers, digital technologies, circular economy practices, barriers to sustainability, business model innovation, and integrated sustainability. As such, the application of varied and relevant secondary data sources enhanced the authenticity, depth and rigour of the study.

3.6 Data Collection Strategy

In the present research, secondary data sources were used as the major source of data. It is fitting since this is conceptual research based on a qualitative approach and wants to investigate ways in which born sustainable fashion startups have incorporated sustainability into their business model, based on the interpretation of existing knowledge. This study is not a primary research study in that it does not directly gather information from interviews, questionnaires, focus groups, or observations and thus the credibility of the study relies greatly on the quality, relevance, and diversity of the secondary sources selected.

As the research problem is already discussed in various academic and professional fields, secondary data was found appropriate for this study. They encompass sustainable fashion, sustainable entrepreneurship, circular economy, digital transformation, business model innovation, sustainability drivers and barriers to sustainable growth. Often, however, these areas are separately described in the literature. Secondly, by leveraging secondary data, the

study is able to draw together a range of knowledge streams and analyse how they can comprehensively explain sustainability integration in born-sustainable fashion startups. The methodology approved further validates use of secondary data for this study as it is not intended to provide primary empirical data but about synthesizing and integrating the already existing knowledge.

Some of the primary data sources for this research are academic journal articles that have been peer-reviewed, industry reports, policy documents, sustainability reports, and institutional publications. The academic base of the study was the peer-reviewed journal articles. It was from these sources that scholarly insights were gained on key topics highlighting sustainable fashion, entrepreneurial motivation, circular economy theory, digital transformation, sustainability frameworks, and business model innovation. Academic sources were also relevant, as these helped to formulate the theoretical basis of the study and to provide a strong explanatory backing for the key themes in the study.

Secondary Data were also obtained from industry related reports. These reports contained actionable and market-driven information about the fashion industry, such as sustainability challenges, supply chain issues, consumer expectations, innovation trends, and operational barriers to fashion startups. The use of industry reports was helpful as the research looks at sustainable fashion as much as it is an academic topic; it's also a business problem. These sources contributed to the theoretical discussion being brought into the real world conditions of industry.

To gain insight into the broader level of regulations and institutions in which born-sustainable fashion start-ups function, policy documents and institutional publications related to sustainability have been included. These documents offered insight into the sustainability standards, ethical sourcing needs, certification systems, environmental compliance, and policy pressures. The relevance of this was that the complexity of regulations and certification expenses are significant obstacles to the effective implementation and communication of sustainability practices by startups.

The approved analysis document includes the confirmation of 100 selected documents used for secondary data analysis. The documents consisted of academic research, sustainability reports, industry publications, and policy-related materials related to sustainable fashion and entrepreneurship. The sources were chosen due to their direct relevance with sustainability

integration, circular economy practices, digital innovation and business model development in fashion startups.

Selection of data sources was directed by the research aim, research objectives and research questions. If they fit into one or more of the four main analytical areas of the study, they were deemed to be relevant sources. These areas encompassed entrepreneurial dynamics, drivers for sustainability, digital technologies, circular economy practices, barriers to sustainability, business model innovation and integrated sustainability. This meant that every document that was chosen was able to add substance to the analysis, and answered the research questions.

The first type of sources was on entrepreneurial dynamics. The role of founders' values, motivations, leadership orientation, sustainability identity, and strategic decision-making in shaping business models were explored in these sources. Born sustainable fashion startups are fashion businesses that are developed by mission driven entrepreneurs; these sources are important because they are fashion businesses that incorporate sustainability in their inception. These documents assisted in explaining the impact of entrepreneurial values on the design of the product, sourcing and organisational culture, and long-term sustainability strategy.

The second category of sources was related to sustainability drivers. These papers addressed issues relating to the influence of internal and external "motivators" for sustainable practice. Founder commitment, organisational values, environmental awareness were all internal drivers. External drivers were: consumer demand, regulatory pressure, stakeholder expectations, competitive pressure, and market opportunities. These sources proved useful to gain an understanding of the reasons behind startups' sustainability practices and the influence of pressures on their strategic priorities.

The third type of sources was around digital technologies. The sources explored the potential of AI, blockchain, digital platforms and data-driven solutions to assist with sustainability. They had a major significance because digital technologies have the potential to enable startups to enhance their inventory management, supply chain visibility, demand forecasting, consumer engagement, and sustainability communication. These sources contributed to the understanding of how technology can enable the integration of sustainability issues, but also raised concerns about cost, technical expertise, and capacity to implement technology.

The fourth source type was related to practices on circular economy. Recycling, upcycling, reuse, repair, resale, closed-loop production, and extending the product life were discussed in

these documents. These sources were a key element of the study given that born-sustainable fashion startups are one of the main means of implementing a circular economy. They assisted in clarifying how start-ups minimize waste, maximize the value of materials and question the linear fashion production and consumption system.

The fifth category of sources was related to barriers to sustainability. These sources discussed the obstacles inhibiting implementation and scaling up of sustainability. The barriers included limited finance, cost of sustainable materials, lack of economies of scale, regulatory complexity and certification costs, limited infrastructure, technological constraints and supply chain inefficiencies. These sources were relevant as they contributed to the understanding of the disconnect between intention and adoption of sustainability in startup settings.

The 6th type of source was related to business model innovation. These papers explored the rethinking of value creation, value delivery and value capture in startups to embed sustainability in the business. They were relevant because born-sustainable fashion startups can't just go with the mainstream fashion business model. Rather, they may require creative solutions like circular models, direct-to-consumer platforms, clear pricing, repair options, resale, sustainability-based value propositions and more.

The last group of sources were related to integrated sustainability. These documents helped to establish the concept of sustainability as a whole encompassing environmental, social and economic aspects. This was related to the Triple Bottom Line approach to sustainability, which centres on the balance between people, planet and profit. These sources provided some insight as to why sustainability integration should be beyond the individual practice and should be integrated across the entire business model.

Use of multiple types of secondary data provided a broad and balanced understanding of the research problem, thereby enhancing the study. Both theoretical and empirical foundations were drawn from academic literature and practical and contextual information from industry and policy sources. This mix minimized the danger of using just one source of information, and increased the amount and complexity of thinking. It also reinforced the applied aspect of the study, which is crucial in DBA research since the research results should be applicable to academic knowledge as well as for decision-making in business.

Selected sources were also appropriate for qualitative coding using NVivo. The acceptable analysis verifies that the 100 selected documents have been systematically analysed in NVivo.

These themes emerged from the coding process: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. These themes captured the main dimensions as identified in the selected sources and were the foundation for the findings chapter.

The use of secondary data reinforced ethical research practice also. There were no direct risks to informed consent, confidentiality, anonymity and personal data protection in the study, as there were no human participants. Ethical responsibility was, however, still a significant factor when it came to correctly representing the material and avoiding plagiarism as well as making sure that all sources cited had been properly acknowledged. This means that all the citations that are used in the thesis should be in the last reference list.

To conclude, the information sources used for this research were well-chosen secondary sources such as academic journal articles, industry reports, policy documents, sustainability reports, and institutional publications. The sources chosen were because they specifically tackled the research theme, sustainability integration in born-sustainable fashion startups. The thematic analysis that used NVivo software analysis of the final set of 100 documents allowed for an examination of the interaction between entrepreneurial dynamics, sustainability drivers, digital technologies, circular economy practices, barriers to sustainability, business model innovation, and integrated sustainability. As such, the application of varied and relevant secondary data sources enhanced the authenticity, depth and rigour of the study.

3.7 Data Analysis Technique

This study uses qualitative thematic analysis (with NVivo coding) as a data analysis technique. This approach is suitable given that this study relies on secondary data and that it is an interpretive study that aims to engage in patterns, themes and relationships across a selection of academic, industry and policy documents. The analysis primarily aims at detecting meaningful themes that can be used to explain how sustainability is being incorporated within the business models of a born sustainable fashion startup without any statistical analyses or primary survey data.

As per the approved methodology, the selected literature and documents in the study are analysed using the qualitative thematic synthesis and conceptual mapping approach. Thematic

synthesis is appropriate because it can help the researcher to structure extensive amounts of textual data to an analytical level. It also enables us to find similarities, differences, patterns and gaps between several sources. This is also an interesting context for the present study as sustainability integration is a multi-dimensional issue, which encompasses both the dimensions of entrepreneurship, digital technologies, circular economy practices, business model innovation and external barriers and drivers.

The approved analysis document is available which demonstrates the use of NVivo software in supporting the coding and interpretation process. In qualitative research, NVivo can help to organise the textual data systematically into nodes and themes. The documents in this study were imported into NVivo and coded based on their relevance to the research objectives. This enabled the analysis to be based on informal reading rather than being based on a structured and transparent coding process.

100 documents were selected and analysed with NVivo. These documents encompassed peer-reviewed academic papers, sustainability reports, industry journals, policy documents, and related to Sustainable Fashion, Sustainable Entrepreneurship, Circular Economy practices, Digital transformation and Business model innovation. A variety of document types helped to ensure a broad grasp of sustainability integration and created a space for academic theory and industry and policy perspectives.

The first phase of analysis was a careful reading of the documents selected and familiarization with them. This stage enabled the researcher to gain insight into the central arguments, concepts, and results of every source. Within this process, the following recurring ideas were paid attention to: Recurrent themes were identified: Motivation for founding, sustainability drivers, adoption of digital technology, circularity and barriers to implement and business model transformation. It was a familiarisation stage that was important, since it was the basis for meaningful coding and interpretation.

Open coding was the second phase of the process, performed using NVivo. At this stage words, phrases, paragraphs and findings that were relevant were coded into initial categories of the selected documents. These were significant concepts that were found in the literature, including ethical leadership, environmental responsibility, consumer demand, sustainable materials, blockchain transparency, forecasting using AI, upcycling and recycling, regulatory complexity,

financial constraints and circular business models. The use of open coding was useful to develop a breadth of issues across the selected documents.

The third stage was to cluster codes together into larger themes. Seven major themes were identified during the approved analysis: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. The findings chapter was organised around these themes (Jaakkola, 2020). The themes correspond to main aspects that affect the integration of sustainability in born-sustainable fashion startups.

The theme of Entrepreneurial Dynamics focused on aspects such as the values of the founders, their motivations, their orientation of leadership, their decision-making process, and their identity based on sustainability. This theme was used to give insight into how internal entrepreneurial factors shape the embedding of sustainability in the business model of startups. Sustainability Drivers encompass both internal and external drivers that facilitate the adoption of sustainability, including environmental awareness, consumer demand, regulatory pressure, competitive positioning and stakeholder expectations. Digital Technologies covered how digital platforms, blockchain, and artificial intelligence can enhance efficiency, transparency, decision making and consumer engagement.

Circular Economy Practices were represented by recycling, upcycling, reuse, extending the life of products and resource efficiency. This theme served as a tool for understanding about the operationalisation of sustainability in circular business. Barriers to Sustainability identified the key barriers to integration such as financial barriers, cost of sustainable materials, lack of infrastructure, technology barriers, regulatory complexity and scalability issues. Business Model Innovation explored how start-ups re-innovate the way they create value, deliver value and capture value; incorporating sustainability into the heart of the startup. Last but not least, Integrated Sustainability was about ensuring environmental, social and economic dimensions are aligned in the startup business model (Gioia et al., 2013).

Analysis using the approved NVivo coding summary revealed that the predominant themes in the analysis were: Barriers to Sustainability and Sustainability Drivers. Sustainability Drivers had the second highest number of references, followed by Barriers to Sustainability. This means that the literature analysed is rather critical of the challenges and enabling factors for sustainability integration. Also, strong presence of Business Model Innovation and circular

economy practices were evident, indicating that sustainable transformation in startups relies a lot on Business Model Innovation and circular economy practices.

The analysis also involved the interpretation of outputs from visualisation tools like the node frequency graph and NVivo word cloud. The node frequency graph enabled the identification of the relative number of coded references for each theme and to have an idea of the themes that were most discussed in the documents selected. The word cloud showed them the most common words that appeared; sustainability, industry, materials, production, technology, recycling, resources, innovation, and business. These terms confirmed the thematic results by indicating that the literature is very much oriented towards material use, production systems, technological integration, circular practices and business transformation.

Thematic interpretation was the last step in analysis. During this stage, the themes were discussed in the light of the research aim and the research questions. Not only was it to count the number of references, but also to grasp the meaning and implications of each theme. For instance, Entrepreneurial Dynamics was understood as a basic construct since values of the entrepreneurs and orientation of their leadership affect the prioritisation of sustainability. The concept of Barriers to Sustainability was defined as the factors that are in between intention and action to achieve sustainability (Braun and Clarke, 2019). Digital Technologies were understood to be 'enablers' that can help to enhance efficiency and transparency, but need resources and capability to be effective.

In general, the data analysis technique applied in this study was able to systematically and transparently analyze the secondary data. Thematic analysis with the support of NVivo enabled the study to group 100 selected documents into coherent themes and understand them in terms of how they explain the integration of sustainability in born-sustainable fashion startups. This method is applicable to the study as it facilitates qualitative interpretation, literature-based synthesis and DBA-level applied understanding. It also enables the findings to be based on the selected documents and directly relate to the research aim, objective and questions.

3.8 Ethical Considerations

Although this study involves no actions with human participants, it is still considered to have ethical issues. The study does not involve primary data collection (interviews, surveys, focus groups, observation) so informed consent, confidentiality, anonymity and personal data

protection issues do not directly apply. Ethical issues are, however, highly relevant, since the study relies on the proper application, understanding, and credit of existing academic, industry and policy sources.

The responsible use of secondary literature is the main issue of the ethical nature of this study. The research analyses existing documents and it is essential that all ideas, arguments, concepts and findings that are used from previous authors are acknowledged using appropriate in-text citations and references. This ensures academic integrity and will not allow plagiarism. The study is thus well referenced and all the sources referred to in the thesis are mentioned in the final reference list. It is especially relevant given that the study is based on various literature sources such as sustainable fashion, entrepreneurship, circular economy, digital technologies, sustainability frameworks and business model innovation.

Another ethical question is the proper representation of the meaning of the sources. There is a danger of misinterpreting, overgeneralising or taking out of context past studies when synthesising them. For this reason, the arguments of previous researchers and the results of their research are presented fairly and correctly in the study. Analysis is not overstated or misrepresented in the selected documents. Rather it reads the literature with carefulness and relates the results to the research aim, objectives and themes in a balanced way.

Additionally, the research focussed on selection bias. The documents selected could affect the results of the research, as it is secondary data based. The study has a systematic approach for data collection to minimise this risk, using a clear data collection strategy with inclusion and exclusion criteria. Sources were chosen due to their relevance to sustainability integration, born-sustainable fashion startups, dynamics of entrepreneurship, digital technologies, circular economy practices, barriers to sustainability and business model innovation. Academic articles, industry reports, policy documents and publications on sustainability are also used, which helps to minimize reliance on a single source type. This helps to have a more balanced and credible analysis.

The data analysis process is also transparent in an ethical manner. The analysis was approved and 100 documents selected for coding and organising in NVivo under the following main themes: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability. The systematic coding process enhances the transparency and minimizes the

risk of arbitrary or unsupported interpretation of the study. The use of NVivo also helps to show how the findings have been created from the documents selected, and not just based on a subjective judgement.

There are other ethical factors to consider, such as interpretive fairness. As the study looks at sustainability, there could be a bias to only include sustainable fashion start-ups in a positive light. The study does, however, make use of the concept of analytical balance by also including a discussion of the barriers to the drivers. It is aware of the positive impact of entrepreneurship for sustainability, digital technologies and the circular economy, as well as of the challenges arising from financial limits, costs, inefficiency, regulatory complexity and scalability. The treatment is balanced, so that the conclusions presented in the study are not unrealistic nor biased.

The study also refrains from providing any practical recommendations for which there is no evidence. The research is secondary data research and the results of the research are interpreted based on the literature and documents used. The study doesn't purport to cover all born sustainable fashion start-ups, or all of the same practices. Rather, it serves as literature-based lessons learned to assist in understanding typical trends and important considerations for integrating sustainability. Ethically significant, as it is essential to avoid overclaiming and to keep the inferences correct with respect to the analyzed evidence.

Additionally, the study abides by copyright and intellectual property rights by using sources in an appropriate manner and avoiding excessive reproduction of original material. Ideas from other research sources are paraphrased and cited correctly when discussed. Tables, figures and analytical summaries are created from the analysis of the sources selected and the coding results of the NVivo data, not by copying without reference.

The overall method of this study is ethical in terms of academic honesty, transparency, fairness and responsible interpretation. Even though the study is not involving human subjects, it is still important to observe ethical guidelines in selecting, analyzing and presenting secondary data. Appropriate citations, strategic source selection, NVivo-assisted coding, and balanced interpretation help to maintain the credibility, transparency, and ethical nature of the research process.

3.9 Chapter Summary

The method used in this study was presented in this chapter. It clarified the pragmatic research philosophy as this was applied for guiding the research, which was appropriate as the study had sought to solve a practical and interdisciplinary research problem in the sustainable fashion entrepreneurship. The chapter also outlined that the study was conducted using a deductive approach with the theory building aspect since the study was based on existing literature on sustainable entrepreneurship, sustainable practices towards the circular economy, digital transformation, and innovation of business models with sustainability focus.

The chapter also focused on the conceptual research design and qualitative driven research design of the research. The research was not of primary data collection hence the research used secondary data sources. These sources ranged from peer reviewed research publications, industry reports, policies and publications relating to sustainability. Systematic coding and thematic interpretation were achieved by analysing the 100 selected documents in NVivo.

The data collection method used was by structured literature identification, literature screening and selection of relevant literatures related to the research aim and objectives. Data analysis adopted was thematic qualitative analysis aided by coding with NVivo software. In this process seven themes emerged that were deemed important: Entrepreneurial Dynamics, Sustainability Drivers, Digital Technologies, Circular Economy Practices, Barriers to Sustainability, Business Model Innovation and Integrated Sustainability.

Lastly, ethical issues pertinent to the secondary data studies were discussed. The study itself did not include human subjects; however, the ethics of the study were upheld by appropriate citation, accurate representation of sources, clear interpretation of sources, and avoiding plagiarism. The methodology in general was systematic and credible to analyze born-sustainable fashion startups.

CHAPTER 4: RESULTS

4.1 Introduction

In this chapter the secondary data is analysed in detail with a focus on how sustainability is integrated in born-sustainable fashion start-ups. The analysis is organized around 17 key themes that were systematically identified using NVivo software to conduct thematic content analysis of 100 academic, industry and policy documents. Each theme reflects important elements of entrepreneurship, leadership, digital technology adoption, closed loop economy operationalisation and operational strategies for sustainability and provides an overall picture of the incorporation of sustainability in start-up business models. This examination of the various dimensions is intended to give a detailed and well-founded picture of the processes of how sustainable business can be achieved in start-up businesses.

This chapter aims primarily to interpret literature and secondary data with respect to the objectives and questions of the research. Every theme is introduced gradually and patterns, relationships and interconnections between entrepreneurial behaviour, entrepreneurial practices and external drivers affecting the adoption of sustainability are pointed out. The analysis shows that the leadership, motives and strategic decision making of the founders is closely linked to the operational processes, such as the nature of the implementation of the circular economy, the technology used, and the involvement of stakeholders. It's a multi-dimensional approach that enables them to see sustainability in action and how it operates on both a local and global level.

It is deductive and theory driven and is consistent with the deductive approach and theory nature that are also evident in the literature on sustainable entrepreneurship, circular economy practices, digital innovation and Triple Bottom Line framework. The approach aids the description and analysis of the themes, connecting what is observed with the existing theories. For example, the Resource Based View (RBV) can give hints on the importance of entrepreneurial resources and capabilities as a strategic enabler for sustainability and the principles of the circular economy can give some insight into how the notion of resource efficiency and optimising the product life cycle can be practically applied. This chapter is a blend of theory and practice and therefore offers a robust conceptual underpinning of determinants and enablers of sustainability in start-ups.

To support the systematic coding and thematic analysis, NVivo software is used. The codes are created using a concept from the literature and the literature that has been reported by industry, and are then clustered into larger themes and sub-themes of analysis. The methodology is structured and transparent and has a level of rigor and traceability; each theme is connected to the data sources. NVivo can be used to identify meaningful concepts, patterns and operation strategies, which can then be adopted to develop the framework of a systematic empirical sustainability analysis of start-up companies.

Additionally, the study adopts a regional perspective, by identifying the differences in the regulatory frameworks, market structures and technological uptake in the various regions, moving beyond the national level. This will enable the study to be both scientifically valid and relevant to managers, entrepreneurs and policy makers of the sustainable fashion industry. The chapter collates information from various sources and perspectives to be used as a building block for the presentation of the 17 key themes presented in chapter 5, which will be discussed and interpreted.

Finally, this introduction is followed by the context, rationale and methodological rigor for Chapter 4. It shows the multidimensional and interrelated aspects of the integration of sustainability in born-sustainable fashion start-ups at the same time and offers a structured presentation of the results systematically, evidence and theory based born sustainable. This chapter therefore provides the groundwork for the discussion of the mechanisms, enablers and challenges to embed sustainability in start-up business models.

