Sustainable Product Development in the UK Fast Fashion Supply Chain: Exploring Solutions for a Sustainable Fashion Industry

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Abstract

This study explores the business practices relating to product development in the UK fast fashion sector and their implications for environmental sustainability. The UK fast fashion sector has achieved significant growth in recent years, driven by online-only ultra-fast fashion brands' strategy of low-cost and quick turnaround of trend-led products made available to the mass market within weeks. However, the sector has faced increased scrutiny over its negative environmental impact, due to the overproduction of poor quality, synthetic garments which are only worn a handful of times before ending up in landfill (Niinimaki et al, 2020). If current strategies continue unchanged, fast fashion is on a trajectory that will exacerbate environmental damage by 2030.

Most research on the UK fast fashion sector focuses on working conditions and labour rights not environmental sustainability, so there is an urgent need for an up-to-date and comprehensive understanding of current working practices in fast fashion product development. Drawing on the theoretical frameworks of Triple Bottom Line (TBL) (Elkington, 1997) and the Natural Resource Based View (NRBV) (Hart, 1995), and empirical data gathered from key actors within the UK fast fashion supply chain, this study maps existing product development practices and explores the gaps between the principles of product stewardship and industry practice. It explores attitudes, knowledge and levels of commitment within brands and suppliers towards environmentally responsible product development practices, including the use of sustainable materials and packaging, green production processes and waste management. It also examines the barriers to implementing sustainable product development practices and how UK fast fashion organisations can overcome these challenges to develop products built around the core principles of product stewardship.

A qualitative research approach was taken to gain depth of insight and capture lived experiences of actors. Twenty semi-structured interviews were conducted with key actors involved in product development across fast fashion brands and suppliers and interview transcripts were interpreted using a reflexive thematic analysis approach. Findings reveal that the fast fashion sector remains focused on profit and survival in an increasingly challenging environment, where cost and speed to market are paramount. The power imbalance between buyers and suppliers, and the perception that fast fashion consumers (and brands) show very

little interest in sustainability has resulted in a resistance to change, denial of responsibility and a reactive approach to implementing sustainable practices. Ultimately, a change in organisational culture is needed for the fast fashion sector to integrate environmental sustainability within product development practices and move beyond the current scenario which is largely limited to the use of recycled materials.

This work makes a valuable contribution to existing knowledge by critically analysing the disconnect between sustainability principles and current practices, offering important insights into the specific challenges facing UK fast fashion organisations in adopting environmentally responsible product development practices.

Keywords Fast Fashion, Product Development, Sustainability, Supply Chain, Sustainable Product Development

Declaration

I declare that no material contained in this thesis has been submitted for another academic award and that all materials that are not my own work have been acknowledged. I have kept all materials used in this research, including research data, preliminary analysis, notes and drafts and can produce them on request.

Name: Catrin Cousins

Signed: 

Date: 26th April 2025

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List of Abbreviations

CSR Corporate Social Responsibility
FF Fast Fashion
FSCM Fashion Supply Chain Management
FFPD Fast Fashion Product Development
NRVB Natural Resource Based View
SCM Supply Chain Management
SSCM Sustainable Supply Chain Management
TBL Triple Bottom Line
UFF Ultra-Fast Fashion
VI Vertical Integration

Acknowledgements

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I also express my sincere gratitude to the research participants who placed their trust in me by sharing their experiences. This research would not have been possible without their willingness to contribute as candidly as they did, and I hope that I have represented their views appropriately in the context of this thesis. Finally, I would like to thank my family for their constant support and patience, and for always encouraging me to keep going, even during the most challenging times.

Chapter 1: Introduction

This chapter provides an overview of the background information necessary to understand the research context. It sets the foundation for the study by exploring key factors that inform the study's focus and motivation, followed by an outline of the research aim and objectives and the methodology adopted. Finally, the structure of the thesis is presented, offering a clear roadmap for the chapters to come.

1.1 Background to the Research

'Fast fashion' is a term used to describe an accelerated fashion business model that involves increased numbers of new collections and a quick response to new trends at low prices (Environmental Audit Committee (EAC), 2019). Fast fashion is a global industry which is estimated to grow from $106 billion in 2022 to $185 billion in 2027 (Statista, 2023a) driven by the increasing adoption of affordable clothes by the rising youth market, providing access to the latest catwalk trends regardless of income level. Western Europe was the largest region in the global fast fashion market in 2022, driven by the UK as the 'epicentre' (Research and Markets Report, 2023) as it is estimated that each person in the UK buys 26.7kg of clothing every year, compared to an average of 15.6kg across Germany, Denmark, France and Italy (Greenpeace, 2019), making the UK an important focus for the study.

The UK fast fashion sector has achieved significant growth since its inception in the 2000s and represents a substantial part of UK clothing and footwear sales, which reached £56 billion in 2022 (Mintel, 2022a). According to Retail X (2019), fast fashion accounted for 10-20% of total fashion industry revenue in European markets, which translates to an estimated $4.2 to £8.4 billion in the UK. Much of the growth in the UK is driven by ultra-fast fashion, a model spearheaded by brands like Boohoo and Missguided, which have pushed the boundaries of fast fashion and played a key role in shaping the industry's success. While traditional fast fashion focuses on low-cost, trend-led products produced in 2-3 weeks, ultra-fast fashion accelerates this process, bringing designs to market in just a few days, to meet consumers' growing demand for immediacy and continual trend updates.

However, fast and ultra-fast fashion has faced increased scrutiny over its negative impact on the environment as it relies on low-cost manufacturing and promotes short-lived garment use (Niinimäki et al, 2020; Koszewska, 2018), with products made from cheap synthetic fibres which are destined for landfill after only being worn a handful of times (Crumbie, 2021). Fast fashion companies are often accused of cutting corners in product development to reduce costs, leading to high levels of production waste (Levitt, 2020) and there is significant evidence of unethical practices that compromise workers' rights (Butler, 2022; Hammer et al, 2015; Levitt, 2020). Despite these concerns, this 'race to the bottom' has proved to be a highly profitable strategy for UK ultra-fast fashion brands (Stringer & Mortimer, 2020). While some initiatives have been implemented to improve sustainability measures within the sector, their impact remains too limited for meaningful change, as brands continue to drive consumerism through their design agility, supply chain efficiency and low prices (Levitt, 2020; University of Nottingham, 2022). Instead of embracing proactive strategies based on the values and principles of sustainability, many fast fashion organisations opt for defensive sustainability strategies aimed at protecting brand reputation and lowered performance (Todeschini et al, 2017).

1.2 Motivation for the Study

Fast fashion is often described in the literature as one of the greatest sustainability challenges facing our generation due to the negative environmental impacts which occur throughout the product lifecycle, from the initial stages of growing and processing raw materials through to the assembly and disposal of products (Niinimaki et al, 2020; Islam et al, 2020; Turker & Altunas, 2014). The development of fast fashion products is attributed to issues such as increased pollution, consumption of energy and water, CO2 emissions and waste (WRAP, 2017; Ellen McArthur Foundation, 2021; Changing Markets Foundation, 2022; Koszewska et al, 2018), highlighting the urgent need to explore how fast fashion organisations can mitigate their environmental impact through more responsible practices.

Sustainability within fashion supply chains is not a new concept and has gained increasing attention over the past decade due to pressures imposed by regulations, non-governmental

organisations (NGOs) and consumers. Significant research exists around circular fashion, green manufacturing and technological innovation, however limited research exists which addresses sustainable product development, particularly in the context of fast fashion. Much of the existing literature on fashion product development suggests that core activities are similar across the sector, regardless of product type or market level (Parker-Strak et al, 2020). However, there is limited research addressing modern-day fashion product development, considering in depth the specific actions taking place within fast and ultra-fast fashion which enables the rapid speed to market and its subsequent impact on the environment.

While extensive research has been conducted on the UK fast fashion supply chain by academics, journalists and NGOs, this work mostly concentrates on social factors such as violations of labour rights and working conditions. To the best of the author's knowledge, there is limited research into environmental factors within the UK fast fashion supply chain, particularly in relation to sustainable product development. Additionally, the concept of ultra-fast fashion has received limited academic attention (Camargo et al, 2020) and given its rapid growth and increasing significance within the fashion industry, this will be the focus of the study.

1.3 Research Aim & Objectives

Building on the research gap identified, this study aims to investigate the extent of sustainable product development practices within the UK ultra-fast fashion supply chain, with the intention of providing insights which can inform the strategic direction of the sector. It also aims to contribute to the literature by offering insights into how sustainability could be better integrated into ultra-fast fashion, shaping both theoretical models and practical strategies for more responsible product development.

Zhang et al (2021) believe there are three perspectives to consider when exploring the relationship between fast fashion and sustainability: the supply side (fast fashion brands), the demand side (consumers) and the regulatory side (governments and industrial organisations). This research aims to focus on the supply side (from brands to upstream suppliers and manufacturers) and aims to provide an up-to-date picture of how UK ultra-fast fashion

organisations undertake product development. Particular focus will be placed on investigating sustainable materials in products, green production processes and waste management. Levels of commitment to sustainability and attitudes to change will also be assessed to identify the potential for change within the sector. Finally, the study will explore the barriers and challenges in implementing sustainable practices as ultra-fast fashion's focus on cheap, poorly made products presents an inherent contradiction with the concept of environmental sustainability which strives for resource conservation and waste reduction.

To establish a clear research framework and set the direction of the study, the following objectives have been developed:

- To examine how UK ultra-fast fashion brands and suppliers are implementing environmentally responsible product development practices and assess the alignment between these practices and overall business strategies.
- To investigate attitudes, knowledge and levels of commitment of UK ultra-fast fashion organisations regarding sustainable product development practices.
- To identify the barriers preventing suppliers and brands from embedding sustainable product development practices into their operations.
- To provide recommendations for UK ultra-fast fashion organisations on improving their product development practices and enhancing environmental responsibility.

1.4 Research Methodology

A qualitative approach was taken, with primary data collected through semi-structured interviews with key actors from within the UK ultra-fast fashion supply chain located around the commercial areas of Manchester and Leicester. This aims to enhance understanding of current product development practices and assess levels of commitment towards sustainability within this sector. Secondary research was used to form the literature review (Chapters 2 and 3), obtained via internet, journal articles, industry reports and academic textbooks.

1.5 Thesis Structure

As presented above, Chapter 1 outlines the background of the research and introduces the research aim and objectives, establishing a clear direction for the study. The remainder of the thesis is structured into three key sections and is organised as follows (see Table 1.1).

Section 1: Theoretical	**Section 2: Empirical**	**Section 3: Conclusion**
Chapters 2 & 3	Chapters 4, 5 & 6	Chapter 7
Literature Review	Research Methodology Qualitative data analysis including discussion and original contribution	Recommendations Limitations and future research

Table 1.1: Thesis structure

The first section, comprising Chapters 2 and 3, presents a critical review of relevant literature and the theoretical aspects of the study. Chapter 2 provides insights into the UK fast fashion sector and associated product development practices while Chapter 3 provides an overview of key sustainability theories and frameworks with a brief review of origins and subsequent development. The main research aim is also introduced here, as well as some of the key challenges anticipated in answering it.

The second section, comprising Chapters 4, 5 and 6, outlines the research methodology, presents empirical evidence and summarises the findings. Chapter 4 details the research design and data collection methods, supported with a rationale for their suitability for this study. Chapter 5 presents key findings organised by theme, offering an analysis of the product development practices of the interviewed organisations and their attitudes towards change, along with the key barriers to implementing sustainable practices. Chapter 6 discusses these findings in relation to existing literature, evaluates their implications and highlights the study's original contributions to the field.

The final section, Chapter 7, presents a concluding analysis, offering actionable recommendations for industry practitioners looking to improve their sustainability practices. This chapter also critically examines the limitations of the study, addressing any constraints that may have impacted the results and outlines potential avenues for future research, suggesting areas where further investigation could build on the findings and contribute to advancing sustainability in the fast fashion sector.

Chapter 2: Literature Review
Fast Fashion Product Development

In the next two chapters the existing literature concerning the UK fast fashion sector and its associated product development practices is introduced. Additionally, a review of the concept of sustainability is provided, along with an exploration of developed models and theories explaining its origins and scope within the fast fashion sector. The literature dedicated to the drivers and challenges of implementing sustainable practices within fast fashion is also reviewed and finally the gap in the literature is presented to provide a comprehensive overview of the topic.

2.1 The UK Fast Fashion Industry

The fast fashion sector is a major player in the UK's fashion industry, with the most prominent fast fashion brands including ASOS, Primark, Boohoo and PrettyLittleThing (PLT) alongside key international players Zara, H&M and Shein. In a recent Statista (2023b) study, H&M ranked as the leading fast fashion brand in the UK based on brand popularity among Generation Z (Gen Z), who are a key target demographic for the sector.

The success of fast fashion in the UK is largely driven by the impact of the 2008 recession, accelerating it to the forefront and driving sales with younger consumers looking for a way of conserving spending while frequently updating their wardrobes (Mintel, 2022b). Despite the success of global brands like H&M in the UK, E-commerce has also played a significant role in the growth of the fast fashion sector, allowing 'pureplay' brands like Boohoo, Missguided and ASOS to adopt an even faster approach, reducing the lead time from concept to consumer to as little as a week (Coresight Research, 2017). ASOS was the UK market leader in 2022 generating revenues of £1.8 billion, followed closely by The Boohoo Group who have enjoyed significant success since launching in 2006, with UK revenues reaching £1.2 billion in 2022 (Statista, 2023c; Boohoo, 2022). More recently Chinese ultra-fast fashion brand Shein has emerged as a significant threat in the online ultra-fast fashion market, accounting for nearly

one-fifth of global fashion sales (Masters, 2023) and reaching £800 million in UK sales in 2023 (Statista, 2024).

2.1.1 The ultra-fast fashion business model

The fast fashion model is based on the rapid production of inexpensive, low-quality garments made available to the mass market within weeks (Perry, 2022; Parker-Strak et al, 2020; Hammer et al, 2015; University of Nottingham, 2022; EAC, 2019). However, as the pace of consumer demand and technological innovation has increased, brands like Boohoo and Shein have adopted an even faster model known as ultra-fast fashion (Camargo et al, 2020). While both models share similarities, the key difference is the speed at which they develop and launch new products, as ultra-fast fashion prioritises production efficiency and can move products from design to sale in just a few days, responding to consumer's growing demand for immediacy.

The distinctions between fast and ultra-fast fashion, though subtle, are important for understanding the processes that are driving ultra-fast fashion's rapid sales growth and success. Table 2.1 highlights how ultra-fast fashion differs from conventional fast fashion in terms of its approaches to product development, sourcing and distribution, as ultra-fast, e-commerce brands rely entirely on their online platforms, harnessing social media and influencer marketing to engage consumers.

Pureplay Ultra-Fast Fashion	**Traditional Fast Fashion**
Online-only	Combination of physical stores and online
High proportion of localised sourcing	Outsourcing using a global network of suppliers
Small batch production	Combination of small and larger volume orders
New products launched daily	New products launched weekly or bi-weekly
Centralised distribution	Regional distribution
Low markdowns due to small volume buys	Higher markdowns
Communication upward from consumer (pull)	Communication from corporate (push)

Table 2.1: Characteristics of ultra-fast v traditional fast fashion brands (Source: Adapted from Mihm, 2010 and Camargo et al, 2020)

Parker-Strak et al (2023) note that ultra-fast fashion brands like Boohoo and Missguided were ahead of the curve in adopting social media marketing strategies to entice their consumers, utilising platforms like Instagram and TikTok to promote designs often inspired by celebrities and influencers, fuelling demand for the latest looks at affordable prices. These brands also deviate in their sourcing strategies, with traditional brands like H&M and Zara mostly outsourcing production to a global network of suppliers, while ultra-fast fashion brands prioritize speed and efficiency by sourcing much of their production locally. Both fast and ultra-fast models involve minimal pre-season ordering and placing smaller and more frequent orders in-season, enabling brands to be more responsive to the needs of the market (Christopher et al., 2004). Following postponement theory, production space within factories may be pre-booked, but the final product specification is typically not confirmed until closer to the delivery time, leaving brands with a larger proportion of 'open-to-buy' budget to spend in season, allowing them to respond to emerging trends and better meet the needs of consumers.

As fast fashion has grown in the UK, there has also been a geographical shift away from London as the epicentre of the UK fashion industry to Manchester, which has become the home of many leading ultra-fast fashion brands, as illustrated in Figure 2.1. With lower costs and fewer competitors on the doorstep and many already with roots in the city evolving from family businesses, Manchester has enabled brands to 'carve out their identify and make themselves known' (Levine, n.d., pg. 1).

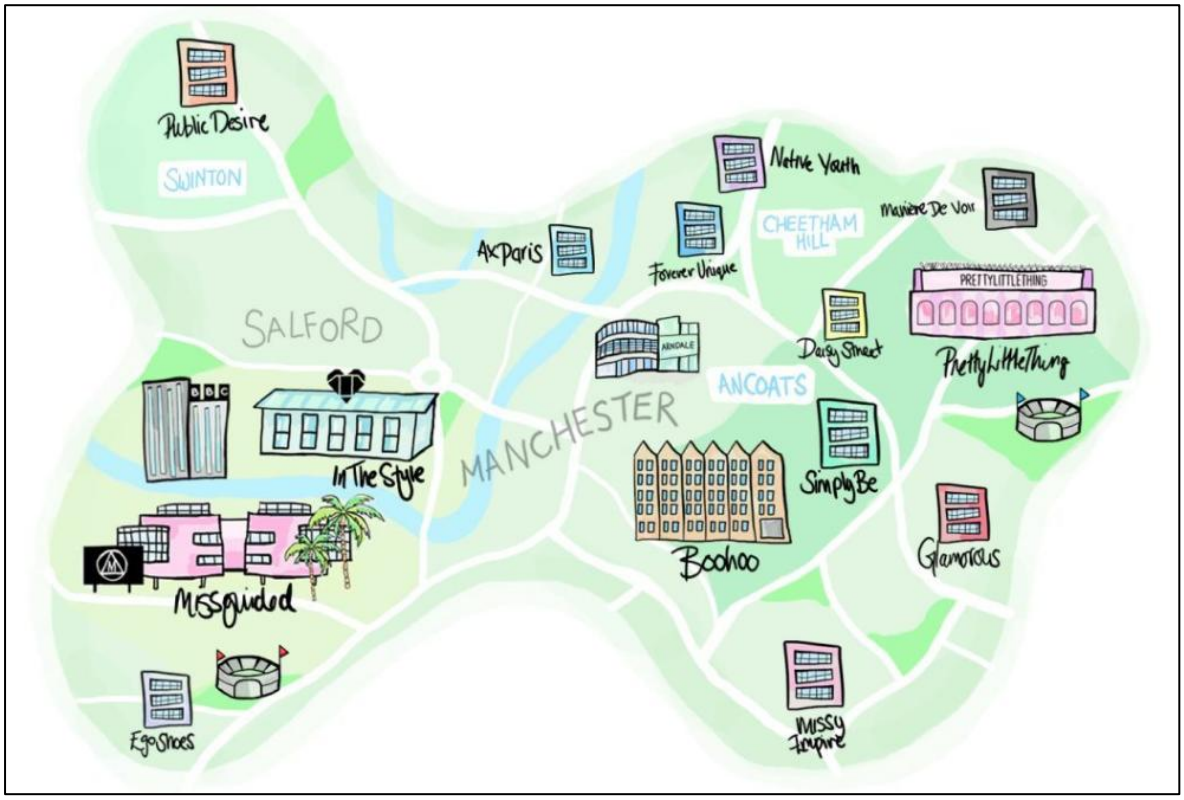


Figure 2.1 Map of fast fashion headquarters in Manchester (Source: Return, n.d.)

2.1.2 The UK fast fashion supply chain

A fashion supply chain comprises all activities involved in the development and procurement of fashion products (Choi, 2014), from sourcing raw materials to delivering the final garment to consumers. As illustrated in Figure 2.2, it typically consists of multiple tiers, ranging from tier 0 to 4. Tier 4 represents the original source of raw materials while tier 0 encompasses the end consumers, with each tier in between having a specific role in the production, processing and distribution of goods. Tier 1 companies are those who have a direct relationship with the brand or retailer and usually handle garment manufacturing, while Tier 2 and 3 companies supply components like fabrics, trims and zips or services to companies further downstream. Tier 3 often supplies to sub-contracted companies, emphasising the remoteness to the brand and opacity of the fashion supply chain.

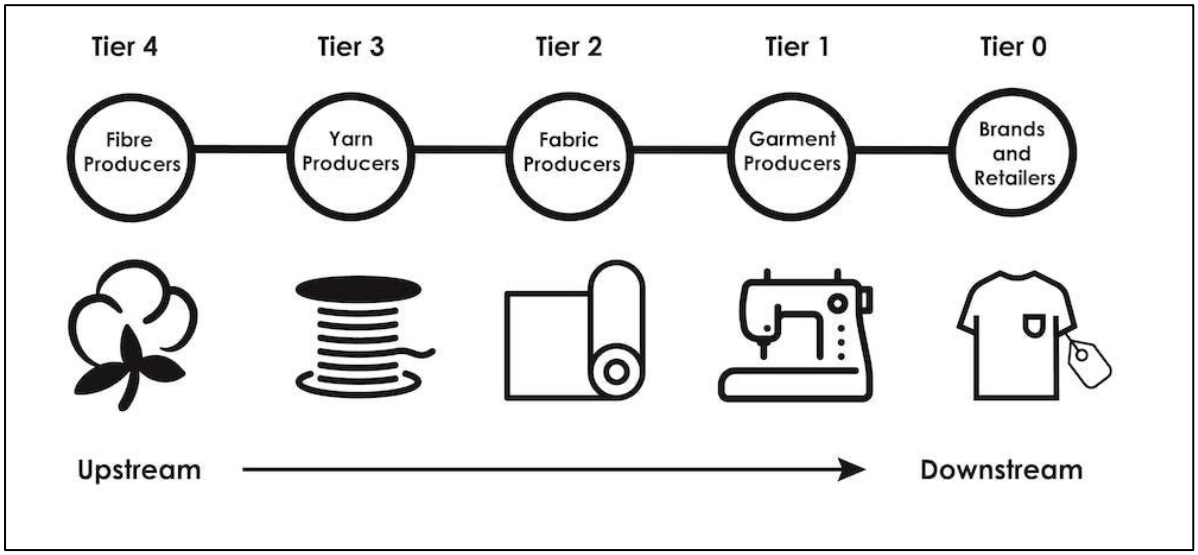


Figure 2.2: Fashion supply chain tiers (Source: Kaine et al, 2020)

Over the past few decades, fashion supply chains have relied on a global network of suppliers to source products from lower-cost countries at higher margins (Fernie & Grant, 2019; Londrigan & Jenkins, 2018). However, ultra-fast fashion brands tend to adopt a more localised sourcing approach with around 40% of products manufactured domestically (Parker-Strak et al, 2023) as it is argued that global supply networks are more complex, lack visibility and are less responsive to changes in the market (Rafi-Ul-Shan et al, 2022). Adding to this point, Ashby (2016) notes that increasing labour and transport costs within developing countries together with global supply risk make reshoring to local suppliers more attractive. There are also benefits in terms of a lower carbon footprint as Williamson (2019) reports that 47% less emissions are created by manufacturing clothing in the UK, along with the opportunity to contribute to the local economy by maintaining local skills and promoting local manufacturing.

UK apparel manufacturing was once an extremely prosperous industry with factories across the regions employing about a million workers and pumping vast amounts into the economy (Bearne, 2018). Leicester was one of these regions, historically renowned as 'the city which clothed the world' (Heighton-Ginns & Prescott, 2019; Sullivan, 2022) which comprised mostly of vertically integrated, large-scale manufacturers. However, the sector experienced a significant decline in the 1980s when fashion brands and retailers began sourcing from abroad in search of higher margins, resulting in thousands of job losses. Manufacturing in the city declined by 69% between 1995-2012, and employment plunged by 84% over the same period

(University of Nottingham, 2022) with the average number of employees dropping from 22.2 to 8.6 (Hammer et al, 2015).

However, the growth of fast fashion in the early 2000s somewhat reversed this decline in manufacturing, with Statista (2022) reporting that the total value of UK apparel manufacturing reached £1.9bn in 2021, with revenues projected to grow by 6.3% from 2022-2025. Many fast fashion brands and retailers increased orders from local suppliers in key manufacturing hubs in Leicester, Manchester and London as they recognised the advantages from the fast turnaround times they could obtain from sourcing domestically (Hammer et al, 2015). In recent years the UK has re-positioned itself as a viable sourcing location for fast and ultra-fast fashion brands (University of Nottingham, 2022), with Leicester emerging as the UK's largest apparel manufacturing hub (Hammer et al, 2015). In 2019, the Leicester textiles and fashion sector produced £1.2bn of GVA, employing over 25,000 employees across 2000 businesses, of which three-quarters are 'micro- sized' (employing less than 9 people), highlighting the dominance of SMEs within the sector today (Leicester & Leicestershire Enterprise Partnership, 2020).

Leicester is an attractive hub for fast fashion manufacturing as it provides retailers with speed to market, low prices and low volume orders (in this context 1000 units or below), providing a greater ability to react to short-term fashion trends and seasonal changes (Hammer et al, 2015). There are also benefits in terms of brands' ease of visiting and monitoring progress of production and the development of closer relationships with suppliers, enabling more efficient product development (University of Nottingham, 2022). Brands appreciate the considerable flexibility of UK fast fashion suppliers in the product development process as small quantity trials can be run and last-minute changes to fabric or product designs are easier to make than elsewhere (Hammer et al, 2015).

However, the Leicester garment sector has undergone significant changes since the growth of fast and ultra-fast fashion, altering its dynamics in terms of processes and practices. According to the University of Nottingham (2022), what exists in Leicester today is a more agile manufacturing base comprised of densely co-located, informally networked units specialising in fairly basic garments, driven by skills shortages and difficulties in recruiting skilled garment workers. UK manufacturers claim that years of textile knowledge have been

lost in the UK due to globalisation which is impacting the overall quality of fashion products (Goworek et al, 2020). In addition, several support services have disappeared such as fabric and trimmings suppliers, reducing supply chain integration and capabilities, creating a barrier to implementing sustainable practices. Research indicates that for a supply chain to be truly sustainable it must be fully integrated to ensure transparency and sharing of information, from raw materials to on-time delivery of finished products to consumers (Caniato et al, 2013; Rafi-Ul-Shan et al, 2020).