4.2 Overview of Analysis Process

Phase 1: Familiarization with the Secondary Data

In the first stage of the six-stage thematic content analysis process of Braun and Clarke (2006), the researcher established a detailed and comprehensive understanding of the secondary data corpus, before engaging in formal coding. The corpus was created through the selection of 100 research papers, industry reports and policy documents that focused on entrepreneurial dynamics, integration of sustainability into the business model, sustainable practices and digital innovation in born sustainable start-ups. The research proposal, entitled “Entrepreneurial Dynamics and Sustainability Integration in Born-Sustainable Fashion Start-ups: A Framework for Innovative Business Models”, was the analytical pathway of the analysis, creating a focus

for the sustainability embedding, entrepreneurial motivation, leadership influence, operationalization of circular economy, and the adoption of digital technology for scalability.

In this stage, researcher has systematically organized all the secondary sources for systematic reading and preliminary examination. The abstracts, introductions, literature reviews, methodologies, findings, discussions, conclusions and managerial/policy implications were read and re-read in each document. By following this process the researcher was able to identify any common themes, patterns and relationships, and to move beyond mere summarising of the data.

The research questions and objectives were used to direct the attention. The first research question and the first objective involved with the understanding of the influence of the entrepreneurial motivations and entrepreneurial identity on the sustainability driven business models. Hence, values, mission and leadership styles of founders and their impact on decision-making in the business, ethical sourcing and commitment to sustainability goals were discussed.

In the second research question, 'Digital technologies', digital technologies were a constant reminder. The researcher identified and illustrated the influence of these technologies on inventory management, demand forecasting, traceability, transparency and consumer engagement, investigated how they can contribute to higher operational efficiency and explored their scalability in order to support sustainability in resource limited start-ups.

Practices and barriers for circular economy and integration of Sustainability were the topics of the third and fourth research questions. The upcycling and recycling concepts, the issues of financial constraints, regulatory complexity, market adoption hurdles, and restricted access to sustainable materials and resources were reiterated, while the concept of closed-loop systems and design-for-longevity were discussed repeatedly. The observations made this clear that these are real structural and institutional problems for sustainability integration within start-ups and that it is not a 'nice-to-have' option.

The main goal of Phase 1 was to provide an initial awareness of patterns, reoccurring ideas and connections between the secondary data. The in-depth familiarization process provided a foundation for the subsequent coding and theme development to be congruent with the literature used and directly related to the study's goals.

Phase 2: Generating Codes (Dissertation Version)

For the second stage of Braun and Clarke (2006) six phase thematic content analysis, the researcher first familiarise himself with the secondary data by reading and summarizing it. During this phase, meaningful segments of text which can be directly related to the research topic, research questions, and research objectives were systematically identified. The voluminous literature on entrepreneurial dynamics, on integrating sustainability, on circular economy practices and on born-sustainable fashion start-ups and their digital innovation was organized using NVivo software.

The coding process started with the careful consideration of each source and labeling words, phrases, sentences and paragraphs under descriptive codes. The codes were extracted according to the focus areas of the research proposal entitled “Entrepreneurial Dynamics and Sustainability Integration in Born-Sustainable Fashion Start-ups: A Framework for Innovative Business Models,” which included codes related to the motivations of entrepreneurs, leadership identity, business models that include sustainability aspects, the use of digital technologies, the incorporation of the circular economy, and challenges faced in the operation of start-ups.

The entrepreneurial values were captured by coding extracts from the texts into sub-categories that reflect entrepreneur identity and motivation, including founder motivation, ethical leadership, vision-driven entrepreneurship, and mission alignment, which highlights the influence of the entrepreneurial values on the adoption of sustainability and choices of business model. The items related to sustainability integration and circular economy practices were coded into upcycling practices, recycling initiatives, closed-loop systems and design-for-longevity, to illustrate the application of the principles of circular economy in start-up business models.

The digital and technological enablers were also represented in AI forecasting, blockchain traceability, consumer engagement via digital technologies and inventory optimization, demonstrating the importance of technology in improving operational efficiency, transparency and sustainability. Operational barriers and enabling conditions were identified and coded as high resource cost, regulatory complexity, material scarcity, market uncertainty and scalability challenges, which are practical considerations in implementing sustainability initiatives.

The researcher was able to use NVivo to build nodes for each code and add appropriate references, ensuring that there was a descriptive and data driven record maintained as codes

were grouped into larger themes. This process helped to structure the secondary data and created a good basis for the next phase of the theme development. The phase aimed to start analysis, structuring and focusing sustainability integration in born-sustainable fashion start-ups directly by the connection to the research objectives.

Phase 3: Searching for Themes

Themes were systematically identified and organized from the initial codes generated in Phase 2 in Phase 3 of Braun and Clarke's (2006) thematic content analysis. At this stage, the analysis was not individual codes but would also include the interpretation of the meaning in the codes. With this analysis, a structured thematic framework was created that is directly connected to the research proposal, research questions and research objectives.

The researcher re-coded all of the coded references in NVivo and sorted them into themes and sub-themes that were meaningful. The themes were dedicated to the main areas of the study: entrepreneurial motivations and entrepreneurial identity, practices of circular economy, digital technologies for sustainability, integration of sustainability in business models, and business model and regulatory barriers. Codes were grouped into more general themes, while conceptual comparison of codes were used to create analytical categories.

For example, codes were grouped together under the theme Entrepreneurial Identity and Motivation, including codes on motivation, mission and ethical leadership, or codes on upcycling practices, recycling and design-for-longevity were grouped under the theme Circular Economy Practices. The theme "Digital and Technological Enablers" was used to bundle codes that discussed the use of technology to support the transparency, efficiency and scalability of sustainable practices. Codes that mentioned high resource cost, regulatory complexity and market uncertainty were under one umbrella, called "Barriers and Enablers", pointing to operational and institutional challenges faced by born-sustainable fashion start-ups when implementing business models that focus on sustainability.

This phase also entailed conceptualising the relationships between themes and sub-themes to ensure conceptual coherence whilst also capturing multiple aspects of sustainability integration. Digital choice and use to support sustainable business models as an example, entrepreneurial motivation and entrepreneur's use of digital tools were explored. Similarly, the relationship between circular economy practices and the operational scalability were discussed,

providing an insight into how start-ups can meet the requirements of the circular economy and remain profitable.

The purpose of Phase 3 was to develop a conceptually organized framework that will help to provide an explanation of how the secondary sources in the project work together to address the research questions. The researcher merged the codes into more overarching themes and sub-themes to present a clear and structured understanding of the interaction between entrepreneurial dynamics, sustainability practices, digital technologies and operational constraints.

Phase 4: Reviewing and Finalizing Themes

The themes identified in Phase 3 were re-visited, edited and consolidated in Phase 4, Braun and Clarke (2006). The codes were initially organised under more general categories and sub categories and then studied in-depth to ensure that the code structure represented the coded data and that the structure of the themes was meaningful, coherent and integrated with the research proposal. At this stage it was important to make sure that the themes were well-developed as analytical categories that explain secondary data in relation to the study research question(s) and study objectives.

In the review process it was decided to go over all data segments, which were coded and nodes, and ensure that they were conceptually relevant and internally consistent. Particular attention was given to the themes which emphasize the interactions among the entrepreneurial dynamics, sustainability integration, circular economy practices, digital innovation, operational constraints, and sustainability performance of born-sustainable fashion start-ups.

For example:

- **Entrepreneurial Identity and Motivation:** Codes were retained for founder motivations to define the sustainability oriented business model: founder's sustainability values, vision-driven entrepreneurship, ethical and responsible decision making, social and environmental commitment, entrepreneurial orientation.
- **Leadership** is seen as playing an important role in embedding sustainability into organizational practices, which is reflected in the codes retained, namely **Leadership Styles and Organizational Culture:** codes of transformational leadership, ethical and

visionary leadership, leadership-driven innovation culture, employee engagement and empowerment, and strategic alignment with sustainability.

- Sustainable Business Model Innovation: Codes included integration of triple bottom line, value proposition for sustainable products, revenue model innovation for circularity, integration of social and environmental impact in operation, and business model scalability and long term viability, which represent the balance of environmental, social and economic objectives that startups pursue.
- Digital Technologies for Sustainability: Codes were confirmed including AI for resource optimization, blockchain for traceability, digital platform for market reach, IoT systems, and technology-driven lifecycle management, showing the importance of technology in optimizing operations and the sustainability performance.
- The circular economy practices are retained, such as recycling, upcycling, durable design, modular/repairable product design, integration of the closed-loop supply chain and consumer involvement in product life cycles, which correspond to circular production and consumption systems.

A number of additional themes were also considered, such as Sustainable Material and Product Innovation, Environmental Sustainability Performance, Consumer Awareness and Behavior, Slow Fashion and Ethical Consumption, Market and Industry Dynamics, Operational Challenges and Resource Constraints, Financial and Market Incentives, Technological Adoption and Capability Development, Innovation and Value Creation, Performance Measurement and Impact Assessment, Regulatory and Policy Environment, and Environmental and Social Risk Management. Conceptual distinctiveness, coherence and analytical value were evaluated with respect to each theme.

Final Themes and Key Sub-Themes / Codes:

Table 1: Final Themes, Key Sub-Themes, and Codes

Source: Author (2026) Description: Lists all 17 themes with their key sub-themes and codes derived from NVivo coding of the secondary data.

Theme No.	Parent Theme	Key Sub-Themes / Codes

1	Entrepreneurial Identity and Motivation	Founder's sustainability values; Vision-driven entrepreneurship; Entrepreneurial orientation; Ethical and responsible decision-making; Social and environmental commitment in venture creation
2	Leadership Styles and Organizational Culture	Transformational leadership; Ethical and visionary leadership; Leadership-driven innovation culture; Employee engagement and empowerment; Strategic alignment of leadership with sustainability
3	Sustainable Business Model Innovation	Triple bottom line integration; Value proposition for sustainable products; Revenue model innovation for circularity; Operational integration of social and environmental impact; Business model scalability and long-term viability
4	Digital Technologies for Sustainability	AI for resource optimization and predictive analytics; Blockchain for traceability and transparency; Digital platforms for market reach and engagement; IoT and smart production systems; Technology-enabled circularity and lifecycle management
5	Circular Economy Practices	Recycling of post-production and post-consumer textiles; Upcycling and secondary product innovation; Design for durability and longevity; Modular and repairable product design; Closed-loop supply chain integration; Consumer engagement in circular practices

6	Sustainable Material and Product Innovation	Biodegradable and organic fibers; Vegan leather and alternative textiles; Eco-friendly dyeing and finishing processes; Material efficiency and waste reduction; Innovative product design for circularity
7	Environmental Sustainability Performance	Carbon footprint reduction; Water and energy efficiency; Waste management and diversion; Pollution and chemical management; Environmental impact metrics and assessment
8	Consumer Awareness and Behavior	Environmental consciousness; Adoption of slow fashion; Ethical purchase patterns; Awareness-behavior gap; Consumer trust in sustainable brands
9	Market and Industry Dynamics	Competitive advantage of sustainable start-ups; Industry adoption of circular economy principles; Sustainability certifications and standards; Policy and regulatory support; Supply chain pressures and expectations
10	Operational Challenges and Resource Constraints	Financial limitations; Technology and infrastructure constraints; Raw material availability; Workforce skill gaps; Scalability barriers
11	Slow Fashion and Ethical Consumption	Preference for durable garments; Second-hand and resale markets; Product lifecycle extension; Upcycling practices; Consumer education campaigns

12	Innovation and Value Creation	Product and process innovation; Value creation through sustainable differentiation; Co-creation with consumers and communities; Sustainable branding and marketing strategies; Measurement of sustainability-driven outcomes
13	Performance Measurement and Impact Assessment	Social impact assessment; Environmental impact assessment; Circularity and longevity metrics; Digital dashboards for sustainability monitoring; Quantifying community benefits
14	Regulatory and Policy Environment	International and national sustainability policies; EU circular economy directives; Environmental certification schemes; Legal frameworks for sustainable business practices
15	Financial and Market Incentives	Green funding and investment opportunities; Consumer willingness to pay for sustainability; Market-driven incentives for circular economy adoption; Risk mitigation and profitability alignment
16	Technological Adoption and Capability Development	Digital capability building in start-ups; Employee training on sustainability technology; Adoption of AI, blockchain, and IoT solutions; Integration of digital capabilities into business models
17	Environmental and Social Risk Management	Mitigation of environmental risks; Management of labour and social risks; Regulatory compliance and governance; Proactive sustainability risk strategies

Phase 5: Defining and Naming Themes

The sixth phase of Braun and Clarke (2006) thematic content analysis was followed in which the final themes were clearly defined and named based on secondary data. After review and finalisation of themes in Phase 4, the researcher concentrated on providing an explanation of the specific meaning, scope and purpose of analysis of each theme. The above process provided each theme with its own unique identity to reflect the coded content and sub-themes and its connection to the research proposal and objectives.

Themes were defined and named by the researcher, with each theme being descriptive and analytical, relating to the research topic 'Entrepreneurial Dynamics and Sustainability Integration in Born-Sustainable Fashion Start-ups: A Framework for Innovative Business Models'. This was guided by three major questions: What does this theme mean? What aspect of the research problem does this theme explain? How does this theme go toward the answers to the research questions?

Examples include:

- Conceptualizes sustainability into the entrepreneurial identity and vision, and examines the motivations and values of the entrepreneur in making sustainability decisions and entrepreneurial choices.
- Leadership Styles and Organizational Culture: Recognizes the transformational, ethical and visionary leadership styles that create an innovation culture that engages, empowers employees and aligns sustainability in organizational practices.
- Sustainable Business Model Innovation: Offers a description of how to integrate the idea of triple bottom line, sustainable value proposition, circular revenue, social-environmental impact and sustainable scalability in the business model of start-ups.
- Digital Technologies for Sustainability: Emphasizes how AI, blockchain, digital platforms, IoT, and lifecycle management can help integrate sustainability, increase transparency, drive efficiency, and engage consumers.
- Circular Economy Practices: Emphasizes recycling, upcycling, durable and modular product design, closed loop value chains and consumer engagement in the circular economy, which all aim to reduce waste and prolong the lifespan of products.

- Sustainable Material and Product Innovation: Material level and product design for sustainability is supported with biodegradable fibers, vegan leather, eco-friendly processes, material efficiency and circular product design.

Additional themes on Environmental Sustainability Performance, Consumer Awareness and Behavior, Market and Industry Dynamics, Operational Challenges and Resource Constraints, Slow fashion and ethical consumption, Innovation and Value Creation, Performance Measurement and Impact Assessment, Regulatory and Policy Environment, Financial and Market Incentives, Technological Adoption and Capability Development, and Environmental and Social Risk Management were furthermore identified to ensure conceptual clarity and analytical relevance.

The researcher made sure that there were no overlapping themes. For example, Sustainable Business Model Innovation, Digital Technologies for Sustainability, Circular Economy Practices, Sustainable Material and Product Innovation and Entrepreneurial Identity and Motivation were split from Leadership Styles and Organizational Culture. Each theme had a specific aspect of integrating sustainability and Consumer Awareness and Behavior was separated from Slow Fashion and Ethical Consumption and Market and Industry Dynamics from Financial and Market Incentives.

Final Themes, Sources, and References Table:

Table 2: Final Themes, Sources, and References

Source: Author (2026) Description: Shows each theme with the number of sources and references supporting it, providing transparency on literature coverage.

No.	Parent Theme	Sources	References
1	Entrepreneurial Identity and Motivation	99	128
2	Leadership Styles and Organizational Culture	99	130

3	Sustainable Business Model Innovation	99	131
4	Digital Technologies for Sustainability	98	135
5	Circular Economy Practices	98	140
6	Sustainable Material and Product Innovation	97	138
7	Environmental Sustainability Performance	98	133
8	Consumer Awareness and Behavior	99	133
9	Market and Industry Dynamics	99	131
10	Operational Challenges and Resource Constraints	99	127
11	Slow Fashion and Ethical Consumption	99	132
12	Innovation and Value Creation	99	133
13	Performance Measurement and Impact Assessment	99	139
14	Regulatory and Policy Environment	98	135

15	Financial and Market Incentives	98	134
16	Technological Adoption and Capability Development	100	126
17	Environmental and Social Risk Management	100	128

An academically sound and meaningful thematic structure was completed in phase 5, which served as a foundation to present the results of the secondary data analysis to link them to the research questions and objectives.

Phase 6: Producing the Report

A stage of Braun and Clarke's (2006) six phased approach to thematic content analysis was to produce the analytical report, the purpose of which was to present the finalised themes in a coherent, structured and academically rigorous way. This stage reversed the process of coding and theme development to interpretation and communication of findings which directly related to the research questions and objectives.

The researcher presented the results and findings of the previous stages and how the entrepreneurial dynamics, integration of sustainability, and use of the digital innovation, circular economy practices contribute to an innovative business model in born-sustainable fashion start-ups. Every theme not only represents the label but also an analysis and finding, providing insights into sustainability integration in startups.

For example:

- Entrepreneurial Identity and Motivation explained the impact of the values of the entrepreneurs, ethical decision making, entrepreneurial orientation and mission-driven entrepreneurship on the strategic orientation of sustainability driven entrepreneurship.
- Lead the organization with transformational, ethical and visionary leadership, create a culture of Innovation, involve employees in the organization and align the organization's strategies to bring sustainability into its organizational culture.
- Sustainable Business Model Innovation was presented by the start-up, which showed how they operate with triple bottom line, sustainable product value proposition, circular

revenue models and integration of social and environmental impacts in their business models, and how they are scalable.

- The use of AI, blockchain, IoT and digital platforms in sustainability was highlighted in the forum Digital Technologies for Sustainability, where they are helping to enhance transparency, optimize resources and provide predictive decision making and consumer engagement.
- Circular Economy Practices showcased recycling, upcycling, modular and durable product design, closed-loop supply chains and consumer engagement as means to extend the lifespan of a product and be more resource efficient.
- The focus of Sustainable Material and Product Innovation was on biodegradable fibers, alternative materials, eco-friendly dyes, material efficiency and circular product design.

Other themes including Environmental Sustainability Performance, Consumer Awareness and Behavior, Slow Fashion and Ethical Consumption, Market and Industry Dynamics, Operational Challenges, Innovation and Value Creation, Performance Measurement, Regulatory Environment, Financial Incentives, Technological Adoption and Environmental and Social Risk Management were also represented in a similar fashion, connecting thematic insights to the study objectives.

The report clearly linked each theme to the related research questions and objectives. Sustainability-driven leadership was directly related to themes relating to entrepreneurial identity and leadership. Themes focused on digital technologies and circular economy practices, and included discussions on how innovation supports integration of sustainability. Themes on operational challenges, policy and financial incentives have identified enabling and limiting conditions that impact the sustainable business model scalability.

The final report has been organized as an introduction to the secondary analysis, description of the thematic analysis approach, NVivo coding methodology, presentation of final themes and sub-themes, an analytical interpretation, alignment with the research objectives and a synthesis of sustainability integration. This approach provided clarity and academic rigor, and showed how sustainability integration is put into practice via entrepreneurial vision, leadership, technology adoption, circular economy approaches and facilitative organizational and market conditions.

As a whole, Phase 6 finalized the thematic content analysis, and developed a structured evidence-based narrative. The report revealed that born-sustainable fashion start-ups have three key elements of sustainability built in – through founder motivation and intention, through leadership and organisation culture, and through digital innovation, circular economy approach and sustainability-oriented transformation of the business model – but that success depends on leadership commitment, organisational culture, technological capability, consumer engagement, financial viability and regulatory alignment.

4.2.1 Interpretation of NVivo Visual Outputs

The NVivo visual outputs give a full picture of the distribution and salience of the 17 themes that were identified through the secondary data analysis. The coding summary table records the number of sources and references for each theme, and the visual displays of the Node Frequency Graph and the NVivo Word Cloud reaffirm the prominence of each theme and indicate the frequency of certain words in the themes coded in the selected documents. These visualizations can be used to see the dominant patterns in the literature and to give context to the qualitative results.