Both Hammer et al (2015) and the University of Nottingham (2022) report on the existence of sub-contracting practices within the UK fast fashion supply chain, where orders are contracted out beyond those factories that were originally designated to produce the goods. According to the University of Nottingham (2022), there are up to 250 unregistered factories and suppliers operating in the Leicester area, resulting in a complex and fragmented supply chain where brands lack visibility and control over their supply base, creating significant challenges towards achieving a more sustainable future.

Islam et al (2020) highlight that size and resource capacity of a business can impact on how it addresses sustainability issues, for example "a firm with more favourable resources and a specialised sustainability team may address sustainability issues better than a firm with poor resource capacity …" (Islam et al, 2020, pg. 342). Building on this, Lynch & Ferasso (2023) found that an organisation's values towards sustainability are greatly influenced by the inherent values of the founder or CEO, particularly within SMEs which dominate the UK supply chain, however it is unclear whether these smaller businesses in the Leicester garment sector exhibit such values or entrepreneurial traits.

2.2 Fast Fashion Product Development

Product development is a critical part of all fashion business operations (Fung et al, 2021) involving processes and practices that contribute to the overall product development cycle. In fashion, the product development 'process' is a sequence of interconnected activities undertaken by a company to conceive, design and commercialise a product from ideation to

market (Ulrich & Eppinger, 2016) and usually involves idea generation, concept development, sampling, manufacturing and launch (Goworek, 2010). Product development 'practices' are the specific tools and methods employed at each stage of the process to ensure a company achieves its goals effectively, such as quality assurance or waste management procedures.

2.2.1 The fashion product development process

Product development in fashion is often described as a complex process (Fung et al, 2021) which involves the research, design and creation of garments and the production, dyeing and finishing of textiles, all of which have a significant impact on the environment (Moon et al., 2013). Existing research primarily focuses on product development activities within traditional fashion retailers (Gaskill et al, 1999, Johnson & Moore, 2001; Tyler et al., 2006; Goworek, 2010; D'Avolio et al, 2015), with little attention given to the methods used by ultra-fast fashion organisations. This existing body of research suggests that fashion retailers follow a linear, step-by-step approach to product development, as illustrated in Figures 2.3, 2.4 and 2.5, which show products moving systematically through the process from the concept and design stage to final production.

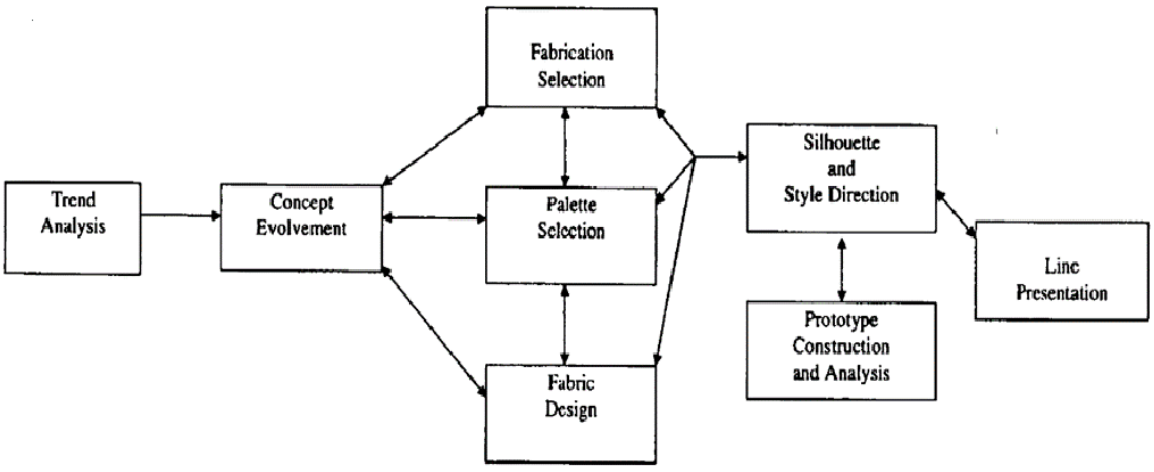


Figure 2.3: Fashion product development process (Source: Gaskill, 1999)

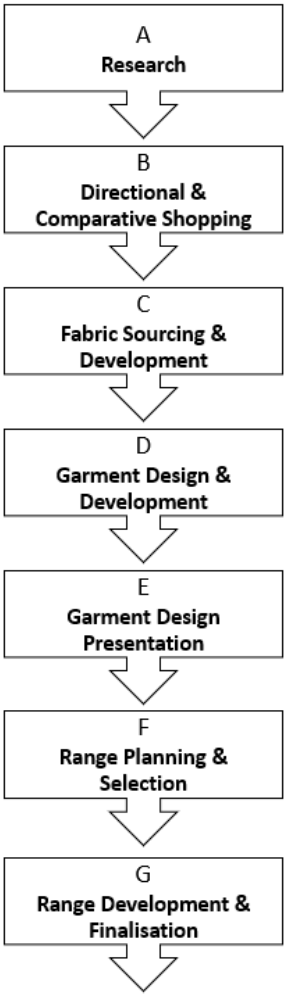


Figure 2.4: Fashion product development process (Source: Goworek, 2010)

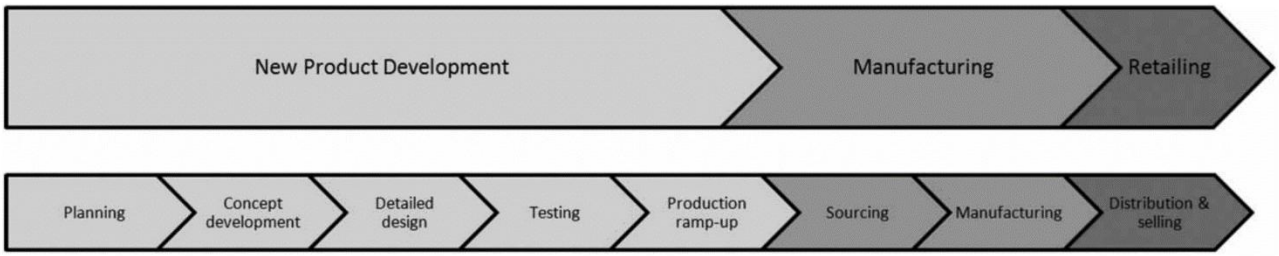


Figure 2.5: Process and tasks in the value chain (Source: D'Avolio et al, 2015)

However, such models have been critiqued in the literature for their over simplistic, linear approach, with no indication of any alternative paths or detail around the speed required to complete each stage (Parker-Strak et al, 2023). The order in which the steps are presented

also fails to align with current industry practices, particularly in ultra-fast fashion where many stages occur simultaneously rather than sequentially, highlighting the complexity of the ultra-fast fashion product development process. Furthermore, the linear process fails to consider sustainability (Curwen et al, 2012; Parker-Strak et al, 2020), as sustainable product development requires a closed-loop system, where product components can be disassembled and reused, and materials can be repurposed into new products.

Parker-Strak et al (2023) highlight that unlike traditional retailers, online ultra-fast fashion brands have developed a much more agile and flexible product development process to enable their speed to market, as illustrated in Figure 2.6. This model presents the process as iterative rather than linear, involving a series of interconnected activities that overlap. The arrows represent continuous communication allowing for products to move back and forth throughout the process for ongoing review to ensure they meet the needs of the consumer. While this approach may seem to lack a clear structure, Parker-Strak et al (2023) argue that it more accurately reflects the fast-paced, flexible nature of fast and ultra-fast fashion, where brands must quickly adapt to evolving trends and consumer demands.

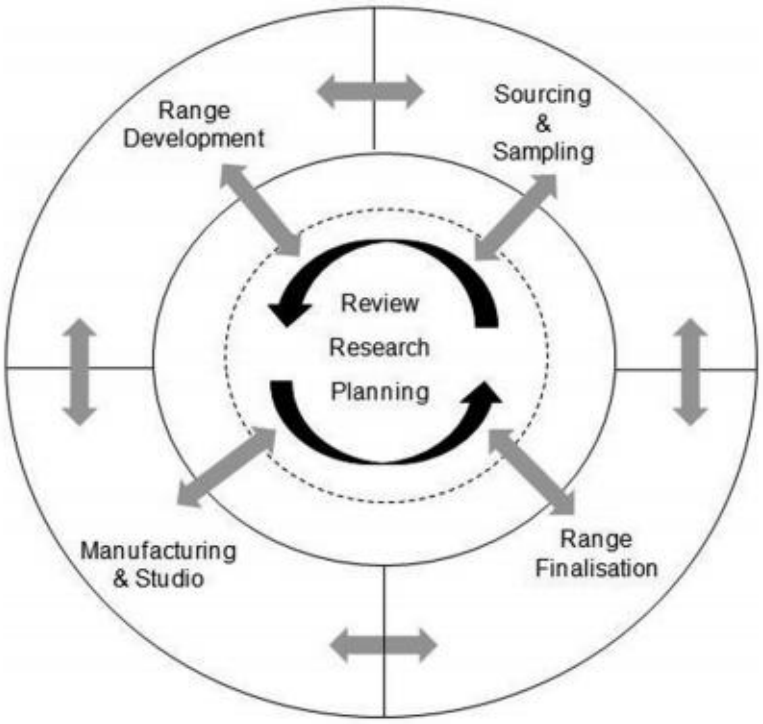


Figure 2.6 Iterative model for fashion product development process (FPDP) for online fast fashion retailers (Source: Parker-Strak et al, 2020)

However, it is argued that this accelerated approach is less rigorous or thorough as it focuses on moving through the process as quickly as possible to reduce the lead time from concept to consumer. Parker-Strak et al's (2023) research into the product development practices of UK online fast fashion brands revealed that organisations frequently skip key stages of product development, cutting corners to meet tight deadlines and maximise profit. Supporting these claims, the EAC (2019) reports that fast fashion brands and suppliers use existing product specifications as a starting point rather than creating new, product-specific patterns. They also reduce the time spent on garment fitting, leaving little to no time for wash tests or wearer trials, which increases the risk of sizing issues and compromises overall product quality. Furthermore, Goworek et al (2020) found that over half of the retailers in their study admitted to avoiding additional quality tests and treatments, estimating that up to 10% of their products could have been rejected based on technical grounds. It could therefore be concluded that consumer demand is such that fast fashion brands are willing to sacrifice some elements of quality and design in favour of introducing a particular style to the market more quickly.

However, many brands such as ASOS argue that a more flexible, economically driven approach to product development is, in fact, more sustainable since there are fewer samples made and less airmiles travelled from supplier to brand (Fashion Capital, n.d.), failing to consider the huge quality issues with garments that have skipped a test or fit session. According to Perry (2022), cheaply manufactured fast fashion products typically exhibit issues with fit and quality, resulting in high returns. Consequently, high return rates are common in the UK fast fashion sector, with around 30% of online purchases being returned, with much of this going directly to landfill (Fashion United, 2022).

Although speed and flexibility are consistent priorities for the fast fashion sector, Levitt (2020) highlights that there are many different processes used for product development within the UK fast fashion supply chain, making it complicated and difficult to control. According to the Levitt Report (2020), fast fashion product development generally happens in one of three ways:

1. A garment is designed by a retailers' in-house designer which is sent out to a tier 1 supplier to create a pattern and then contracted out to a separate tier 2 manufacturer (as illustrated in Figure 2.5, Structure A).

2. A tier 1 supplier presents one of their designs to a retail buyer, usually in the form of a sample, which is then ordered by the buyer, and manufactured by either the tier 1 supplier or contracted out to tier 2 (as illustrated in Figure 2.4, Structure B).
3. A retail buyer has an idea which is presented to a tier 1 supplier, often in the form of an image from social media, who creates a design and sample. If an order is placed, the supplier then creates a pattern and supplies the finished garment or outsources production to a tier 2 manufacturing unit.

A key issue which is evident across all three methods of product development is the lack of transparency across the supply chain. In each scenario presented above, brands interact only with tier 1 suppliers, rarely engaging directly with garment manufacturers or material producers. This outsourcing of production highlights the complexity and opacity of the fast fashion supply chain, complicating efforts for brands to control sustainability within the production process. Furthermore, this lack of engagement across the supply chain reflects a broader issue of insufficient cooperation across the network of brands and suppliers, which will be explored in more depth in the following section.

2.2.2 Buyer/supplier relationships

The performance of supply chains in fast moving environments like the UK ultra-fast fashion sector depends on how well all members work together. Existing theories of supply chain management state that a more integrated, partner-led approach is key, where brands work with smaller numbers of partners to build trust and foster more effective relationships (Brydges et al, 2020). Network theory points to organisations creating partnerships based on trust, cross-functional teamworking and cooperation (Fernie & Grant, 2019), and as fast fashion has become more competitive and the expectations of consumers are more complex, it is in the interest of fast and ultra-fast fashion brands and their suppliers to develop collaborative rather than confrontational relationships (Parker-Strak et al, 2023; Talay et al, 2022; Perry and Wood, 2018).

Building on this perspective, Talay et al's (2022) research into the impact of asymmetric relationships within sustainable fashion supply chains indicate that unbalanced relationships between suppliers and retailers are detrimental to sustainable product development. Their

findings highlight the importance of effective information exchange in supporting the implementation of sustainability policies and practices, ultimately improving overall business performance. In essence, fostering an open and collaborative approach between fashion suppliers and retailers emerges as a key element in achieving successful sustainable product development. Goworek et al (2020) agree that fostering an environment where product development teams work closely and openly with suppliers during the design and sampling stage could facilitate innovation in sustainable product development and product longevity. Curwen et al (2012) also advocate for an integrative approach, arguing that a single functional group such as a design team is not equipped to identify and launch viable sustainability options on its own and assert that collaborating and utilising the expertise of various organizational actors is a more effective strategy for sustainable product development.

However long-term partnering does not seem to be a priority for the UK fast fashion sector as research indicates that relationships within its supply chain are often transactional and lack a longer-term, partnership approach (Levitt, 2020; Rafi-Ul-Shan et al, 2020). According to Levitt (2020) the online, ultra-fast fashion brands work with hundreds of suppliers to provide them with greater choice and availability of products to meet consumer demand for a variety of styles. However, despite long-standing relationships, if a supplier is too slow or lacks flexibility, buyers will go elsewhere, which reduces trust between suppliers and brands and hinders progress towards more sustainable product development practices.

Historically UK fashion supply chains were dominated by large suppliers and manufacturers, but during the early 2000s, a power shift emerged from manufacturers to brands and retailers, which Barnes & Lea-Greenwood (2006) attributed to the growth of UK fast fashion brands. In today's fast fashion industry, it is generally accepted that fast fashion brands dominate the supply chain and maintain control (Goworek et al, 2020; Parker-Strak et al, 2020; Dewalska-Opitek & Bilinska-Reformat, 2021), creating a shift in the nature of the buyer-supplier relationship. This power shift has had significant implications for the UK apparel and textiles manufacturing sector, which is now comprised of mostly smaller companies employing 11 workers on average (ONS, 2021). Consequently, these smaller organisations find themselves with limited bargaining power against larger, more powerful brands and retailers (Levitt, 2020).

The fast fashion supply chain is widely documented for its unethical practices, with numerous examples illustrating the pressures placed on suppliers by fast fashion brands. Drapers reported on this growing tension, warning that the relentless pressure from brands to keep prices low were pushing manufacturers to breaking point (Sutherland, 2017), forcing them to act unethically and create 'lousy products' (Goworek, 2020, pg. 637). More recently Boohoo was reported to have demanded a 10% blanket discount from suppliers in a bid to control costs, resulting in significant financial losses for manufacturers (Mills, 2023: Hu, 2023). Brands are also prone to cancelling orders at the last minute to remain responsive to changes in the market and avoid markdowns (Levitt, 2020), leaving suppliers with unsold stock and a loss of profit. Hammer et al (2015) also observed that brands are continually increasing their demands on suppliers, insisting they take on additional responsibilities for quality control, packaging and ticketing while also expecting them to offer design and product development services.

Existing literature also describes ethically questionable practices undertaken by fast fashion buyers, which make it difficult for suppliers and manufacturers to operate responsibly. Fast fashion buyers, particularly those who are young or inexperienced, often prioritise margin targets above all else, with little regard for the consideration of the costs involved in producing garments (Hammer et al, 2015). This pressure on cost efficiency forces suppliers to accept prices they cannot meet without cutting corners in production or underpaying workers. Accusations within the industry against Boohoo suggest that suppliers are played off against each other in a 'cattle-market environment' where they have to offer the lowest price to win business (EAC, 2019). Orders are also accepted by suppliers on extremely short lead times and very low margins which can only be sustained when repeat orders are placed. Yet as fast fashion buyers are very price driven and regularly switch between suppliers (University of Nottingham, 2022; Levitt, 2020), repeat orders are not always guaranteed. Hammer et al (2015) report on one case where a fast fashion supplier covered the upfront costs of developing a garment and received a small trial order, only for the larger repeat order to be given to a competitor who under-cut their price. This cost-driven approach in fast fashion often results in suppliers being forced to accept unsustainable orders, compromising environmental and labour standards.

Using the concept of power, Cox et al (2003) proposed a power matrix model which consists of four potential power stances in relation to the distribution of power within a supply chain, as presented in Figure 2.7. Applying this model to the UK fast fashion supply chain based on the literature illustrates a clear representation of the 'buyer dominance' power structure, where buyers hold substantial influence over suppliers, leveraging their position to dictate terms and conditions. In this power dynamic, buyers exercise control and lack long-term commitment, forcing suppliers to accept orders under unfavourable terms and conditions, with little regard for their preferences or operational constraints.

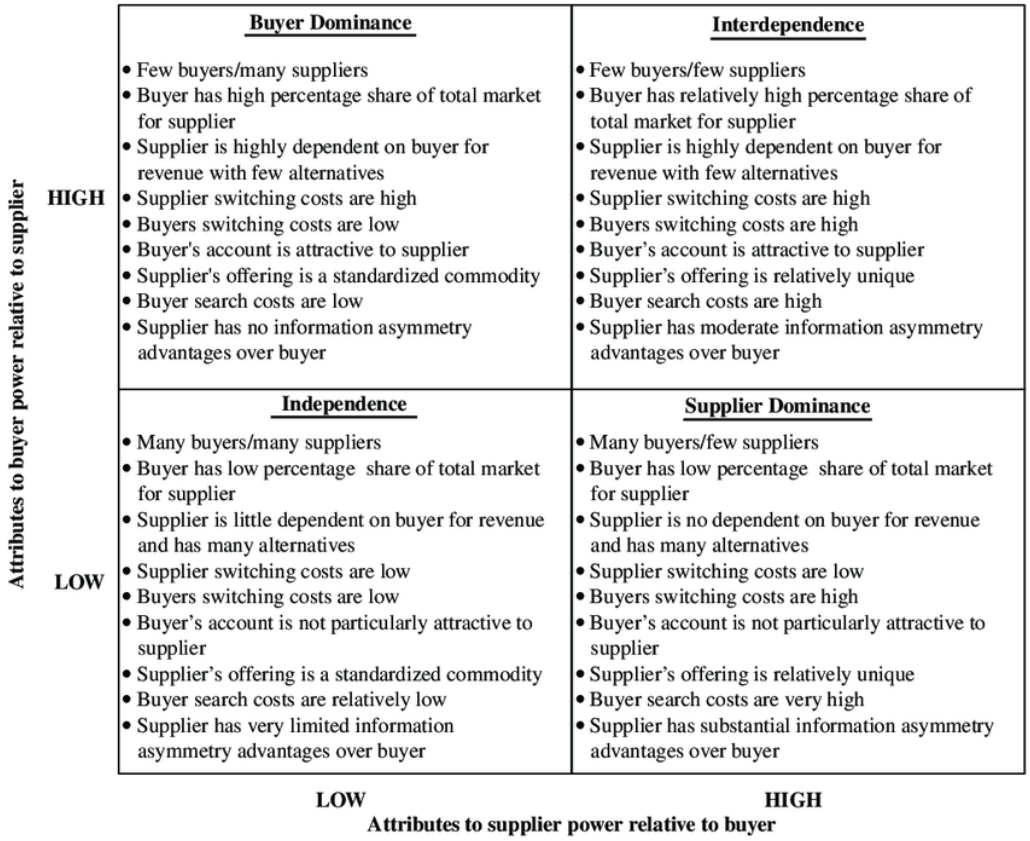


Figure 2.7 The power matrix: the attitudes of buyer and supplier power (Source: Cox et al, 2003)

2.2.3 Product 'newness' and width of options

A key characteristic of fast and ultra-fast fashion is the frequent introduction of new products, and it is this continual newness which is recognised as the driving force behind its success (Niinimaki et al, 2020 Barnes & Lea-Greenwood, 2006; Parker-Strak et al, 2023). Traditionally fashion buying and product development followed a fixed calendar of trade fairs and fabric events, organised around a two-season approach where planning for new products was based on historical sales almost a year ahead of the selling season (Barnes & Lea-Greenwood, 2006). However, this traditional model has been replaced by a much more agile approach, with response times from concept design to product launch now reported to be as little as a week (Coresight Research, 2017). Figure 2.8 illustrates the differences in the lead times of traditional, fast and ultra-fast fashion retailers, highlighting that fast and ultra-fast fashion brands have much shorter lead times compared to traditional retailers, with ultra-fast fashion brands such as Missguided and Boohoo launching products in as little as a week.

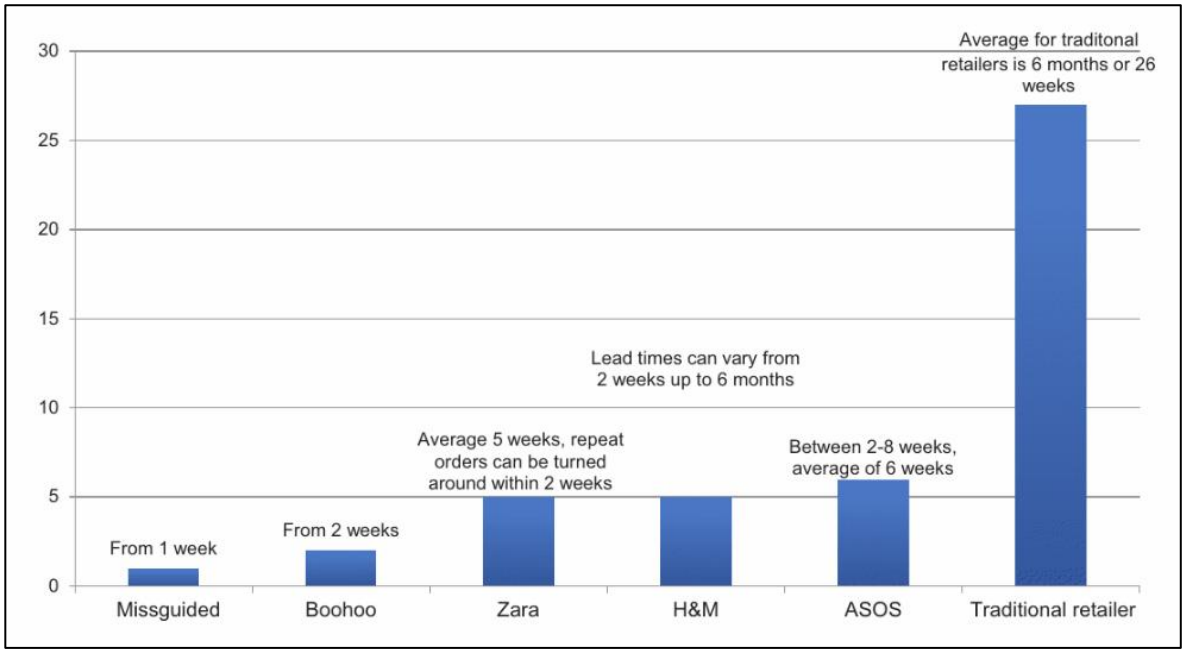


Figure 2.8 Example of lead times in the fashion industry (Source: Coresight Research, 2017)

Ultra-fast, online-only brands also have a much larger number of products available to the consumer as they are not limited by physical store environments (Parker-Strak et al, 2020; Wood et al, 2019), allowing them a product offering double or triple the size of fashion retailers with physical stores. According to retail analytics firm Edited (2019), leading fast fashion brands like Boohoo and ASOS had over 30,000 products available online between February and May 2019, as shown in Figure 2.9, emphasising the huge width of offer from

ultra-fast fashion brands. Furthermore, The Business of Fashion reports on Shein's vast offering, with as many as 600,000 items available on its site at any given time and adding around 6000 new items daily (Chen, 2023), compared to Boohoo who launch around 500 new products a week. This abundance of products not only emphasises the extent of over-production but also highlights the potential waste generated by the industry, further contributing to environmental concerns.