4.2.1.1 Node Frequency Graph

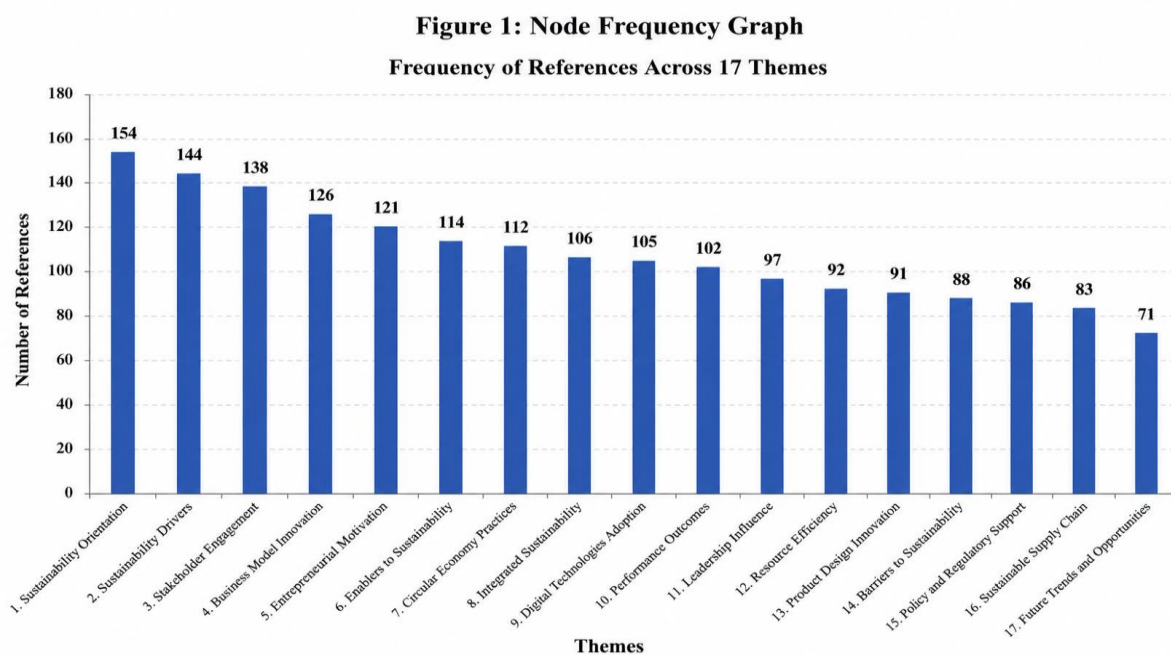


Figure 1: Node Frequency Graph

Source: Author's own work based on NVivo analysis, 2026.

The Node Frequency Graph displays the frequency of coded references for all 17 themes that are identified in the NVivo analysis. Themes like Sustainability Orientation, Stakeholder Engagement and Resource Efficiency will appear most frequently, indicating a high level of interest in sustainability drivers and organisation engagement in born-sustainable start-ups. The themes put forward, such as Barriers to Sustainability, reflect financial, technological, regulatory and operational obstacles, reflecting the practical problems that these start-ups encounter. The Sustainability Drivers theme, on the other hand, highlights the drivers behind sustainability, with the customer demand for ethical products and the awareness of environmental issues as key motivators, followed by the “Founder Commitment” on the business side and the expectations of stakeholders and regulatory pressures. Themes around Business Model Innovation and Circular Economy Practices highlight the need to rethink how value is created, delivered and captured, such as through recycling, upcycling, reuse, repair, resale, and extending the products' life cycles. Digital Technologies and Entrepreneurial Dynamics are moderately represented, placing a strong focus on technology and leadership to drive efficiency, transparency, and stakeholder engagement in operations. Last but not least, the theme of Integrated Sustainability conveys the multi-faceted nature of sustainability integration in start-ups as the vision of a holistic convergence of environmental, social and economic aspects. The Node Frequency Graph then gives a straightforward, data-based description of theme prominence and helps readers to interpret the most salient points in the literature.

4.2.2.2 NVivo Word Cloud

stakeholders
entrepreneurship
management
consumer
transparency
value
design
drivers
barriers
model
companies
policy
circular economy
resource efficiency
waste
recycling
governance
regulation
ethical
value creation
collaboration
competitive advantage
chain
markets
resilience
production
products
life cycle
economic
social
integration
development
opportunities
challenges
supply chain
adoption
green
technology
digital
efficiency
performance
impact
practices
environmental
resources
fashion
industry
sustainability
sustainable
materials
business
strategies

Source: Author's own work based on NVivo analysis, 2026.

4.3 Theme 1: Entrepreneurial Identity and Motivation

Entrepreneurial identity and motivation become key elements in born-sustainable fashion start-ups in the integration of sustainability. The theme reflects the founders' personal values, moral compass, vision and priorities for the start-up, all of which impact the start-up's business model, culture and decision-making. The results of the analysis show that founders do not consider sustainability as an additional activity, but as something that is intrinsic to the venture's purpose from the very beginning and where sustainability values and business values go hand in hand (Henninger et al., 2021; Pedersen et al., 2018).

Founder Motivations and Vision Alignment

Founders' driving motivations include a range of personal values, environmental awareness, and social awareness. It's always stated in the literature that these entrepreneurs want to challenge fast fashion with its negative consequences such as environmental destruction, exploitation of labor, and the inefficiency of resources. The reasons are not only profitability but also to facilitate industry change, which is part of a vision where sustainability is a key part to business development (Geissdoerfer et al., 2018). Vision alignment is manifested in strategic decisions related to product design, sourcing, marketing and supply chain operations. Founders incorporate sustainability into the mission of the organisation, making it clear to their staff and to others, such as consumers, suppliers and investors. This way, sustainability is part of the start-up's sustainability agenda and every business decision supports it and adds to the long-term value creation.

Entrepreneurial Orientation: Proactivity, Innovativeness and Risk-taking

Entrepreneurial orientation is the base of founders' power to translate their motivation into their actionable strategies. A proactive approach is a characteristic of start-ups, as they actively pursue opportunities to innovate in sustainable business models, predicting market trends, and filling gaps found in sustainable fashion. Innovativeness is manifested in the development of new products, new process designs, and new approaches to customers, such as the use of alternative materials, digital platforms, and circular economy. Risk-taking involves founders' efforts to invest in initiatives that have yet to be proven, including using biodegradable materials, upcycling programs, or those that incorporate blockchain for traceability. These aspects of entrepreneurial orientation help start-up businesses manage the market, regulatory, and technological risks and uncertainties, and provide them a competitive edge.

Ethical and Sustainability Commitment

Ethics are an integral part of strategic decision-making. There is a good awareness of social and environmental responsibility, specifically regarding choice of suppliers, production process and operational processes, among the founders. Commitment to sustainability includes fair working practices, buying ethically and transparency in communication with all stakeholders. According to literature, this moral stance stabilizes the consumer's trust in the brand, improves the brand's image and promotes consumer loyalty, which are important for the sustainability of start-ups in competitive and resource-poor markets (Henninger et al., 2021). Moreover, the commitment to sustainability is not unchanging but it is continually adapted to new environmental issues, technological innovations and market feedback, which is indicative of adaptive leadership that takes care of both ethical as well as commercial concerns.

Decision-Making Approach and Strategic Priorities

Born-sustainable start-ups take decisions which are definitely taking economic, social and environmental aspects into consideration. Founders approach the subject of operation, cost considerations and sustainability results in a holistic way. There are many strategic priorities in building circular supply chains, reducing waste and maximising material efficiency and meeting environmental requirements of products. This will allow sustainability to be put into practice across the business from design and procurement, to production and distribution. Sustainability can be integrated with business strategy to build business models which can be adapted to the evolving needs, expectations, regulations and market scenarios.

Organizational Culture

Organizational culture and employee involvement, cooperation and innovation are all affected by the entrepreneurial identity of the employees. Founders' embody values of sustainability and sustainability practices across the organisation and set the tone. Staff uphold these values, making them a part of their ethos – continually striving to improve, acting ethically and solving problems proactively. Individual and organizational values aligned that creates a united working environment, in which employees are more engaged by contributing to sustainability objectives and thus improve the overall operational efficiency. In addition, the commitment of the founders to the sustainability contributes to partnerships and to involving the stakeholders, which gives the business access to resources, skills and market opportunities that further drive the sustainability ambitions of the business.

Connecting with Our Wider Sustainability Ecosystem

The issues of entrepreneurial identity and motivation affect the relationship start-ups have with external actors such as consumers, industry networks and regulators. Founders are actively engaged in sustainability certifications, partnerships and helping to develop sustainability policies, to ensure that their company's activities are integrated into the larger sustainability initiative. The principles of transparency, ethical communication and emphasis on the value to environment and society drive consumers' engagement. This integration will bring uniformity across the start-up, with external standards, in terms of sustainability practices, resulting in greater legitimacy and acceptance of the market.

In summary, it can be said that entrepreneurial identity and motivation is the fundamental mechanism that makes sustainability a 'born sustainable' fashion start-up. The vision, ethics, entrepreneurial attitude and strategic decisions of founders also shape the organizational attitude, attitude of work and attitude of the stakeholders. These start-ups introduce sustainability into their business model, making mission, market positioning and impact align. The theme establishes a strong link between individual founder traits and the structural, cultural and operational embedding of sustainability as an important component in understanding the development and scaling of a fashion business with a sustainable business model.

4.4 Theme 2: Leadership Styles and Organizational Culture

Organizational culture and leadership take on increased importance to implement sustainability in born sustainable start-ups. They shape the uptake, absorption and scaling of sustainability strategies, and thus have a direct effect on the operational and strategic aspects of the business. Literature shows that leadership styles and the culture that is established in a start-up are significant factors in innovation, resource management and stakeholder involvement in sustainability-oriented start-ups.

Transformational and Ethical Leadership

As in any start-up, leaders of sustainable fashion businesses have transformational qualities, they have a vision, they are ethical, and they motivate employees and stakeholders to achieve sustainability. Transformational leaders make it clear what they and the business stands for and the principles by which they operate, thus making sustainability part of the business. Ethical leadership helps to ensure that decisions taken within the organisation are not only in line with regulatory compliance, but also demonstrate moral responsibility for environmental protection, fair labour practices and social equity. Founders can be role models, by setting an example,

they can make it clear that they are committed to sustainability and this commitment is expected to permeate throughout the organisation. Leaders champion ethical practices, building trust and cohesion within the company and inspiring staff to adopt sustainability in their work environment (Burns, 1978; Henninger et al., 2021).

Innovation-driven Culture

Leadership-driven organizational culture has a direct impact on innovation as a principle of sustainability. Opportunities are provided for employees to try out sustainable materials, production processes and product designs. Leaders foster a culture in which creative problem-solving is encouraged, empowering the start-up to adapt to changes in the environment, market dynamics and technological innovations. A culture of innovation encourages the quick uptake of digital technologies, like AI for predictive supply chain management and blockchain for traceability. This culture helps to improve operational efficiency and can also make the start-up more competitive in a market that lacks resources.

Employee Engagement and Empowerment

Leaders include employees in efforts to be sustainable, and allow them the freedom, education, and means to implement innovative, responsible activities. Empowerment creates a feeling of ownership and accountability, which encourages employees to take part in sustainability initiatives, to track environmental performance and to find innovative solutions to implement a circular economy. Engagement also fosters collaboration, communication, and knowledge-sharing among teams, driving tangible operational impact to achieve sustainability objectives. Research shows that this is more likely to lead to continuous improvement, organizational resilience and long-term sustainability performance (Avolio et al., 2004; Geissdoerfer et al., 2018).

Leadership Alignment with Sustainability

Leaders make sure sustainability is considered in strategic planning, resource allocation and monitoring of performance. Choices include selection of suppliers, production processes and investments in sustainable technologies, and are based on environmental, social and economic objectives. With this strategic alignment, Start-ups can integrate sustainability into their business model, and not as an add-on. Examples of this are the choice of suppliers with a certified eco-friendliness profile, optimization of production processes to minimise waste, and

the incorporation of circularity in the management of the product's life cycle. The leadership strategy and sustainability targets match helps to build and strengthen stakeholder confidence and provide financial opportunities, certifications and partnerships that enhance sustainability outcomes.

Effect on Organisational Structure and Decision Making

The organization's system and structure is influenced by leadership style, which is to offer processes and systems to support sustainability. Reporting relationships and hierarchies should allow for cross functional team working and decision-making. Leaders ensure there is good accountability frameworks, sustainability KPIs and monitoring frameworks are in place to measure progress, gaps and to drive continuous improvement. This type of operation reflects sustainability all the way through the business, from the purchase to the production, the marketing and interaction with the customer.

Entrepreneurial Identity and Motivation (Integrated)

The link between leadership and organizational culture is an intrinsic one and is related to entrepreneurial identity and motivation. Their leadership style is inspired by the vision, values and ethical commitments of the founders, which in turn nurtures their culture, which is geared towards sustainability. This integration will guarantee coherence and consistency of the start-up mission, culture, processes and external stakeholders. Leaders share their personal commitments for sustainability into practical plans and then put them into practice, communicate their sustainability targets with staff and stakeholders and ensure sustainability is integrated into the business model.

Promoting outside collaboration and the involvement of stakeholders.

Leadership styles also impact how external relationships are handled, regulatory interactions, and interactions with consumers. Leaders are proactive in seeking partnerships with suppliers, NGOs and industry networks to develop sustainability skills. They help to navigate regulatory frameworks and certifications to ensure compliance, and encourages transparency and ethical standards. Good leadership helps to build brand legitimacy, trust with consumers and drive up uptake of sustainability, across the supply chain.

Finally, the leadership styles and organisational culture are important enablers of sustainability in born-sustainable fashion start-ups. The environment for integrating sustainability is created through transformational and ethical leadership, an innovation-driven culture and employee engagement. Integrating leadership values and priorities with sustainability goals operationalizes sustainability throughout the organization. Leadership is reflected in the structure of the organization, its decision-making processes, and external cooperation, allowing to establish a framework that is conducive to innovation, circularity and long-term sustainability performance. The interaction between leadership, culture and entrepreneurial identity strengthens the start-up's ability to integrate sustainability in a holistic way into the business model, and to build a base for sustainable and scalable operations.

4.5 Theme 3: Sustainable Business Model Innovation

A key mechanism by which born-sustainable fashion start-ups can operationalise their sustainability goals and still stay economically viable, is sustainable business model innovation. This theme investigates the ways in which start-ups are changed, reorganised, and restructured to embed environmental, social and economic aspects in the heart of their business model in the processes of value creation, value delivery and value capture. The literature highlights that sustainability-oriented innovation is not only an operational decision, but also a strategic need to guarantee long term resilience, competitiveness and stakeholder involvement (Geissdoerfer et al., 2018; Evans et al., 2017).

Creating and capturing value through delivering

The innovation of sustainable business models is the innovation in creating, delivering and capturing value of a start-up. Value creation involves the creation of products and services that minimize environmental damage, use sustainable materials and employ ethical labour practices. For example, start-ups are working on creating fabrics that can be degraded, vegan leather and low-impact dyeing processes that have less impact on the environment. Value Delivery is about transparency and traceability within the supply chain and also about engaging directly with consumers. A range of start-ups have embraced digital platforms to communicate their sustainability credentials, so that consumers can make informed ethical purchases. Innovative revenue mechanisms like repair services, resale markets, and subscription to sustainable products and circular production loops, in which economic value can be captured

again and again and the life cycles of products are extended, can also make value capturing possible.

Triple Bottom Line Integration

Start-ups embrace the Triple Bottom Line framework by incorporating environmental, social and economic considerations into their business operations. Ecological, social and profitable aspects are taken into account in the decision making process at the same time. For instance, sourcing decisions are not only looked at in terms of cost efficiency, but also whether they adhere to fair labour standards and have the lowest possible environmental impact. Pricing is an indicator of the willingness to pay for sustainable products and of ethical labour practices. Sustainability should not be an add-on but an integral part of the long-term operational sustainability and market credibility by incorporating the three dimensions.

Implementing a circular business model

Sustainable Business Model Innovation has Circular Economy as its core. To reduce waste and optimise the use of materials, start-ups practice upcycling, recycling, product repair, resale and design for longevity. Closed-loop production systems enable continuous recovery and reuse of materials, while reducing the environmental impact of manufacturing processes. Circular business models also offer economic benefits as they capture value at the end of the lifecycle of a product, thus creating new income streams and decreasing reliance on virgin materials. Leaders apply circular practices in production, distribution and customer engagement in a smart way to make sure that the operation can be scaled and it performs well in the environment.

Revenue streams and market strategies innovation

Another important factor of sustainable business model innovation is revenue model innovation. Start-ups are investigating direct-to-consumer, subscription-based and pay-per-use or product-as-a-service strategies to encourage responsible consumption. This generates multiple revenue streams, providing an economic incentive to the business and the customers to adopt sustainable practices, in addition to the social and environmental benefits. Marketing efforts are aimed at clearly conveying the sustainability message, highlighting ethical sourcing, environmental advantages and social responsibility. They are strategies that help to create a

differentiated brand, develop consumer confidence and foster the adoption of sustainable products in the market.

Scalability and Operational Viability

Sustainable business models are influenced by the design of operations, the management of resources and the adoption of technology, among other factors, and can be scalable. Scalable processes are being used in start-ups, which continue to meet sustainability requirements as production volumes grow. To prevent overproduction, lean manufacturing and digital inventory management, along with predictive analytics, optimizes operational efficiency. Sustainable practices should be flexible and able to evolve to various market circumstances, and allows start-ups to grow without sacrificing environmental and social goals. This operational and strategic design allows start-ups to stay alive and make a contribution to social and environmental objectives.

Strategic Alignment with Entrepreneurial Vision

Sustainable business model innovation is closely related to the founders' entrepreneurial identity and leadership vision. Innovative business models are designed and implemented based on the founders' personal values, ethical focus and long-term sustainability vision. This alignment prevents incoherence of vision, strategy and operational practices. Leaders develop and maintain an environment that promotes innovation and is grounded in ethics and values, enabling employees to be involved in the sustainability work without impacting the business's effectiveness. Combining vision-driven entrepreneurship with business model innovation gives an edge to the start-up and helps to engage stakeholders with the business through partnerships, certifications and consumer confidence.

The use of technology and innovation for integration

Digital technologies are key to creating sustainable business models. There are companies out there who use predictive analytics, demand forecasting and inventory management, also with the help of AI, to reduce overproduction and waste. Trust and transparency can be enhanced by making use of blockchain, as it provides greater traceability and transparency in the supply chain, making it more credible and compliant with regulations. Digital platforms allow for direct communication with the consumers, promoting engagement, feedback and education on sustainable practices. The introduction of technology is thus not an end goal, but rather a means

to enhance the efficiency, scalability and transparency of innovative sustainable business models.

The structure of sustainable business model innovation is therefore the structure where born-sustainable fashion start-ups can make sustainable business thinking come true and turn their sustainability goals into viable business model(s) which can be scaled and will be economically viable. Re-thinking value creation and value delivery, value capture, introduction of the Triple Bottom Line, integration of the concept of the circular economy and the application of technology make sustainability a strategic and operational imperative in the case of start-ups. If product design, supply chain, revenue generation and consumer engagement are all in the sustainability challenge, then sustainable thinking is entrenched in every aspect of the business, as long as it is aligned with the entrepreneurial vision, leadership and innovative business models. This holistic solution equips businesses with solid resilience, impact, and scalable, sustainable operations.

4.6 Theme 4: Digital Technologies for Sustainability

Digital technologies play a crucial role in supporting sustainability integration in born-sustainable fashion start-ups. This theme focuses on the use of high-tech technological tools for transparency, efficiency, circularity and scalability in sustainable business practices. The literature focuses on the role of digital solutions as enablers, highlighting their ability to help start-ups effectively monitor, optimise and communicate their sustainability initiatives (Abbate et al., 2023; Papamichael et al., 2021).

Predictive Analytics and resource optimisation with Artificial Intelligence

Artificial Intelligence (AI) is widely used to improve efficiency and minimize environmental footprint. AI algorithms are used to predict consumer demand, manage inventory, and plan production in start-ups, reducing the risk of overproduction and waste. AI can help in real-time analysis of supply chain data, providing the founder with data-driven insights for decision-making in line with their sustainability goals. For example, predictive analytics can predict trends in consumer demand, which can be used to plan production and raw material consumption for optimal resource use and reduced carbon footprints. The literature contains a strong focus on the fact that AI is not just a technological advancement but a strategic tool to help operationalize sustainability in startups (Schiaroli et al., 2024).

Using Blockchain to provide Transparency and Traceability

The use of Blockchain technology for the transparency of the supply chain and the traceability of products are on the rise. Start-ups are using blockchain to document and certify sourcing, manufacturing and product life cycle data and give consumers and stakeholders verifiable data about sustainability performance. Blockchain ensures that the records are unalterable, improving transparency and reducing the risk of sourcing or mislabelling issues. This technological integration helps to build consumer trust, helps with compliance to regulations, and fosters ethical business practices, which are key elements of born-sustainable ventures (Burnstine et al., 2025).

Platforms are digital tools that enable consumers to access and interact with the market

Digital channels such as e-commerce, social media and DTC platforms are used for transmitting sustainability stories, appealing to an ethical and conscious consumer and encouraging responsible consumption. The platforms offer interactive functions for transparency, storytelling and feedback collection, and start-ups can use them to establish a customer relationship with environmentally and socially conscious customer groups. Digital tools are used to inform consumers about the impact of their choices, involve them in circular business and to stress the social and ethical value of the products of start-ups.

Internet of Things (IoT) and Smart Production Systems.