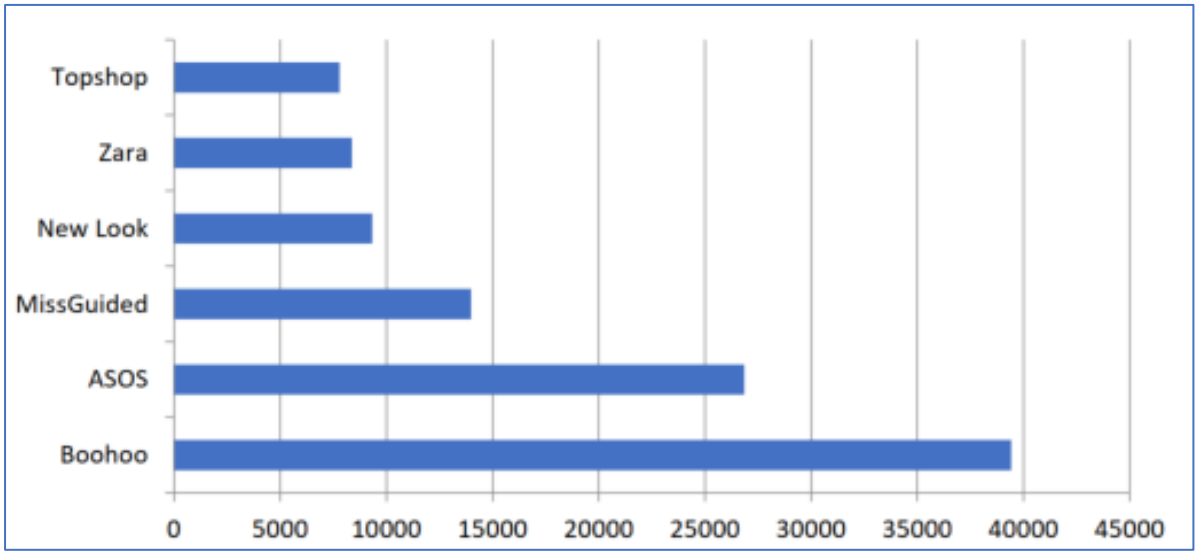


Figure 2.9 Number of fast fashion apparel products available online from 1st February to 1st May 2019. (Source: Edited, 2019)

2.2.4 Test & repeat strategy

In search of shorter lead times and responsiveness to unpredictable demand, smaller production runs are commonplace within ultra-fast fashion in particular, made possible by the modest production units within Leicester manufacturing. Leveraging this advantage, ultra-fast fashion brands such as Boohoo are known to adopt a 'test and repeat' strategy, initially producing small quantities of a product to gauge demand before moving into mass production (Fernie & Grant, 2019; BBC, 2018).

Fashion Enter, a Leicester based social enterprise who are 'leading the way in promoting sustainability within the sector' (Fashion Capital, n.d.) argue that shorter supply chains comprising low volume orders and shorter production runs are the way forward in making the UK garment industry more sustainable as they minimise waste and over-production. Shein makes a similar argument, asserting that their predictive ability facilitated by Artifical

Intelligence and small production runs aid in waste reduction as they report unsold inventory levels at less than 10%, against an industry average of 25-30% (Taylor, 2023). However, it is unclear whether the motivation from brands such as Boohoo and PLT for such practices of restricted initial buys to test the market are solely to reduce the risk of markdowns and increase profitability, or as an initiative towards more responsible practices. Given the sector's focus on low-cost production and tight margins, it is more likely that the main goal is to minimise risk, reduce inventory costs and maximise profits rather than sustainability.

2.3 The Environmental Impact of Fast Fashion Product Development

Although fast fashion is a highly successful and profitable industry, it is regarded as one of the greatest sustainability challenges due to the significant impacts which occur throughout the supply chain, from the initial stages of growing and processing raw materials through to the assembly of products and ultimate disposal (Niinimaki et al, 2020; Islam et al, 2020; Turker & Altunas, 2014). Described as a 'take, make and dispose system' (Moorhouse and Moorhouse, 2017) it is a process where natural resources are taken, reproduced and disposed after use which ultimately end up as waste.

Figure 2.10 presents the main stages of a clothing supply chain alongside their contribution to the system's carbon footprint (Millward-Hopkins et al, 2023). Notably, a substantial 65%-95% of emissions are generated during the product development stage, with fabric production having the greatest impact. These findings are reinforced by WRAP (2023), who similarly highlight that while emissions occur throughout the product lifecycle, more than half are emitted within the fibre production and processing stages.

While this data offers an overview of the broader clothing system, it does not address specific nuances of individual fibres or clothing types prevalent in fast fashion, which may possess a different carbon footprint. However, it still offers a useful snapshot of the adverse environmental repercussions of fashion product development and the need for more sustainable practices to mitigate the environmental impacts. Given the substantial environmental impact of material production, focusing on this aspect is a crucial first step towards more sustainable product development practices.

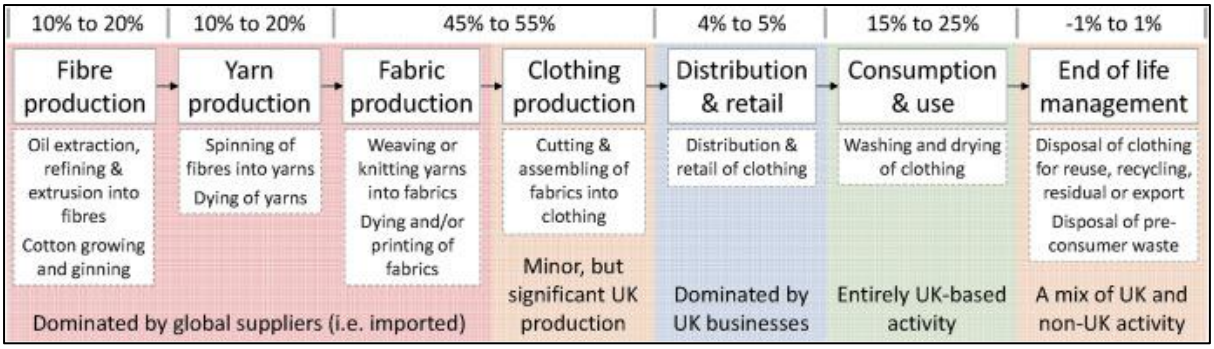


Figure 2.10 The approximate amount that each stage of the clothing supply chain contributes on average to the total carbon footprint of the clothing system (Source: Millward-Hopkins et al, 2023)

2.3.1 Fast fashion materials

Ultra-fast fashion brands like Boohoo and PLT depend heavily on cheap synthetic materials such as polyester to create their products. Polyester, which is derived from fossil fuels, is now the most widely used fabric in the fashion industry, representing 52% of global fibre production and is projected to account for more than 26% of the carbon budget by 2050 due to its energy intensive production and reliance on oil extraction (Textile Exchange, 2022).

Reports suggest that key players like PLT, Boohoo and Missguided use virgin polyester in over 80% of their products due to its low cost and widespread availability (Bloomberg, 2022), however this heavy reliance on synthetic materials has significantly contributed to the sector's environmental impact due to the substantial greenhouse gas emissions generated during production. It is reported that Shein's emissions have nearly tripled in the last three years due to its extensive use of synthetic fibres and energy-intensive manufacturing processes (Kent, 2024), highlighting how ultra-fast fashion brands focus on low-prices continues to drive significant environmental damage. Furthermore, polyester is non-biodegradable and is a major source of microplastic pollution where tiny fibres enter waterways during washing, infiltrating oceans and potentially contaminating the food chain. To further emphasise this issue, the EAC (2019) estimates that 20-35% of all primary microplastics in the marine environment originate from synthetic clothing, creating a significant threat to marine ecosystems and human health.

Synthetic fibres also have high energy demands in production, as shown in Figure 2.11 with polyester using 106kWh per kg of fibre and polyamide 160kWh, adding to the high carbon footprint attributed to the fast fashion sector. Although synthetics use less water to produce than some natural fibres like cotton and wool, they still require a large amount of strong chemical dyes to achieve the desired colours as they do not take up colour as well as natural fibres (Ross, 2017).

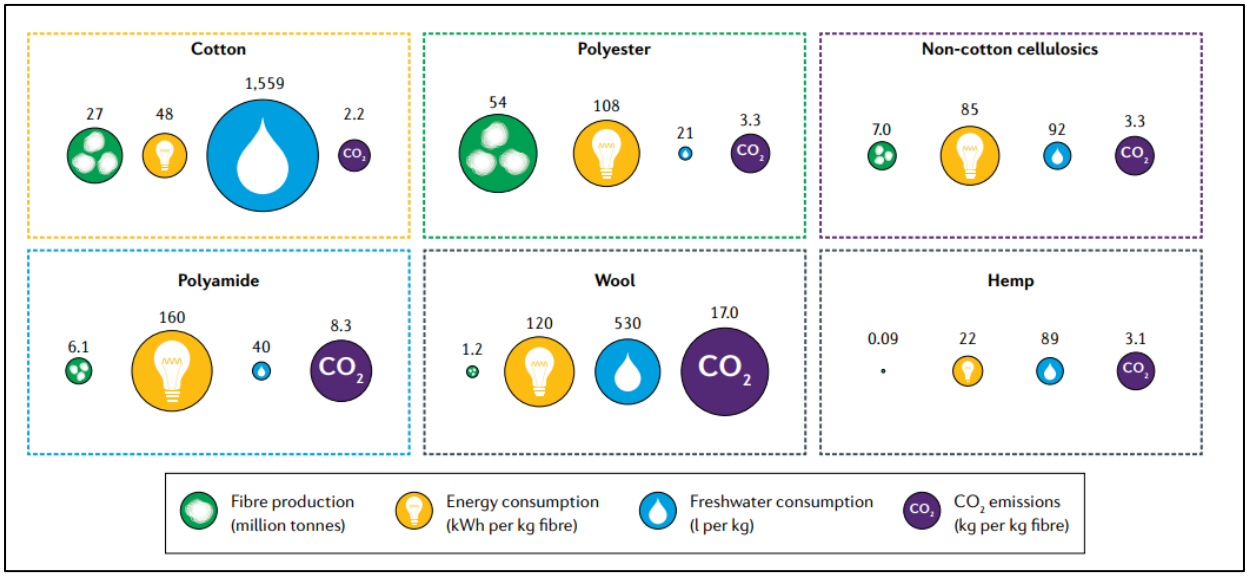


Figure 2.11 Environmental impacts of six types of fibres. Approximate fibre production, energy consumption, freshwater consumption and CO2 emissions for cotton, polyester, non-cotton cellulosics, polyamide, wool and hemp (Source: Niinimäki et al, 2020)

Along with chemical dyes, the sector is also guilty of using other highly polluting toxic chemicals in the development of products (Akhtar, 2022), often to soften the fabric or improve durability. A 2021 investigation into Shein by Canadian Broadcasting Corporation found elevated levels of lead, phthalates and per-and poly-fluoroalkyl substances (PFAS) within their products for both adults and children (Changing Markets Foundation, 2022). Exposure to such chemicals builds up over time and are harmful to the environment and human health (Niinimäki et al, 2020), particularly for the people manufacturing the clothes, with estimates that almost 27 million people working in fashion supply chains could be affected (Common Objective, 2018).

Despite increased scrutiny and a growing body of evidence pointing to the environmental devastation and health hazards associated with synthetic fibres, fast fashion's reliance on

harmful fabrics remains. Although brands like Boohoo and Shein appear to be making moves to replace virgin polyester with recycled polyester, their recent efforts are insufficient for meaningful impact. As illustrated in Table 2.2, Boohoo only used 10% recycled fabrics within their total range in 2022 (Changing Markets Foundation, 2022), highlighting its continued reliance on cheap synthetic fibres.

Brand	Recycled content as % of total fibres used
adidas	48%
ESPRIT	40%
BURBERRY	35%
KERING	18.9%
LINDEX	18%
H&M	17.9%
George ASDA	16.74%
G-STAR RAW	13.7%
TESCO	10.7%
boohoo	10%

Table 2.2 Top ten brands that use the most recycled content as a proportion of total fibres (Source: Changing Markets Foundation, 2022)

Although estimates show that recycled polyester can reduce emissions by up to 32% compared to virgin polyester (WRAP, 2017), most of the fashion industry's recycled polyester is sourced from plastic bottles (Textile Exchange, 2022) which is considered an interim solution at best. Polyethylene terephthalate (PET) bottles are part of a well-established, closed-loop system and can be recycled multiple times, but converting them into clothing disrupts this cycle as most clothing made from these bottles are unlikely to be recycled, ultimately accelerating their path to landfill and contributing to the waste crisis. Furthermore, switching to recycled polyester fails to address the problem of microplastic pollution, as fibres continue to shed from recycled polyester at the same rate as from virgin yarns (Bryce, 2022).

2.3.2 Fast fashion waste

Greenpeace (2019) describes the UK fast fashion sector as a 'monstrous disposable industry' as it estimates that more than two tonnes of clothing are bought each minute, which is more than any other country in Europe. As a result, discarded textiles and apparel are a rapidly growing category in UK household waste streams, with reports of UK consumers discarding around 300,000 tonnes of apparel every year (Oxfam, 2019; Koszewska et al, 2018). Between 2004 and 2012, UK textile waste per capita significantly increased from 4kg to 19kg, compared to more modest increases in Germany (2kg to 4kg) and Austria (4 to 5kg) (Koszewska et al, 2018). This trend is expected to worsen, as WRAP (2023) predicts that clothing consumption will continue to rise, driving even higher levels of waste. Their *Textiles Policy Options Report 2023* forecasts that the volume of new textiles products consumed in the UK will increase from 1.66 million tonnes in 2018 to between 1.75 and 2.37 million tonnes by 2030. Based on current disposal patterns, this growth could result in an additional 90,000 to 710,000 tonnes of textile waste annually (WRAP, 2023), further intensifying the environmental impact, unless substantial improvements in reuse and recycling are made.

During the past decade there has been increasing pressure for fashion brands and retailers to minimise their environmental impact through eliminating both pre- and post-consumer waste from their operations. Pre-consumer waste includes any excess fabric discarded by textile mills and apparel manufacturers during the product development and manufacturing process (Sinha & Dissanyake, 2015; Koszewska et al, 2018) and could take the form of fibres, yarns, off-cuts, selvages, roll ends, and rejected materials. Conversely post-consumer waste refers to any products discarded by consumers which could be unworn, upcycled or reached the end of life.

Garcia-Ortega et al (2023) highlight the importance of waste reduction, reporting that extending the average lifespan of clothing by just nine months can reduce carbon emissions, water consumption and waste generation by approximately 30%. In response to growing concerns about textile waste, several fashion brands have introduced initiatives aimed at prolonging the life of their products and minimising waste. Patagonia's *Worn Wear* program encourages customers to repair, trade in and purchase second-hand Patagonia products, reinforcing the brand's commitment to product longevity and reducing textile waste. H&M's garment collection scheme sorts old clothing for resale, reuse, or recycling into textile fibres,

while Mud Jeans operates a denim leasing model, allowing customers to rent jeans and return them for recycling or exchange at the end of the lease. Bamboo Clothing promotes circular fashion through material innovation, using bamboo-based textiles that require less water and fewer pesticides than conventional cotton, while also offering greater durability and recyclability, ensuring that garments can be repurposed or biodegrade more easily than synthetic alternatives. However, despite such efforts, fast fashion continues to generate waste by driving overconsumption, prioritising rapid turnover and frequent purchases while encouraging the frequent disposal of 'old' garments.

Adding to this waste problem is the increase in returns rates of fast fashion products, made easier by brands offering convenient returns policies with free shipping. Wood et al (2019) report that returns rates for some fast fashion items are in excess of 50 percent as many customers are 'bracketing' - ordering multiple sizes and returning ones that do not fit - with much of the returned stock sent directly to clearance to mitigate the costs of reprocessing. Managing such high levels of returns presents a huge challenge for fast fashion brands as the cost of reprocessing often exceeds potential resale revenue (Perry, 2022), resulting in much of this stock ending up in landfill having never been worn (Fashion United, 2022).

Traditional fast fashion brands with physical stores such as H&M and Zara are taking steps to address this issue by introducing charges for postal returns, aiming to encourage consumers to make more informed purchase decisions and discourage impulsive buying behaviour (Doherty, 2023). A recent study by the British Fashion Council suggests that the introduction of returns charges is expected to significantly reduce rates of returns, as 56% of online shoppers surveyed indicated that a returns charge would be the most effective measure to deter them from returning items (BFC, 2023). However, this approach is more feasible for traditional fast fashion brands, as their physical stores offer customers an alternative for returns, reducing reliance on postal returns. Additionally, since their business models are not primarily centred around online sales, unlike online-only brands, these companies face fewer challenges in implementing such measures.

2.4 Sustainability Initiatives in UK Ultra-Fast Fashion

Much of the literature into fashion sustainability considers fast fashion to be diametrically opposed to ethical consumption (Stringer & Mortimer, 2020; Cavender et al, 2017), however some fast fashion organisations are beginning to react to shifts in the market towards more ethical consumption with the introduction of sustainably marketed brand extensions and CSR campaigns. The Boohoo Group claim to be making inroads into improving their sustainability credentials through commitments to overhauling materials, their supply chain and corporate governance to include 'sustainable thinking on all levels' (Nazir, 2021). The group have partnered with 'Re-Gain', a take-back program that enables consumers to dispose of their unwanted clothes to be renewed, upcycled or recycled into new sustainable products in exchange for discount codes (Regain, n.d.). However, it is argued that such schemes do not address sustainability issues but simply provide consumers an opportunity for guilt-free consumption (Gould, 2017).

Boohoo also opened a 'model garment factory' in 2022 allowing them to take control of their production and demonstrate best practices in product development and manufacturing. However, in 2023 the BBC revealed that this factory was only making 1% of Boohoo's total production (BBC, 2023), an initiative which is far too small to create the much-needed structural change in the industry. Additionally, the report found that hundreds of orders placed with this factory were actually being made in Morocco and other units in the Leicester area and not within the model factory as indicated on the packaging. In fact, a follow-up report in 2024 has since revealed that Boohoo are closing their model factory and relocating operations to other locations (Smith, 2024), undermining their promises towards a more sustainable future. Therefore, Boohoo's true level of commitment remains to be seen as vague pledges to ensure materials are 'more sustainable' by 2030 and recycling schemes which encourage over-consumption seem to contradict their intentions towards a more sustainable future.

In 2022, Shein launched a collection of garments made from recycled polyester and a 'forest-safe' viscose fibre labelled 'EvoluShein'. However, critics argue that this is simply an example of 'greenwashing and box-ticking' (Lieber, 2021) as brands who produce thousands of new styles daily and focus on generating short-term profits at the expense of the environment, are examples of the fashion industry's throwaway culture and are simply not

sustainable (Cline, n.d.). NGOs such as 'Good on You' and 'Fashion Revolution' who rate clothing brands for their impact on the environment, labour rights and animal protection have scored many leading fast fashion brands poorly, with Shein's environmental rating described as 'We Avoid' as it continues to use high-impact materials and lacks evidence that it has taken meaningful action to reduce its climate impact (Goon On You, 2022).

The Ethical Trade Initiative (n.d.) argue that government intervention in the form of legislation is what is required to eradicate unethical practices and rebuild the UK garment industry, as existing voluntary schemes are simply not enough to drive meaningful change. In the EU and US changes are beginning to take place as governments consider a raft of policies and regulations that look to transform the industry and 'end fast fashion' (European Parliament, 2023). In 2021, the European Parliament voted to press ahead with their 'Strategy for Sustainable and Circular Textiles' which includes measures around stricter supply chain obligations, tighter guidelines for marketing products as sustainable and incentives to support more sustainable business models. The EU aims to ensure that by 2030, all fashion products will be recyclable, durable, free from hazardous substances and ethically manufactured with penalties of up to 10 euros per item proposed on fast fashion products as well as a ban on advertising such products (European Parliament, 2023). This raft of new legislation includes any large company trading in the EU which will impact leading UK brands such as Boohoo, PLT and ASOS who will soon be compelled to make more eco-friendly choices when trading in these markets.

However, much less progress has been made in the UK as the government has so far failed to recognise the urgent action required to reform the fast fashion business model, despite growing evidence of its environmental impact. All key recommendations from the 2019 *Fixing Fashion* whitepaper, which proposed measures to tackle the environmental impact of cheap clothing, were rejected with only vague commitments made towards an Extended Producer Responsibility (EPR) scheme. EPR is designed to incorporate environmental costs associated with a product throughout its life cycle into its market price, encouraging waste prevention, lower-impact design and supporting wider public use of recycling. However, in February 2023, then-Secretary of State for Environment, Food and Rural Affairs, Therese Coffey, confirmed that an EPR for clothing and textiles was not expected anytime soon, despite similar schemes

already applying to electrical goods, batteries, vehicles and packaging (Russell, 2023), providing little hope for a more sustainable fast fashion sector in the UK.

In response to these ongoing challenges, WRAP (2023) published its *Textiles Policy Options* report, designed to support DEFRA's goal of halving textile waste and reducing industry emissions. The report evaluates key policy interventions, including an EPR scheme, eco-design regulations, landfill and incineration restrictions and improved textile collection systems. It emphasises that no single policy can effectively reduce textile waste in the UK, advocating for a coordinated approach that integrates multiple strategies to drive meaningful change. Despite these recommendations, DEFRA has yet to take meaningful action, postponing its planned public consultation on textiles that was originally scheduled for late 2024. WRAP's (2025) *Textiles EPR FAQs* report notes that following the formation of a new UK government in July 2024, planning is on hold as DEFRA awaits guidance from the new Circular Economy Taskforce to establish priorities and develop a Circular Economy Strategy. This delay further postpones the much-needed reforms to address the UKs growing textile waste crisis.

This chapter has explored the literature surrounding the UK fast fashion sector, examining existing product development practices and their environmental consequences. In the next chapter the literature on sustainability will be introduced, including key foundational theories and frameworks. This will be followed by a review of sustainable approaches and conclude by addressing the challenges of integrating sustainable product development practices within the fashion industry.

Chapter 3: Literature Review
Sustainable Fashion Product Development

In this chapter the concepts of 'sustainability' and 'sustainable supply chains' are introduced with a brief overview of their origins, alongside an analysis of established models and theories that underpin sustainable supply chain management (SSCM). The literature exploring advancements in sustainable fashion product development is also explored together with an examination of the challenges of implementing such practices within the UK fast fashion supply chain.

3.1 Theoretical Background

It is necessary to understand the theoretical bases which exist on sustainability as these concepts and frameworks offer a holistic perspective of sustainability, serving as guiding principles for generating systemic change (Schluter et al, 2022). However, due to the complexity of sustainability and its diverse dimensions, there appears to be a lack of consensus among existing theories and frameworks. This is reflected in the variety of perspectives, priorities and contexts in the field, resulting in multiple approaches to address the various aspects of sustainability. Consequently, this study does not rely on a single theory or framework, but instead draws on the insights of various authors to guide the project's development.

The term 'sustainability' was first introduced in 1987 by the United Nations as 'development that meets the needs of current generations without compromising the ability of future generations to meet their own needs' (WCED, 1987). More recently, the most frequently used ideas and concepts refer to organisational activities that support the principles of the 'triple bottom line' (TBL), a well-established and influential theory introduced by John Elkington in 1997. This theory suggests that sustainability should be evaluated based on three dimensions: economic, social and environmental. Therefore, for a company to be considered as sustainable, they must balance economic development with the protection of the environment and social interests (Ostermann et al, 2021). Whilst the TBL's value is often highlighted in the literature, it has also faced criticism due to misinterpretation and over-

simplification. In a 2018 Harvard Business Review article, Elkington argues that he coined the term 'triple bottom line' as a challenge for business leaders to rethink capitalism not merely as an accounting tool to quantify social and environmental impacts in monetary terms (Elkington, 2018). Therefore, while the TBL framework is a starting point for understanding an organisation's approach to sustainability, it is important to consider other models that allow for a more holistic view of the field.

In the 1990's, Hart (1995) highlighted the growing importance of environmental sustainability for organisations through his 'natural, resource-based view' (NRBV) theory which stands out as a visionary concept, recognising the importance of sustainability long before it became a mainstream concern. By highlighting how organisations could gain competitive advantage from environmentally sustainable activities such as waste minimisation, green product design and development and technology cooperation, Hart's theory laid the foundation for integrating sustainability into strategic management. Three key areas are considered within the NRBV framework, namely 'pollution prevention', which involves eliminating emissions and waste from operations, 'product stewardship' which focuses on product design and development and lastly 'sustainable economic development' which represents the broader context within which these strategies operate, emphasising the integration of environmental considerations with economic decision-making.

Product stewardship is of particular relevance to this study as it guides the selection of raw materials and product development, with the objective of reducing the environmental impact and lifecycle costs. According to Hart (1995), for a product to have a low environmental impact, designers and product developers need to focus on three areas: minimising the use of non-renewable materials, avoiding the use of toxic substances and utilising living (renewable) resources in accordance with their rate of replenishment. In addition, the product must also be easily composted, reused, or recycled at the end of its life. By embracing product stewardship principles, fast fashion organisations could break away from their environmentally hazardous practices and improve their reputation by taking a more environmentally proactive stance towards product development.

2015 also saw the launch of the United Nations Sustainable Development Goals (SDGs) framework, a call for action by all member countries to promote prosperity while protecting

the planet (United Nations, n.d.). The SDG goals align with the Triple Bottom Line (TBL) and recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality and spur economic growth, all while working to preserve the environment (United Nations, n.d.). Although well-intentioned, the SDGs have faced criticism for their over-ambitious nature with 17 goals and 169 targets which are overly complex and sometimes contradictory. A recent Financial Times article highlights the challenges countries face when attempting to pursue goals such as increasing income (SDG1) and reducing inequality (SDG10) simultaneously, as these objectives may pull in opposite directions and conflict with one another (Pilling, 2023). Consequently, the SDGs are considered more as a wish-list than a strategic roadmap for driving meaningful change.

'Sustainable practices' are often referred to in the literature, but as highlighted, the term lacks an agreed definition and means different things to different people. However, an amalgamation of the most frequently used conceptualisations by Islam et al (2020) agree that 'sustainable practices' refer to activities that are less damaging to people and the planet and support the triple bottom line pillars of sustainability addressing ethical, environmental, and economic factors. Within the fashion industry, sustainable practices refer to activities such as slow design, green production, waste management and fair pay and working conditions where fashion products are developed and distributed in an environmentally and socially responsible way throughout the whole supply chain (Shen, 2014).

Perry (2022) argues that the term 'sustainable fashion' is difficult to define as a fashion garment cannot address all three pillars of the triple bottom line. For example, if a company wants to support women with employment in a developing country, this will come at the expense of longer lead times and a higher carbon footprint. A brand may decide to switch to vegan leather for ethical reasons, however this type of material is not biodegradable as it is derived from plastic which has negative impacts on the environment. The challenges of balancing sustainability with profitability occur at every stage of the apparel supply chain (Shen, 2014), therefore sustainable fashion is about being as environmentally friendly and ethical as possible but almost always involves a trade-off.