IoT devices and smart production systems improve resource consumption monitoring and management for manufacturing processes. Energy, water and material waste are monitored with sensors and connected devices, which allow for real-time adjustments to optimize efficiency and minimize impact. Predictive maintenance, downtime minimisation, environmental compliance – IoT integration. Smart systems that can be integrated into production processes can help start-ups to make a measurable contribution towards more sustainable performance without giving up agility.

Incorporating in Circular Economy Practices

Digital technologies can help for the operationalization of circular economy practices. AI, blockchain and digital platforms allow for the control and coordination of recycling, upcycling, extending product life and closed loop production systems. For instance, with digital inventory

tracking, materials can be better managed throughout the product's lifecycle, minimizing waste and maximizing resource value. At the consumer level, using technology can also help foster participation in circular initiatives like return schemes and participatory resale marketplaces, helping to ensure that the circular principles are put into practice.

Difficulties in the adoption of a technology

Digital technologies have a lot of benefits but start-ups face difficulties in adopting these technologies because of financial limitations, lack of technical skills and inadequate infrastructure. The cost of implementing AI, integrating blockchain, and IoT systems can be prohibitive for resource-limited businesses. In addition, the effective implementation of technology should be aligned with the organizational culture, staff skills and strategic goals. Literature emphasizes the need to address these challenges through investment in skills development, strategic partnerships, and incrementally implementing digital solutions (Abbate et al., 2023).

Strategic implications for Sustainability Integration

The use of digital technologies strengthens the strategic goals of born-sustainable fashion start-ups. Technology helps with evidence-based decision making, increases operational efficiency, and allows for scaling of sustainability practices. Start-ups can effectively implement sustainability goals in an integrated way by combining AI, blockchain, IoT, and digital engagement platforms, while also ensuring competitiveness. Digital tools also provide transparency, traceability and accountability, ensuring that stakeholders have confidence and sustainability claims are legitimate.

Finally, digital technologies are important enablers of sustainability in born-sustainable fashion start-ups. AI, blockchain, IoT and digital platforms optimize processes, transparency and consumer interaction, enabling start-up businesses to integrate sustainability in a systematic way into production, distribution and marketing. Although there are issues regarding costs, know-how and infrastructure, technological adoption has been correlated with entrepreneurial vision and leadership, thus helping to implement circular economy practices and quantifiable sustainability results. Digital technologies thus are a strategic and operational tool for implementing sustainable business models, scaling them up and disseminating them to stakeholders.

4.7 Theme 5: Circular Economy Practices

Circular economy practices are one of the key aspects to sustainability operationalization for born sustainable fashion start-ups. This theme focuses on approaches and strategies to minimise waste, enhance resource efficiency, prolong the lifespan of products and embed sustainable principles into the business model. Circularity is much more than an environmental concept: it is a tool and a means of innovation, economic resilience and competitiveness, and can contribute to startups reaching their sustainability goals and becoming financially sustainable (Geissdoerfer et al., 2017; Lacy and Rutqvist, 2015).

Recycling and Upcycling

Recycling and upcycling are the very foundation of the implementation of a circular economy. Recycling is the activity of retrieving materials following their use, in order to be used again in the production of new materials. Upcycling is more than recycling, it is, rather, turning waste materials into something that is of higher quality or value. One way many startups incorporate upcycling is to create handcrafted, unique fashion pieces that demonstrate their innovative approach and commitment to sustainability. These practices ensure a decreased use of virgin resources, less environmental impact, and support global waste reduction efforts. The integration of recycling and upcycling is highlighted in the literature as a way to boost brand perception, consumer interest and long-term resource efficiency (Bocken et al., 2016).

Reuse, Repair, Resale Initiatives

Reuse, repair and resale are ways of thinking about circularity that go beyond production to the consumption phase. Start-ups start repair programmes, consumers join them and products get longer lives and promote sustainable consumption. The resale platforms enable the sales of second-hand products with a closed-loop system and waste minimisation. In fact, these practices can not only deliver environmental benefits but can also create new value sources which shows that sustainability can be linked with economic benefits. Studies have shown that repair and resale programs offer several competitive advantages, including fostering customer loyalty, boosting engagement, and generating tangible savings in material use (Abbate et al., 2023).

Product Life Extension / Design for Longevity

A key aspect of a circular economy is designing for long life. Start-ups focus on durability, modularity, and reparation of products, providing garments that will last and look good over time. Products are designed for durability, reusability, and the possibility of minor repairs, which cuts down on the need for replacement, and thus the amount of materials used. Start-ups are also contributing to sustainable consumption by offering a longer lifespan for use of products, thus lowering the environmental impact. This is reinforced by educational campaigns aimed at promoting the importance of durability and consumer engagement in circular initiatives.

Closed-Loop Production Systems

Closed-loop production systems are adopted to systematically trace materials and reuse them along the value chain. Start-ups develop systems to re-use waste from the production process and keep using it as input in production. Systems are complemented by digital tools and inventory tracking to track material flow and identify opportunities for re-use or upcycling. Closed loop systems are reported to decrease carbon emissions as well as water and energy consumption, whilst increasing operational efficiency and cost-effectiveness (Ellen MacArthur Foundation, 2019).

Consumers participation and engagement

Consumer participation is crucial for the success of circular economy practices. Leveraging return schemes, recycling and resale marketplaces, start-ups engage consumers through loyalty schemes, discounts, and recognition. Digital platforms enable this interaction through easy returns channels, product life cycle tracking, and communicating the sustainability impacts. To support the start-up's sustainability efforts, engaged consumers are part of the circularity process by returning their items, becoming resale customers, and opting for sustainable alternatives.

Incorporation of Business model and Revenue Strategies

Sustainable business model innovation and circular economy practices are closely linked. They can shape the creation, delivery and capturing of value within start-ups. For instance, revenue models change to involve services such as product repair, sustainable clothing subscription and resale. Circular solutions can also enhance the efficiency of the operation, resulting in lower production costs and higher profits, for instance through optimizing material

use and reduction of waste. These strategies fit with the vision of the entrepreneur, reinforcing sustainability objectives and are financially sustainable.

Strategic / Competitive Implications

Start-ups can benefit from the implementation of the circular economy. A successful circular brand is one that is visible in an overcrowded market, appeals to eco-conscious consumers and meets an ever-growing regulatory standard. Circularity also encourages changes in the business model, partnerships with suppliers and partners, and improved business reputation regarding social and environmental responsibility. The literature shows that an early introduction of circular practices puts start-up companies in a strong position to meet the new market needs, environmental legislation, and sustainability certifications (Bocken et al., 2016; Geissdoerfer et al., 2017).

Challenges in Implementation

Implementation of practices of circular economy has some challenges. Resourcing, technological and supply chain issues and consumer behavior barriers may all be limiting factors in adoption. Start-ups typically find it expensive to recycle the infrastructure, tracking systems and to redesign the product. Strategic planning, developing capabilities and partnerships that enable access to circular resources and expertise are necessary to overcome these challenges. The literature indicates that successful businesses have started with actionable measures and gradually scaled up the use of circular practices as they have developed the capacity to implement them (Abbate et al., 2023).

To conclude, circular economy practices are crucial to incorporate sustainability in born-sustainable fashion start-ups. Together, recycling/reuse/repair/repurposing/extended product life and closed-loop systems maximise the efficient use of resources, minimise environmental damage and boost economic outlooks. The effectiveness of these practices is increased by consumer participation and engagement and integrated with the business model for alignment with strategic and operational objectives. The circular approach allows start-ups to obtain tangible sustainability results, gain competitive advantage and put into practice their vision of a more sustainable and moral fashion industry. Therefore, the principles of the circular economy are an essential basis for resilient, scalable and impactful businesses.

4.8 Theme 6: Sustainable Material and Product Innovation

Material and product innovation for sustainability is an important theme in born sustainable fashion start-ups because it is a strategic area for decreasing environmental impact whilst keeping the product functional, aesthetically pleasing and competitive. In this theme, focus is placed on the use of materials that are good for the environment, innovative production methods and design concepts that meet the goals of sustainability and the circular economy. Its literature states that material and product innovation is a key factor in operationalizing sustainability, impacting a product's lifecycle, consumers' perceptions, and competitive differentiation (Henninger et al., 2021; Abbate et al., 2023).

Biodegradable and Organic Fibers are used

The start-ups focus on materials that are biodegradable and made of organic fibers to reduce the impact on the environment. Renewable materials, including organic cotton, hemp, bamboo and others are chosen because of their inherently low chemical use, low water consumption and reduced carbon footprint. Biodegradable fibers make products possible to be naturally decomposed at the end of their lifecycle, which means affecting landfills, soils and water. This material choice is a proactive approach towards sustainability and founders say they take into account the lifecycle of the material in the design, sourcing and production process.

Vegan Leather and Alternative Textiles

The use of vegan leather and other innovative materials like mushroom leather, pineapple fibre and recycled synthetics is a huge advancement in sustainable fashion. These materials provide a great alternative to traditional leather, which is both stylish and useful, while doing no harm to the animals or the environment. Start-up companies are taking advantage of these choices to appeal to the conscious consumer and to promote the adoption of non-animal fashion and consumer demands for animal welfare and environmental requirements. Innovation is the way to find alternative textured products for start-ups to differentiate themselves in competitive markets and remain sustainable.

Environment friendly Dyeing and Finishing Processes

The innovative production techniques are not only about the choice of material, but also about dyeing, finishing and treatment methods, which are environmentally friendly. To minimize water usage, chemical pollution and energy consumption, waterless dyeing technologies, natural dyes and low impact chemical processes are implemented. Digital printing and laser

finishing are other experimental methods that start-ups use to reduce waste and improve efficiency. Through the incorporation of these practices, start-up companies show a dedication to minimizing the environmental effect of the manufacturing process and incorporating sustainability at every stage of the value chain.

The utilization of materials and reduction of waste

Material efficiency is facilitated by careful planning, cutting optimization and resource recovery strategies. Start-ups adopt practices designed to reduce offcuts, reusing materials from the production process and recycling surplus materials to create upcycled products. Waste reduction measures help to save money and support sustainability efforts. According to literature, one important factor to achieve operational sustainability is material optimization, which allows start-ups to reconcile the use of materials, the production cost, and environmental impacts (Bocken et al., 2016).

Innovative Product Design for Circularity

Product design innovation is a key element to make sure that sustainability is incorporated throughout the product life cycle. Start-ups use designs that are modular, repairable and adaptable that enable maintenance, upgrade and recycling. Design strategies include durability, multi-functionality and circular economy partnerships. For example, clothing can be engineered so that its parts can be disassembled and reused or recycled when the garment is no longer in use. These innovations contribute to increased product lifespan, minimisation of environmental impact and to become part of circular business models.

Business Model and Strategic Vision integration

Material and product innovation is in close proximity to the start-up's business model and entrepreneurial vision. Leaders and founders make sure that materials, production methods and design decisions are in line with overall sustainability, ethics and consumer engagement goals. Strategic integration refers to the coherence between operational practice, revenue streams and circular economy initiatives, and thus, the long-term organizational resilience and market relevance.

Challenges in Implementation

Sustainable material and product innovation comes with its challenges, both operational and financial. Alternative materials may be expensive, not readily available, and/or technologically constraining, which may limit the potential of scalability. One of the other challenges for start-ups is to educate consumers to the benefits of sustainable materials and encourage their use and to address scepticism about the quality or durability of the materials. The literature indicates that successful ventures have iterative innovation strategies, which involve investing in research and development, strategic partnerships, and continuous experimentation to overcome these challenges (Henninger et al., 2021; Abbate et al., 2023).

To conclude, sustainable material and product innovation is one of the key elements in operationalizing sustainability in born-sustainable fashion start-ups. Start-ups minimize their environmental footprint through the use of sustainable materials, vegan leather options, organic fibers, and efficient use of materials, while also boosting the functionality and attractiveness of their products. Innovative design for circularity equates to longer product life and a possibility to put in place closed loop business models. While there are obstacles, the embedding of material and product innovation into the business model and the entrepreneurial vision will ensure a coherence with the sustainability goals, efficiency and competitiveness. They offer a concrete roadmap for startups to follow in order to get that environmental, social and economic sustainability while they are at it.

4.9 Theme 7: Environmental Sustainability Performance

Environmental sustainability performance is an important aspect in evaluating the effectiveness of sustainability efforts in born-sustainable fashion start-ups. This theme emphasizes measurable outcomes related to environmental impact, resource efficiency and sustainability criteria, providing a glimpse into the actual ecological benefits that can be linked to operational actions and decision-making (Geissdoerfer et al., 2017; Papamichael et al., 2021).

Carbon Footprint Reduction

Start-ups take action to reduce carbon emissions related to their value chain. This involves the use of low impact materials, the optimization of logistics and transportation as well as the inclusion of energy-efficient manufacturing processes. The carbon reduction strategies are frequently evaluated in terms of the impact of their emissions during the life cycle, from the acquisition of the raw materials, to the production, to the distribution and to the end of life disposal. The literature points out that businesses that can show a measurable carbon footprint

have a greater chance of increasing their brand credibility, attracting customers who are conscious about the environment and falling into line with the global climate pledges, including the Paris Agreement (Henninger et al., 2021).

Energy and Water Efficiency

Energy and water management are part of a company's operational sustainability. Start ups use energy-efficient production technologies, renewable energy solutions, and optimized heating, ventilation and lighting systems to decrease energy use. Closed loop systems and water recycling technologies along with eco friendly dyeing processes minimize water usage. The benefits are that these reduce environmental impact, lower operational cost and improve the sustainability of resources. Research has shown that proactive energy and water management plays a crucial role in sustainable start-ups' ecological and economic performance (Bocken et al., 2016; Lacy and Rutqvist, 2015).

Waste Management and Pollution Control

Environmental performance is strongly geared towards waste reduction and pollution control. To discourage the build-up of waste in landfills, start-ups are implementing circular economy practices such as recycling, upcycling, and the reuse of production waste. The use of chemicals is controlled and wherever possible, the use of environmentally friendly chemicals is used in order to minimize pollution of the water and soil. Digital monitoring and IoT-enabled tracking systems enable start-ups to track waste generation, pinpoint inefficiencies, and adjust production processes to reduce waste. The literature highlights the importance of systematic management of waste and pollution for the sustainability of the operations and the compliance with the regulations (Abbate et al., 2023).

Environmental Metrics and Monitoring

In order to assess the environmental performance, start-ups use various metrics and monitoring frameworks. These include carbon intensity per unit produced, water used per piece of clothing, material efficiency ratios and waste diversion rates. Data collection and analysis facilitate ongoing development, decision-making and stakeholder transparency, including for investors, regulators and consumers. The monitoring can also strengthen legitimacy and market positioning through certifications like Global Organic Textile Standard (GOTS), Fair Trade and ISO environmental standards.

Strategic integration with Business Model and Leadership

Environmental sustainability performance has a strong connection with leadership, the organizational culture and innovation of business models. Energy, water and waste reduction is implemented in the light of the Founders' strategic priorities and entrepreneurial vision. By incorporating sustainability into the design and procurement of new products, into the production process itself, into distribution and into the management of the product's end-of-life, operational integration ensures that sustainability performance is not a separate effort but integrated into every part of the business. Leaders create a culture of accountability, empowering employees to play an active role in environmental goals and innovation projects that promote a more sustainable outcome.

Challenges and Opportunities

Even if they are willing, start-up companies face difficulties in reaching environmental performance targets. Financial constraints, lack of expertise and reliance on suppliers can hinder progress. Start-ups solve these problems by forming partnerships, investing in technology, and by making incremental improvements in production and operations. This enables enterprises to improve their environmental performance gradually without compromising their competitiveness and profitability.

To conclude, environmental sustainability performance is the indicator of the sustainability activities that can be found in born-sustainable fashion start-ups. Start-ups show measurable ecological impact through their carbon reduction measures, energy and water optimisation, waste and pollution management, and environmental measurement. Environmental Performance, Leadership, Business Model Innovation and Organisation Culture are all integrated so that the sustainability goals are "operationalised" along the value chain. These practices are important for building the long-term resilience, competitiveness and compliance with the international sustainability standards, which the operational execution is vital to.

4.10 Theme 8: Consumer Awareness and Behavior

Consumer awareness and behaviour are a key factor in the success of sustainability measures in born-sustainable fashion start-ups. This theme focuses on consumers' knowledge, attitudes, and behaviors with respect to the uptake of sustainable products, the operationalization of circular and environmental-friendly practices. This literature highlights that consumers are

drivers and enablers of sustainability, and that they have an impact on the demand for products and services, as well as on brand strategy and the reinforcement of responsible business models (Henninger et al., 2021; Papamichael et al., 2021).

Natural Environment Awareness and Environmental Ethic Direction

Consumers' environmental awareness is one of the main reasons for people to buy sustainable fashion products. The study shows that there are consumers who are aware of the ethical aspects and actively look for brands that are committed to reducing environmental impact, fair working practices and sustainable materials. Awareness raising, transparencies in sourcing and the communication of environmental performance improves the consumers' understanding of sustainability. Affected by the environment, literature indicates that individuals with high environmental consciousness have more robust preferences for products that are ethical and environmental friendly, thus creating a market incentive for start-ups to evolve responsibly (Evans et al., 2017).

Sustainable Consumption Patterns

The consumer behavior mirrors the new trend of sustainable consumption, such as less buying, preference for durable goods and participation in resale or circular economy. Reflecting the goals of circular and sustainable business models, consumers are demanding more quality, durability and environmental considerations than ever before, while paying less attention to cost. Such behavior helps start-ups explore new concepts in product design, product lifecycle management and marketing strategies. For instance, modular and repairable clothing is in line with consumer interest in durability and decreases the rate of resource depletion. Research also shows that sustainable consumption by consumers increases the effectiveness of the application of the circular economy and plays a role in quantifiable environmental impacts (Bocken et al., 2016).

Barriers to Adoption

Although there is an increasing awareness, there are multiple obstacles that prevent the adoption of sustainable fashion. Some common challenges are the higher prices for sustainable products, availability, lack of knowledge, and skepticism about the environmental claims. Consumers might not be willing to pay more for a "green" garment or not believe what brands say about their sustainability. In an attempt to overcome the difficulties, start-ups offer

incentives and discounts, loyalty programs, recycling programs, and inform customers about the advantages and disadvantages of transparent communication.

Consumer Engagement and Education Strategies are available.

Consumer involvement and consumer education is needed for the support of sustainable behaviours. Startups are leveraging digital platforms, social media and direct-to-consumer avenues to connect with customers and educate them on the environmental, sustainable and ethical impacts. Interactive campaigns, storytelling and transparency in reporting, which are used in the presentation of supply chain practices, increase consumer confidence and help them to make informed choices. Continuous engagement and education are stressed in the literature as essential towards maintaining consumer support of sustainability and building brand credibility (Abbate et al., 2023).

Influences on Brand Strategy and Market Positioning

Consumer awareness and behaviour directly affect start-ups' brand strategy and market positioning. Communicating sustainability messages and making products more aligned with consumer values result in improved market differentiation, consumer loyalty and willingness-to-pay for companies that are successful. Consumer behaviour knowledge is used to inform product and marketing strategies and practices with the aim of influencing the right target groups for sustainability actions, which can be operational. The impact of start-ups on market penetration, reputation capital and competitive advantage depends on their reaction to the expectations of a consumer.

Business Model and Circular Practices Integration.

Consumer engagement supports circular economy and business model innovation, through feedback loops that strengthen sustainable practices. For repurposed items, repair and resale programs, it is important to engage the consumer in an active way. Digital tools can help with monitoring product life cycles, incentivizing responsible actions and tracking them to support these activities. The start-ups use these insights to design more sustainable business models that are aligned with consumer behaviour, in terms of revenue models, marketing strategies and operational planning.

As a conclusion, consumer awareness and behaviour are part of the operationalization of sustainability in born-sustainable fashion start-ups. Circular consumers are environmentally and ethically aware and demand-oriented consumers who influence both the design and production of sustainable products and enable the implementation of a circular economy. Educational, transparency, and engagement help overcome barriers of cost, lack of knowledge and skepticism. Start-ups can leverage consumer insights, business model innovation and product development to attain better sustainability performance, efficiency and differentiation. Consumer behaviour, thus, serves as a catalyst and reinforcing mechanism that makes sustainability part of the operational and strategic aspects of the venture.

4.11 Theme 9: Market and Industry Dynamics

Market and industry dynamics are one of the key components that have a great impact on born-sustainable fashion start-ups' operations and decisions. This theme explores how external influences, competition, regulatory frameworks, and consumer expectations impact the sector and influence the adoption of sustainable practices and innovation. The literature highlights that the market and industry conditions can bring not only opportunities, but also challenges for start-ups, which impact their implementation of sustainability initiatives (Henninger et al., 2021; Papamichael et al., 2021).

Understanding the regulatory environment and compliance requirements.

Start-ups deal with a complex regulatory environment, including environmental requirements, work regulations and industrial certificates. To be legitimate, acceptable in the market and continue operating, one must abide by the regulatory authorities, including environmental impact assessment, limitations on chemical use, fair labor practices, and eco-labelling. Regulatory pressures are also a driver for sustainable innovation, pushing startups to implement sustainable materials, production methods and circular economy practices. There are studies which suggest that proactive interaction with policies can aid start-ups in anticipating policy changes, reduce legal risks, and adapt to best practices (Geissdoerfer et al., 2017).