Parker-Strak et al (2023), highlight that media attention around sustainability has also increased significantly over the last decade. 2015 saw the release of '*The True Cost*'

documentary which scrutinised the industry for its lack of sustainable credentials and in 2019 TV broadcasts such as Stacey Dooley's '*Fashion's Dirty Secrets'* exposed the damaging effects of fashion production on the environment, alongside publications such as Lauren Bravo's '*How to Break Up with Fast Fashion',* highlighting the negative impacts of the fast fashion industry. There have also been signals that suggest the industry is beginning to come to terms with its social and environmental footprints as many brands and retailers have been actively engaged in discussions related to the 2015 Paris Agreement, a landmark treaty between representatives of 195 countries which marked a transformative moment on the journey towards a low-carbon economy (Parker-Strak et al, 2023).

WRAP's '*Textiles 2030'* framework is a key element of the UK's efforts to meet the climate targets established in the 2015 Paris Agreement. Launched in April 2021, '*Textiles 2030'* is designed to engage UK fashion and textiles organisations in collaborative climate action, aiming to create a more sustainable and circular fashion industry by 2030 (WRAP, 2021). Funded by its signatories and the UK government, the initiative emphasises the importance of transitioning from a linear to a circular economy, encouraging the use of more sustainable, lower-carbon materials and the design of durable, reusable and recyclable products. By promoting these practices, '*Textiles 2030'* not only helps reduce waste and resource consumption in the UK but also supports the Paris Agreement's goal of achieving net-zero carbon emissions by 2050 (WRAP, 2021). As of August 2023, 130 businesses have committed to the initiative, including 33 brands and retailers, collectively representing over 62% of UK clothing products placed on the market, as well as 48 textile reuse and recycling organisations and 49 affiliates, such as researchers, academics and industry groups (WRAP, 2023).

According to the '*Textiles 2030 Annual Progress Report 2022-23'* (WRAP, 2023), 44% of products developed by signatories in 2022 had a lower environmental impact compared to 2019 levels. However, these improvements have been largely offset by increased production volumes, particularly prevalent within the fast fashion sector, resulting in only a 2% overall reduction in emissions. These findings highlight that in addition to improving product sustainability, production volumes must also be addressed for '*Textiles 2030*' targets to be met. While UK fast fashion businesses such as the Boohoo Group and Asos have joined the initiative, the extent to which it has driven meaningful change within these companies remains unclear, as the available data lacks detailed insights into their specific actions.

Despite the significant increase in manifestos and initiatives aimed at promoting fashion sustainability, Fletcher & Tham (2019) argue that the sector's response to the climate crisis has been ad-hoc and largely ineffective, as many actions are simply examples of greenwashing rather than proactive sustainability strategies. Brands and retailers continue to fall short on transparency as revealed by the latest Fashion Transparency Index (FTI), with an average score of just 26 points out of 100 which is an increase of only 2 points from the previous year (Kent, 2023). The Pulse of Fashion Report (Lehmann et al, 2019) reinforces this view, stating that fashion companies are failing to implement sustainable solutions fast enough to offset the industry's environmental harm, with no net reduction in overall impact observed.

3.2 Sustainable Approaches to Fast Fashion Product Development

Over the past decade research has highlighted a consumer led increase in the desire for environmentally friendly fashion products (McKinsey & Co, 2021; Fung et al, 2021; Stringer et al, 2022; Papasolomou et al, 2022), therefore it is imperative that fast fashion brands adapt their product development practices in line with these expectations. Aligned with Hart's NRBV theory, sustainable product development supports his principles of product stewardship, creating products through environmentally responsible and economically viable processes that minimise the overall negative impact on the environment (Govindan et al, 2015). Sustainable product development involves key decisions about materials, quality, style and manufacturing processes including selecting renewable materials that do not deplete natural resources, using non-hazardous inputs and adopting production processes that reduce both material and energy consumption (Todeschini et al., 2017). Additionally, products must also be designed to be re-usable, recyclable and biodegradable (Moktadir et al, 2018a).

3.2.1 Collaborative supply chains

Fung et al (2021) argue that to develop products sustainably, brands must collaborate with all members of the supply chain from concept creation through to material selection, manufacturing and distribution, while considering the Triple Bottom Line (TBL) at every stage, as illustrated in Figure 3.1. Embracing this model is essential for the UK fast fashion sector to

develop products more responsibly as research suggests that brands currently operate in isolation with limited collaboration across the supply chain (Levitt, 2020; Hammer et al, 2015), hindering efforts towards more sustainable practices. By integrating sustainability into every phase of the process and fostering collaboration among all stakeholders, brands can more effectively address environmental impacts, enhance social responsibility and ensure economic viability.

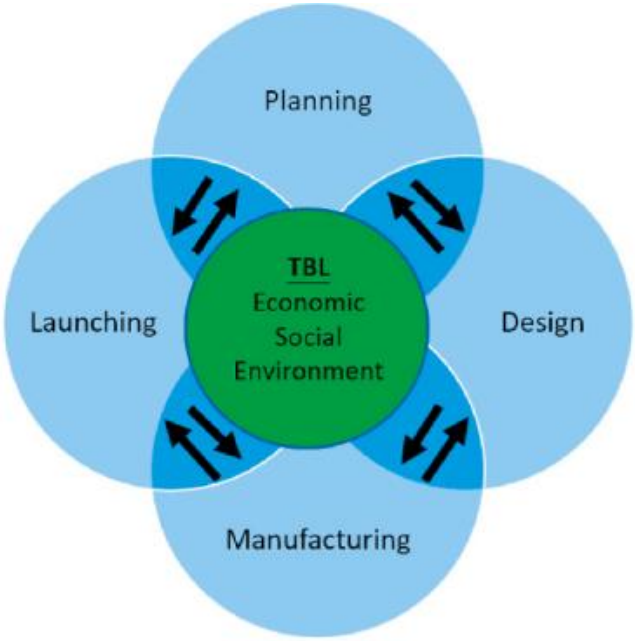


Figure 3.1 Sustainable product development process – triple bottom line (Source: Fung et al, 2021)

3.2.2 Eco-conscious materials

As highlighted in the previous chapter, a significant proportion of emissions originate from the production of materials used in fashion products, emphasizing the crucial role of material choices in product sustainability. Since most materials used in fast fashion products are synthetic and have a significant environmental impact, switching to more sustainable alternatives presents a key opportunity for fast fashion brands (Rauturier, 2022; Kirchain et al., 2015). Therefore, fashion buyers and designers should adopt a sustainability mindset from the outset when developing products, aiming to reduce or eliminate the use of non-renewable materials like polyester and other low quality synthetic fabrics. Instead, they

should explore alternatives such as newer, more innovative fabrics made from renewable resources which can be easily composted, reused, or recycled.

Recycled Materials

Recycled materials are those which are transferred from existing products to create new ones, reducing reliance on virgin materials in new product development. Hence, using recycled materials saves energy and water as well as reducing greenhouse-gas emissions, making it a more sustainable option (Shen, 2014). According to McKinsey & Co (2021b), 24% of fashion companies surveyed plan to make at least half of their products with recycled fibres by 2025. ASOS already offers products made from recycled materials and in 2019 provided a 'recycled fabrics' filter on its website, enabling consumers to narrow down their search for more sustainable fashion items. Similarly in 2019, Boohoo launched a sustainable fashion line called 'For the Future' made only from recycled materials, but this range only represented a small proportion of their total product offering, thereby limiting its overall impact.

Todeschini et al (2017) argue that while using recycled materials in products is generally more sustainable than using virgin resources, the process of textile recycling requires a large amount of energy and should be considered as a secondary approach in the 3Rs of sustainability (reduce, reuse, recycle). Despite these concerns, incorporating recycled materials is preferable to relying on new, non-renewable resources as it helps to reduce the overall demand for raw materials.

Organic Materials

Cotton is one of the most popular materials used for fashion products, however research suggests that it is also among the most chemically intensive crops to grow (Rauturier, 2022). Switching to organic cotton is argued to be a more sustainable option as it is grown without the use of pesticides or synthetic fertilisers (Shen, 2014). Data from WGSN reports a 59% increase in the use of organic cotton in fashion products in the UK from 2019–20 (Givіden, 2020), however this fibre still requires high water consumption during both the agriculture and manufacturing stages, thereby limiting its sustainability credentials. It is also more costly to produce than regular cotton (Curwen et al, 2012), creating a potential barrier for its use within fast fashion products where maintaining low prices is key. Organisations within the fast fashion supply chain could look to recycled cotton as a more sustainable alternative as the

Textile Exchange's (2022) 'Preferred Fibre and Materials Market Report' suggests that recycled cotton is more sustainable than both conventional and organic cotton as it has the potential to reduce water and energy consumption as well as keep cotton clothes out of landfill.

Plant Based 'Vegan' Materials

Many fashion brands are now actively pursuing the use of plant-based, 'vegan' materials in their products. Derived from plants such as cacti and pineapple leaves, these materials are said to be the driving force in the journey towards a more sustainable fashion industry, with both high-end designers and mainstream brands incorporating such materials into their product ranges (Fashion Network, 2022). Embracing a vegan approach to fashion product development involves a company refraining from using any raw materials derived from animal origin, which not only aligns with ethical principles but also reduces the amount of energy used during a fashion item's production. Unlike animal materials which demand significant energy for extraction and processing, vegan alternatives offer a more environmentally friendly option (Todeschini et al., 2017). Furthermore, by using raw materials made from fruit fibres and leaves, fashion brands can help to ensure the continued availability of raw materials without harming the environment.

Many fashion brands are now using plant-based materials to improve sustainability and reduce their environmental impact. For example, footwear brand UGG's 'Plant Power Collection' features carbon-neutral materials like renewable sugarcane, Hevea rubber and natural hemp, which has significantly reduced their dependency on fabrics derived from fossil fuels (Fashion Network, 2022). Tommy Hilfiger created trainers in 2020 incorporating recycled apple peel fibres, while Chloé, the French luxury fashion house, developed their 'Pot de Confiture' bag made of apple skins and Pangaia, who are well known for their sustainability credentials, offered denim products made from wild Himalayan nettle (PANettle™) and rain-fed hemp (PANhemp™). Not only is hemp more sustainable as it requires no pesticides and very little water, but it is also extremely durable as it is proven that hemp is four times stronger than cotton, making it a much more environmentally friendly choice compared to other fabrics (Rauturier, 2022).

Lyocell is another increasingly popular plant-based material with high sustainability credentials as it is produced from the wood pulp of trees and is fully biodegradable (Boardman et al., 2020). WGSN reported an increase of 60% in searches for 'lyocell material' in the UK between 2019 and 2020 (Givіden, 2020) with many high street fashion brands such as & Other Stories, H&M and Topshop now incorporating Lyocell into their garments**.** This rising interest in Lyocell is due to its similar properties to viscose and its relatively low production costs (Boardman et al., 2020), however its adoption by fast fashion brands may be limited by the constant pressure to maintain low prices to stay competitive, as Lyocell comes at a higher cost than synthetic-based fabrics.

Other notable developments in plant-based, eco-friendly raw materials include ROICA, a premium stretch fibre created by Asahi Kasei, a global leader in innovative material development. Through ongoing investment in R&D, the company has engineered versatile, sustainable stretch yarns, reducing ROICA's carbon footprint by approximately 50% without compromising quality (Asahi-Kasei, n.d.). The company has also partnered with Lenzing AG to combine ROICA V550, a sustainable biodegradable stretch fibre, with Tencel fibres, setting new benchmarks for sustainability, performance, and circular design in textiles. Similarly, Hyosung, the world's largest manufacturer of spandex/elastane (Hyosung, n.d.), has expanded its sustainable textile offerings with the introduction of Creora, a bio-based elastane introduced in 2021, which has since been adopted by many leading global fashion brands. Made with 30% renewable resources, this fibre reduces carbon footprint by 20% compared to conventional spandex, as verified by an independent third-party Life Cycle Assessment (Hyosung, n.d.). There are also a number of plant-based and eco-friendly polyester alternatives pioneered by start-ups such as LanzaTech and Kintra Fibres. Lanzatech developed a technology to transform carbon emissions from industrial sources into the building blocks of polyester. The end product is identical to virgin polyester in appearance and functionality and the company has collaborated with athleisure brand Lululemon to create the first polyester yarn and fabric from captured carbon emissions (Lanzatech, n.d.). Kintra Fibres has pioneered a 100% bio-based (e.g. corn and sugar) and biodegradable synthetic alternative to fossil-fuel based polyester. In this way it achieves a 95% reduction in emissions, a 30% decrease in water usage and 20% lower energy consumption (Kintra Fibres, n.d.).

Piñatex has also emerged as a pioneering natural textile made from waste pineapple leaf fibres, offering a sustainable and cruelty-free alternative to animal-based leather. Developed by Ananas Anam, Piñatex is emerging as a key disruptor in the global leather industry, attracting significant attention for its sustainability, performance and durability (Research and Markets, 2024). While the bio-based leather market is still in its infancy, market research projects that the Piñatex fibre market will grow from $69.1 million in 2023 to $147.4 million by 2032 (CMI, 2023), driven by rising consumer demand for eco-friendly alternatives. Many major fashion brands have adopted Piñatex, integrating it into their collections to align with consumer values. For instance, Zara collaborated with Ananas Anam to launch a range of footwear and accessories made from Pinatex, while brands such as Nike, Hugo Boss and Paul Smith have also integrated the yarn into their products (Fresen, 2022), reinforcing the industry's shift towards more sustainable materials and reducing environmental impact.

However, the Business of Fashion (2022) reports that while the fashion industry has seen a significant increase in the amount of fashion products made from sustainable materials, this remains low overall. Adoption rates of newer, more innovative fabrics are generally higher in the mid to high-end sector of the fashion market due to challenges around price and availability. Additionally, mid and luxury brands have a greater ability to market sustainability as a premium feature, catering to consumers who are willing to pay a premium for eco-friendly products.

There is ongoing debate within the literature regarding which materials can be genuinely considered as sustainable, as many marketed as such fail to live up to their claims (Rauturier, 2022) creating challenges for both fashion brands and consumers. In 2023, Boohoo and ASOS faced scrutiny by the Competitions and Markets Authority (CMA) for 'greenwashing', a practice where companies mislead consumers into believing their products are more sustainable than they are. The CMA state that terms such as 'organic' or 'recycled' must be accompanied by clear, specific percentages of the fibres, which are easily visible to consumers (CMA, 2024), however both brands failed to meet these standards and were accused of marketing products as 'sustainable' and 'eco-friendly' without providing verifiable information regarding where materials were sourced or their overall environmental impact. As a result, Boohoo and ASOS were required to revise how they present their sustainability claims and subsequently signed formal commitments to ensure the accuracy of their claims

(CMA, 2024). These investigations reinforced the need for companies to back their sustainability claims with verifiable evidence, further enforcing the Green Claims Code introduced by the government in 2021 to tackle greenwashing across various industries, including fashion. Legislative measures were strengthened further in 2025 with the introduction of the Digital Markets, Competition and Consumers (DMCC) Act, which gives the CMA new powers to fine companies up to 10% of their annual global turnover for making claims likely to mislead consumers, including those relating to sustainability.

3.2.3 Sustainability certifications

Incorporating recognised standards and certifications into business practices can strengthen an organisation's sustainability credentials while building trust with consumers and partners (Zujewski, 2021). The UKFT (2023) suggests that such frameworks demonstrate a commitment to ethical practices, environmental stewardship and social responsibility. However, the landscape of sustainability certifications is vast, presenting numerous options, each with its own requirements and verification processes, making navigating this landscape extremely challenging for businesses.

According to the UKFT's Sustainability Survey (2023), the main barriers preventing businesses from adopting raw material standards are high costs and complexity of implementation. To address these challenges, UKFTs Sustainability 101 Series (Issue 1) provides a guide tailored to the UK fashion and textiles industry to simplify the certification process and support businesses in identifying the most relevant standards. The guide covers key areas such as organic wool and natural fibre certifications, chemical management requirements and following a recent update, now also covers eco-labels and social and environmental audit frameworks, offering further support to UK businesses seeking to improve their sustainability performance.

The report highlights several widely recognised certifications in the fashion industry, including the Global Organic Textile Standard (GOTS), Oeko-Tex Organic Cotton, Better Cotton Initiative and Fairtrade Textile Standard, which serve as key benchmarks for responsible sourcing and production. Among these, GOTS stands out as one of the most widely adopted standards, setting strict criteria to verify the authenticity of organic textiles (UKFT, 2023). However, while

GOTS provides a database of approved manufacturers, it includes a caveat that not all products from a certified operation may carry the GOTS certification, creating ambiguity and potentially misleading consumers and stakeholders. A recent investigation by the New York Times highlights these concerns, exposing organic cotton certification as a “system rife with opportunities for fraud” (New York Times, 2022, pg. 1). The report found that a high proportion of fibres are falsely marketed as organic, complicating efforts for fashion brands and suppliers looking to integrate sustainable materials into their products.

Fung et al (2021) further reinforce the challenges of sustainability certifications, noting that sustainably certified materials are often blended with other yarns, which complicates recycling at the end of a product’s life cycle. For example, a material made from 60% organic cotton and 40% polyester may carry sustainability credentials, but the presence of a blended yarn complicates the recycling process as the fibres have varying properties and cannot be easily separated (Kahoush & Kadi, 2022). Despite this challenge, fashion brands continue to promote these products as sustainable, emphasising the source of the sustainable raw material and certifications obtained, potentially misleading consumers about the true sustainability of the final product.

3.2.4 Fabric dyeing & printing

Another consideration for fast fashion brands in developing more sustainable products is using environmentally friendly dyes in textile production. According to WGSN, the fashion industry is beginning to utilise more sustainable fabric dyeing processes such as ‘Zero Waste Colour’ and ‘Microbial Colour’, which are non-toxic and biodegradable, thereby reducing water pollution caused by chemical dyeing (Clark, 2020). There is also a growing trend toward using natural, plant-based dyes derived from botanicals like turmeric, madder, rose, nettle and eucalyptus, as well as from food sources such as avocado peel, onion skins and walnuts. These non-toxic alternatives not only offer sustainable options but also provide an opportunity to repurpose global waste. For example, H&M have used dyes made from coffee grounds in their Conscious Choice collection released in 2020 and Nike have worked with Maharishi to create a cotton fabric coloured with dye made from pomegranate and turmeric (Clark, 2020).

However, as highlighted in WGSN's report, the colour fastness of natural dyes can be poor, resulting in subtle variations in colour across products in the range, which impacts overall product quality and may be unappealing to consumers. Furthermore, these processes are still in their infancy so may be challenging to produce in volume. As a result, switching to natural dyes presents many challenges: brands will need to source new, specialist suppliers, manage higher costs and establish new business relationships which can be time consuming and may delay the implementation of more sustainable practices. Additionally, natural dyes are not compatible with synthetic fabrics which are used extensively within fast fashion, further complicating sustainability efforts within the sector (Clark, 2020).

Research also highlights digital printing as one of the most sustainable methods for fabric printing due to its low water and energy consumption compared to traditional methods (Kujanpää & Nors, 2014; FESPA, 2021). According to FESPA (2021), digital printing can reduce industrial water usage by up to 95%, making it an eco-friendlier alternative to traditional screen printing. In addition, utilising computer design for fabric printing provides the ability to instantly change designs, ensures more consistency between samples and bulk production and reduces the use of dyes and chemicals. This approach also benefits brands and suppliers in terms of stock management as it enables them to produce the exact amount of fabric required without any surplus stock, significantly reducing waste (Ross, 2017; Boardman et al, 2020).

3.2.5 Digital innovation for sustainable product development

As fashion organisations become increasingly aware of the consequences of their actions, they are actively looking for ways to optimise resource use and minimise their environmental impact. This growing awareness is driving the adoption of 'eco-innovation', defined by Diaz-Garcia et al (2014) as the process of making changes to products and services through new technologies to reduce environmental harm and pollution.

The fashion industry is experiencing an increase in the number of technological advancements aimed at improving sustainability and, although in their infancy, some forward-looking companies are beginning to embrace these technologies to enhance their environmental practices and gain a competitive edge. The following section will explore these emerging technologies, particularly those that are most relevant to the fast fashion sector.

Virtual Product Development

In the past two years, the fashion industry has experienced a surge in alternative approaches to product development methods among brands and suppliers (McKinsey & Co, 2021b) driven by travel restrictions and supply-chain disruptions resulting from the Covid pandemic. One such advancement is virtual garment development, also referred to as 3D prototyping, which is increasingly replacing traditional 2D CAD images used early in the buying cycle for designing and refining styles.

According to McKinsey & Co (2021b), virtual sampling software such as 'Clo 3D', 'Browzwear' and 'Style 3D' are revolutionising fashion product development as they reduce the need for costly physical samples and the amount of carbon emissions used by samples going back and forth between buyers and suppliers. Adopting 3D prototyping in the product-development process can also reduce the overall lead time of the buying cycle by eliminating the need to wait for physical samples to arrive. Additionally, it helps reduce errors caused by miscommunications with suppliers, as the technology provides a more accurate and realistic representation of the final product when produced (Parker-Strak et al, 2023). Whereas the traditional sampling process (without 3D software) requires multiple cycles of sampling and review as highlighted in Figure 3.2, designing with virtual sampling software enables buyers to accurately visualise the fabric, fit and silhouette of designs to achieve the desired outcome of a product.

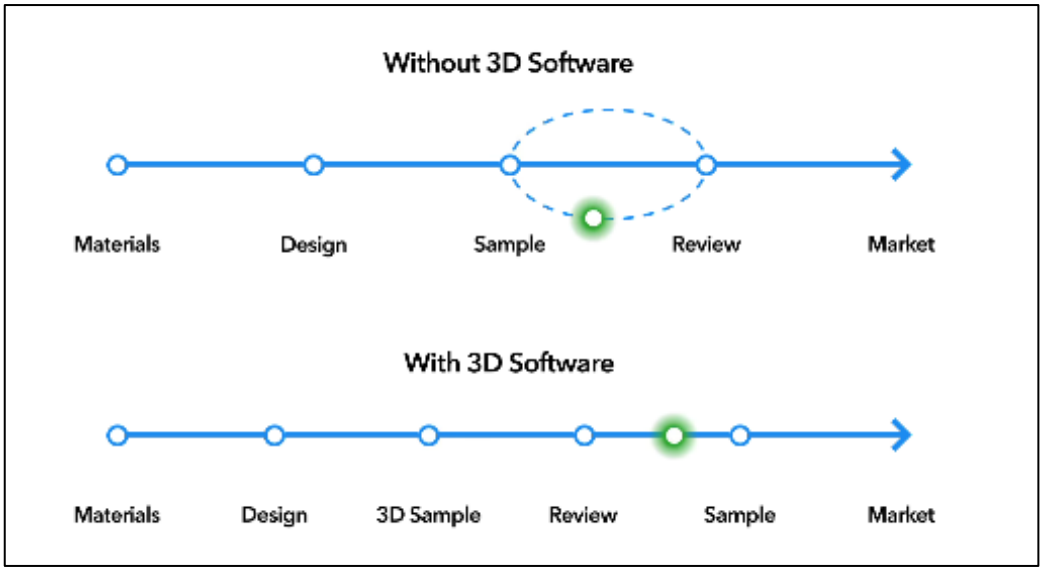


Figure 3.2 Sampling process with and without 3D software (Source: Clo, 2020)

As shown in Figure 3.3, this digitised design process is already gaining traction in the industry, with 30% of fashion companies intending on using virtual sampling for over half of their products by 2025 (McKinsey & Co, 2021b). While this technology provides significant potential to drive competitive advantage by being quicker to market as well as addressing the sustainability agenda, the extent of its adoption within the UK fast fashion sector remains unclear.

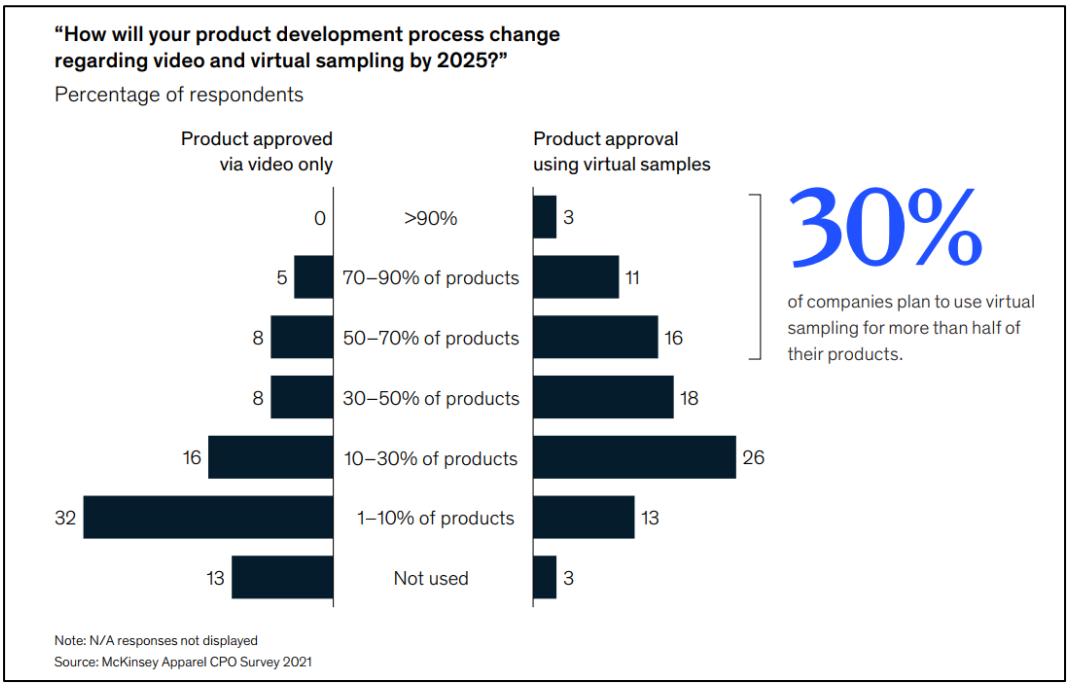


Figure 3.3 Survey responses to the question 'How will your product development process change regarding video and virtual sampling by 2025' (Source: McKinsey & Co, 2021b)

Parker-Strak et al (2023) outline several drawbacks associated with using 3D prototyping technology compared to physical samples. Firstly, existing product developers within an organisation (buyers, designers and garment technologists) may be required to upskill as they are likely to lack the necessary skills or experience to use the technology effectively, which could incur costs and take time. Furthermore, where virtual prototypes are used instead of physical fitting sessions with real-life fit models, it could be more difficult to ensure the accuracy of the fit as models can verbally inform garment technologists how the garment feels and how it fits, as well as assess any problems with taking it on and off. Failure to address these fit issues may result in a higher number of product returns and more products being

sent to landfill, which negates the positive environmental impacts previously identified. Parker-Strak et al (2023) suggest an optimum solution would be to use a combination of 3D prototyping for earlier samples, followed by a physical sample closer to bulk production of the garment to ensure that material and fit are at their optimum.