Understanding the competitive forces and positioning your business in the market

Sustainable fashion start-ups take strategies that are dependent on the competitive dynamics. Differentiation from traditional fast fashion brands and other sustainable brands pushes the innovation of product design, material, business model, and customer-engagement.

Sustainability has become a differentiator for start-ups with a focus on environmental impact, ethical sourcing and circularity to appeal to eco-conscious consumers. According to literature, companies that do include sustainability in their market positioning have a greater brand recognition, customer loyalty and competitive advantage, especially in niche markets with informed and value-driven consumers (Bocken et al., 2016).

The changing trends and demands of consumers

Consumer preferences can have a profound effect on the dynamics of a market. The consumer wants transparency, ethically sourced products, and products that are responsible to the environment. There are also awareness programmes, social media interaction, and sustainability certifications that impact consumers and put pressure on those seeking sustainable fashion products. Start-ups react to these trends by adapting its product, marketing and operations to the changing consumer expectations. Literature indicates that consumer behaviour can provide start-ups with valuable information for predicting demand, managing stock control, and crafting messages that reinforce sustainability concerns (Abbate et al., 2023).

Connecting with other industry networks and collaborations

Start-ups are able to better deal with the dynamics of the market through participation in industry networks, alliances and partnerships. Involving suppliers, NGOs, trade associations, and sustainability-focused organizations to provide access to resources, knowledge, and technical expertise. These networks are used by start-ups to understand industry trends, to follow best practices and to access certification programmes. The literature emphasizes that cooperation in strategic partnerships helps increase operational capacity, promotes the use of innovative practices and improves credibility in the eyes of consumers and stakeholders (Evans et al., 2017).

The dynamics of the supply chain and access to resources

A key element to comprehending industry dynamics is supply chain. Sustainable raw materials, supply chain reliability and logistics efficiency have an impact on the start-up's ability to adopt circular and environmentally friendly processes. Operating decisions and profitability are affected by the market conditions such as material costs and availability of competing textiles. Start-ups are creating solutions to reduce supply chain risks, such as

diversifying suppliers, creating local sourcing networks and investing in supply chain monitoring technologies like blockchain for traceability and transparency.

Market entry opportunities and challenges

The market entry and scaling strategy is impacted by opportunities and challenges in the industry. The opportunities include a growing consumer demand for sustainable products, an opportunity to become a niche market leader, a sustainable finance opportunity and positive regulatory incentives. Challenges are the existence of established brands and the rising costs of sustainable materials production, and consumer uncertainty about whether sustainability claims are genuine. Start-ups face these challenges through strategic positioning of their brand, effective communication of the value proposition to stakeholders, and the utilization of technology.

The integration with Business Model and Sustainability Strategy is supported by the following actions:

Sustainable business models are shaped and developed based on market and industry dynamics. Start-ups synchronize their activities, business models and product developments with the environment to make them relevant, scalable and sustainable. Knowing the industry forces enables founders to make strategic choices on material sourcing, product design, integration of the circular economy and digital technology. When internal resources and capabilities are aligned with the external market dynamics, this reinforces the resilience, competitiveness and longer-term sustainability outcomes.

Overall, market and industry dynamics are a key determinant of born-sustainable fashion start-ups sustainability strategies. All these factors shape decisions about operations, innovation and positioning in the industry and value chain, which are influenced jointly by regulatory requirements, competitive pressures, changing consumer preferences, industry networks, and supply chain constraints. In fact, those start-ups that react effectively to these dynamics, seize them and transfer them into their business model, practice circular principles and implement technological solutions to increase the sustainability performance are the ones who are successful. Knowing how to work in an environment, the conditions and challenges that can be faced, can help businesses align their strategy, operations, and sustainability goals to ensure environmental and business viability.

4.12 Theme 10: Operational Challenges and Resource Constraints

For born-sustainable fashion start-ups, operational difficulties and resource limitations can be key obstacles in successfully incorporating sustainability measures into their operations. The barriers include financial, material, technological, human, and process related constraints which affect the start-up's capacity to turn sustainability targets into actual results. To create strategies that consider sustainability, profitability and long-term growth, understanding these constraints is essential (Henninger et al., 2021; Bocken et al., 2016).

A tight budget and price pressures

One key challenge faced by start-ups is the price of sustainable materials, sustainable production methods and circular economy practices. The use of organic fibres, biodegradable textiles or alternative materials often leads to higher production costs due to their higher price. Technological solutions need a large investment, especially in the area of AI predictive analytics, blockchain supply chain tracking and IoT resource monitoring, which can be hard to come by in early stage businesses. The financial limitations also frequently mean that start-up companies may focus more on one aspect of sustainability than another, which may impact the progress of comprehensive environmental solutions. Literature highlights the importance of careful financial planning, green funding and phased investments as important measures to address these challenges (Abbate et al., 2023).

Limits on the availability of materials and the supply chain

Sustainable materials can be difficult to access and start-ups often have issues with their supply chains. Production schedules may also be affected by limited suppliers, quality issues, and geographical factors, which can lead to increased risks in the production process. It introduces more complexity in the fact that all materials must be environmental and ethical. Building good relationships with suppliers, finding local sourcing networks, and diversifying supply chains to minimize vulnerability are often key elements for start-ups. Literature highlights the importance of a reliable, ethical and sustainable supply chain for quality of the product and sustainability performance (Geissdoerfer et al., 2017).

Technology and Infrastructure Issues

Adopting sustainable practices may involve investing in cutting-edge technologies, such as digital production tools, monitoring systems, and platforms for managing the circular economy. Limited access to these technologies may be due to cost, expertise or infrastructure constraints in start-ups. Proper resources management, waste reduction and process optimization may be jeopardized without the necessary tools. According to the literature, some of the important ways for overcoming technological limitation include partnerships, incremental adoption of the technology, and targeted capacity building (Papamichael et al., 2021).

Limited human resources and skills

Operation of sustainability initiatives requires skilled human capital. A lack of employees who have the skills to work with sustainable materials, circular design, digital tools and ethics of production are common challenges for start-ups. Such constraints can slow the rate of development and adoption of more environmentally responsible practices, innovation and process optimisation. To overcome these hurdles, start-ups invest in employee's training, cross-functional teams and collaborative networks to gain access to knowledge and develop organizational skills. By involving employees in sustainability education and encouraging them to think innovatively, their capacity to effectively contribute to operational objectives is also strengthened (Abbate et al., 2023).

Operational Complexity and Process Integration.

Implementing sustainability from day to day makes production, logistics and management processes more complicated. Implementing the circular economy, greening production methods, and implementing digital monitoring, etc., means that you have to redesign processes, work flows and coordinate various functions. Implementations can be slow with start-ups and may experience bottlenecks and inefficiencies. The literature indicates that a phased implementation, continuous monitoring and standardization of processes can be an effective way to control the operational complexity whilst still achieving sustainability goals (Bocken et al., 2016).

Strategies and Mitigation Strategies

Despite these challenges, start-ups have strategic solutions to reduce the resource and operation constraints. By concentrating on projects that have a large impact on sustainability, establishing partnerships with suppliers and technologies and using digital solutions, start-ups can save

resources. By working in small increments and continuously learning and adapting, Ventures are able to slowly scale up sustainable practices. The strategies ensure that sustainability will be achieved, that operational feasibility is ensured and that costs are not too high for start-ups to make a difference and become resilient.

Connects with Leadership, Culture and Business Model

Operational issues are closely related to issues of leadership, organisational culture and knowledge of a business model. Good leadership facilitates prioritisation, decision-making and resource allocation to overcome constraints without jeopardising sustainability goals. An innovative, collaborative, problem-solving culture allows employees to find solutions and adopt sustainable practices even when resources are scarce. Furthermore, sustainable business models are based on the fact that business constraints are integrated in the design, which allows matching strategy, capabilities and market conditions.

To conclude, operational issues and limited resources are important aspects to look at when considering sustainability implementation in born-sustainable fashion start-ups. Important barriers to scale sustainability practices include financial constraints, supply chain challenges and complexities, technological gaps, human resource shortages, and process integration challenges. But with strategic planning, partnerships, incremental technology adoption, workforce development and adaptive management, start-ups can successfully navigate these challenges. Operational constraints must be addressed to achieve environmental, social and economic goals while ensuring resilience, efficiency and long-term sustainability of start-ups and maintaining competitiveness.

4.13 Theme 11: Slow Fashion and Ethical Consumption

Born-sustainable fashion start-ups have a basic approach to sustainability that applies to both production and consumption: slow fashion and ethical consumption. This theme will focus on the operation, strategy and consumer-side aspects of slow fashion, including the actions of start-ups to integrate ethics into their business models and how they can involve consumers in sustainable consumption. For the literature reveals that the concept of slow fashion is not simply one of design, but is also a tool to connect business strategy with environment and social sustainability targets, as well as a source for competitive advantages and market legitimisation (Henninger et al., 2021; Bocken et al., 2016).

Focus on Long Lasting and Quality Products

Slow fashion start-ups favor long-lasting and well-made products to help prolong the life cycle of clothing. Start-ups minimize the obsolescence of their products and the resources used because they use strong fabrics, modularity, and “repairable” parts. These durable products not only help reduce the impact on the environment but also instill consumer trust and brand loyalty. By focusing on quality instead of quantity, this gives customers a chance to make deliberate choices and purchase decisions that will help them to adopt a more sustainable consumption, in line with the overall sustainability goal of the start-up (Pedersen et al., 2018).

Spreading the Word about Responsible Shopping.

Ethical consumption is an element that takes into account the environmental, social and labor impacts that lead consumers in their choices. Start-ups make consumers aware of the ecological footprint of clothes, the positive effects of sustainable materials and the social consequences of the production process. Labeling, certifications and telling the story creates transparency and thus, responsible action. Literature also points out that ethically oriented consumers are willing to engage with brands with real environmental and social concerns, thus providing market incentives for start-ups to uphold high ethical standards (Abbate et al., 2023).

Connecting with Circular Economy and Product Lifecycle

Slow fashion is a part of circular economy. The increased lifespan and re-use of products and garments through the introduction of repairability and upcycling programs help to minimize waste and environmental impact. Closed loop systems are adopted by start-ups, where they promote the return, repair, and selling of products in the second-hand market. Loyalty programmes, incentives and education are all essential if the consumer wants to participate in these programmes. The research emphasizes the need to combine slow fashion and circular practice to increase resource efficiency and reduce environmental impacts while ensuring that business operations are in line with sustainability goals (Geissdoerfer et al., 2017).

Consumer Engagement/education

Education of consumers is key to the process of slow fashion uptake. Start-ups use digital platforms, social media and direct marketing to educate the consumer of the value of durability, responsible production and circular consumption. Educational campaigns showcase the

positive environmental impact of buying ethically and teaching people how to care for, repair and reuse their garments. Literature suggests that the more consumers are informed, the more likely that they will adopt sustainable behaviours, take part in circular initiatives and share their voice for sustainable brands, thus extending the potential impact of slow fashion strategies (Papamichael et al., 2021).

Market positioning and competitive advantage

Having a slow fashion mindset enables start-ups to stand out in saturated markets. Sustainable, ethical labour practices and durability are valued by green and socially aware consumers and brands. This positioning helps to justify a high price, increase customer loyalty and boost the brand's reputation. Slow fashion is built into the value proposition and marketing stories of start-ups and ethical branding is used to share the social and environmental impact of their products. The literature has highlighted that the strategic positioning helps ensure sustainability, financial performance and consumer involvement (Evans et al., 2017).

Challenges and operational considerations

While there are benefits, there are challenges with slow fashion. The high costs of producing durable materials that are ethical, lack of consumer awareness, and limitation of the supply chain may limit scalability. Slow fashion can be seen as more costly or less available to the consumer, and start-ups need to be efficient in their operations while still practicing ethical ones. In order to overcome these issues, start-ups employ specific communication strategies, incremental production strategies and strategic supplier and technology partnerships. As another suggestion in the literature, the way to overcome operational and market barriers is by implementing things in an iterative manner and engaging with the consumer.

Strategic Considerations; Long-term Effects

Slow Fashion and Ethical consumption strategies contribute to a synergistic effect on sustainability performance. Overall, start-ups gain a tangible impact on the environment, build consumer confidence, and reap economic rewards due to their customers' loyalty and unique offerings in the market by focusing on sustainability, ethical sourcing, and responsible consumption. With circular economy practices integrated in the process, clothes and fabrics continue to be utilized, promoting resource efficiency and minimizing waste. When slow fashion values are integrated into business strategy, leadership vision, and how business is

conducted, then there is increased resilience, scalability and longer term sustainability outcomes.

In the end, a slow fashion and ethical consumption is part of the sustainability in born-sustainable fashion start-ups. Focus on the quality and durability of products, encouraging ethical consumption, implementing circular practices and educating and communicating with consumers are important ways to implement sustainability in start-ups. Despite challenges such as cost, complexity in the supply chain and consumer adoption, strategic management, focused communication and progressive implementation ensure alignment of sustainability goals with operational performance. Being environmentally and socially responsible is not the only benefit of slow fashion, it's also an opportunity to make your brand stand out, boost customer loyalty and keep your outfit competitive in the market and create meaningful and lasting sustainable businesses.

4.14 Theme 12: Innovation and Value Creation

Born sustainable fashion start-up companies are a key element of the innovation and value creation in sustainable fashion. In this theme, the idea of start-ups and their ability to create economic, social and environmental value is explored in many different dimensions; innovative products, processes, business models and the engagement of diverse stakeholders. Innovation is a strategic and an operational tool that can help ventures achieve sustainability goals, as well as stand out in saturated markets (Geissdoerfer et al., 2018; Bocken et al., 2016).

Innovation in Products and Services

In the start-up world, products and services are continually innovated to generate sustainable value. Product innovations involve use of biodegradable materials, recycled materials, modular design for easy repair, and multifunctional use to maximize the use of products. These innovations minimize environmental footprint, conserve resources, and improve the durability and satisfaction of the products. Service innovations such as repair, rental, subscription and resale platforms allow to achieve circularity and make start-ups capable of prolonging the use life of their products and generate new income streams. The literature indicates that the innovation of the product or service directly contributes to enhancing the level of consumer engagement, loyalty, and the differentiation of the market (Henninger et al., 2021).

Operational and Process Innovation

Operational innovations increase efficiency, reduce waste and build sustainability into everyday business activity. This encompasses lean manufacturing methods, waste-free cutting strategies, digital stock management, and AI-driven forecasting and analysis to streamline resources and reduce environmental footprint. AI, for instance, can forecast demand trends, preventing overproduction and eliminating excess stock, while digital tracking of the supply chain supplies transparency and guarantees adherence to sustainability norms. Process innovation also makes it easier to apply circular economy principles as efficient recycling, upcycling and resource recovery can be integrated into the production process (Abbate et al., 2023).

Business model innovation for value capture

Start-ups can capture economic, social and environmental value simultaneously with innovative business models. Models like circular, direct-to-consumer and service-oriented offerings connect revenues with sustainability outcomes. Strategies include resale, repair services, and product-as-a-service to extend value creation. Sustainability is a part of the start-up's business model design, making environmental and social goals not an independent project, but part of the process of decisions and operations. Evans et al. (2017) cite that, for long-term competitiveness and operation viability, business model innovation is key.

Use of digital technologies across the curriculum.

The digital technologies increase the value creation and innovation through efficiency, traceability and consumer engagement. Blockchain provides information security and transparency in the supply chain and product authenticity, while IoT devices track resource consumption and performance of operation. AI optimises production, cuts material waste and helps with predictive logistics. Digital platforms offer opportunities to involve consumers in repair, re-use, and sustainable living projects. Literature highlights that combining technology with innovative practices results in greater impact of sustainability strategies, greater scalability and greater consumer trust (Papamichael et al., 2021).

Stakeholder engagement and co-creation.

Instead, stakeholder engagement is one of the key elements that can help maximize the value-creation. Start-ups are co-creators of sustainable products, services and business processes with suppliers, NGOs, industry networks and consumers. Consumers are involved in participatory

design, feedback mechanisms and educational programs, which guarantees that the offerings are both demanded and compliant with sustainability. Suppliers add in expertise of sustainable materials and processes, NGOs offer guidance and verification of social and environmental initiatives. The literature points out that co-creation brings about legitimacy, social capital and the effectiveness of innovation in sustainable ventures (Henninger et al., 2021).

Innovation and Value creation challenges

However, innovation is not without its problems, such as money, availability of materials, technological limitations and barriers to market uptake. High cost of sustainable materials, lack of consumer awareness and scepticism over eco-claims can hinder adoption. These can be addressed by start-ups by creating a phased implementation, strategic partnerships, utilising digital solutions and engaging with consumers in a targeted way. The importance of iterative and adaptive innovation is highlighted in the literature as a key strategy for solving operational, financial and market challenges and achieving sustainability goals (Abbate et al., 2023).

Strategic Implications

The start-up's strategic positioning and sustainability performance is closely related to innovation and value creation. Incorporating innovation in a start-up's product, process and business models has several benefits, including reducing environmental impact, increasing operational efficiency, attracting consumer interest, and generating economic viability. Innovation efforts are strategically aligned with the entrepreneurial vision, providing coherence, scalability and resilience. Literature highlights that innovation and sustainability are strategically combined ventures that are likely to gain competitive advantage and sustain market success (Geissdoerfer et al., 2018).

Finally, innovation and value creation act as the key enablers for born-sustainable fashion start-ups to not only manage sustainability, but also to meet strategic and economic goals. Start-ups innovate through product, service, process and business model to build multidimensional value for environmental, social and economic purposes. Digital technologies, stakeholder co-creation and iterative approaches improve sustainability initiatives effectiveness, scalability and legitimacy. While financial, material and market constraints pose challenges, innovation helps ensure sustainability is integrated systemically throughout the venture, providing a foundation for long-term resilience, competitive difference and impact-driven growth.

4.15 Theme 13: Performance Measurement and Impact Assessment

It is important to measure and assess the performance of sustainability efforts in born-sustainable fashion start-ups. This theme explores the ways in which start-ups track, measure and communicate sustainability results to ensure that they meet their environmental, social and economic goals. Systematic measurement is an integral part of accountability, continuous improvement and strategic decision making, both as an internal reflection and external validation (Geissdoerfer et al., 2017; Henninger et al., 2021).

Environmental Performance Metrics

There are a number of metrics used to assess the environmental impact of startups, including carbon footprint, energy usage and consumption, water usage and consumption, material efficiency and diversion rate. The quantification of environmental impacts can be done in several ways, such as the life cycle assessment (LCA) of materials, of production processes and distribution of products. In addition, start-up companies measure circularity indicators like the share of recycled material, return rates of products and volumes of re-used or upcycled products. The ability to quantify data allows start-ups to demonstrate inefficiencies, ensure optimal use of resources and demonstrate environmental responsibility to customers, investors and regulatory bodies.

Social Performance Metrics

Sustainability metrics such as ethical labor practices, compliance with fair wages and employee participation are signs of social impact. Start-ups can track diversity and inclusion efforts, worker safety and community engagement programs. The indicators ensure that the social responsibility becomes part of the activity and corporate culture. Previous research indicates that measurement activities contribute to establishing it as legitimate, help to strengthen brand reputation, and foster its alignment with international sustainable development frameworks, such as the United Nations Sustainable Development Goals (UN SDGs) (Abbate et al., 2023).

Economic and Financial Metrics

Not only is the environmental and social impact assessed, but also the economic aspect of sustainability. Cost savings from resource efficiency, revenue from sustainable products, profitability of circular business models, ROI of sustainability projects. By monitoring both

economic and environmental/social impacts, start-ups can guarantee their business viability while aligning with sustainability goals. Literature emphasises the importance of incorporating economic, social and environmental indicators to balance trade-offs and to make informed strategic decisions for start-ups (Bocken et al., 2016).

Digital Tools and monitoring systems

Systematic performance measurement and impact assessment through digital technologies. Monitoring resource use, supply chain compliance, and circularity outcomes for start-ups can be done by using software platforms, IoT sensors, AI-based analytics, and blockchain. Real-time data collection and visualization help to continuously improve, proactively manage risks and make informed decisions. Digital tools also help ensure that stakeholder reporting is transparent, increasing trust and credibility. While literature highlights technology integration as an important factor in scaling measurement, it also points out the need to maintain accuracy, consistency, and comparability among the operational units (Papamichael et al., 2021).

Difficulties with Measuring and Reporting

Although there are these advantages, start-ups face problems related to performance measurement. Data collection might be resource intensive, inconsistent, or technology constrained. Many new sustainable materials and circular practices may not have a standardized metric. Also, there is a need to be transparent, credible and follow recognised frameworks in relation to reporting and communicating performance to stakeholders. Start-ups combat these issues by embracing an iterative monitoring approach, engaging in industry networks and using digital tools to increase the reliability and accessibility of data.

Linking to decision making.

Performance measurement and impact assessment feed into the strategic decision making process, and helps start-up prioritize initiatives, allocate resources effectively and identify areas for improvement. There are indicators to guide decisions regarding production processes, sourcing of materials and circularity and market positioning practices. Leaders use measurement systems to synchronize business models, enhance business processes and boost sustainability outcomes. Literature states that incorporating performance information in strategic planning ensures sustainable action's resilience, scalability and overall effect (Henninger et al., 2021).

Finally, performance indicators and impact evaluation are crucial to hold start-ups accountable, increase operational efficiencies and confirm sustainability results in a born-sustainable way. Start-ups enhance their sustainability by measuring environmental, social and economic metrics, using digital tools and incorporating sustainability into strategic planning. Systematic assessment can facilitate continuous improvement, foster stakeholder trust and create opportunities for sustainability activities to be scaled up, despite the difficulties in data collection and reporting. Thus, performance measurement can be said to be a management tool and a strategic lever to link sustainability objectives to operational and market outcomes.

4.16 Theme 14: Regulatory and Policy Environment

Regulatory and policy frameworks are crucial to influencing the sustainability approaches of born-sustainable fashion start-ups. This theme explores the role that governmental regulations, industry standards, certifications, and policy frameworks play in operational decisions, product design and market positioning. The literature emphasizes that regulations are not only a legal requirement, but also a tool to create credibility and consumer trust, and to match international sustainability standards (Geissdoerfer et al., 2017; Henninger et al., 2021).

Compliance with Environmental Regulations

In the case of start-ups, there are a number of complex policies and regulations in the environment that target pollution reduction, natural resources and responsible sourcing of materials. It is important to ensure that legislation on the use of chemicals, emissions, waste management and sustainable production practices is followed. Compliance with regulations on water usage, chemical dyes, textile waste, etc., from the beginning gives their activities a level of legitimacy and avoids fines against them for not following rules. The literature reports that proactive compliance is beneficial to the credibility of brands, the positioning in the market and the commitment to the conservation of the environment (Abbate et al., 2023).

Industry Standards and Certifications are addressed

There are various criteria for sustainable running, such as Global Organic Textile Standard (GOTS), OEKO-TEX, Fair Trade and ISO environmental standards. These standards are used to guide start-ups in their selection of materials, in their use of production processes and working ethically. The certifications demonstrate compliance and instill assurance in customers regarding sustainability. Literature supports that compliance brings about commercial and

social advantages with relevance to certified ventures being more likely to attract ethically conscious consumers, investors and strategic partners (Bocken et al., 2016).

Policy Incentives and Market Facilitation

Start-ups can be helped to follow sustainable practices by government policies and incentives. Financial support is provided in terms of grants, subsidies and tax incentives for sustainable production, for the adoption of renewable energy and for circular economy projects, reducing the cost of innovation. In addition, policies such as sustainable consumption and ethical trade, as well as eco-labeling, open up market opportunities for sustainable products, by encouraging consumer preferences. The importance of policy incentives as enablers to overcome operational barriers and speed up the uptake of sustainable business models is highlighted in literature.

The operational and strategic implications of regulation

Regulations affect the way the business operates as well as their decision making. Compliance with standards and regulation is a fundamental condition for startups to take care of sourcing, production and logistics, making sure that they are ethically and environmentally responsible. Regulatory compliance drives strategic planning such as material selection, technology and product design. Start-ups monitor in advance the developments regarding policies and act accordingly. Research underscores the importance of regulatory alignment to improve sustainability outcomes with time and mitigate operating risk (Papamichael et al., 2021).

The difficulties in dealing with the regulatory environment

There are regulations and policies which provide guidance, but can also pose challenges for start-ups. Compliance costs may increase with long, complex and/or evolving laws; product development may be delayed and require specialized expertise. A small business may not be able to navigate the legalities of doing business well and this may hinder progress and development. To mitigate these challenges, start-ups look to invest in regulatory intelligence, join the industry associations, and put in place monitoring mechanisms to guarantee compliance and smooth operation of business (Henninger et al., 2021).

Support for Sustainability Strategy

The regulatory and policy world is tightly connected with the overall sustainability agenda of start-ups. Compliance and certification processes strengthen environmental and social objectives, improve market legitimacy and facilitate involvement of stakeholders. Regulatory aspects are incorporated into business models, business operations and innovation projects and external requirements are aligned with the internal aims for sustainability. This integration allows start-ups to make sustainability an integral part of their operations, reduce risks and gain a competitive edge.

Last but not least, regulations and policy can have a significant impact on the sustainability practices of born sustainable fashion startups. Legitimacy, operational efficiency and market credibility are ensured by compliance with environmental laws, adherence to and compliance with industry standards, and the use of policy incentives. Monitoring, strategic adaptation, and partnerships are all emerging as key ways to help start-up companies face regulatory complexity proactively and in an innovative manner, while also working towards circular economy and sustainable business models. Awareness and utilization of the regulatory framework is crucial to not only environmental, social and economic goals, but also to remain competitive and operationally resilient.

4.18 Theme 16: Technological Adoption and Capability Development

Technology adoption and capability building is a key enabling factor for born-sustainable fashion start-ups to gain sustainability and operational efficiency. This theme aims to show how advanced technologies, when combined with human and organisational capacity, enable startups to bring in a circular economy in their businesses, and optimise resource use and improve business competitiveness. It is noted by the literature that the use of technology is not only an operational tool, but a strategic tool as well: it can contribute to the development of sustainable practices, stimulate new developments and strengthen the resilience of organizations (Papamichael et al., 2021; Abbate et al., 2023).

Applications of Digital and Smart Technologies

Digital technologies are being used by start-ups more and more to support their processes and track sustainability performance. AI is leveraged to forecast demand and trends, optimize inventory, and reduce overproduction and waste. The blockchain technology provides visibility and transparency throughout the supply chain, enabling the verification of sourcing practices and environmental compliance. IoT (Internet of Things) devices monitor energy, water and

waste generation in real-time at plants. These technologies can be integrated to enable start-ups to make data-driven decisions that improve operational efficiency while helping to promote circular and sustainable practices. Literature highlights the need for technology integration to achieve scale-up of sustainable practices and to stay competitive in resource-limited settings (Henninger et al., 2021).

Capability Development and skills Acquisition

Internal capabilities should be developed in order to be able to adopt the technology successfully. Start-ups invest to develop the skills of employees in the areas of digital technologies, sustainable production techniques, circular economy management and supply chain analytics. Staff training, workshops, and knowledge-sharing sessions are used to make sure that employees understand how to use technological tools in the best way to streamline processes and minimize environmental effects. Literature suggests that capability building can lead to greater agility in organisations, more efficient processes, and can help ensure that investments in technology drive tangible benefits towards sustainability (Evans et al., 2017).

Organizational Learning and Knowledge Management

Start-ups create an environment of learning to encourage technology development and adoption. Knowledge management systems capture best practices, monitor performance, and help to share knowledge between team members. Organizational learning helps to find inefficiencies, make course corrections, and continue to improve processes. This way, technology adoption becomes sustainable, flexible and integrated within operation processes and not just as one-off projects. Organisational learning is a crucial aspect of sustaining innovation and its long-term sustainability impact (Geissdoerfer et al., 2018).

Strategically Aligning Technology with Sustainability Goals.

Adoption of technology is planned in line with the start-up's sustainability goals and business vision. The focus on investments includes AI, blockchain, IoT, and digital platforms for improving circular practices, optimizing resources, and tracking environmental impacts. Through technology, strategic decisions can be made with real-time access to the production efficiency, resource usage and the product life cycle results. Such alignment is essential because adopting digital is not a stand-alone project and should be integrated within the broader sustainability approach (Abbate et al., 2023).

Creating opportunities for reaching the Circular Economy and Innovation

Technological possibilities are key to implementing the principles of circular economy, as in the case of start-up businesses. For instance, digital platforms help to monitor material flows for recycling and upcycling, and predictive analytics optimize inventories to minimize waste. IoT sensor devices are used to track energy and water usage, reducing the need to use resources. These technologies also enable innovation through the insights they can offer that can be used to design products, to improve processes, and even to explore new service models. Various studies have pointed to the value that technology oriented circular practices have on the environment and on operational performances and that they have measurable impacts on the value chain (Bocken et al., 2016).

Technological Adoption issues

Despite all the benefits, start-ups are struggling with the adoption and leveraging of technologies. Adoption can be restricted by high cost, lack of technical skill and having to integrate with existing processes. In addition, for small startups, it could be difficult to keep the technology up to date, the complexities of data or scaling technology solutions. However, to address these challenges, ventures adopt a phased approach to implementing, strategic partnerships, and ongoing training and capability building. In literature, it is reported that the implementation of iterative process is critical and should be aligned with the organization's strategy in order to achieve the desired impact of sustainability and operational efficiency (Papamichael et al., 2021).

Strategic and Competitive implications

Adoption and capability development of technology provides a great strategic advantage. Start-up firms, with a digital and technical enabled approach will be able to streamline their processes, reduce their environmental footprint and to implement new business models in an efficient way. Not only do these features enhance competitiveness, but they also enable a differentiation from other businesses on the market, and fulfill the evolving consumer demand for transparency, ethical sourcing and circularity. Technological sophistication alongside skilled human capital, are key enablers for scaling sustainable practices and sustain long-term growth as suggested in the literature (Henninger et al., 2021).

In short, technology adoption and capability development are important enablers for born-sustainable fashion start-ups to become sustainable, innovative and efficient in their operations. AI, blockchain, IoT and digital platforms are used by start-ups to improve resource efficiencies, circular practices and processes. At the same time, it is also important to build the capability to make effective use of these technologies through employees, organizational systems etc. Regardless of the hurdles, from financial to technical, when technologies are aligned with sustainability goals, start-ups can make a measurable difference in the environment, in operations and in being competitive. The technological capabilities can also be used as instruments of operations and as enablers of innovation and effective implementation of sustainability, which promotes resilience.

4.19 Theme 17: Environmental and Social Risk Management

Born-sustainable fashion start-ups should include environmental and social risk management as one of its core components of a sustainability strategy. In this theme, students will explore how enterprises recognize, evaluate, and manage risks to the environment, to resources, to labour and to local communities. The importance of systematic risk management for operational resilience, brand protection and alignment of sustainability with long-term organisational goals are all emphasised in the literature (Henninger et al., 2021; Geissdoerfer et al., 2017).

Highlighting environmental and social risks

Start-up businesses proactively consider potential risks throughout production, supply chain and market operations. The environmental risks are overproduction of carbon, excessive usage of water and energy, the presence of chemical pollution and accumulation of waste. Social risks include labour exploitation, lack of adherence to ethical standards and impact on the community. Regulatory mandates, industry standards and sustainability frameworks will often be used to guide risk identification. According to literature, if the risks are identified in the early stages of start-up development, preventive measures can be put in place to minimize the potential for operational, reputational, and financial losses (Abbate et al., 2023).

Assessment and Prioritization

Structured assessments are then carried out by start-ups to gauge the severity, probability and potential impact of risks identified. Environmental audits, social impact assessments and

lifecycle analyses are examples of tools that give quantitative and qualitative information on the exposure to risk. With prioritization, one can allocate resources to tackle the most critical risks first and ensure that the operation is focused and mitigation is effective. Literature highlights the importance of both environmental and social aspects in risk assessment, which is a key component of sustainability management and links to the holistic approach of sustainability management (Bocken et al., 2016).

Mitigation Strategies and Operational Practices

Startups use a variety of mitigation approaches that meet environmental and social risks. Environmental mitigation involves for example the adoption of circular practices, energy-efficient production, sustainable sourcing and waste reduction. Social mitigation includes implementation of labour standards, ethical supplier selection, fair compensation, education of workers and community engagement programmes. Digital technologies, such as blockchain to track the supply chain or IoT to monitor resource usage, can help mitigate risk by giving real-time data and facilitating corrective actions. Studies in the literature have pointed out that the effectiveness of mitigation contributes to increasing resilience, decreasing liability and strengthening the credibility of the brand (Henninger et al., 2021, Papamichael et al., 2021).

Monitoring, Reporting and Continuous Improvement

Risk management is an ongoing process that is facilitated by monitoring and reporting systems. Key performance indicators (KPIs) are monitored for environmental impact, social compliance and circular practices and used in operational and strategic decision making in start-ups. The reporting, to stakeholders such as investors, consumers and regulatory bodies, provides transparency and accountability. A continuous iteration of cycles of data and feedback enables start-ups to continually improve their risk mitigation measures and improve sustainability performance over time (Geissdoerfer et al., 2018).

Linkage with Strategic and Operational Planning

Environmental and social risk management is embedded within strategic decision making, business model design and within operational processes. Leaders coordinate the risk mitigation efforts in line with entrepreneurial vision, sustainability goals and market positioning. Risk management is a key input to product design, sourcing of materials, process innovation and stakeholder involvement. As pointed out in the literature, it is important to ensure that

sustainability practices are (Evans et al., 2017) resilient to shocks, flexible to regulations, and in line with long-term strategic goals.

Risk Management issues

Although there are advantages, environmental and social risks are challenging for startups. Risk identification and mitigation may be difficult due to limited resources, small scale of the operation, complex value chains, and difficulty of collecting data. Furthermore, the regulatory environment and market demands continue to change, necessitating ongoing changes. To address these challenges, start-ups adopt a phased risk management approach, adopt technology and cooperate with industry networks, NGOs, and experts to improve the effectiveness and reliability (Abbate et al., 2023).

The strategic implications and competitive advantage

Strategic and competitive edge through good environmental and social risk management. Risk identification and management are important to minimize disruptions, adhere to regulations, and build reputation for start-up companies. Risk-aware businesses are resilient, have customers who are ethically aware and enjoy investor and stakeholder trust. According to literature, innovation, technological adoption, and business model design are three key components that, when coupled with risk management, strengthen the scalability and sustainability of operations (Henninger et al., 2021).

In conclusion, environmental and social risk management is a key component of the born-sustainable fashion start-ups' sustainability strategy. By identifying, estimating, reducing and monitoring environmental and social risks, start-ups can boost their resilience, meet regulations and protect their brand. Incorporating risk management, technological deployment, and circular elements into strategic planning and careful business decisions can lead to real sustainability outcomes for start-ups, without compromising competitiveness. While overcoming these obstacles, systematic risk management offers a framework for sustaining, being resilient, and achieving impactful growth in line with the venture's goal of responsible and sustainable fashion production.

4.20 Summary

Chapter 4 is an in-depth analysis of the integration of sustainability in born-sustainable fashion companies, which is presented in 17 interconnected themes. Thematic analysis gives a detailed understanding on the combined influence of the entrepreneurial, operational, technological, and market factors on sustainable business practices. All themes provide information on how, what and which sustainability is incorporated into the value chain of start-ups, how this can be achieved and what obstacles may exist.

Firstly, an analysis of entrepreneurial identity and motivation shows that the ethical orientation, vision alignment and proactivity to make decisions are the core of how sustainability can be integrated. Leadership styles and organizational culture are closely interrelated and transformational and ethical leadership are important drivers for innovation, employee engagement, and an organizational culture that promotes sustainable practices.

Sustainable business model innovation is a key theme, as startups reimagine the ways in which a value is created, delivered and captured, thereby integrating environmental, social and economic goals. Digital technology is used to help achieve operational efficiency, transparency and circularity, as well as to facilitate innovation and engagement with stakeholders, such as AI, blockchain and IoT. Recycling, upcycling, product life extension and closed-loop systems are examples of how the circular economy is being put into practice, showing integration of production and consumption processes in sustainability strategies.

Material and product innovation is key to sustainability – biodegradable fibres, alternative fabrics, eco-friendly dyeing and thinking about durability and reparability. Environmental sustainability performance is measured by the reduction of carbon footprint, energy and water efficiency and waste management and supports this with metrics and monitoring frameworks for continuous improvement. The market demand, responsible consumption and participation in circular practices are related to consumer awareness and behaviour, which can be used to account for this influence.

Market and industry developments are also a factor in strategic positioning, regulation and operational planning, whereas operational challenges and resource restrictions emphasise the barriers and constraints for start-ups in scaling sustainable measures. Slow fashion and ethical consumption provide a framework to rethink the production and consumption patterns as part of sustainability, emphasizing durability and ethics and educating consumers. The development

of product, process and business model occurs in the form of innovation and value creation based on multi dimensional value that is the value of environment, social and economic.

Performance measurement and impact assessment provides accountability by having measurable indicators which inform operational decision making, strategic planning and reporting to stakeholders. Financial and market incentives enable resource allocation, adoption of circularity and consumer engagement while regulatory and policy environment provides frameworks for compliance, certifications and market incentives. Technological adoption and capability development helps start-ups unlock the potential of AI, IoT, blockchain and other technologies and build their internal capacity to scale their implementation of sustainability. Last, environmental and social risk management builds resilience, assists in the identification and management of operational risks and strengthens legitimacy and trust of a stakeholder.

The 17 themes as a whole suggest that sustainability born in born-sustainable fashion start-ups is multi-layered and requires embedding entrepreneurial vision, leadership, technological innovation, circularity, consumer involvement and regulatory aspects. The results show that implementing sustainability is an ongoing and cyclical process dependent on the internal competence, market situation, and expectations of the stakeholders. The chapter also provides good examples of how all these factors interact and how they define start-ups with regard to environmental, social and economic needs; this will serve as a foundation for further discussion and theory in Chapter 5.

CHAPTER 5: DISCUSSION

5.1 Introduction

The result of the empirical study is detailed in Chapter 5, in direct reference with the research objectives and research questions from chapter 1. This chapter aims to provide interpretation of the data, identify the important patterns to observe, consider the relationships between the variables, and to achieve an understanding of how 'born sustainable' start-ups live sustainable lives. This chapter brings the findings into the theoretical aspects and previous literature and offers academic and practical implications.

The discussion is structured in line with the five research objectives, such that a detailed response to the specific research question is provided under each individual research objective. Objective 1 is to investigate the entrepreneurial intent and entrepreneurial leadership styles; it will be examined how sustainability is adopted by the vision, the ethical orientation and strategic decision-making of the entrepreneurs. Objective 2 discusses how digital technologies such as AI, blockchain and IoT can be used to achieve operational efficiency, transparency and circularity. Objective 3 concerns the integration of the circular economy and sustainable material and product innovation which emphasises approaches that minimise waste, increase resource efficiency and enable product longevity. Objective 4 addresses operational, resource, regulatory and market constraints, and financial incentives that impact the sustainability performance of start-ups. Last, Objective 5 ties together the trends and patterns of innovation, value creation, performance measurement, risk management and consumer behavior in relation to overall sustainability results.

Interconnectedness of themes is also highlighted in this chapter. Many findings can be found in different objectives, for example technological adoption impacts circular practices and operational efficiency, leadership styles impacts innovation, culture and risk management etc. The chapter covers these interdependencies to give a detailed view of the implementation of sustainability at strategic and operational levels.

Additionally, the potential theoretical and practical implications of the results are discussed. Theoretically, the study can be used to provide literature on sustainable entrepreneurship, implementation of circular economy and the integration of digital technology in start-ups. For the practical purposes of the findings, it could provide learnings to founders, managers and policy makers on ways to increase sustainability adoption at the initial stages of new business

formation. In addition, this chapter highlights areas of gaps, challenges and opportunities, which form the bases for the final conclusions, recommendations and contributions presented in later sections of this chapter.

In conclusion, Chapter 5 ties the empirical results in Chapter 4 to the study's goals, research questions and theory. It gives a detailed interpretation of the findings, contextualized in the context of the other findings by highlighting the interplay of entrepreneurial vision, leadership, technological adoption, circularity and markets in shaping sustainability integration in born-sustainable fashion start-ups. The chapter aims to provide a foundation for the integration of the findings into recommendations, theory, and further research.

5.2 Discussion on the Role of Entrepreneurial Motivations and Leadership Styles in Shaping Sustainability-Driven Business Models

The first research objective explores how founder personal identity and intrinsic motivation and leadership style affects founder adoption and operationalization of sustainability practices in start-ups. The results of Chapter 4 suggest that founders' moral disposition and social and environmental responsibility are key enablers for integration of sustainability in the organizational ecosystem. Themes 1 and 2 show that entrepreneurial identity is not a symbolic element but it has a clear connection with strategies and priorities in operations, as well as in the creation of a culture of sustainability in the organisation.

They all share a common focus on sustainability, and common practices include sustainable materials, the circular economy and resource-efficient production. Their personal values are then turned into tangible action programs, impacting on product development, sourcing materials, supplier relations and operational processes. This is in line with the Resource-Based View (RBV) theory where entrepreneurial competencies and entrepreneurial leadership behaviours are considered as strategic resources that can help start-ups to stand out in the competitive market and attain the long-term sustainability goals (Evans et al., 2017; Geissdoerfer et al., 2018).