Social Media

Social media is also beginning to revolutionise the product development process for some fast fashion brands as buyers and merchandisers are using their social media platforms to test out new products and pricing strategies and drive traffic to their websites (Parker-Strak et al, 2023). For example, some fast fashion brands are utilising 3D CADS to showcase digital samples or prototypes of upcoming products on social media feeds or via influencer collaborations to gauge public opinion and demand. This feedback helps to fine-tune product offerings and determine order quantities for bulk manufacturing, resulting in improved performance and less unsold stock.

Augmented Reality

According to Barclay's Research (2018), one in ten Britons have bought clothes online to wear briefly for content creation, only to be returned directly afterwards, potentially ending up in landfill. Recognising this growing trend of 'purchase, Instagram, return', digital fashion retailers like DRESSX have emerged to support the behaviour of a generation of consumers whose online persona requires constant newness while addressing the environmental impact of products that are barely worn before being discarded or resold.

Digital fashion transcends the physical realm, utilising 3D software to create realistic virtual garments that are simulated to look like real clothing. These virtual products are applied in Augmented Reality (AR) to blend seamlessly with real-time videos and photos (Schauman et al, 2023), enabling consumers to satisfy their hedonic needs in a less resource-intensive way. As such, digital fashion innovation is increasingly regarded as a potential sustainable solution for fast fashion as it removes the need for physical garments and eliminates the use of raw materials, water and chemicals whilst reducing waste and energy consumption.

The Ellen Macarthur Foundation (2021) reports that digital fashion can reduce the carbon footprint of fast fashion by up to 97% compared to physical garments and eliminates concerns around microplastic shedding associated with laundering fast fashion products. This

technology also benefits fast fashion consumers as demand can be satisfied very quickly. As the founder of 'DRESSX' states, "Digital fashion is the new fast fashion …. if we really want it fast, it should be digital" (Ellen MacArthur Foundation, 2021, pg. 1). Ericsson (2020) further supports this idea, noting that creating a digital garment emits only 0.312kg of CO2 per hour, compared to 6.5kg of CO2 for a conventional white cotton t-shirt. Whilst acknowledging the simplicity of these calculations, they highlight the significant potential for reducing energy and carbon emissions through digital fashion.

Laser Cutting Technology

Fung et al (2021) emphasise the critical role of manufacturers in achieving sustainable fashion products due to the significant waste generated during garment production. According to Niinimaki et al (2020), one of the most visible stages of waste in garment production occurs during the fabric cutting stage, as it is estimated that between 10% to 20% of fabric is discarded and left as waste when using traditional methods, highlighting the need for more efficient cutting techniques to reduce environmental impact.

An effective method for reducing fabric waste in garment production is laser cutting technology, which is gaining traction in the fashion industry. Nayak & Padhye (2016) explain that laser cutting offers precise control, allowing the laser beam to focus on specific areas at precise angles, resulting in more accurate cuts and less material wastage. Although laser cutting is not a new technology, its adoption in the fashion industry has grown due to this increased accuracy, high processing speed and overall efficiency. Unlike conventional cutting tools like blades and discs which can displace material and lead to inaccurate cuts, laser cutting ensures a cleaner, more efficient process with minimal waste, making it a valuable tool for sustainable production in the fashion industry.

3.3 Challenges of Implementing Sustainable Product Development Practices

Adapting to a more sustainable landscape presents significant challenges for UK fast fashion brands and suppliers as their low-priced, poorly made products are in direct conflict with the principles of environmental sustainability which strives for resource conservation and zero waste (Lejeune, 2018; Zhang et al, 2021).

While sustainable materials offer numerous benefits as discussed, they also come with certain drawbacks that can complicate their widespread adoption in the fast fashion industry. For example, Todeschini et al. (2017) argue that sourcing alternative materials may require working with specialist suppliers, adding complexity to supply chains and potentially increasing lead times and heightened risk associated with new business relationships. Additionally, product development teams including fashion buyers, designers and garment technologists may need time to familiarise themselves with these new materials and test their suitability. Buyers must also ensure that these materials are readily available to maximise repeatability, which is often a challenge with new, innovative fabrics. As a result, incorporating these factors into the buying cycle could extend lead times and increase inaccuracies in forecasting consumer demand (Parker-Strak et al., 2023).

Critically, both Moktadir et al (2018b) and Bhandari et al (2022) state that environmentally friendly materials tend to be higher priced than virgin fabrics as they are less readily available and more expensive to produce, creating a barrier for fast fashion brands operating within tight margins. Additionally, the Business of Fashion (2021) points out that many fashion organisations may still be recovering from the financial impacts of the pandemic and that any investments in sustainability initiatives may take a back seat in the post-Covid era as they prioritise immediate issues such as inventory management over sustainability. However, Shen (2014) counters that despite these challenges, environmentally friendly materials are essential for sustainable fashion and brands must continue to explore cost effective ways to incorporate eco-fabrics into their product ranges to reduce their environmental impact.

Parker-Strak et al (2023) highlight the reluctance of suppliers to engage with sustainable practices due to the pressure from brands to maintain low prices. As fast fashion is characterised by rapid production cycles and affordable prices, suppliers are forced to prioritise cost efficiency over sustainability. This issue is further intensified by the adversarial nature of supply chain relationships within the UK fast fashion sector, where the power dynamic usually favours brands, leaving suppliers fearing financial repercussions or loss of business if they prioritise sustainability over cost-reduction.

Goworek et al (2020) agree that implementing sustainability into fast fashion product development will be time-consuming and hard to predict in terms of how long this could take,

especially for companies that are new to these processes. However, despite these challenges, it is clear from the literature that there is a need for change where environmentally sustainable practices are transforming from niche to necessity. As highlighted by Lieber (2021, pg. 1) 'Fast fashion is not going away, it's here to stay, it's part of global economies. How we are going to make real progress is figuring out how to make it more sustainable ….'.

3.4 Chapter Summary and Research Gap

The growing awareness of sustainable fashion is reflected in the increasing number of related journal papers on the topic. To explore this further, the study began with a literature search using the Science Direct and Web of Science databases, aiming to establish the scope of existing research around sustainable fashion and identify potential gaps in the literature. Beginning with a broad search of the topic, keywords such as 'sustainable fashion', 'sustainable supply chains' and 'sustainable product development' were included with a specific focus on the fashion industry to align with the focus of the study. By screening titles and abstracts, it was evident that a wealth of research exists around sustainable fashion with much of the literature having been published in the last decade. Consistent with the findings of Fung et al (2021) in their review of fashion sustainability literature, key themes identified around the topic include sustainable fashion operations and supply chain management, sustainable fashion design and sustainable business planning and development. Additionally, much of the literature focused on drivers and motivators for engaging in SSCM and the need for change within the system (Ostermann et al, 2021; Todeschini et al, 2017).

It is also evident that existing research in the field of sustainable fashion is dominated by environmental factors, as shown in Figure 3.3, which identifies the most widely studied topics in terms of the number of publications, based on a detailed literature search. Notably this search reveals that circular fashion appears to be the most well-established topic which focuses on the principles of the 3Rs (Reuse, Recycle, Repair), with waste management identified separately to reflect its growing importance in the field. There is also growing interest in eco-materials and technologies driving advancements in environmental

sustainability, as well as green manufacturing initiatives aimed at reducing carbon emissions and pollution, alongside broader sustainable practices within the fashion supply chain.

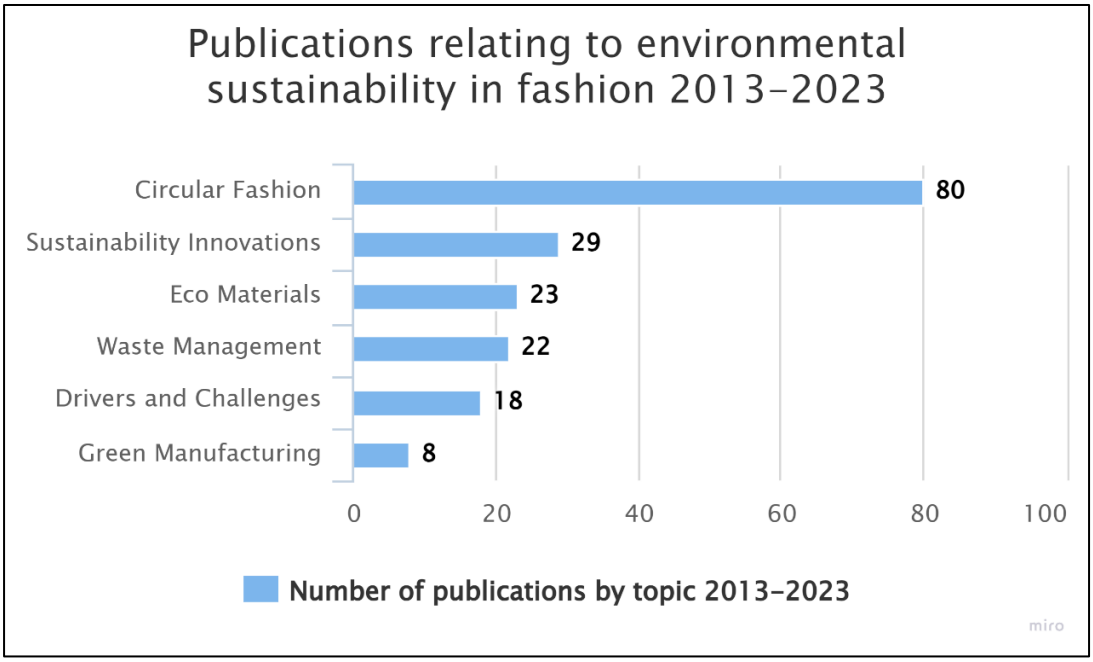


Figure 3.4 Publications on topics relating to environmental sustainability in the fashion industry over the ten-year period from 2013 – 2023 (Created by author)

It is also important to note that most of the literature found relates to the fashion industry as a whole, with only seven papers specifically addressing the fast fashion sector, highlighting the lack of attention given to this particularly problematic segment of the industry. In terms of ultra-fast fashion, this has received even less scholarly attention. Given its rapid growth and significant impact, there are many aspects of ultra-fast fashion that require exploration to fully understand its dynamics and implications within the sector.

Considerable academic focus is also placed on consumer attitudes towards sustainability in fashion (Stringer et al, 2021; Zhang et al, 2021, Papasolomou et al, 2023) with limited focus on the supply chain from a supplier's perspective, which Mukhendi et al (2020) attribute to a lack of access to relevant organisations. Islam et al (2020) agree that more research is required on upstream manufacturers within the fashion supply chain as organisations should look to a longer part of the supply chain to become truly sustainable. With this in mind, this study aims to go beyond tier 0 (fashion brands and retailers) and focus on collecting data from upstream suppliers and manufacturers within the UK fast fashion supply chain to gain a broader picture of product development practices and sustainability.

Research into the social issues of the UK fast fashion supply chain, particularly the Leicester garment sector, has been extensive, with significant focus from academics, journalists and NGOs on issues such as violations of labour rights and working conditions. However, there is limited academic research exploring environmentally responsible product development practices within the UK fast fashion sector, which justifies the study's geographical focus. Both Fung et al (2021) and Goworek et al (2020) emphasise the need for more scholarly research on sustainable product development in the fashion industry, highlighting that research specifically into sampling procedures, fabric manufacturing, garment assembly and waste management is essential for improving the long-term viability of the sector.

As such, the over-arching aim of this project is to investigate the extent of sustainable product development within the UK fast fashion supply chain to address the gap in the literature and develop a roadmap designed to guide industry stakeholders toward more sustainable approaches. This roadmap will provide actionable recommendations and practical guidance for fashion businesses, supporting the integration of sustainability into their product development processes and ultimately reducing the sector's environmental impact.

Chapter 4: Methodology

This chapter explains the philosophies and approaches taken to achieve the aims and objectives of this study. An analysis of the strengths and weaknesses associated with these methods is undertaken and the selection of the most appropriate form of investigation is presented, drawing insights from relevant literature. The chapter also addresses potential limitations relating to reliability and validity of the chosen research approach.

4.1 Research Process

To formulate an effective research methodology, Saunders et al (2023) identity five key stages a researcher must progress through, which begins with identifying a research philosophy, followed by the development of a research approach, appropriate strategies and techniques and a time horizon, with each stage requiring justification in conjunction with the overarching aims and objectives of the study. Figure 4.1 outlines the research methodology adopted for this study, detailing the steps taken to facilitate the production of comprehensive results which can be applied to industry whilst also maintaining scholarly contribution and relevance.

Figure 4.1 Research methodology adopted for this study (created by author)

4.2 Research Paradigm

A research paradigm provides a 'framework that guides how research should be conducted based on people's philosophies and their assumptions about the world and the nature of knowledge' (Collis & Hussey, 2014, p.43). Understanding these philosophical foundations is essential for researchers as they shape the research design, guide the selection of appropriate methods and enable them to fully understand their role and reflect on their own positionality and biases (Easterby-Smith et al, 2021).

Business and management literature tends to distinguish between two main research philosophies – positivism and interpretivism (Easterby-Smith et al, 2021; Malhotra et al, 2017), with each having their own ontological and epistemological assumptions. Ontology is concerned with the nature of reality while epistemology is concerned with what we accept as valid knowledge and involves an examination of the relationship between the researcher and that which is researched (Collis & Hussey, 2014).

A positivist philosophy is based on the belief that reality exists independently of us and the aim is to discover theories through empirical research (observation and experiments) (Collis & Hussey, 2014). This type of research adopts an objectivist ontology which assumes that social reality is bound by certain fixed laws in a sequence of cause and effect and only phenomena that can be observed and measured can be validly regarded as knowledge (Saunders et al, 2023; Collis & Hussey, 2014). Positivism usually incorporates a deductive approach where the researcher formulates and tests hypotheses to offer explanatory theories for understanding social phenomena (Thomas, 2006; Shusterman, 2016) and tends to produce quantitative data based on large sample sizes. A positivist philosophy is therefore not considered appropriate for this study as the aim is to actively identify new theories and responses to research questions, rather than testing established theories or hypotheses.

In this study the emphasis is on understanding and interpreting subjective meanings, experiences and perspectives of actors within the UK fast fashion supply chain to expose current practices, challenges and opportunities. Existing theories are initially employed to help guide the exploration of sustainable product development, but as the research progresses, the aim is to develop new theories that address the unique dynamics of the fast fashion sector. This approach aims to generate findings that not only provide actionable

insights for industry but also contribute to the literature, bridging the gap between theory and practice in this rapidly evolving sector.

Therefore, the researcher's philosophical stance is rooted in an interpretivist paradigm and a subjectivist ontology which is underpinned by the belief that social reality is highly subjective because it is shaped by our perceptions instead of objective and external factors (Collis & Hussey, 2014). With this type of research, the researcher interacts with that which is being researched as it is perceived to be impossible to separate what exists in the social world from what is in the researcher's mind. While objectivists try to maintain an independent and objective stance, an interpretivist epistemological approach involves attempting to minimise the distance between the researcher and what is researched (Collis & Hussey, 2014) and therefore suggests that knowledge comes from practical engagement with the world. Whilst positivism is involved in testing, verification and prediction of generalisable theories about an objective reality, interpretivism concentrates on reality as a human construction that can be understood subjectively and is therefore better suited to the aims of this under-explored research topic.

4.3 Research Approach

In line with an interpretivist standpoint, an inductive approach is utilised as it provides the opportunity to develop new theories and patterns from individual observations (Collis & Hussey, 2014), as opposed to a deductive approach which favours data collected quantitively to verify existing hypotheses (Saunders et al, 2023). Since sustainable product development in fast fashion is under researched and lacks in-depth knowledge, the flexibility and versatility to analyse and explain new ideas which arise from inductive research is extremely beneficial to identify solutions.

4.3.1 Qualitative research

Malhotra et al (2017) state that qualitative research is an effective way to gain deeper insight into real-world problems and explore the nuances of human attitudes, motivations and behaviours as required by this study. It involves collecting and analysing data in the form of words (e.g., from interviews) and pictures (e.g., video, objects/artefacts) and includes the use of in-depth interviews, focus groups, observation, documents and texts as well as a

researcher's impressions and reactions (Malhotra et al, 2017). As highlighted in Table 4.1, a key strength of qualitative research lies in its ability to tell a story, often from the perspective of those directly involved, enabling researchers to address the 'how' and 'why' of human experiences in a way that provides deeper insights that can be difficult to quantify (Tenny et al, 2022). A qualitative approach allows for an in-depth examination of a small number of cases therefore data tends to be rich and detailed, thus its validity is based on fair samples and is not generalisable to the population as a whole.

Advantages of Qualitative Research	**Disadvantages of Qualitative Research**
It can obtain a more realistic feel of the world that cannot be experienced through numerical data and statistical analysis (Braun & Clarke, 2013)	Data collection and analysis may be labour intensive and time-consuming (Malhotra et al, 2017)
It has flexibility in data collection, subsequent analysis, and interpretation of information collected (Braun & Clarke, 2013)	Inability to investigate causality between different research phenomena (Collis & Hussey, 2013; Malhotra et al, 2017)
It has the descriptive capability based on unstructured data and primary data. (Collis & Hussey, 2013)	Different conclusions may be reached based on the personal perspective of the researcher (Braun & Clarke, 2013)
The data tends to be rich and detailed and leaves the participants' perspectives intact (Braun & Clarke, 2013)	May require a high level of experience from the researcher to obtain the targeted information from the respondent (Braun & Clarke, 2013; Malhotra et al, 2017)
It can move away from the original objectives of the research, in reaction to the changing nature of the context (Collis & Hussey, 2013)	Lacks consistency and reliability as researchers may employ different penetrating techniques and respondents may focus on certain themes and views and ignore others (Malhotra et al, 2017)
It provides a holistic view of the phenomena under investigation (Braun & Clarke, 2013)	Not generalisable to the population as a whole due to small sample sizes (Braun & Clarke, 2013; Malhotra et al, 2017; Collis & Hussey, 2013)

Table 4.1: Advantages and Disadvantages of Qualitative Research

In contrast, a quantitative approach is more formal, objective and systematic, relying on questionnaires, structured surveys or experiments to collect large volumes of data, allowing for valid conclusions to be drawn (Creswell, 2014). This method was rejected as it is concerned with pre-formulated hypotheses and numerical data and is restricted by closed-ended questions that do not allow for in-depth analysis (Malhotra et al, 2017). Since this study investigates an under researched topic with many unknown aspects, quantitative techniques would not provide the depth of investigation required.

Fung et al (2021) highlight that qualitative research is the most popular approach used within similar studies (such as Goworek et al, 2020; Parker-Strak et al, 2020; Curwen et al, 2012; Rafi-Ul-Shan et al, 2022), further supporting its adoption in this study. However, whilst rich in insights, qualitative research is susceptible to researcher error and bias which can compromise the credibility of findings. Collis & Hussey (2014) recommend several strategies aimed at mitigating bias in qualitative research to enhance objectivity, consistency and reliability, including utilising a standardised interview process, conducting pilot tests to identify potential biases and encouraging reflexivity and self-awareness by the researcher throughout the research process.

4.3.2 Sampling

Prior to undertaking data collection, it is essential to define the population the study will address (Easterby-Smith, 2019). Having established the aim of the research is to investigate sustainable product development practices within UK fast fashion, this study focuses on organisations operating within the UK fast and ultra-fast fashion supply chain, specifically those located around the Leicester and Manchester areas given the high concentration of suppliers and brands operating in these clothing and textile hubs. Participants eligible for inclusion were those with at least one year of professional experience in product development within this sector, ensuring they possess sufficient expertise to provide informed insights into sustainable practices.

Collis & Hussey (2014) state that one of the biggest challenges in undertaking qualitative research is finding willing participants but given the researcher's industry experience and strong network of contacts, this granted unique access to various actors across the ultra-fast fashion supply chain that might have otherwise been challenging to obtain. This population is notoriously difficult to access due to the complex and fragmented nature of the sector with many organisations lacking transparency and a willingness to divulge operational details. Moreover, confidentiality agreements between brands and suppliers often prohibit the sharing of sensitive information to third parties, including researchers. Therefore, gaining access to these actors not only enhanced the researcher's understanding of the inner workings of the industry but also provided a more nuanced and informed exploration of the research objectives, contributing to the depth and breadth of insights into industry practices and sustainable product development.

The deliberate selection of the sample from the researcher's existing network represents a non-probability, purposive sampling approach which Collis and Hussey (2014) describe as selecting individuals with substantial experience in the field of study based on the researcher's judgement. Fourteen organisations were initially invited to participate and from those contacted, ten suppliers and two ultra-fast fashion brands agreed. Two buyers working for ultra-fast fashion brands declined due to contractual restrictions that prevented them from engaging with researchers. Additionally, two more suppliers were recruited using the snowballing technique, where existing participants provided referrals to other contacts with similar experience in the supply chain. Both respondents from ultra-fast fashion brands who agreed to be interviewed had recently left their roles so to avoid bias and ensure the data was not skewed by negative viewpoints of potentially disgruntled employees it was important to include current employees in the sample to offer a balanced perspective. Therefore, to expand the sample pool beyond the researcher's network, potential participants from other Manchester-based ultra-fast fashion brands were contacted through the professional networking site LinkedIn. Although this presented challenges as many were reluctant to talk to researchers as they feared reprisals from their employers, this approach resulted in three additional interviews. Additionally, three interviews were conducted with experts in fashion sustainability to gain valuable insights into best practices, emerging trends and challenges in the field.

Twenty interviews were conducted in total between November 2023 and February 2024, resulting in a total of 14 hours of interview data and 270 pages of transcripts. Participants included directors of tier 2 manufacturers such as fabric knitters, dyers and printers as well as directors and designers from established tier 1 suppliers with direct links to ultra-fast fashion brands, offering a diverse range of perspectives across the sector. Notably, all interviews with tier 1 and 2 suppliers were conducted through site visits, allowing the researcher to directly observe suppliers' work environments and gain insights into day-to-day operations, as well as the practical realities impacting sustainability efforts. Additionally, fashion buyers, designers and sourcing managers from brands and three sustainability experts contributed to the research, offering multiple insights and perspectives on the topic. As per the inclusion criteria, each participant had at least one year's experience in a product development role within ultra-fast fashion, confirming their eligibility to offer valuable perspectives. However, tier 1 and 2 suppliers exhibited significantly more experience, each

averaging 25 years in the industry, demonstrating their deep understanding of the sector's nuances and complexities.

Table 4.2 presents participants details with their names and organisations removed to protect their anonymity in line with the ethical approval protocol. Both the variation of organisations in the sample and the multiple actors consulted at various levels provided a spectrum of viewpoints, offering a more nuanced analysis. This also enhanced the validity and reliability of the research as cross-referencing perspectives helped to ensure the insights were not overly influenced by the bias of a specific role or position within a company.

Participants	**Job Title**	**Type of Organisation**	**Location of Organisation**	**Location**	**Length of Interview**
Participant 1	Director	Tier 1 Supplier: Apparel Manufacture	Leicester	Site Visit	45 mins
Participant 2	Sales Director	Tier 1 Supplier: Apparel Manufacture	Leicester	Site Visit	40 mins
Participant 3	Sales Director	Tier 1 Supplier: Apparel Manufacture	Leicester	Site Visit	37 mins
Participant 4	Designer	Tier 1 Supplier: Apparel Manufacture	Leicester	Site Visit	45 mins
Participant 5	Director	Tier 1 Supplier: Apparel Manufacture	Leicester	Site Visit	52 mins
Participant 6	Director	Tier 1 Supplier: Apparel Manufacture	Leicester	Site Visit	32 mins
Participant 7	Director	Tier 1 Supplier: Apparel Manufacture	Leicester	Site Visit	35 mins
Participant 8	Director	Tier 2 Supplier: Fabric Manufacture	Leicester	Site Visit	36 mins
Participant 9	Director	Tier 2 Supplier: Apparel Dyeing	Leicester	Site Visit	25 mins
Participant 10	Sales Manager	Tier 2 Supplier: Fabric Manufacture	Leicester	Site Visit	52 mins
Participant 11	Director	Tier 2 Supplier: Fabric Printer	Leicester	Site Visit	60 mins
Participant 12	Buying Director	Ultra-Fast Fashion Brand	Manchester	Online	30 mins
Participant 13	Ethical Manager	Ultra-Fast Fashion Brand	Manchester	Online	90 mins
Participant 14	Assistant Buyer	Ultra-Fast Fashion Brand	Manchester	Online	25 mins
Participant 15	Designer	Ultra-Fast Fashion Brand	Manchester	Online	42 mins
Participant 16	Designer	Ultra-Fast Fashion Brand	Manchester	Online	25 mins
Participant 17	Merchandiser	Ultra-Fast Fashion Brand	Manchester	Online	30 mins
Participant 18	Director	Trade Association	Leicester	Site Visit	60 mins
Participant 19	Director	Social Enterprise	London	Online	50 mins
Participant 20	Director	Sustainability Consultant	London	Online	50 mins
				Total	**14.35**

Table 4.2: Respondent profiles

Figure 4.2 maps the network of interconnected organisations in the sample and identifies which companies have experience of working together based on the information provided in the interviews and the researcher's prior knowledge. Due to the limited number of organisations operating at tier 2 in the UK, these four companies had connections with all tier 1 suppliers and one fast fashion brand. However, not all tier 1 suppliers were connected to each of the fast fashion brands interviewed, limiting opportunities to corroborate information and cross validate findings at that level of the supply chain.

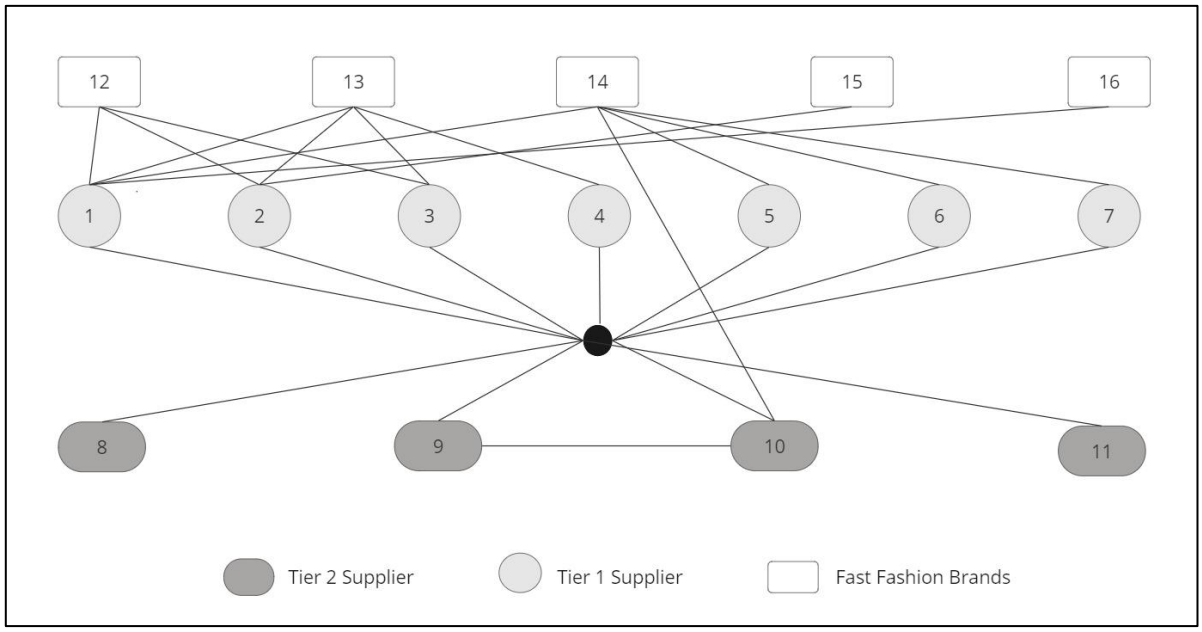


Figure 4.2: Map of participants interconnected networks (created by author)

The sample size aligns with similar studies of this nature and supports Malhotra et al.'s (2017) argument that a smaller sample size is adequate for qualitative research. They note that this type of research is characterised by a relatively low sample size due to time and cost constraints and that after a certain point, theoretical saturation occurs where no new data emerges. In this study, theoretical saturation was reached after twenty interviews, making this an acceptable sample size. Rafi-Ul-Shan et al (2022) agree that while the small sample size offers a limited scope for generalisation to the sector as a whole, it still offers valuable insights into sustainable practices within the UK fast fashion sector.

4.3.3 Data collection

As previously highlighted, qualitative research includes several data collection techniques including in-depth interviews, focus groups, observation, analysis of documents and texts, as well as a researcher's own impressions and reactions (Malhotra et al, 2017). Each of these techniques have distinct strengths and weaknesses and the best method for a particular study may depend on the size, location, budget and accessibility of the sample. After careful consideration of these factors, it was concluded that in-depth interviews were the most suitable approach for exploring sustainable product development within UK fast fashion.

In-depth interviews typically involve an interviewer probing a single participant to uncover underlying motivations, beliefs, attitudes and feelings on a topic (Wilson, 2012). Widely favoured in qualitative research, this method provides direct and personal interactions and enables the researcher to go beyond common-sense explanations and provide deeper insights into the experiences of participants, as well as probe unexplored issues hidden from ordinary view (Malhotra et al, 2017). In-depth interviews have also been used in many similar studies to capture nuanced insights (Goworek et al, 2020; Parker-Strak et al, 2020; Kozlowski et al, 2018; Rafi-Ul-Shan et al, 2022; Curwen et al, 2012), further validating their use in this study.

Other qualitative tools such as focus groups were deemed unsuitable for this study for several reasons. While focus groups offer the advantage of efficiency by collecting data from multiple participants at the same time (Braun & Clarke, 2013), the logistical challenges of coordinating the schedules of busy industry participants make them impractical. Also focus groups are not suitable for gathering insights from industry respondents as they may include competitors who may be reluctant to divulge sensitive information in the presence of their rivals.

Malhotra et al (2017) suggest that in-depth interviews are particularly effective for accessing busy professionals like fast fashion suppliers as they can be conducted at their workplaces and at times that are convenient for them. Consequently, all interviews with tier 1 and 2 suppliers were held onsite which helped participants to feel at ease and facilitated in-depth discussion, particularly around commercially sensitive information. Observing participants in their work environment also allows researchers to observe characteristics of the participant which helps in their analysis (Malhotra et al, 2017). For example, observing aspects such as

workplace formality or corporate culture, the use of technology or items displayed around the workplace can offer insights into a company's commitment to sustainable practices. Whilst on site, field notes were also taken alongside the interviews to provide context and detail that may not be captured in the interviews. While interviews provide direct insights into participants' experiences, field notes offer an opportunity to record observations and capture any nuances in behaviours or the environment, providing a richer perspective to the research.

There is also an assertion that in-depth interviews are particularly useful when the researcher has a good understanding of the subject matter (Malhotra et al, 2017), as is the case in this study given the researcher's extensive experience within the UK fast fashion sector. This knowledge not only helps the researcher to grasp technical language and appreciate the importance of specific revelations, but also establishes credibility with participants and fosters an environment which encourages openness and honesty. However, there is considerable debate in interpretivist research about how much prior knowledge a researcher should possess. Some argue against approaching studies with preconceived notions as such biases can restrict the exploration of new ideas, advocating instead for an open-minded stance that allows for fresh insights (Collis & Hussey, 2013). To minimise interview bias during data collection, several of the strategies previously highlighted were employed to improve objectivity, consistency and reliability in the data collection process. These included a standardised interview protocol with well-defined questions applied consistently across all participants, along with rigorous pilot testing to identify any ambiguities or areas for improvement. Additionally, the researcher engaged in reflexivity, regularly reflecting on their own biases and preconceptions to minimise any influence of personal perspectives on the interview process.

Despite the many advantages of in-depth interviews, they also have certain drawbacks, including the time and cost involved with organising and conducting them. If participants are located across different geographic areas, the process can be both time-consuming and expensive, however since most fast fashion suppliers are clustered in and around the Leicester area, face to face interviews were deemed feasible for this group of participants. The location of ultra-fast fashion brands are somewhat more diverse, therefore possible alternatives such as online or telephone interviews were considered for these participants as

they are more convenient and eliminate the need for physical travel. While telephone and online interviews offer clear advantages, Bryman and Bell (2015) argue that they lack the benefit of body language and restrict the ability to analyse facial expressions making it difficult to assess whether respondents fully understand the questions. These interviews also tend to be shorter and less in-depth and are more difficult to build rapport with participants, resulting in less sensitive information being disclosed compared to face to face settings. Despite these limitations, all participants in this study were given the option of online interviews to ensure the best possible response rates and provide more flexibility around their busy schedules.

The interview questions were developed around key themes identified from the literature search, as outlined in Table 4.3. These focused on existing actions related to product development and the dynamics within supply chain relationships (objective 1), participants' knowledge and commitment towards environmentally responsible product development (objective 2), and the challenges to implementing sustainable practices (objective 3).

Literature Review Themes	**In-Depth Interview Themes**
Product Development Practices	Outline of step-by-step process
	Number of orders and buy quantities
	Materials used in products
	Number of samples required
	Quality control and fit process
Supplier Relationships	Number of customers/supplies
	Length of time working with customers
	Importance placed on relationship building
	Order cancellations
Sustainable Practices	Levels of knowledge
	Waste management processes
	Green production processes
	Use of eco-materials
	Use of digital technologies
	Standards and certifications
	Drivers and challenges

Table 4.3: Literature review and interview themes

The interview guide, included in Appendix A, was developed in line with Wilson's (2012) funnel approach, beginning with simple questions to build rapport with participants before progressing to more sensitive topics. The initial phase introduced the overall aim of the interview along with the topics to be discussed, followed by classification questions about the organisation and participants' roles. The next phase addressed more commercially sensitive questions regarding existing practices and attitudes towards sustainability, supported by probing questions such as 'why do you say that?' and 'can you tell me more …?' to draw out deeper responses and uncover any hidden issues, and concluded with a summary of the key points discussed and thanks given to the participants. Questions were adapted based on the type of organisation being interviewed (tier 1 and 2 suppliers or fast fashion brands) to ensure relevance to their specific roles, operational challenges and perspectives on sustainability.

4.3.4 Research ethics

To reduce risks to both the researcher and participants, ethical considerations were carefully considered to ensure the research was conducted in line with the recognised ethical principles of informed consent, confidentiality and anonymity. To obtain informed consent, participants signed a consent form confirming their agreement to take part in the study, have the interviews recorded and allow their data to be used for academic purposes in this thesis. To address concerns regarding confidentiality, measures were taken within the data collection process to ensure participants' anonymity, honouring all statements communicated within the Participant Information Sheet and Consent Form which ensured participants would not be embarrassed or harmed during the research.

Participants were assured that their personal details would not be disclosed in any part of this study, therefore any names including company names remain anonymous as shown in Table 4.2. Interviews did not contain any questions that revealed the identity of the participant and were transcribed and anonymised by the researcher with no third-party involvement in the data handling. All data (consent forms, interview recordings and transcripts) are stored and backed-up securely on the University SharePoint server and no data is required to be transferred outside of the University. Any non-anonymised data related to research participants is stored in a secure manner and all data held elsewhere has been deleted.

4.4 Data Analysis

Data analysis follows Braun & Clarke's (2006) reflexive thematic analysis approach which is particularly suited to this study due to its inductive nature. It is a rigorous and systematic approach involving a six-phase process: data familiarisation, systematic coding, theme generation, development and refinement and finally creating the analytical report. Following this process enables the researcher to move beyond the surface and superficial and present a particular story about the data that directly addresses the research objectives.

The analytical process began with data familiarisation involving thorough reading of the interview transcripts and repeated listening to the audio recordings to become fully immersed in the data. A systematic coding process was then undertaken to reduce the data, which involved meticulous analysis of the interview transcripts to identify patterns, themes and concepts relevant to the research objectives. Traditional methods were used for first-order coding where transcripts were printed and highlighted to capture areas of interest, which served as building blocks for further analysis (see Appendix B for an extract of coded data). First-order codes captured both explicit (semantic) and implicit (latent) meanings, enabling a deeper and more nuanced analysis (Braun & Clarke, 2022).

Following the initial coding process, second-order coding was undertaken to identify broader patterns and connections present in the data. This iterative process involved continuously revisiting both the first-order codes and the raw data to ensure a comprehensive and accurate analysis and despite being time-consuming, these higher-level themes helped uncover meaningful insights and relationships of interest within the data (Collis & Hussey, 2014). Finally, the second-order codes were clustered into over-arching themes which capture the overall story of the data and align with the research objectives, which will be presented in detail in the next chapter.

4.5 Validity and Reliability

To ensure data validity and reliability, it was also important to conduct data verification which involves seeking alternative explanations for the interpretations of qualitative data via other sources of data (Malhotra et al., 2017). Collis & Hussey (2014) suggest undertaking participant validation as a form of data validation which involves taking ones findings back to the

participants under study to verify the emergent conclusions. Based on the above, the researcher sought feedback from four participants who confirmed the initial thematic conclusions.

4.6 Limitations of the Research Approach

A key limitation of this research design lies in its narrow participant base selected from the researcher's existing network, so will not be generalisable to the industry as a whole. Despite the researcher's unique access to a network that would otherwise be difficult to access, this pool was limited by confidentiality agreements and the complex, opaque nature of the industry. However, to overcome this constraint snowball sampling was utilised alongside a professional networking platform which provided access to a more diverse pool of industry stakeholders, offering multiple perspectives and viewpoints on the topic. Furthermore, as highlighted in Figure 4.2, the lack of existing relationships among some participating organisations presented challenges for cross-validating findings and limited opportunities to corroborate information. Despite these limitations, the research is still valuable due to its diverse sample from various tiers of the fast fashion supply chain, including actors with extensive industry experience. Collectively, the participants bring over 150 years of experience, offering a well-rounded perspective that strengthens the overall validity of the findings.

Chapter 5: Findings and Analysis

This chapter presents the findings and analysis of the qualitative research conducted via in-depth interviews, exploring the interaction between product development and sustainability in the context of ultra-fast fashion. It explores areas of commonality and disparity around various aspects of sustainable product development from both a supplier and brand perspective and concludes by presenting key challenges in implementing sustainable practices within the sector.

5.1 Analytical Approach

This study used thematic analysis to systematically identify and interpret patterns in the interview data, enabling a thorough exploration of recurring themes and meanings to create a clear narrative. Visual mapping, as illustrated in Figure 5.1, played a critical role in the process as it helped to identify broader themes within the data and explore their interconnections.

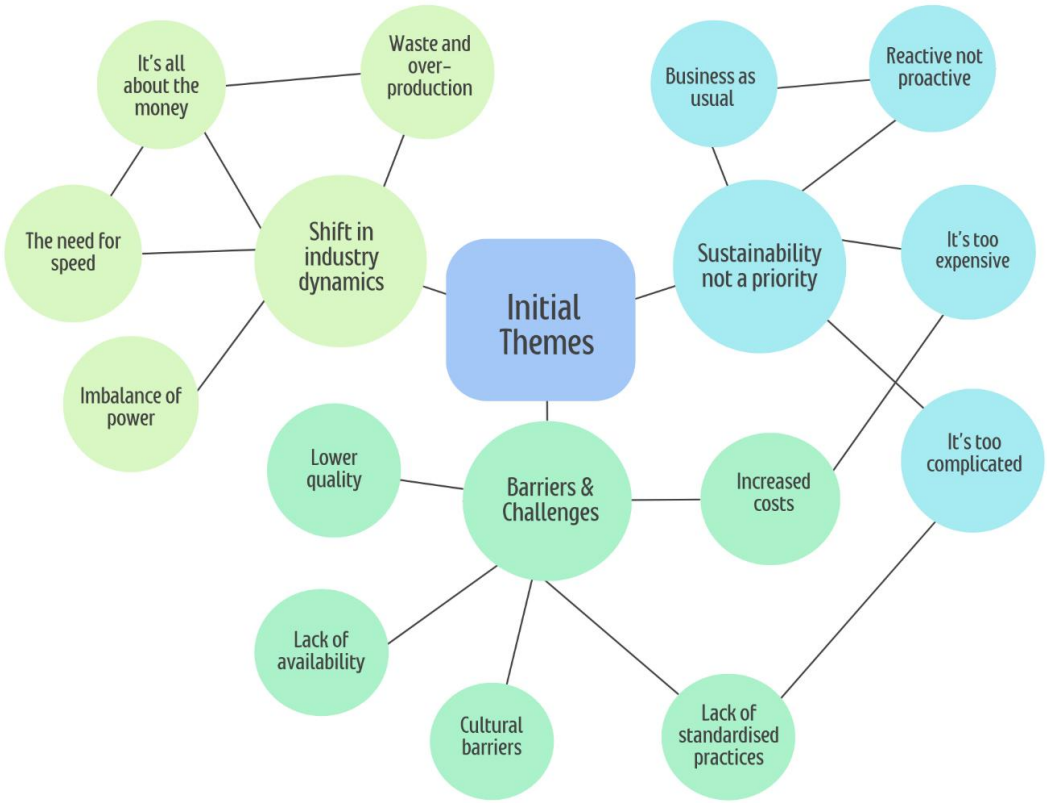


Figure 5.1 Thematic Map

These key themes were structured following the Gioia framework (Gioia et al., 2013), providing a rigorous approach to examining qualitative data. Figure 5.2 summarises the findings, presenting the data in the adopted structure of first and second order concepts and over-arching themes.

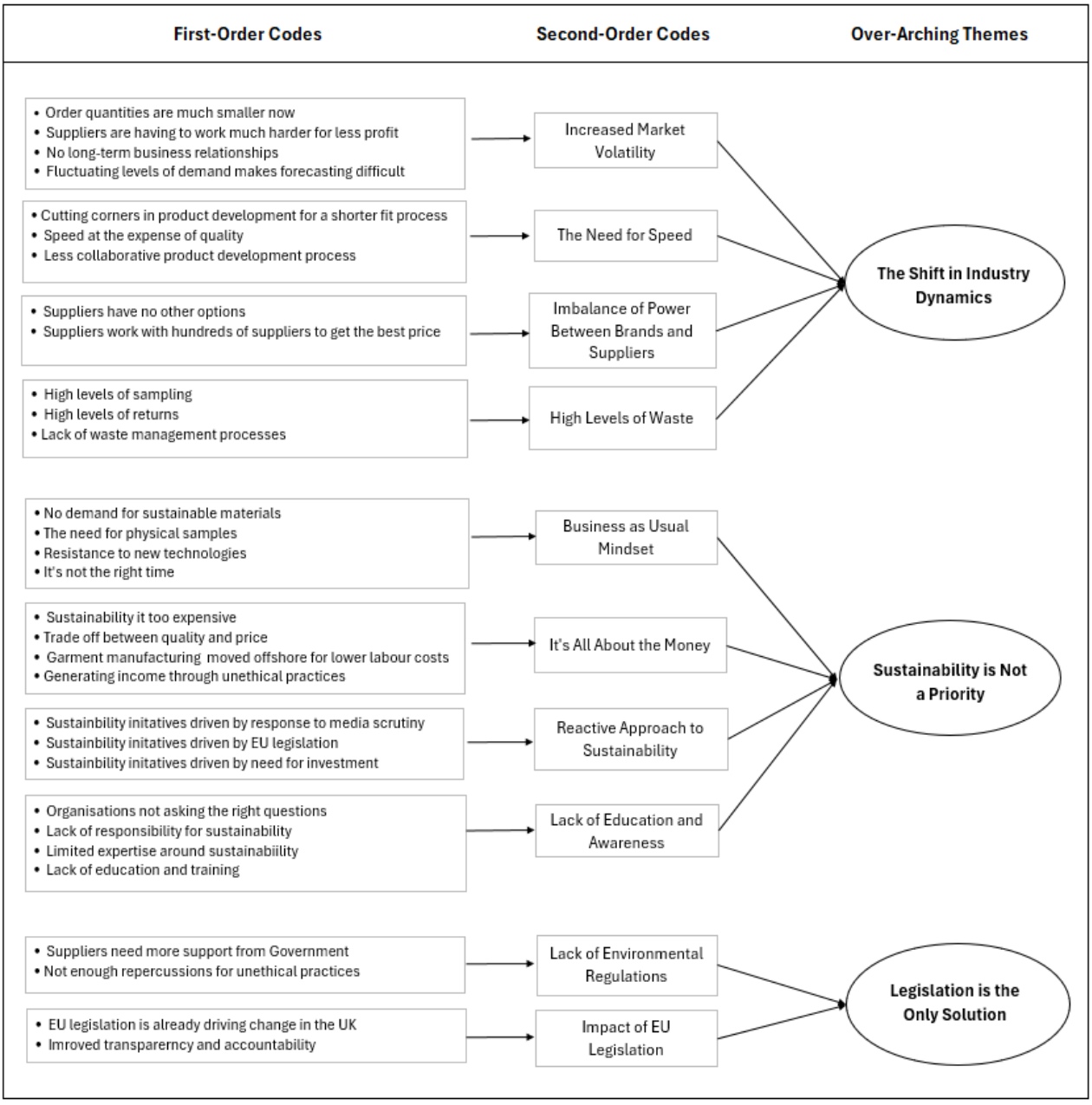


Figure 5.2: Codebook

The following section presents the findings for each identified theme, supported by figures and tables that illustrate the data structure. Illustrative quotations from participants are also included which have been edited for clarity while preserving their original meaning and intent. As the data provided numerous examples to support each theme, quotation tables have been included in Appendix C, while the main body of work only features the most significant quotes chosen to best illustrate the findings.

The section begins with an analysis of responses on existing product development practices, followed by an investigation of attitudes, knowledge and commitment to change and concludes with the identification of key barriers to implementing sustainable practices that emerged throughout the interviews.

5.2 The Shift in Industry Dynamics

A prominent theme in the data highlights the profound impact that fast fashion has had on the UK fashion industry, as almost all suppliers interviewed emphasised the significant changes in industry dynamics since the rise of fast fashion in the early 2000s. Given their extensive experience within the sector, averaging 25 years each, these perspectives offer a comprehensive understanding of how fast and ultra-fast fashion has reshaped practices, consumer expectations and business models which will be explored in detail within the following section.

5.2.1 Increased market volatility

The findings suggest that ultra-fast fashion has significantly altered product development practices in the sector, as the focus on responsiveness and speed to market has resulted in many negative consequences. For example, the demand for constant newness has increased the number of products produced but at the cost of lower quality and smaller production runs, resulting in higher levels of waste and less equitable supply chain relationships.

These changes have led to a much more volatile market with fluctuations in demand where brands and suppliers are having to work much harder for less profit, as illustrated in Appendix C, Table C1 which provides illustrative quotes supporting this theme. Participant 1, a fast

fashion supplier, emphasised how fast fashion has changed the industry due to smaller orders, noting,

> *"You're having to work a lot harder now, previously when you worked on a sample, you've done the work for 10,000 units, but now you're having to produce twenty times the amount (of orders) to achieve the sales of that one order. So your designers are having to do twenty times the amount of samples just to achieve the profits which you've been used to from one style previously…"*

Participant 6, another fast fashion supplier further highlighted the challenges of managing "*lots of products in smaller volumes (..) as you've got more variety and less quantity which makes it more tricky",* suggesting that suppliers are now working much harder for less profit. This sentiment was also observed by the researcher during the interviews, due to the nature of their work environments. Many suppliers interviewed worked in small, cramped office spaces filled with hundreds of samples, reflecting the increased workload and complexity of managing a greater variety of products in smaller quantities. During the interviews, many suppliers were also frequently interrupted by phone calls and queries from staff, highlighting the high-pressure nature of their roles. These observations, noted in the fieldnotes taken during the interviews, present a clear picture of how the increased demands for variety and rapid turnover require a significant amount of effort and coordination by suppliers, creating a highly stressful and challenging environment.

It is evident from the findings that UK suppliers are mostly used for small trial orders with repeats placed offshore to achieve higher margins. Participant 5, a fast fashion supplier, expressed concern that, *"We're getting used and abused because we're getting these small 500 piece orders and the repeats are all going to Morocco, because if the style sells the retailer wants to make the margin."*. This is corroborated by participant 14, a buyer for a well-known ultra-fast fashion brand, who admitted that *"Most of the time we would use UK suppliers for quick re-buys and that'd only be a few hundred units (..) so they're used for a faster speed to market and filling in gaps."*.

A further consequence of market volatility and fluctuating levels of demand is the reduced focus on long-term business relationships between fast fashion brands and suppliers. Participant 1 expressed concern about the short-term focus of the sector, indicating that even a strong relationship with a brand offers no guarantee of future orders as brands will switch to the lowest-price supplier. He explained,

> *"Forget commitment, there are no long-term relationships, it's strictly a monetary business. it doesn't matter how strong your relationship with a buyer is, that order will go somewhere else because it's just about which manufacturer offers the right price."* (Fast Fashion Supplier)

This insight suggests fast fashion brands prioritise low prices above all else, often working with hundreds of suppliers on a short-term basis rather than committing to longer-term agreements that might not be adaptable to sudden shifts in the market. Participant 14 admitted, "*We work with loads of suppliers (..), I'd say about 15 to 20 in the UK alone* …". This approach highlights the industry's focus on flexibility and cost reduction at the expense of stability and long-term partnerships. Participant 7, a fast fashion supplier, further suggested that some fast fashion brands intentionally rotate their buyers across departments to prevent them from building relationships with suppliers. They remarked, *"I think they (the brands) do it on purpose to stop the buyers building relationships with us as it makes them better negotiators ..."*.

5.2.2 The 'need for speed'

Another key shift driven by fast fashion is the move towards a more economically focused product development process, due to the emphasis placed on speed and cost efficiency. As illustrated in Table C2, findings suggest that as fast fashion brands strive to keep up with consumer's constant demand for newness, the focus has shifted from an in-depth, high quality product development process to a faster, less thorough approach which involves cutting corners in the fit process and reducing the number of samples produced. Participant 2, a knitwear manufacturer, outlines the product development process adopted by their fast fashion customers stating,

> *"Because they (the buyers) are so fast it means they come in, see the sample, agree the price and fit the sample while in the meeting, then raise the order and you can ship within two weeks. So one fit job done!"*

Several other participants support this claim as participant 1 confirmed *"Ultra-fast fashion brands have changed the landscape (of the sector) because they tend to seal more or less on the first fit"*, a point also corroborated by participant 15, a fast fashion designer, who explained, "*Sometimes you would confirm an order based solely on a picture and just go for it (..) because the order quantity was so small it was just a risk we took."*

Findings also suggest that most of the tier 1 suppliers interviewed were reluctant to make additional fit samples due to the associated costs and lead times involved, potentially leading to poor fitting garments. Participant 5 explained *"On average we go to a second fit (sample), if they (the customers) ask for a third fit we would normally look at cancelling as it's too expensive and time consuming to keep making samples." (*Fast Fashion Supplier*).*

The focus on rapidly producing hundreds of new products every week has also led to products being viewed as mere commodities, reducing the passion for design and innovation. This is expressed by participant 4, a designer working for a fast fashion supplier, who stated,

> *"The product doesn't really matter anymore, it's just an order which is a bit sad, it didn't used to be like that. The brands are more focused on just getting products on the website now, getting colours on, numbers on, items on. Three skirts, five tops, two dresses, it doesn't really matter what it is anymore."*

Participant 2 also highlighted this shift, stating "*Fast fashion doesn't generate real design, it's just something somebody has seen before and you're making some alternation of that style, it's different to how it was before."* This sentiment was further confirmed by participant 15, a fast fashion designer who argued, *"People are getting used to so much newness all the time (..) the product just becomes a bit samey ...".* This saturation of product offer is not only overwhelming for consumers but also increases excess stock and waste, adding to the environmental impact of the sector.