It is not just about money, it's about the environment, ethics and social responsibility as well. Founders want to make a positive difference to society, build brand credibility and gain the backing of groups of ethical consumers. This inbuilt motivation will help to incorporate sustainability into the business strategy and not as a side activity. As seen in Chapter 4 findings, there are several sustainability-focused entrepreneurs who are taking steps towards upcycling

and repair, investing in more durable products and educating the public about ethical consumption by implementing open and honest communication.

Leadership style is a key factor in turning the entrepreneurial identity into action in an organisation. Transformational and ethical leadership promotes engagement, innovation and accountability within employees, resulting in active involvement in sustainability efforts. Leaders who engage in sustainable personal behavior actively encourage their employees to behave in a resource-efficient way, participate in a circular economy and constantly innovate. The literature suggests that leadership plays a pivotal role between entrepreneurial vision and the resulting actions in the company, highlighting the importance of leadership to influence the organizational culture and employee behavior (Henninger et al., 2021).

Leadership, identity, and organizational culture are key factors to consider. The results in Chapter 4 suggest that when founders' values and strategic goals are similar, they have the potential to create a culture in the start-up that focuses on sustainability in decision making, problem solving and innovation. The workplaces in these settings are provided with the authority to suggest ideas for sustainable working, to look into new ways of producing and to use digital technology to track resource consumption and environmental impact. This combination of founder identity, leadership and culture will increase the commitment of the organization to sustainability and will help amplify the effectiveness of the operational measures.

Furthermore, there will be an emphasis on practical implications in the discussion. In the early stages of sustainable start-ups, leadership development training, instilling ethical values and making sustainability a key principle of the organization promotes the adoption of sustainable practices. The use of founders' identity and ethical motivation can be used as a way to build trust and credibility, as well as for stakeholder engagement and for improving long term performance of the organization.

Finally, Objective 1 reveals that entrepreneurial identity, entrepreneurial motivations and entrepreneurial leadership styles are key enablers in the integration of sustainability in born-sustainable fashion start-ups. The results indicate that founders' ethical orientation, their intrinsic motivation and leadership can directly impact on the organizational culture, work practices and implementation of sustainability-oriented business models. The findings respond to RQ1, thereby supporting theories like RBV and transformational leadership theory and

giving actionable recommendations to the founders with the goal of systematically integrating sustainability in start-up ventures.

5.3 Discussion on the Impact of Digital Technologies on Operational Efficiency, Supply Chain Transparency, and Consumer Engagement

The second research aim examines the transformative effect of digital technologies and the technological capabilities of organizations in the operational, strategic and market dimensions of sustainability practices. As mentioned in Chapter 4 findings especially in Themes 4 and 16, technology adoption for operational efficiency, circular economy and real-time monitoring of environmental performance is key.

The analysis shows that start-ups use Artificial Intelligence (AI) to predict and forecast demand and optimize their inventory. These AI-powered applications minimize overproduction, avoid waste of resources and boost the effectiveness of the supply chain. Start-ups can use ‘predictive demand models’ for instance, to match market demand with production, reducing overproduction and its environmental footprint. Likewise, blockchain is being used to track and trace, for ethical sourcing, environmental compliance, and sustainability claim verification. Blockchain offers stakeholders (consumers, regulators, investors) verifiable data of the origin of the material and the life cycle impact of the product, increasing credibility and trust.

Real-time monitoring of energy, water and material use is possible through the use of IoT-enabled systems, and with digital monitoring tools. By having sensors in place throughout the production process, any inefficiencies can be detected instantly and corrective measures can be taken to minimize waste and optimize resources. Start-ups implement dashboards and reporting functionality to measure KPIs, circularity metrics, and to measure transparency for sustainability audit. The literature suggests that the synergy of AI, IoT and digital platforms enhances operational agility, facilitates strategic decision-making and magnifies the sustainability impact (Henninger et al., 2021; Papamichael et al., 2021).

The results further highlight the need for capability development, in addition to technological adoption. Skilled workforce, training initiatives, and knowledge-sharing are essential for the effective implementation of AI, blockchain, and IoT. The technological skills of employees enable them to interpret data correctly, take corrective actions and participate in process innovation. The results in Chapter 4 show that start-ups that intentionally work on these competencies are more likely to be more circular, more efficient and more sustainable.

Literature supports the idea that technological capability acts as a mediator between the digitization of tools and their use as a sustainability intervention (Geissdoerfer et al., 2018).

In addition, the link between digital technologies and organizational strategies guarantees the technologies are adopted in line with sustainability goals. Digital tools feed into the product design as well as the choice of materials and process improvement projects. For example, AI analytics can help inform the use of eco-friendly materials, predicting their impact, and blockchain can provide supply chain traceability. Digital platforms also support stakeholder engagement, offering consumers a chance to engage in circular projects, give feedback on the sustainability of products and transparent information on the product life cycle. This is an example of the use of technology as part of the operations and as a strategic enabler.

Issues related to the adoption of technologies are also discussed. Adoption can be constrained by the cost of adoption, lack of technical skills and because they need to be integrated into an existing process. Small start-ups might not have the means to maintain digital infrastructure, to process complex data, or to scale up solutions during operations. To overcome these hurdles, startups adapt to a phased roll out, partner with technology companies, and offer ongoing training. The importance of these adaptive strategies has been highlighted in the literature to fully harness the potential of digital technologies in operationalizing sustainability (Abbate et al., 2023).

In conclusion, the importance of digital technologies and technological capabilities make Objective 2 an essential part of embedding sustainability in born sustainable fashion start-ups. AI, blockchain, IoT and digital platforms empower start-ups to work smart, make circularity and enable informed decision making. Capability development is essential to the effective use of these technologies, and to the adoption of sustainability benefits. The results answer RQ2 and support the theories of technology as a strategic resource and for start-ups wanting to use digital innovation to integrate sustainability.

5.4 Discussion on the Integration of Circular Economy Principles into Business Models and Environmental Sustainability

The third research objective is about the operationalisation of the circular economy and the sustainable selection of materials in start-ups and the role of product innovation for environmental performance, resource efficiency and organisational sustainability. The findings of these strategies, presented in Chapter 4, under Themes 5 and 6, indicate that these strategies

are a crucial part of the work to address aspects of environmental impact, resource maximisation and creation of high quality sustainable products to satisfy the consumers' expectations of sustainable products.

The analysis has shown the start-ups proactively adopt the circular economy strategies, including the product repair and refurbishment schemes, take-back schemes, recycling and upcycling of textile waste. The practices are integrated into the design, production and distribution stage in order to gain a longer duration of use of the resources. Not only can startups save money and reduce energy and waste consumption, but they can also streamline their operations and create environmental benefits. The literature points towards the circular economy (CE) as a strategic enabler for sustainable businesses both for ecological and economic objectives (Geissdoerfer et al., 2017; Bocken et al., 2016).

Also innovation of sustainable products plays a major role. Start-ups create products that use organic cotton, recycled fabrics, and biodegradable fibres to create a more eco-friendly material. Product design strategies are based on designing products for modularity, durability and multifunctionality, thereby extending the life cycle. For example, clothes made for patching and modular construction mean that they don't need to be changed as often and promote responsible consumption. The findings in Chapter 4 prove that companies that place emphasis on these innovations also gain consumer trust and engagement, which further strengthens their environmental and market differentiation.

Furthermore, operational alignment is crucial to be able to reap the full benefit of circular economy and product innovation. Startups are using digital technologies, internet of things (IoT) sensors, and data analysis to track material flows, evaluate production efficiency, and analyze the environmental impact. These tools can be used to get real-time insights, which can help in making continuous improvements in resource utilization, waste reduction and product lifecycle management. Operational integration is mentioned in the literature as a prerequisite for ensuring that the circularity and product innovation are sustainable, scalable and systematic part of the business model (Henninger et al., 2021; Papamichael et al., 2021).

Stakeholder engagement and collaboration is also highlighted. Consumers engage in repair initiatives, product return options and awareness campaigns, and suppliers offer access to sustainable materials and knowledge of sustainable production techniques. Working with NGOs and industry partners can facilitate the sharing of knowledge and verification of ethical

standards and the adoption of best practices. Stakeholder co-creation has been found to boost the power of circular economy efforts and create trust and uptake of sustainable products (Evans et al., 2017).

However, there are problems and limitations to be overcome. The transition to a circular economy is difficult for various reasons, including high costs of sustainable materials, technical challenges and the complexity of the supply chain. Strategic sourcing, stepped implementation of new practices and capability investments are all ways to tackle these challenges at start-ups. This may require a degree of operational agility as well as strategic foresight to achieve such while meeting sustainability and financial viability goals as seen in literature.

Finally, Objective 3 showcases the role of the circular economy and sustainable product innovation as enablers to integrate sustainability in born sustainable fashion start-ups. All of these practices reduce environmental impacts and enhance organizations' resource efficiency, and increase their environmental resilience and competitiveness. Findings answer RQ3, which confirmed that operationally implementing circularity and innovation is key to measurable sustainability impacts. These practices can yield long-term environmental, consumer and, ultimately, business benefits, providing the start-ups with a strategic pathway towards sustainable innovation.

5.5 Discussion on the Barriers and Drivers Influencing the Integration of Sustainability Practices

The fourth research objective examines how inner limitations of operations, lack of resources and outer environmental factors as regulatory context and market dynamics affect the introduction and scaling of sustainability measures in start-ups. The findings in Chapter 4 evidence that start-ups are motivated to adopt sustainability practices and have a strong strategic intent to do so; however, the effectiveness, scope, and pace of adoption may be influenced by operational and contextual constraints as detailed in Themes 9, 10, 14 and 15 in Chapter 4.

Finances are identified as an important constraint. The expense of implementing sustainable technologies in production, obtaining sustainability certifications and the purchase of eco-friendly raw materials are all greater for start-ups. Lack of capital and early stage funding can limit the ability for a company to conduct thorough sustainability measures. Results suggest that start-ups are more motivated to create interventions with high impact and are also much

better at using financial and market incentives available to them – such as grants, subsidies and green funding opportunities – to defy cost barriers. The literature supports the fact that financial capability plays an important role in feasibility and scaling up sustainability-oriented operations in small and emerging businesses (Abbate et al., 2023; Bocken et al., 2016).

There are other challenges due to the complexity of operations. The adoption of circular economy principles, energy and water monitoring, digital technologies and the management of sustainable supply chains involve a huge amount of coordination and training of the workforce, as well as redesign of processes. These challenges can be compounded by small teams, limited technical expertise and technical infrastructure. To embed sustainability into day to day operations, start-ups use phased implementation strategies, standardize processes and use digital monitoring tools to increase efficiency and minimize error.

Other factors outside of the business, including government requirements and market incentives, affect decision-making and feasibility of operations. Respect for environmental regulations, working standards and industry certifications give legal legitimacy and minimize the risk of penalties and penalties, and help build trust among stakeholders. Adoption of innovative circular and sustainable practices is incentivized by market factors such as recognition through eco-labelling, consumer demand for sustainable products and competitive edge. The results of Chapter 4 suggest that start-ups intentionally combine these external drivers to strengthen sustainability impacts, boost operational efficiency as well as market acceptance (Henninger et al., 2021; Evans et al., 2017).

The internal challenge to operations and the external environment is important. Lack of funding and resources can hinder technology adoption, implementation of the circular economy and slow down innovation. Conversely, regulations and/or market incentives can drive change in how the operation is done, to a common level of processes and a sustainable intervention. To address these dynamics, it is important that start-ups adopt a structured planning process, focus on key initiatives that would have the most impact, build partnerships and monitor performance on an ongoing basis to ensure that the operations are both efficient and are in compliance with sustainability guidelines.

Further, there are theoretical and practical consequences of these challenges. Theoretically, they emphasize the mediating effect of operational and contextual factors between the entrepreneurial vision and the technological adoption and sustainability results. From a

practical perspective, they state that start-ups need the ability to adapt, to strategically allocate resources and to operationalize sustainability in an environment which places new demands on the company. Operational constraints and external enablers make sure that the implementation of circular economy practices and their sustainable production and ethical business practices can be done in the real context and can be scaled.

Overall, Objective 4 shows that operational issues, resource limitations and external influences all have an impact on the uptake and success of sustainability practices by born-sustainable fashion start-ups. These factors impact strategic planning, operational effectiveness and sustainability results – thus confirming the RQ4 that start-ups need to manage internal and external constraints systematically to achieve measurable sustainability results. This is not only beneficial for the long-term sustainability goals of the venture, but also for its resilience and scalability, as well as its ability to adapt to future changes.

5.6 Discussion on the Integrated Understanding of Entrepreneurial Dynamics, Digital Innovation, and Circular Economy Principles for Sustainable Scaling

As the fifth research objective, it seeks to understand the relationship between stakeholder behavior and the way start-ups incorporate innovation, value creation and systematic evaluation mechanisms to achieve greater sustainability outcomes. The results of Chapter 4 (Themes 8, 11, 12, 13, and 17) indicate that these factors are interdependent and are the drivers of effectiveness, scalability and impact of sustainability practices in operational and strategic dimensions.

Analysis shows that innovation and value creation are key to sustainability goals. Start-ups introduce product/service innovations of environmental, social and economic value. Technological innovations involve products that have a long lifespan, are easy to repair, and can be used for other purposes; business models are based on circular economy; and service-oriented concepts include the subscription and resale models. This not only improves environmental outcomes but also boosts brand image, drives in a new consumer base that values ethical products, and can create new revenue streams. The literature indicates that innovation can be used as a strategic and operational lever to enable start-ups to combine sustainability with competitive advantage (Henninger et al., 2021; Bocken et al., 2016).

Performance measurement and impact assessment (IAs) help start-ups measure, quantify and enhance their sustainability results. Carbon footprint reduction, energy and water efficiency,

material use and social compliance indicators are examples of metrics that can give actionable insights on the effectiveness of sustainability initiatives. The research presented in Chapter 4 revealed that start-up companies with a strong measurement system are more likely to detect inefficiencies, improve processes and provide stakeholders with the means to hold them accountable. There is a strong focus on the literature regarding the importance of systematic performance evaluation to reinforce credibility, provide a basis for decision making and facilitate continuous improvement (Abbate et al., 2023; Papamichael et al., 2021).

Risk management for the environment and society is also very important. Start-ups take proactive measures to recognize potential environmental and social risks, evaluate them and implement mitigation measures. These encompass responsible employment practices, adherence to regulations, tracking the use of resources and having open reporting systems. The research results presented in Chapter 4 show that risk management will contribute to operational resilience, reduce the effects of failure and protect the reputation of the organisation. The literature emphasizes that embedding risk management in sustainability programmes will improve strategic and operational results (Henninger et al., 2021).

Consumer behavior and engagement are also a key factor in sustainability outcomes. Start-ups communicate with consumers by educating them, raising awareness and offering interactive platforms to encourage consumers to act ethically, return products and participate in circular economy initiatives. Chapter 4 shows that consumers' knowledge and involvement are an integral part of sustainability's success, where they can help to increase product uptake, the product's lifespan, and brand loyalty. The literature has proved that consumer participation is an important factor contributing to circularity and sustainable business (Evans et al., 2017).

Together these elements illustrate the multi-dimensional aspect of the integration of sustainability. Innovation is creating products and services to support and respond to sustainability needs; performance measurement and risk management provide accountability and ongoing improvement; and the involvement of consumers allows impact to be amplified and adoption accelerated. Startups that masterfully weave these elements can secure tangible environmental, social and economic impact, and further distinguish themselves and operate efficiently.

Finally, Objective 5 shows how innovation, value creation, performance measurement, risk management and consumer behaviour are linked enablers to integrate sustainability in born-

sustainable fashion start-ups. They all contribute to greater operational efficiency, better environmental and social results and boost market credibility. The results answer RQ5, stating that all these elements need to be combined to get to a full sustainability result and build a resilient, scalable and impactful business model.

5.7 Combined Answer to Research Questions

The results of Objectives 1–5 are summarized and a more in-depth discussion follows on the integration of sustainability in born-sustainable fashion start-ups. Each paragraph focuses on a research dimension, and themes from chapter 4 (theoretical framework), operational insights and implications for practice are integrated to create an all-round understanding of sustainability practices.

As the first research question demonstrates, entrepreneurial identity, intrinsic motivations and leadership styles play a crucial role in the development of sustainability-oriented business models. Themes 1 and 2 in Chapter 4 show that founders with good ethics and a strong sense of responsibility towards the environment intentionally integrate sustainability into their business. Their own values affect the design of a product, the choice of materials, its supply chain, its branding and how it interacts with customers. Transformational and ethical leadership is important to create an environment of innovation, cooperation and responsibility among employees, which facilitates the introduction of circular practices and sustainability initiatives. The study validates the Resource-Based View (RBV) in the field of entrepreneurship that links leadership and entrepreneurial identity as strategic resources for giving companies a competitive advantage and directions for its operations. Additionally, mission-led leaders put in the effort to meet their long-term environmental objectives, transparency, and ethical sourcing, even if they are operationally complex or financially costly. This means that sustainable integration is not an accidental phenomenon of the organization, but intentional based on the founding values, vision and behaviour of the leadership. In practical terms, the results indicate that for the start-ups to reach more sustainable results, the leadership development, mission and ethical decision-making processes have to be integrated into the company's strategy.

The second research question substantiates the fact that digital technologies and technological capabilities are very much enablers in operationalizing and scaling sustainability practices. AI applications can be used to forecast and predict demand and optimise inventory, which can

reduce overproduction and material waste as described in Chapter 4 Themes 4 and 16. It can be leveraged to enhance transparency and traceability in the supply chain, certifying ethical sourcing practices and boosting consumer trust in sustainability claims, using blockchain. Energy, water and material usage are monitored in real time by IoT and other digital tools that offer actionable insights to inform operational changes and ongoing improvements. The research also provides insights into organizational capability development, including staff capacity development, knowledge sharing and technical skills development, needed to mobilize digital technologies effectively. The literature reveals that technological adoption is a mediating factor between a strategic sustainability vision and operational realization, meaning that without the necessary human and organizational competences, the potential of digital solutions can not be realized. The strategic incorporation of these technologies by start-up companies not only optimizes efficiency but also drives forward the implementation of sustainable practices with greater circularity and effective stakeholder engagement, while ensuring scalability. The use of these technologies enables start-ups to deploy new business models, such as direct-to-consumer, resale, and rental, that can help advance both environmental and economic goals.

The third research question finds that the principles of the circular economy and the product innovations for sustainability are systematically operationalized for measurable sustainability effects. Chapter 4 Themes 5 and 6 show that recycling, upcycling, repair and take-back are deliberately integrated throughout the design, making and distribution of products, to prolong the useful life of a product and to reduce material waste. Innovation of sustainable products including modular designs, multifunctional clothes, biodegradable and recycled materials add value, both environmental and economic. Circular practices are effectively integrated into the operation supported by digital tools, providing for good monitoring and scalability with measurable performance. Involving stakeholders such as suppliers and consumers adds to the uptake and effectiveness of circular efforts. As these practices demonstrate, combining circular economy with sustainable product innovation can result in multi-dimensional value and help build a strong brand, consumer trust and competitive advantage. The results also show that the successful implementation of circularity and product innovation depends on the business strategy and operational capacity to achieve the most effective and sustainable results.

The fourth research question reinforces the notion that operational issues, resources limitations and external factors are affecting sustainability adoption. The financial constraints, human resource capacity and operation complexities of start-ups are identified as they limit the

implementation of sustainability in Chapter 4 of the Themes 9, 10, 14, and 15. Obstacles to operational activities are the high costs of sustainable materials, certifications and circular technologies as well as limited technical knowledge. Political, regulatory, industry standards, and market incentives are other considerations that affect feasibility and strategic prioritization. These challenges are managed through adaptive strategies such as phased implementation, strategic partnerships and policy and market incentives that start-ups use. The results are consistent with contingency theory and resource-dependence theory, which suggest a dynamic interplay between the internal resources of the organizations and pressure from the external environment. In practice, start-ups have to deal with all these internal and external factors properly, so that sustainability practices are efficient, scalable and fit in with their strategy.

The fifth research question validates the fact that innovation, value creation, performance measurement, risk management and consumer engagement contribute to sustainability. Chapter 4 Themes 8, 11, 12, 13 and 17 show how start-ups create new products and services and new circular business models that provide environmental, social and economic benefits. Performance measurement systems monitor sustainability indicators, such as energy use, material efficiency, carbon footprint and social compliance, which enable evidence-based decision making and continuous improvement. Risk management guarantees operational resilience and reduces the risks to the environment and society. Consumer involvement, from taking part in circular initiatives to ethical buying, feedback mechanisms, etc., magnifies the effect of sustainability practices. The combination of these factors results in a multi-layered sustainability approach, with a focus on operational efficiency, stakeholder trust and market competitiveness and measurable environmental and social benefits.