The 'need for speed' in fast fashion has also impacted the relationship between buyers and suppliers as findings indicate that young, less experienced buyers engage with suppliers less collaboratively than in the past. Table C2 includes illustrative quotes from several respondents to support this point, with one supplier expressing frustration that fast fashion buyers no longer visited their showrooms in Leicester, which had been standard practice in the past. They explained,

> *"The older more experienced buyers would come to Leicester and physically work with us so we can change this colour or that colour while they're here, we used to get it right, but now I don't see that. The young buyers don't come here anymore …" (*Participant 11*)*

Instead, suppliers are expected to present their products at the brand's head office in a cattle-market environment, where numerous suppliers compete for business simultaneously to drive down prices. This claim is corroborated by participant 14 who confirmed, "*We meet with*

suppliers normally on a Wednesday in our office (..) my buyer would go to theirs sometimes but not very often, normally they came to us" (Fast Fashion Buyer). These insights emphasise the highly competitive environment within fast fashion where suppliers are played off against each other, thereby reducing opportunities for collaboration and long-term relationship building.

5.2.3 'It's good for me but not for them' (The imbalance of power between brands and suppliers)

Since the growth of fast fashion in the UK, the sector has experienced a shift towards more transient and adversarial business relationships, with a clear imbalance of power between brands and their suppliers. As Mahmud Kamani, CEO of Boohoo, openly remarked in a recent Panorama documentary, *"It's good for me but not for them"* (Panorama, 2023) highlighting the exploitative nature of these relationships where fast fashion buyers use their dominant positions to dictate terms and conditions of business. The following section delves into the dynamics of these relationships, illustrating how the power held by buyers impacts product development practices and forces suppliers into a cycle of dependency and inequity.

Table C3 presents illustrative quotes from both brands and suppliers reflecting this theme. For example, Participant 3, a fast fashion supplier, emphasises the dominant position of brands stating, *"Brands rule the roost, it's either you give them what they want or you're out"* (P3). He further added that *"To survive we need to agree to making 100 to 150 pieces as we need to keep the production lines going"*, highlighting the desperate measures suppliers must take to survive.

The adversarial nature of these relationships is further exemplified by an incident involving a tier 1 supplier which the researcher observed firsthand. During the interview, the supplier received a call from a buyer regarding a misunderstanding about a confirmed order, threatening to cease all future business unless the supplier agreed to blanket discounts on all orders placed. The buyer's tone was aggressive, visibly angering the supplier who perceived these demands as unfair and unreasonable. The supplier explained,

> *"I've just had a call from one of my customers as there's been some misunderstanding in terms of purchase orders that were placed. The buyer called and said, 'because you didn't notify us that you didn't receive the purchase order we're going to have to take discounts on all previous orders too'.*

> *So when I refused to accept the discount (as we haven't made a mistake) she says 'well, we'll have to give the orders to another supplier and we won't place any future work with you'".* (Participant 1)

This ultimatum clearly illustrates the intimidating tactics fast fashion brands use to assert dominance over their suppliers. Such tactics not only exploit the imbalance of power but also create an environment where suppliers feel compelled to comply with their demands, undermining their ability to negotiate fair terms or employ sustainable business practices.

5.2.4 High levels of waste

As highlighted in the literature review, the fast fashion industry is well-known for generating high levels of waste at both pre- and post-consumer levels (WRAP, 2017; Ellen McArthur Foundation, 2021; Changing Markets Foundation, 2022; Koszewska et al, 2018). Findings from this study further highlight the problem of pre-consumer waste generated during the product development process, as evidenced in Table C4. Participant 1 expressed their frustration at the high levels of sampling waste as *"buyers struggle to visualise something with a small change like a short sleeve, so they insist on seeing another sample ...",* often demanding multiple iterations of the same style to review small changes to design or fit. While the importance of fit samples for a thorough product development process has been discussed, this example offers a different perspective, suggesting that buyers may be requesting excessive samples unnecessarily for minor changes such as adjusting sleeve length.

The issue of excessive sampling is corroborated by a fast fashion designer who described the head office environment of one ultra-fast fashion brand stating, "*There were so many samples in the office, so much material for design purposes …"* (Participant 17). This observation was also noted in the researcher's fieldnotes, highlighting that many suppliers' offices were congested with samples with no clear means of disposal, emphasising the urgent need for more sustainable approaches to product development and waste management.

Participant 10, a fabric manufacturer, highlighted how customer returns led to fabric waste for which there was no clear method of disposal, stating,

> *"This business is very, very wasteful, you're always left with waste and there's not a lot you can do with it. We get some rolls (of fabric) back from customers*

> *saying it's underweight or it's see-through so OK it's our fault (..) but we're then left with the lightweight fabric in their colour that nobody else wants."*

This participant also highlighted a further challenge around the management of fabric waste as "*most fabric used in fast fashion can't be recycled because it's blended with elastane, so you have a problem there."* The excessive use of elastane in fast fashion products results in materials that cannot be recycled and therefore end up in landfill as there are no other viable waste management routes.

Adding to this waste issue is the high levels of product returns that exist in fast fashion, a point raised by several participants. Participant 19's company was asked by one well known fast fashion brand to assist with processing their returns due to the overwhelming volumes received. She revealed, *"There were some shocking things in there, where people buy a garment, wear it and send it back",* highlighting the issue of customers buying garments to only wear once and then returning them. Participant 13, a sustainability manager, noted how the issue around returns was exacerbated during the Covid-19 lockdowns stating,

> *"In lockdown people were buying stuff because they were bored, but then when they were allowed to go out again the returns would come back and it would just be a never ending cycle. Returns rates were at like 80% at one point, it was terrible."*

She further explained that while some waste management solutions exist in the UK, such as the charity 'New Life' who work closely with the fashion industry to take its waste as donations, they are overwhelmed with the amount of donations received. She explained, *"They (New Life) are in over their head (..) they don't have the capacity to deal with all the stock they get and just don't know what to do with it all"*, highlighting the enormous amount of waste generated by the fashion industry.

5.3. 'They Just Don't Care About Sustainability' (Sustainability is Not a Priority)

The next section presents the interview findings that reveal fast fashion organisation's attitudes, knowledge and levels of commitment towards environmentally responsible product development practices. This exploration is pivotal to the development of the study

as it provides insights into the industry's appetite for change and assesses how responsive organisations will be to implementing more sustainable practices.

5.3.1 What does sustainability mean to you?

To generate insights around awareness and understanding of sustainable product development, participants were asked "*what does the term 'sustainable fashion' mean to you?*". While all participants demonstrated a reasonably good awareness of the term, the most frequently mentioned answers centred around products that are *'longer lasting'* or had *'longevity'*. This was closely followed by mentions of *'recycled fabrics'*, products with a *'lower carbon footprint'* and those that have *'less impact on the environment',* as illustrated in Figure 5.3 which summarises answers in the form of a word cloud, highlighting the most frequently occurring answers in larger text. This insight presents a challenge for the sector in improving sustainable practices as longevity contradicts the fundamental principles of fast fashion which prioritises rapid turnover and constant newness.

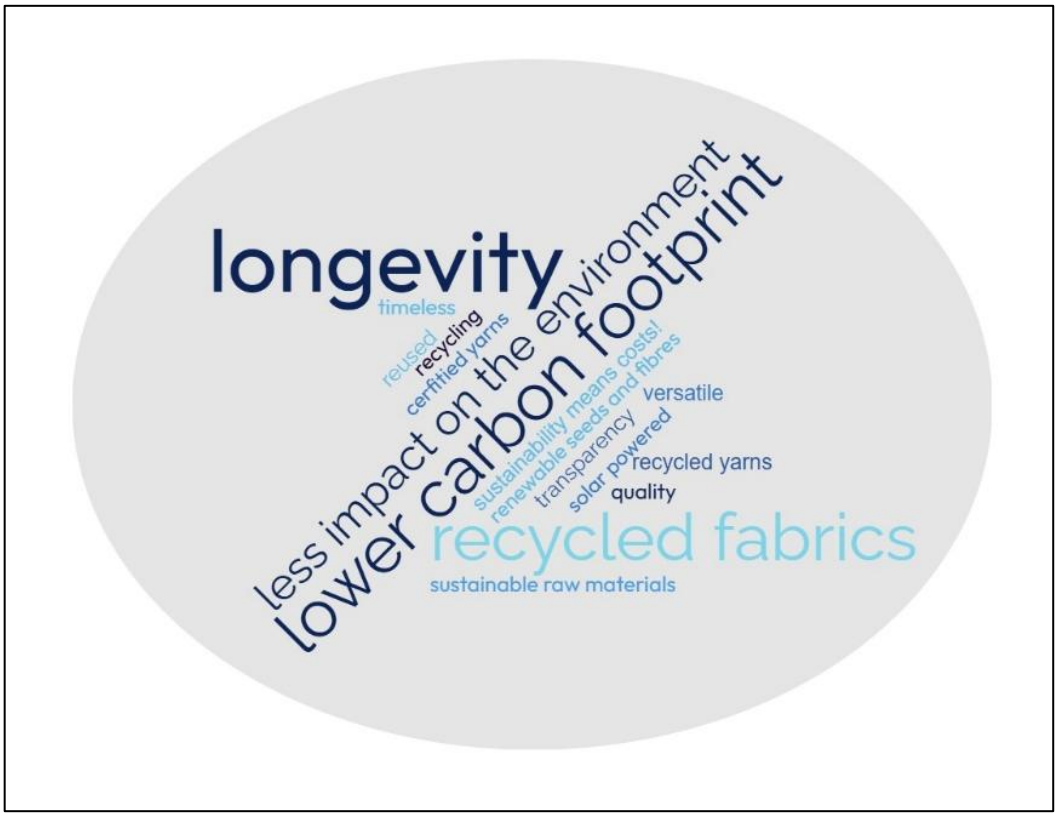


Figure 5.3: Participants interpretation of the term 'sustainable fashion' (Source: created by author)

5.3.2 Business as usual mindset

In terms of participants' commitment to sustainability, findings reveal that suppliers and brands acknowledge that sustainability is a pertinent topic within the fashion industry but do not fully recognise its importance in ensuring its long-term future. A recurring theme in the data was that suppliers and brands adopted a 'business as usual' mindset towards product development, with minimal evidence of proactive steps taken towards sustainability. For example, when assessing how well organisations prioritise the use of sustainable materials in their products, the findings indicate a lack of appetite for such practices. This point was highlighted by nearly all tier 1 suppliers and many buyers and designers, with representative quotes included in Table C5. One supplier noted, *"Nobody we know of or that we deal with is interested in sourcing recycled materials because they're more expensive"* (Participant 1), revealing that cost is a significant barrier to switching to more sustainable alternatives. Participant 10, a fabric manufacturer, confirmed the higher prices for recycled materials, stating that while virgin polyester costs £2.25 per meter, the cost of recycled polyester increases to £2.90 per meter.

Contrary to these findings, participant 20, who runs a sustainability consultancy, challenges the idea that sustainable materials are more expensive noting,

> *"There's a huge misunderstanding that brands think it (sustainability) costs more, but if you do it right it doesn't cost more (..). When we cost garments for Primark or Tesco, they're actually shocked that our costs (for sustainable fabrics) can come in lower than what they're paying now (for virgin fabrics)."*

However, she clarified that this generally applies to large volume retailers such as Primark as *"volumes make a huge difference with costings"*, emphasising how bulk purchasing significantly lowers the unit cost of sustainable fabrics. Unfortunately, ultra-fast fashion brands are constrained by a lower purchasing power so cannot achieve the same cost efficiencies, highlighting the challenges they face in adopting more sustainable practices.

The researcher also observed a lack of sustainable materials during the interviews, noting in the field notes that most of the of samples in the showroom were made from cheap, synthetic materials with no sight of any natural fibres or other more sustainable materials. Incorporating materials with sustainable qualities such as recycled fibres is one of the simplest ways for a brand to improve their sustainability credentials as it does not require significant changes to its business model. However, as Participant 1 noted, *"the brands don't*

really care about sustainability" as they continue to prioritise profit over implementing more sustainable practices.

The interview findings also suggest that fast fashion organisations are reluctant to embrace new technologies that enhance sustainability in the fast fashion industry, hindering progress towards more environmentally friendly practices. Both suppliers and brands appear hesitant to invest in sustainable innovations due to perceived costs and disruptions to established processes. Participant 3 explained that they invested in the 3D design software 'Browzwear' to meet demands from European customers adhering to new EU legislation. However, they added, "*The UK is way behind (with investing in 3D), I don't think it's affordable for a lot of people here if I'm honest because it's not cheap".* Participant 1 also supports this view stating, "*It'll be a long time before the UK gets on to investing in new technologies",* adding that a key challenge lies in buyers' reluctance to sacrifice physical samples for 3D CADS. He explained, "*The problem is the buyers, because when you send a 3D CAD to a buyer, they tell you that they can't do anything with it as they need a sample!"*. Participant 4 expressed concern about new technologies taking people's jobs*,* noting that "*3D software cuts out a lot of work for their (garment) techs" adding, "I'd be worried if I was in their tech department because they're actually being made redundant by this new technology".* This apprehension could explain why suppliers in particular are resistant to investing in new technologies as they fear the potential job losses that such innovations might bring.

5.3.3 'It's all about the money' (prioritising profit above all else)

It is clear from the data that the UK fast fashion sector is predominantly driven by a pursuit of profit at the expense of environmental considerations. While the literature suggests that consumer interest in sustainable products is growing (Todeschini et al, 2017; Stringer & Mortimer, 2020; McKinsey & Co, 2021), fast fashion brands continue to prioritise cost-cutting measures to maximise revenues, contradicting the ethos of the triple bottom line which seeks to balance economic, environmental and social factors (Elkington, 1997).

Table C6 provides illustrative quotes to support this point, further demonstrating a resistance to investing in sustainable materials and innovative technologies due to the associated costs. Findings also revealed that suppliers are reluctant to invest in sustainability accreditations such as 'Fast Forward' due to the high costs involved. Participant 5 explained, *"Some*

customers started pushing for Fast Forward (accreditation) which a lot of factories weren't willing to do because it's way too expensive". Although some fast fashion brands are insisting that suppliers invest in Fast Forward accreditation, it seems they are not willing to pay the higher prices associated with these standards.

A key issue impacting this reluctance to invest in sustainability is the perception from suppliers and brands that consumers are unwilling to pay higher prices for sustainable products. Participant 1 argues, *"That's the thing, the customer won't pay for it (sustainability)",* a view supported by participant 18 who declared that *"fast fashion and sustainability do not work, that's the bottom line (..) consumers are too price conscious".* This point is further illustrated in Figure 5.4 which presents participants' responses to the question, '*Why do you think fast fashion is so popular?*' The most frequently occurring answer related to 'cheap prices', emphasising the importance for brands to keep their prices low to drive sales.

Figure 5.4: Participant responses to why fast fashion is successful

The sector's relentless focus on profit maximisation has also led to a trade-off between quality and price, where cost-cutting measures prioritise cheap fabrics that result in poor quality garments with little durability or longevity. Participant 3 explained, *"The fabrics are mostly cheap jersey fabrics like polyester elastane for the price …",* which often means compromising

on fabric composition and construction, ultimately reducing the longevity of the final product. Participant 9, a fabric manufacturer, corroborates this issue stating,

> *"If you keep finishing garments to the specs we were finishing for Boohoo, those fabrics won't last long, they're gonna shrink because they've been pulled and stretched so much. The fast fashion market didn't let us finish fabrics properly, they just wanted yield so they could get more garments out of the meter."*

In addition, rising operational costs in the UK have squeezed profit margins making it harder for local manufacturers to compete with cheaper overseas alternatives. As a result, almost all suppliers interviewed noted a shift in production from the UK to Morocco, driven primarily by the pursuit of lower labour costs. This point was well articulated by participant 8, a fast fashion supplier, who explained,

> *"We can't afford to produce in the UK anymore because the brands won't pay the prices, they're pushing all the time for price (..), so the only thing we can do is get production done in Morocco to buy it cheaper. So as far as UK manufacturing is concerned, in another six months' time it will probably be nil."*

Interview findings also highlight a troubling trend where brands generate income through unethical practices, as illustrated in Table C7. Participant 3 revealed that "*Sometimes after the production is made one of the buyers will call and say, 'OK we need to reduce the price', so they try and renegotiate the price after the garments have been made but before delivery (..) it puts the supplier in an impossible situation".* This practice not only undermines the financial stability of suppliers but also compromises the integrity of contractual agreements made during negotiations. Additionally, many instances of unethical practices were identified in relation to the cancellation of orders. Participant 1 highlighted a concerning directive within some companies stating,

> *"Some directors give instructions to their buying teams to find reasons to cancel an item just to get out of stock. They'll get their garment techs to find reasons like garments are not to spec, when if business was good they wouldn't even look at it."*

These insights suggest that order cancellations are often motivated by brands' need to manage their stock levels rather than issues related to quality or late deliveries, highlighting how brands are exploiting suppliers to maximise profits regardless of ethical implications.

Participant 9 also discussed the pressure on buyers to secure margins, explaining *"Some buyers would ask for an open costing, look at it but still want it cheaper (..) so how does that work? Somebody's got to cut corners somewhere to do that order",* highlighting the unrealistic demands placed on suppliers to reduce costs despite offering transparency in their costing methods. These examples illustrate how cost and margin pressures drive decisions in the industry, pushing buyers to negotiate lower costs from suppliers which result in shortcuts in product development that compromise product quality and ethical standards.

5.3.4 Reactive approaches to sustainability

Despite the perception that the fast fashion sector *"doesn't care about sustainability" (P1)* findings indicate that there have been some efforts made towards more sustainable product development practices. However, a closer analysis reveals that these efforts were largely reactive rather than proactive, driven by media scrutiny and EU legislation rather than a genuine commitment to sustainability, as illustrated in Table C8. Participant 10 described a surge in interest in recycled polyester just before the pandemic in 2020 which has since waned noting,

> *"Just before Covid in 2020 recycled was a buzz, it was on trend, we were selling a tonne of it every week. But now nothing (..) it's slowed down dramatically."*

Interestingly this heightened interest in recycled polyester coincided with the increased media attention following the publication of the Levitt report and Boohoo's subsequent Agenda for Change strategy, suggesting the response was a reaction to media scrutiny not a genuine commitment to change.

A common theme in the data also pointed to sustainability initiatives driven by the new raft of EU legislation stemming from the 'EU Textiles Strategy 2030' as discussed in the literature review. Participants 3 and 4, who supply European fashion retailers, emphasised the requirement to adopt sustainable product development practices to maintain these business relationships, admitting that their sustainability initiatives were driven from obligation rather than a sustainability mindset. As participant 4 explains,

> *"The European clients want us to start using the 3D software, so to carry on working with them we had to start. It was voluntary but really, two years down the line, if you haven't got it you're out, so we had no choice."*

5.3.5 Lack of sustainability education and training

Although it is evident that the participants interviewed had some awareness of sustainability (as presented in Figure 5.3), the findings suggest there is a gap in translating this knowledge into practice, emphasising the role of education and training in shaping industry practices. Table C9 provides illustrative quotes on this theme, addressing factors such as a lack of training and expertise, the importance of knowledge transfer and the reluctance to take responsibility for sustainability.

Several participants highlighted various shortcomings in training and education amongst buying teams in particular, suggesting that rapid growth and promotion of staff have outpaced the development of essential skills and knowledge related to sustainable product development. Participant 12, a fast fashion buying director stated,

> *"I think there's a lack of training in the fast fashion buying teams (..) because the sector grew so quickly and it was so successful, the buyers were promoted too quickly so don't have the right skills or experience."*

Participant 18, a director of a manufacturing trade association and sustainability expert, corroborated the lack of education among buyers, highlighting a critical gap in training and knowledge where buyers prioritise cost-cutting and maximising profit without considering sustainability implications. He exclaimed,

> "*One of my biggest gripes is with the buyers in fast fashion (..) by and large a lot of them don't have the experience to buy, they have no concept of how to cost a garment, they're just told to get the cheapest price possible."*

Findings also suggest that a significant problem with fast fashion in the UK lies in its leadership, often composed of young and inexperienced individuals who lack expertise in sustainability. Participant 13 pointed out that *"Fast fashion brands are run by young people who don't have any experience in this field",* supporting this view with an example.

> *"The marketing director writing the Modern Slavery statement (at the brand) had no idea what she was doing, she kept trying to put claims in there that just weren't true, they were marketing gimmicks that she'd copied off some other website because it sounded good."*

It is also evident from the findings that suppliers and brands lack knowledge about the origins of the fabrics and raw materials they use as they are failing to ask critical questions when

sourcing, highlighting a lack of motivation to delve deeper into the environmental implications of their sourcing decisions. For example, participant 5 stated,

> *"To be honest people put fabric in front of us and if we like it we start buying it, you would never ask where (it's from) or how (it's made) (..) we ask the composition but we don't go any further than that."*

Participant 2 supports this claim noting, "*Fast fashion brands don't ask questions about where the fabrics come from. Some of our other customers do but not the fast fashion brands"* suggesting that this lack of interest in the origins of fabrics is more prevalent within fast fashion than other sectors of the fashion industry.

5.4 Barriers to Sustainability

In the next section, the findings related to barriers inhibiting fast fashion organisations from implementing sustainable product development practices are presented. Although not a standalone theme, challenges and barriers to sustainable product development have surfaced consistently throughout the interviews and are interwoven within the themes already discussed. This section consolidates these insights to provide a comprehensive overview of the complexities and challenges that hinder sustainable practices, directly addressing the third research objective.

5.4.1 Increased costs

With its emphasis on speed to market and low prices, fast fashion has transformed the UK fashion industry over the last two decades. However, it is evident that these drivers of competitive advantage are also key barriers to implementing sustainable practices, as developing products in a more environmentally sustainable manner leads to higher costs. For example, sustainable materials are more expensive, investing in sustainability technology requires a high initial outlay and time for training which impacts productivity and investing in accreditations drives prices too high making suppliers uncompetitive in the market. As stated by participant 1, "*It all comes down to one thing in fast fashion … the cost, everything in this industry is to do with cost …".* As fast fashion suppliers operate on very small margins and face

significant pressure to maintain low prices, they have no capacity to absorb the higher costs associated with sustainability.

5.4.2 Lack of availability and choice of sustainable materials

Existing research suggests that a lack of availability of sustainable materials also presents a significant barrier for the fast fashion industry, impacting lead times and creating a need to establish new business relationships (Todeschini et al, 2017). Several participants agreed with this claim, highlighting a lack of availability of sustainable materials in the supply chain, as suppliers refuse to hold stocks of recycled fabrics due to a lack of demand from brands. Participant 19 explained, *"I've seen the amount of sustainable fabric stock in the UK actually get smaller (..) there's not enough demand for it so fabric suppliers won't stock it".* This affects lead times and limits brands' ability to place small orders, as most 100-to-200-piece orders depend on readily available fabrics stocked in the UK.

Contrary to these observations, several suppliers suggested that there are no restrictions on the availability of recycled polyester in the UK. Both participant 5 and 10 shared this view, indicating that recycled materials are widely available in the market. Participant 10 noted, "*Recycled poly is there if customers want it, not like it was four or five years ago, it's readily available now".* Similarly Participant 5 stated, *"If somebody came to us and said we want to do recycled we could do it no problem, there is availability, especially for small quantities …".* In fact, another supplier showcased a wide range of recycled fabrics available in the UK market, presenting numerous swatches to the researcher during the interview. These included both plain and more intricate designs such as textures and burnouts, as illustrated in Figure 5.4, mirroring what is available in virgin polyester. This suggests that there are few restrictions in terms of design and availability in recycled fabrics for UK fast fashion brands.

Figure 5.5: Recycled polyester fabric swatches

5.4.3 Quality issues with sustainable materials

In addition to increased prices and restrictions of sustainable materials, several participants complained about the quality issues associated with recycled polyester, as illustrated in Table C10. Participant 8 explained that *"there are issues with hand feel with recycled polyester",* while participant 19 complained that it *"slows down production"* as it sticks on the machines and *"doesn't take the dyes as well".* These quality concerns further complicate the adoption of recycled polyester, making it less appealing for manufacturers aiming to maintain high standards and efficiency in their production processes.

5.4.4 Lack of standardised practices

The findings also indicate that a significant challenge lies in the lack of standardised practices relating to sustainability, complicating efforts and increasing costs for fast fashion organisations, as illustrated in Table C11. Participant 2 emphasised this issue, noting how attempting to adhere to sustainability demands from their customers can be challenging due to the lack of a unified set of rules or standard audit procedure. He explained *"There is no one common rule or standard audit, every customer wants a different way for the audit to be done*

which costs a lot of money …". Participant 19 shared a similar view, noting that the use of different software systems for various aspects of product development has forced some companies to invest in multiple, costly platforms, which strains financial resources and highlights the inefficiencies that currently exist in the fashion industry. She explains,

> *"There are lots of different technologies out there for different parts of the job (..) Some of the bigger brands have invested in Optitex and Clo 3D as well and that's not right, you don't want to be paying two huge charges for two different systems."*

Additionally, for technologies such as 3D sampling to be efficient in product development, it is imperative that both brands and suppliers invest in the same software to ensure seamless collaboration and maximise the technology's potential. Participant 20 illustrates this challenge, noting that while some companies have adopted 3D sampling software, others have not, impacting its effectiveness as it requires all parties involved in product development to commit to the same platform. This is particularly challenging for the fast fashion sector that lacks a long term-collaborative approach, because without widespread adoption across the supply chain, the benefits of 3D sampling such as reduced physical sampling (McKinsey, 2021) cannot be fully realised.