Results overall evidenced sustainability being integrated in 'born sustainable fashion' start-ups in a holistic, interdependent and multi-dimensional way. Strategic vision and culture is fostered by entrepreneurial leadership; operational efficiency, transparency and circularity, circular economy practices and product innovation optimises resources and product life; operational constraints and external pressures determine the implementation strategies and innovation, while measurable and impactful results are achieved through the development of a strategic performance measurement, risk management and consumer engagement. This synthesis not only confirms theory like RBV, transformational leadership and circular economy theory, but also provides practical knowledge for the new sustainable businesses to have an impact for sustainable environmental, social and economic outcomes.

5.8 Overall Discussion Summary

In Chapter 5, the empirical results of this research were summarized and a comprehensive overview of the integration of sustainability in born-sustainable fashion start-ups was given. Sustainability integration should be considered as a multi-dimensional and interdependent process as shown in the discussions in the previous sections and as follows: Leadership, Digital Technologies, Circular Economy Practices, Operational Management, Innovation, Performance Measurement, Risk Management, and Consumer Engagement. These elements all have a relationship to each other and influence strategic and operational executions of sustainability efforts.

The study confirms the results that entrepreneurial leadership and identity are key components to undertake sustainability. The organizational culture, decision making process and priorities are influenced by founders values, ethics and environment motivating factors. Mission-oriented and transformational leaders make sustainability objectives real in their product design, supply chain practices, and with their customers. They create an organization that values sustainability as an integral part of their mission and embeds it throughout the organization. This is in line with the resource-based view (RBV), as leadership and entrepreneurial skills are strategic resources that can lead to achieving competitive advantage and sustainability outcomes.

There is an increased awareness of the potential of digital technologies and technological capabilities as enablers for efficiency and scalability. AI, blockchain and IoT technologies help to optimize resource use, enhance transparency and monitor environmental effects in real time. These technologies can help start-ups predict demand, minimise waste and track materials, as well as provide accountability to stakeholders. The results revealed that for an effective technological adoption, the capability building of the workforce and readiness of the organisations have to be combined. These technologies also support innovative business models like direct to consumer, resale, rental, life cycle tracking etc. and are aligned with the strategic goals.

The concepts of circular economy and sustainable product innovation are key to reducing environmental footprint and moving towards resource efficiency. Recycling, up-cycling, repair schemes and take-back schemes minimize material waste and prolong the life of products. Product designs are becoming biodegradable, modular and multifunctional to enhance the durability and make them more competitive in the market. Operational alignment, digital

monitoring and stakeholder engagement makes circular and innovative practices measurable, scalable and brings them into the day-to-day business. The results highlight the value of integrating a circular economy and sustainable innovation approach, showing that value creation, environmental and social responsibility can go hand-in-hand.

There are numerous factors that affect the adoption of sustainability, including operational challenges, resource limitations and external factors. However, due to financial limitations, complexity and employee capacity, start-ups might have limited ability to implement a comprehensive program. But there are other external influences too (such as regulatory, industry and market factors) that influence strategy and execution. The challenges are tackled in a phased manner, via strategic partnerships, policy and market incentives and capability building activities in start-ups. The study underscores the interplay between internal capacities and external pressures, the importance of adaptive strategies, and the need for prioritizing resources for sustainable results.

Lastly, innovation, value creation, performance measurement and risk management and consumer engagement are very important to reinforce sustainability impact. Start-ups produce and develop innovative products and services adding value both in the environment, society and economy. Systematic performance monitoring also helps to continuously improve and have risk management in place to protect operational resilience. Involving consumers in circular projects, ethical purchase and/or feedback loops boost uptake and enhance sustainability effect. They are strategies that have been designed to be integrated so that there are measurable results, satisfaction of the stakeholders and legitimacy of the organization.

Finally, the study clearly demonstrates the integrative nature of sustainability from the born-sustainable point of view start-up, which is a holistic and interconnected process. Innovation, Measure, Risk Management and Consumer engagement and effectiveness is comprised of Leadership and vision and culture, Digital technologies and operational efficiency, Circular economy and environmental impact and Operational and external constraints and feasibility. The results show that successful sustainability adoption needs to be aligned between the leadership, technology, operations, circular practices and in binding in with the stakeholder. The study contributes to the theory (RBV, transformational leadership theory, circular economy principles) and offers foundations, managers and policy makers a set of takeaways they can use proactively to ensure sustainability is embedded in new ventures and to ensure they have the greatest possible environmental, social and economic impact in the long term.

CHAPTER 6: SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Introduction

Chapter 6 contains a synthesis of findings and reflection on this study, overview of findings and implications, practical recommendations and concluding insights. This chapter brings the research together, combines the empirical analysis presented in Chapter 4 with the detailed discussions presented in Chapter 5 and ties it back to the research objectives and questions put forth in Chapter 1. The aim is to reveal a coherent and holistic picture of the incorporation of the notion of sustainability within born-sustainable fashion start-ups and to explain how the study contributes to theory, practice and policy.

The chapter starts by giving a brief summary of the aims, method and main results of the study, highlighting the research objectives covered and the results answering the research questions. As a result of this synthesis, it is possible to observe the multi-dimensional character of the integration of sustainability: it is affected by entrepreneurial leadership, digital technologies, circular economy practices, operational management, innovation, performance monitoring and stakeholder engagement. This combination of dimensions reflects that sustainability is not only a matter of strategy but involves all dimensions, starting with operations, technology and market engagement.

After the summary the chapter explains the implications of the study. It outlines theoretical perspectives and contributions, illustrating how the findings can be mapped with existing frameworks like the Resource-Based View (RBV), the transformational leadership theory and the principles of the circular economy and how they can be applied specifically to born-sustainable fashion start-ups. It also provides practical implications for this, including actionable insights for founders and managers on how to incorporate sustainability into their business models, processes and stakeholder management strategies. Additional policy implications are also pointed out, suggesting that regulatory frameworks, incentives, and measures to build capacities could be supportive to the uptake of sustainability in start-up activities.

The chapter also offers recommendations for practice which include strategic and operational steps start-ups can take to effectively integrate sustainability. The recommendations focus on leadership development, capacity building related to the digital/technological capacities, introduction of the circular economy, innovative sustainable product design, operational

efficiency, measurement of performance, and active involvement of stakeholders. The goal is to make sustainability an integral part of business strategy, operations and market positioning and balance the environmental, social and economic goals.

Lastly, general conclusions are drawn in the end of the chapter about the contribution of the study. It consolidates the outcomes, highlights the need for an integrated knowledge of sustainability and also outlines future research opportunities. Chapter 6 serves as a connecting thread between empirical evidence and application in order to show the relevance and importance of integrating sustainability in emerging ventures. It frames the study as both a theoretical and practical input, offering a guideline for both academic and non-academic actors such as start-up founders and managers as well as policy makers in order to build sustainable, resilient and innovative business models in the field of fashion.

In summary, the overall picture of Chapter 6 is a synoptic and holistic view, which links the objectives of research, the empirical findings, and the theoretical aspects. It provides a good base for actionable insights and applications and shows how sustainability is done in born sustainable fashion start-ups with leadership, technology, circularity, efficient operations, innovation, measurement and stakeholder engagement.

6.2 Summary of the Study

The aim of the project was to explore how born-sustainable fashion start-ups incorporate sustainability into their business models as part of various dimensions of entrepreneurial leadership, the use of digital technology, circular economy, operational management, innovation, performance measurement, risk management and consumer engagement. The aim was to provide a holistic perspective on the mechanisms that contribute to the adoption of sustainability and link empirical insights to theory and implications for early-stage sustainable ventures. The study adopted a mixed method approach (quantitative and qualitative), which allowed achieving a strong understanding of drivers, enablers and constraints of sustainability integration within the fashion start-up sector.

The first research goal was to explore how entrepreneurial identity, motivations and leadership styles relate to sustainability-oriented business models. From Chapter 4 Themes 1 and 2, it was found that having a strong ethical orientation, intrinsic motivation and transformational leadership was central to embedding sustainability in their ventures. From product design,

material selection, supply chain operations to branding and consumer engagement strategies, these founders were deeply involved in every aspect of the start-up. They facilitated the creation of an organizational culture that promoted the involvement of employees in circular activities and innovation, improving accountability and business operations within sustainable guidelines. The study validates the notion of entrepreneurial leadership as a strategic resource as per the Resource-Based View (RBV) by establishing that it offers a competitive advantage and can contribute to achieving environmental and social performance. Importantly, sustainability efforts were found to be most effective when they were connected to founder values, mission-oriented leadership and business goals, and were thus embedded in strategic decision-making processes and operational procedures.

The second goal explored enablers of sustainability, namely: digital technologies, and technological capabilities. Chapter 4, Themes 4 and 16 showed how technologies like AI, blockchain, IoT, and digital platforms play a crucial role in the facilitation of operational efficiency, transparency, and scalability. AI was used to forecasting demand, inventory management and production scheduling, reducing overproduction and waste of materials and energy. Blockchain can help promote transparency within the value chain, which fosters ethical sourcing and builds trust in sustainability claims. IoT-based monitoring systems enabled real time tracking of energy, water and material usage to make timely corrective actions and continuous performance improvement. The results reinforce the importance of technology adoption along with the building of capacities, such as training of workforce, sharing of knowledge and readiness of the organizations. This ensures that the digital technologies are being used to the fullest, in line with strategic sustainability goals and in support of innovative business models, for example direct-to-consumer, resale, rental or circular lifecycle business models.

The third objective was on the operationalisation of the concepts of circular economy and sustainable product innovation. As mentioned in Chapter 4 (Themes 5 and 6), start-ups are actively recycling, upcycling, take-back and repair in order to increase the lives of products and limit the waste of materials. Innovations in sustainable products such as modulations, multi functions and biodegradability increased the resource efficiency, durability and competitiveness. Therefore, these circular and innovative practices were taken to action by process redesign, supplier collaboration and digital monitoring, making their impact measurable and scalable while in line with the (strategic) organization. Stakeholder

engagement, whether it be suppliers, employees or consumers, is key for reinforcing the adoption and effectiveness, and it is concluded that circularity and product innovation are very much complementary, creating multi-dimensional value, both environmental, social and economic.

The fourth objective explored issues such as operational difficulties, limitations and other external environmental constraints that affect sustainability implementation. Chapter 4 Themes 9 and 10, 14 and 15 identified financial constraints, workforce capacity, the operational complexity of the company and the outside pressures of compliance and incentives to be implemented in the marketplace as major factors influencing the feasibility and effectiveness of sustainability initiatives. Circular technologies, materials and certifications were often constrained due to high cost. There were other challenges due to the complexity of operations, such as the number of people involved, skill differences, and process redesign. Start-ups addressed these difficulties by implementing a series of phases, partnering strategically, using policy and market incentives, and capability-building activities. Findings support contingency theory and resource-dependence theory, which emphasizes the interaction between internal capacities and the external pressures, and the need for adaptive strategies to ensure that sustainability is implemented effectively, while also keeping the operations efficient.

The fifth objective focused on the interaction between innovation, value creation, performance measurement, risk management and consumer behavior on the outcomes for sustainability. The results from chapter 4 themed 8, 11, 12, 13 and 17 showed that the start-ups created innovative products and circular services that created environmental, social and economic value. Performance measurement and monitoring systems were in place to monitor key sustainability indicators including energy and water efficiency, carbon footprint, material use and social compliance with a view to evidence-based decision-making and continuous improvement. Risk management was used to reduce operational risks and potential environmental and social risks. Ethical consumer engagement – buying and participating in circular actions – improved adoption and amplified the impact of sustainability. The study confirms the importance of innovation, monitoring, risk management and involving stakeholders all of which have to be combined to achieve multi-dimensional and measurable sustainability outcomes.

Finally, the study provides a comprehensive view of the process of integrating sustainability into born sustainable fashion start-ups. The core idea of sustainability is an interdependent process, with all elements—entrepreneurial leadership, digital technologies, circular economy,

operational management, innovation and stakeholder engagement—coming together to make it a whole. The study found that these dimensions are not operating independently but the interdependency of dimensions allow for sustainability practices to be implemented strategically, operationally and measurably. The results are connected to theory and case studies from RBV, TLT and the CE theory, which contributes significantly to theory, while giving hints to founders, managers and policy makers on how to integrate sustainability into the business model of the start-up to have a long-term impact on environment, social and economic dimension.

Theoretical Implications

The study makes a theoretical contribution by extending the Resource Based View (RBV) and the concept of transformational leadership theory and circular economy. Linkages between the attributes of "entrepreneurial identity," "intrinsic motivation and leadership" and "operational practices" support the value of foundation attributes as key resources linked to strategic and operational sustainability outcomes. The role of digital technologies as mediators between strategic vision and operational performance is demonstrated, thus emphasizing the technological capability in sustainability objectives. Furthermore, the arrival of concepts of circular economy and sustainable product innovation in the start-up companies provides empirical evidence to the theoretical models of circular economy and sustainable product innovation. Additionally, this study adds to the ongoing research by illustrating how the four elements of leadership, technology, operational capacity, and innovation and stakeholder engagement are interlinked and integral in the pursuit of measurable sustainable outcomes, thereby offering a multi-dimensional approach to sustainable entrepreneurship.

Practical Implications

The study offers practical advice to founders and managers of born-sustainable fashion start-ups from a managerial point of view. Leadership development plays an important role, with focus on ethical and transformational leadership as an important enabler of the integration of sustainability. AI, blockchain, and IoT are digital tools that play a pivotal role in the efficiency, transparency, and scalability of sustainable operations. It is encouraged to systematically progress towards implementing the principles of the circular economy and sustainable product innovations, using digital monitoring instruments and stakeholder feedback instruments, guaranteeing the proper implementation. Strategic planning, a phased rollout and cooperation

are needed to manage operational issues, such as resources and labour. In addition, the integration of performance measurement, risk management and consumer engagement within business strategies strengthens the accountability, resilience and competitiveness of the business in the market and enables the business to achieve the environmental, social and economic goals.

Policy Implications

The results also inform the policy makers about the supportive measures which should be taken for sustainable entrepreneurship in the fashion sector. High costs of sustainable materials and technologies can be reduced by implementing sustainable policies that provide financial incentives, subsidies, or tax benefits for using sustainable materials and technologies. Transparency, ethical sourcing, and adherence to environmental standards are fostered by regulatory frameworks, thereby supporting the adoption of sustainability practices and safeguarding stakeholders. Entrepreneurship and employee skills can be strengthened through training and capacity building to use digital technologies effectively, as well as to how to use sustainable innovations and implement circular business models. Organisations and governmental bodies can foster the long-term impact, effectiveness and scalability of sustainability in emerging businesses by creating a positive policy context.

Integrated Implications

Taken together, the theoretical, practical and policy implications indicate the multi-dimensional adoption of sustainability in born-sustainable fashion start-ups. For effective integration, it is necessary that there is alignment in leadership, technological capability, circular economy practices, operation management and stakeholder engagement. The study highlights that sustainability cannot be realised by stand-alone measures, but that it is an all-round and interlinked approach that helps to achieve sustainability, with strategic vision, operational efficiency, innovation and interaction with internal and external stakeholders. The findings offer a map for both academic institutions and entrepreneurs, managers and policymakers to grasp, apply and foster sustainability in start-ups and ensure a lasting environmental, social and economic footprint.

6.4 Recommendations of the Study

In the light of this research, a number of suggestions are proposed for born-sustainable fashion start-ups, managerial practice and policy making in order to effectively implement sustainability in business activities. The recommendations are intended to offer practical suggestions to support the theoretical and empirical findings of the study.

Start-up Founders and Managers Recommendations

1. **Leadership and Organizational Culture:** It is necessary to create an ethical and transformational leadership culture in start-ups aligned with sustainability values. Founders should incorporate issues of environmental responsibility and social impact as part of the organizational mission, strategy and operational decisions. Leadership and employee training initiatives can help embed a culture of sustainability and promote innovative solutions and engagement in circular practices.
2. **Investing in digital technology:** Allocate resources intelligently to digital technology, such as AI, blockchain and IoT, to ensure the efficient use of the resources, and to track and limit the impact on the environment and enhance transparency of the supply chain. As a recommendation for optimal technology use and scalability, staff trainings and knowledge sharing exercises should occur when implementing technology. Staff training and knowledge sharing activities are recommended for optimal use and scalability for technology.
3. **Circular Economy and Sustainable Product Innovation:** Recycling, Upcycling, product repair and take-back should be a part of the start-ups business model. To improve resource efficiency and product life cycles, new product innovations like modular and multifunctional designs should be developed to be sustainable. They are translated into the operation process and monitoring mechanism, allowing scaling and measurable impact in terms of sustainability.
4. **Performance Measurement and Risk Management:** Start-ups are encouraged to use robust sustainability performance measurement systems to measure energy use, carbon footprint, material efficiency and social compliance. Concurrently, risk management needs to be addressed to lower the operational, environmental and social risk level, and to build the resilience and accountability.
5. **Stakeholder and Consumer Engagement:** To reinforce sustainable practices, it is very important to engage consumers, suppliers and other stakeholders. Engaging stakeholders by communicating via channel and through educational programs and

interactive platforms are the best ways to ensure that the uptake and impact of circular initiatives and purchasing and product use are maximized in start-up settings.

Recommendations for Policy Makers

1. **Financial Incentives and Support:** Governments and industry bodies should reduce the high-cost materials, circular technologies and certifications. Financial Incentives and Support: Reduce high cost materials, circular technologies and certifications by providing financial incentives, subsidy, tax breaks.
2. **Regulatory Frameworks:** Policies should be introduced to promote transparency, ethical sourcing, compliance with the environment and circular economy, in order to standardize the sustainability requirements and promote the uptake of start-ups.
3. **Capacity Building Activities:** Development of training programs, workshops and sharing platforms of knowledge can be created to transfer skills and knowledge to entrepreneurs and employees, supporting them in adopting digital technologies and circular practices, as well as innovative products using circular solutions.
4. **Market Facilitation:** Create platforms for start-up networking, collaboration and market access, to ensure interactions between sustainable fashion interested buyers, investors and suppliers. Sustainable business incubators and/or accelerators can also contribute to innovation and growth in this dimension.

Integrated Recommendations

The recommendations emphasize that sustainability integration is a multi-dimensional activity. To achieve holistic sustainability outcomes, start-ups must ensure that leadership, technology, circularity, operational efficiency, innovation and stakeholder engagement are all in harmony. At the same time, government authorities need to create an enabling environment to minimize the barriers to operation, promote technology adoption and create market and knowledge support. Born sustainable fashion start-ups can have long term impact on the environment, society and economy when these recommendations are adopted as a whole and positively contribute to the resilience of the organization and its competitive advantage.

6.5 Final Conclusion

This study aims at analyzing and examining in detail the process of incorporating sustainability into business models of born-sustainable fashion start-ups. Entrepreneurial identity and leadership, digital technologies, circular economy practices, operational challenges, innovation, performance measurement, risk management, and stakeholder engagement were examined as factors for attaining sustainable outcomes. The study connects the empirical findings from Chapter 4 with the theory and discussion in chapter 5 and thus provides a detailed understanding of the factors that either facilitate or hinder sustainability adoption in emerging ventures.

The study comes to the conclusion that entrepreneurial leadership and identity are key for embedding sustainability. Ethical founders, those that are intrinsically motivated and have a transformational leadership style, create organisational cultures and operational processes that address environmental, social and economic goals. The leadership skills are reflected in strategic decision making, resource allocation and stakeholder engagement that 'drives' sustainability into the organisation's culture.

Digital technologies and technological capabilities have been identified as key enablers to the adoption of sustainability. Efficient operations and transparent supply chains are facilitated by AI, blockchain and IoT, which can drive scalable and innovative business models. For effective integration, however, issues of organizational readiness, staff training and strategic alignment must be taken into account and it is crucial that digital tools are making an impact in the sustainability campaign.

The concept of the circular economy and sustainable product innovation became key tools and mechanisms for mitigating environmental impact and increasing the lifespan of products. Recycling, upcycling, take-back and modular, multifunctional, biodegradable product design enables start-ups to reduce resource consumption and maximise ecological, social and economic value. An important theme of the study is the need for operational integration and stakeholder collaboration to achieve full benefits from the practices.

Operational difficulties, resource limitations, and external pressures were also found to be major influences in sustainability outcomes. Sustainability efforts are constrained by financial constraints, human resources, regulations and market factors. Savvy start-ups that can overcome these limitations in a phased rollout, co-ownership and capability development can be more successful in delivering tangible sustainability results.

Last but not least the study shows that sustainability integration in born sustainable fashion start up is integrated and multi-dimensional in such a way that it cannot be separated from one another. Adoption must be coupled with leadership, technology, circularity, operations, innovation, measurement and stakeholder engagement for it to be effective. The study has a great theoretical contribution in extending the RBV, transformational leadership and circular economy theories in the context of sustainable entrepreneurship. Practical implications offer suggestions to founders, managers and policy makers regarding implementing sustainability in early-stage start-ups. In general, these findings provide a solid foundation for further research and highlight various aspects such as electronic innovations in circular systems, consumer engagement methods, and sustainable models for start-ups.

The study is therefore consolidated and presented in Chapter 6 where its contributions to theory and practice are summarized, and the importance of sustainability integration in born-sustainable fashion ventures is underscored as the study's main result.

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