5.4.5 Accusations of greenwashing

An additional challenge raised by participant 12, a fast fashion buying director, is the potential of being accused of greenwashing which can undermine genuine sustainability efforts. She explained that despite her company's ambitious ESG strategy and strong focus on sustainability, they chose not to promote their sustainability credentials due to concerns that these initiatives might be met with scepticism. She explained,

> "*We had a team of maybe four or five people looking after ESG and had specialist people bringing us all the sustainable fabrics, but they were scared to talk about it as they were petrified of greenwashing. If you stick your neck out and say 'we're doing this' someone will come at you and say 'no you're not' … "*

This concern reflects a broader challenge in the fast fashion industry where even companies with legitimate sustainability initiatives may hesitate to promote their efforts. However, this concern was only raised by one participant during the interviews, suggesting that while it may

be a significant barrier for some, it may not be a widespread issue within the UK fast fashion sector.

5.5 Legislation is the Only Solution

In terms of implementing solutions towards a more sustainable UK fast fashion sector, a recurring theme in the data relates to the need for governmental support in the form of stricter regulations, as existing voluntary initiatives are not enough to drive meaningful change. Table C12 provides illustrative quotes for this theme, indicating that both suppliers and brands highlighted a need for regulation to improve sustainable practices in the sector. Participant 2 highlighted the need for legislation to help them *"stand up to retailers about the way they're dictating the market"*, a sentiment also supported by participant 19 who argued that *"there isn't enough buy in to sustainability at the moment, which is why the government need to get involved to actually force the issue."*

Participant 13 and 19 also highlighted a need for more environmental regulations, noting that much of what currently exists is primarily concerned with social issues. Audits such as SMETA and Fast Forward focus mostly on working conditions and pay rather than environmental impact as noted by Participant 19. "*There's definitely a gap for audits looking at the environmental side, I think it's more reporting currently, it's not going to the factory and auditing in the same way that the social side is done …".* Building on the need for more detailed environmental regulations, it is apparent that new legislation imposed by the EU is already having a positive impact on the UK fashion industry. Participant 13 explained how adhering to sustainability requirements for a German customer led to applying these same standards to all orders across the business including the UK, as it would have been inefficient to manage the German orders separately. She further elaborated on the positive impact of the German Supply Chain Act, stating,

> *"The German Supply Chain Act is probably the most interesting legislation that's come in (..) it's having a massive impact as they've prosecuted some people for supply chain issues already …"*

By ensuring that companies are accountable for their supply chains, this legislation promotes transparency, ethical sourcing and environmental responsibility and sets a benchmark for the fashion industry.

5.6 Summary of Findings

This chapter has examined the interview findings to provide an in-depth understanding of product development practices and attitudes towards sustainability in the UK fast fashion sector. The results reveal a dynamic and highly competitive environment where organisations continually adapt to changing market conditions and prioritise cost efficiency and operational effectiveness. However, the findings also reveal that many organisations resort to unsustainable practices in response to these pressures, cutting corners in product development, fostering adversarial relationships and generating significant amounts of waste to meet the demands of the sector.

Whilst the findings suggest that organisations acknowledge the importance of sustainability, there is little evidence of proactive action or genuine commitment to change within the sector. Despite claims by some fast fashion brands and suppliers of taking steps towards more sustainable practices, these actions are tokenistic at best, aimed at appeasing market interest in sustainability rather than implementing meaningful change. At this point in time, sustainability does not appear to be a key priority for fast fashion organisations, as their focus remains on selling vast quantities of cheap products to maximise profitability, contradicting the ethos of product stewardship (Hart, 1995) and the triple bottom line (Elkington, 1997).

The theoretical and practical implications of these findings will be discussed in the next chapter, providing an in-depth evaluation of how these practices and attitudes affect the potential for sustainable product development in UK fast fashion.

Chapter 6: Discussion

Drawing from the findings of the research and synthesising information from the literature, this chapter evaluates the themes presented in the previous chapter, exploring areas of commonality and disparity in sustainable product development. It also addresses a gap in the literature on ultra-fast fashion product development, offering an up-to-date model that accurately represents how practices are implemented in today's ultra-fast fashion sector. Additionally, the chapter discusses the implications of the findings, including how they may influence future practices and drive shifts towards more sustainable approaches. By identifying where current practices fall short, this chapter offers actionable insights that will be further developed in the final chapter of the thesis.

6.1 Product Development in Ultra-Fast Fashion

The following section is organised by the key findings relating to existing product development practices, thereby addressing Objective 1 - "*To examine existing actions of UK ultra-fast fashion organisations in adopting environmentally responsible product development practices".*

It is evident from the findings that ultra-fast fashion has had a significant impact on the dynamics of the UK fast fashion supply chain, affecting everything from order size, materials and business relationships. This section explores these dynamics in detail, evaluating how the sector's strategies and practices impact its sustainability efforts, drawing on existing literature to provide a more in-depth discussion.

6.1.1 Order size and consistency

Findings confirm that the ultra-fast fashion model has created a more volatile market in the UK, characterised by fluctuating demand and a lack of consistency in orders. The need for continual newness to keep up with rapidly evolving trends has led to smaller, more frequent orders, resulting in increased workloads and complexity for suppliers, as presented in chapter 5, section 5.2.1. The unpredictability of orders strains suppliers' resources, forcing them to focus on immediate deadlines, leaving very little capacity to invest in sustainability or

implement improvements in their practices. These smaller, inconsistent orders also create cash flow issues and reduced profitability for suppliers, further limiting their ability to invest in sustainable initiatives. Consequently, these actions contradict the principles of the TBL as smaller, more regular orders increase environmental impact by driving over-consumption and are less profitable for suppliers, whereas the TBL emphasises a balanced approach that integrates economic, environmental and social considerations (Elkington, 1997).

These findings are largely consistent with the work of Hammer et al (2015) and Levitt (2020), who both reported similar implications of small order sizes and continual newness in fast fashion. In fact, this study extends existing knowledge by suggesting that order sizes are shrinking even further as ultra-fast fashion brands accelerate production and increase the frequency of product launches, highlighting the sector's lack of progress in addressing key challenges that hinder progress towards sustainable product development.

6.1.2 Product sourcing

Findings also uncover a concerning trend where fast fashion suppliers are shifting volume production offshore to countries like Morocco to chase lower labour costs and improved margins. Data from the Department for Business and Trade (2023) supports this claim, reporting a 46.7% increase in total UK imports from Morocco since 2022, reaching £2 billion, with clothing accounting for 11% of this total.

These insights challenge existing literature as both Camargo et al (2020) and Parker-Strak et al (2020) suggest that fast fashion brands prioritise local production to reduce lead times and better meet consumer demands by being closer to their manufacturing facilities. However, this study reveals a shift in the opposite direction, highlighting a divergence in suppliers' production strategies as organisations prioritise cost over speed. Nearshoring production to hubs in Europe and North Africa is not unique to UK ultra-fast fashion, as the findings indicate that these hubs are increasingly supplying leading European fast fashion brands like Zara and H&M with products at higher margins too.

The shift to offshore production has significant implications for the sector. Firstly, moving production offshore has significantly disrupted UK garment manufacturing, resulting in job

losses and a more fragmented system. In line with the University of Nottingham's (2022) findings, this study indicates that the sector can now only produce basic garments due to the shortage of skilled garment workers resulting from the demise of the sector.

Secondly, this shift complicates transparency as offshore production limits visibility across the stages of product development, making it harder to ensure sustainable practices. As noted by Hammer et al (2015), Leicester should be an ideal hub for ultra-fast fashion due to its speed to market, small volume orders and responsiveness to trends. However, moving production offshore negates these advantages and further exacerbates environmental impact due to the increased transportation emissions resulting from moving fabrics and products between countries. By adding to their carbon footprint through cross-border transportation, the sector is further harming the environment.

The VUCA framework (Bennis & Nanus, 1985) offers a valuable tool for analysing the UK ultra-fast fashion sector as it provides a framework to assess its volatility, uncertainty, complexity and ambiguity, which could inhibit the sector from implementing sustainable product development practices. As discussed, ultra-fast fashion is a highly volatile market, driven by rapidly evolving trends that force brands to continuously develop new products to satisfy consumer demand. It also faces significant market uncertainty driven by unpredictable shifts in consumer behaviour and potential regulatory changes on environmental and labour standards. It is a highly complex industry due to the challenge of balancing speed, cost and sustainability which complicates decision-making processes and finally, it is a sector plagued by ambiguity as brands struggle to differentiate themselves in a saturated market where many similar products exist, making it difficult to stand out from the competition. Although these factors present significant challenges for sustainable product development, addressing them can help in identifying potential solutions that can enhance sustainability practices in the sector.

6.1.3 The product development process

Findings from this study reveal how the ultra-fast fashion sector's focus on speed and low prices impact the product development process, as the pursuit of quick turnaround times lead to a less robust, more economically driven approach. Unlike traditional product development which involves extensive concept and design phases as outlined in the literature review, the

ultra-fast fashion process involves a shorter sealing process, fewer fit samples and a reliance on readily available stock fabrics, often resulting in poor quality products and high levels of returns (Perry, 2022).

Findings from this study reveal a similar product development process to that outlined by Levitt (2020), where buyers send an idea to a supplier, often in the form of a picture from social media, who then create a sample from existing stock fabric and move directly to production with very little time to focus on the fit process. As suppliers handle a greater number of orders to achieve the same levels of profitability as in the past, they strive to move through the product development process as quickly as possible, leading to a shorter time frame between receiving the order and delivering the goods. Findings suggest that suppliers typically only make one fit sample to reduce the sealing time and are reluctant to produce additional samples due to the increased costs and time involved, resulting in poorly fitting garments which compromise the quality and sustainability of the final product.

To address the gap in the literature on ultra-fast fashion product development, the researcher has developed a model based on the study's findings that more accurately represents how the process functions in practice. While Parker-Strak et al (2023) touched on this area, their model primarily focuses on the complexity of the process and the overlapping stages of product development, rather than providing a step-by-step framework. Figure 6.1 presents this new model, illustrating how ultra-fast fashion brands can take a product from concept to consumer in as little as a week. The model emphasises the continual cycle of concept and sample development between steps 2 and 4, identifying the sustainability challenges that arise from this accelerated approach, including increased waste, higher resource consumption and the production of poor-quality products.

08: Consumer Feedback

Activities: Rapid collection of feedback for next cycle
Duration: Variable

07: Retail and Marketing

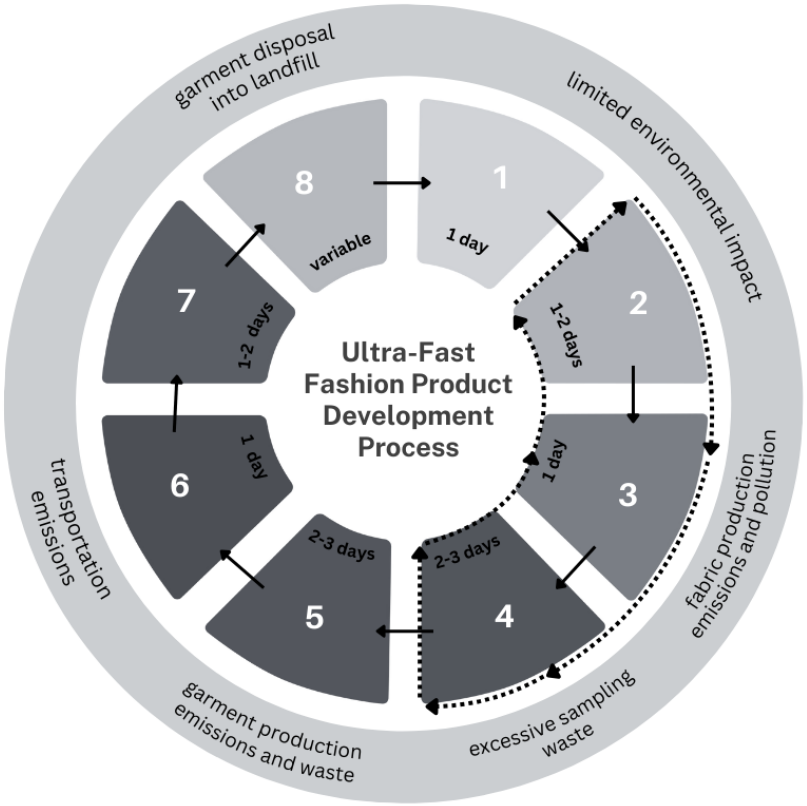
Activities: Shoot product, launch online, promotions
Duration: 1-2 days

06: Distribution

Activities: Stock distributed to brands' warehouse
Duration: 1 day

05: Production

Activities: Fabric cutting, sewing and finishing, Fast turnaround.
Duration: 2-3 days



01: Trend Identification

Sources: Social media, celebrities, catwalks, trend reports

02: Concept Development

Activities: Quick sketches using pre-existing templates
Duration: 1-2 days

03: Fabric Sourcing

Type: Stock fabrics, mostly virgin, synthetics, readily available
Duration: 1 day

04: Prototyping

Activities: Limited prototypes. quick approvals with minimal adjustments
Duration: 2-3 days

Figure 6.1 Ultra-fast fashion product development process (Source: created by author)

6.1.4 Materials for product development

This study also contributes to the existing literature on fast fashion product development (Parker-Strak et al, 2022; Levitt, 2020; Hammer et al, 2015) by highlighting the sector's reliance on stock fabrics, demonstrating how this practice not only accelerates production but also contributes to the commodification of products made from poor quality fabrics.

Stock fabrics are readily available in the market and can be purchased in small quantities, making them ideal for ultra-fast fashion brands looking to place orders for 100-200 pieces. However, this practice has significant implications for product quality and transparency as manufacturers have no control over quality and limited information about the origins of the fabrics, including where and how they were produced. Typically made from virgin, synthetic materials, these fabrics lack traceability making it difficult to ensure they meet environmental standards, further complicating the pursuit of sustainable product development within the sector. Using stock fabrics also reduces the scope for design and innovation as these fabrics must be bought in their existing form and cannot be altered in line with emerging trends. This lack of flexibility appears to be eroding brand loyalty, as consumers perceive fast fashion products as lacking uniqueness and interchangeable across competitor brands. This issue is particularly prevalent in ultra-fast fashion, where the primary focus is on launching hundreds of new products every day as evidenced by Edited (2019) showing the large number of options available at any given time.

6.1.5 Buyer and supplier relationships

The sector's focus on short-term gains has inevitably led to less emphasis on long-term, collaborative business relationships, as this research reveals that relationships within the UK fast fashion supply chain are mostly transactional and lack a longer-term, partnership approach. As presented in chapter 5, section 5.2.1, findings indicate that brands work with hundreds of suppliers to develop products and reveal a competitive, cattle market-like environment where suppliers are played off against each other to drive down prices.

While existing literature already addresses buyer-supplier relationships (Goworek et al, 2020; Levitt, 2020; EAC, 2019), this study advances the discussion by highlighting how the sector's

focus on cost cutting and profit maximisation intensifies the transactional nature of these relationships. Additionally, as much of the previous work is dated, these findings offer an up-to-date perspective, highlighting the lack of improvements that have occurred since the previous work was published.

Both Fung et al (2021) and Curwen et al (2012), highlight the importance of collaboration within the supply chain for developing sustainable fashion products, while network theory supports the idea that organisations should create partnerships based on trust and cooperation. However, it is evident that ultra-fast fashion brands fail to prioritise building long-term, strategic relationship with their suppliers, treating them instead as vendors who are expected to meet their unrealistic demands. Without close cooperation between fast fashion buyers and suppliers, the attention to detail and quality control process required for sustainable product development can be compromised as suppliers rush production to meet buyer's demands for short lead times. Furthermore, the lack of collaborative relationships contributes to a highly competitive environment among suppliers, pressuring them to create shortcuts in product development, compromising quality and resulting in inferior products.

The lack of collaboration between buyers and suppliers is just one aspect of a wider shift towards more adversarial relationships where brands hold all the power, as evidenced in chapter 5, section 5.2.3. These insights reveal significant inequities within the UK fast fashion supply chain, where brands lack professionalism and use intimidating tactics to assert dominance over their suppliers. For example, findings reveal that brands impose unfavourable terms and conditions on suppliers such as fines, order cancellations and unreasonable payment terms. Such tactics not only exploit the imbalance of power that exists but also drive suppliers to adopt unethical practices, such as underpaying workers and cutting corners in product development to reduce costs and lead times. Additionally, suppliers are expected to take on significant risks such as fabric commitments and operating without credit insurance, which places a huge financial burden on them, especially if demand reduces or a business fails, leaving them to absorb the resulting losses. Therefore, addressing these unethical practices is crucial for maintaining integrity and advancing genuine sustainability goals within the sector.

Applying these findings to Cox et al's (2003) power matrix model presented in the literature review reveals a clear representation of the 'buyer dominance' power stance, where buyers

exert substantial control over suppliers. Several forms of 'buyer dominance' are evidenced in the findings, including the high ratio of suppliers to brands that exist in the sector, suppliers' reliance on brands for orders, and the ease with which buyers can switch between brands due to their similar offerings, further evidencing how power asymmetry allows brands to use their position to drive cost efficiencies and enforce compliance.

These insights build on the work of Goworek et al (2020) and Parker-Strak et al (2020), who both highlight how fashion brands exploit their power to maintain control over suppliers. However, this study extends this understanding of brand dominance by revealing how it leads to unfair treatment of suppliers, specifically revealing how they impose unfair fines and unwarranted order cancellations, ultimately hindering their ability to develop sustainable products.

Overall, unbalanced and adversarial relationships that are focused on cost savings present significant barriers to sustainable product development within the UK fast fashion supply chain compromising quality, reducing transparency and encouraging unethical practices. Addressing these issues is crucial to improving the long-term viability of the sector as equity and collaboration are essential for creating a more sustainable supply chain.

6.1.6 Waste management

As detailed in Chapter 5, section 5.2.4, this research highlights the substantial waste generated from excessive sampling, high returns and inadequate waste management processes in the fast fashion supply chain, contradicting the ethos of Hart's (1995) NRBV theory, which states that eliminating waste from operations is key to achieving environmental sustainability. The following section will explore the implications of these findings, evaluating their impact on industry practices and sustainability efforts.

Findings reveal that fast fashion product development involves high levels of sampling waste arising from the creation of multiple samples, many of which never make it to market. Suppliers report on having to produce hundreds of samples to secure orders as buyers and designers demand physical samples to evaluate potential new products, often rejecting innovative technologies like 3D sampling that can significantly reduce the need for physical samples. This finding offers new insights into pre-consumer fashion waste by revealing how

the sector's excessive sampling practices contribute to waste - an issue that, to the best of the author's knowledge, has not been previously explored in the literature. By highlighting this often overlooked source of waste in fast fashion product development, it extends current knowledge and identifies a key area for potential intervention and reform.

Furthermore, this research supports existing literature on the high rates of fast fashion returns, corroborating the work of Wood et al (2019) who reported product returns rates for some fast fashion items in excess of 50 percent. This continual cycle of returns not only results in huge amounts of waste as much of the returned stock is sent directly to landfill, but also highlights the increased environmental footprint resulting from the additional logistics involved in the returns process. In this study, brands report on having to deal with unmanageably high return rates, often resorting to engaging external companies to handle the reprocessing of these returns, further increasing carbon emissions due to transporting returns to and from external facilities.

Compounding the issue of waste is the sector's inadequate waste management processes, particularly in relation to pre-consumer waste. Findings suggest that manufacturers lack effective systems for managing textile waste generated during production, which is a significant issue considering research shows that approximately 20% of fabric is discarded during the fabric cutting stage (Niinimaki et al, 2020). Without proper disposal or recycling methods, these fabric scraps are typically discarded in general waste streams, ultimately ending up in landfill. Despite the availability of advanced technologies such as laser cutting, which minimises material waste by precisely cutting fabric with minimal offcuts, their adoption in the sector appears to be limited, likely due to the high costs associated with this technology.

This inefficiency not only reflects poor resource management but also highlights the urgent need for the sector to adopt more sustainable waste management practices such as fabric recycling programmes and zero-waste manufacturing techniques. However, a particular challenge with fast fashion products is their use of blended yarns such as polyester elastane which complicates recycling efforts. This supports Kahoush and Kadi's (2022) research, which highlights that blended yarns complicate fabric recycling as they cannot easily be separated, illustrating the need for innovative recycling solutions such as fabric separation technologies to overcome this barrier to sustainability.

In summary, ultra-fast fashion's reliance on excessive sampling coupled with the overwhelming volume of returns significantly contributes to the issue of waste in the sector. The challenges of managing waste, including the inability to recycle blended fabrics further exacerbate this issue. To mitigate these environmental impacts, the sector must move away from physical samples and invest in innovative technologies like laser cutting and virtual sampling, while also improving training for buyers to reduce their reliance on multiple samples before approving orders. If smaller businesses lack the resources for investing in such technologies, they should focus on building trust and collaborating more closely with suppliers to align on specifications early in the product development process, as this approach reduces errors and the need for multiple samples, thereby minimising waste and streamlining production.

6.2 Attitudes and Commitment Towards Sustainable Product Development

This section addresses objective 2, *"To investigate attitudes, knowledge and levels of commitment of UK ultra-fast fashion organisations towards environmentally responsible product development practices".* Organised by the key themes generated from the interview findings, this section evaluates suppliers' and brands' knowledge and attitudes towards sustainable product development as well as their commitment to change.

6.2.1 Existing knowledge on sustainability

In terms of existing knowledge around sustainability, the findings indicate that suppliers and brands have a good understanding of sustainability concepts, as evidenced by their use of terms such as 'longevity', 'recycling' and 'minimising environmental impact'. Notably, the ideas expressed by participants align well with Hart's (1995) NRBV theory which emphasises the importance of renewable materials and recycling in sustainable product development, highlighting the relevance of this theory in guiding sustainable practices. By embracing product stewardship principles, fast fashion organisations can move away from environmentally damaging practices and improve their reputation by taking a more proactive approach towards sustainable product development. However, these insights present a challenge for the sector in improving sustainable practices as the concept of longevity conflicts with the fundamental principles of fast fashion which prioritises rapid turnover and constant newness. Encouraging consumers to wear garments for longer rather than

continuously buying new disrupts the cycle of rapid consumption, which may explain why sustainability remains a low priority in the sector.

These findings enhance the existing literature on sustainable fashion practices, which has predominantly focused on consumer knowledge of sustainability (Todeschini et al, 2017; Stringer & Mortimer, 2020; Zhang et al, 2021; Khare and Sadachar, 2017). By providing insights from industry practitioners, this study offers a unique perspective on the knowledge and attitudes of fast fashion suppliers and brands, revealing how their understanding of sustainability impacts their commitment to change.

6.2.2 Attitudes to sustainability and commitment to change

This study reveals a concerning disregard for sustainable product development within the sector, which remains focused on profit maximisation and speed to market. Findings suggest that sustainability efforts are predominantly reactive rather than proactive and there is a notable lack of training programs to enhance knowledge and shift attitudes towards sustainability. These key findings, along with their implications will be discussed in detail in the following section.

Economic focus over environmental concerns

While the literature suggests that consumer interest in sustainable products is increasing, it is evident that suppliers and brands continue to prioritise economic factors over environmental concerns, as discussed in chapter 5, section 5.3.3, contradicting the ethos of the triple bottom line which seeks to balance economic, environmental and social factors (Elkington, 1997).

A key finding highlights resistance from brands and suppliers to invest in sustainable materials due to the higher costs involved, driven by concerns that consumers will not pay the higher prices associated with sustainable products. This resistance presents a significant barrier to progress, as switching to more sustainable materials is a relatively simple step towards sustainability that does not require major changes to business models or technological investment.

These insights align with previous research which consistently reports that sustainable materials are more expensive (Todeschini et al, 2017; Moktadir et al, 2018b; Bhandari et al,

2022), presenting a significant barrier for both fast and ultra-fast fashion as they rely on keeping costs low. This resistance to sustainable alternatives also corroborates the Changing Markets Foundation (2022) report and Bloomberg (2022), who both highlight the sectors' continued focus on virgin polyester due to its lower cost and widespread availability, highlighting the critical role that cost plays in the decision-making process.

There is also a notable resistance to investing in sustainable technologies due to the higher costs and training required, along with concerns around job security. These findings contribute valuable insights into the human and employment challenges hindering technological advancements in the sector, revealing a complex barrier to sustainability in a sector which prioritises rapid production and cost efficiency.

Reactive approaches to sustainability

This study also demonstrates that sustainability initiatives in the ultra-fast fashion sector tend to be reactive rather than proactive, offering new insights by revealing an aspect of the sector's approach to sustainability that is overlooked in existing research. Findings suggest that while there have been some efforts towards more sustainable product development practices such as a heightened interest in sustainable materials and virtual sampling technologies, these actions are primarily driven by external pressures such as media scrutiny to safeguard brand reputation and adherence to EU legislation. This reactive approach suggests that sustainability measures are mostly implemented in response to immediate challenges rather than as part of long-term strategic planning. For the UK fast fashion sector, this implies that genuine commitment to sustainability remains superficial and inconsistent as brands are more focused on addressing external criticisms and meeting regulatory requirements than on proactively embedding sustainable practices into their operations.

This short-term, reactive approach to sustainability has several implications for the sector. Firstly, short-term fixes rather than long-term strategies potentially lead to inefficiencies and higher costs over time as organisations are forced to continuously adjust to new environmental demands rather than integrating sustainable practices from the outset. Secondly, there is a reputational risk associated with lagging behind in sustainability efforts which could impact brand loyalty and trust. As consumers become more interested in sustainably produced products, a reactive approach could lead to a loss of market share as

more proactive competitors capture the growing segment of environmentally conscious consumers.

6.3 Challenges and Barriers Towards Sustainable Product Development

While existing research emphasises the importance of sustainable product development for the long-term viability of the sector (Hart, 1995; Parker-Strak, 2023; Niinimaki et al, 2020; Fung et al, 2021), it is evident that the UK fast fashion sector is still in the early stages of adopting these practices. Therefore, this section draws from the findings to evaluate the challenges faced by fast fashion organisations in implementing sustainable product development practices, thereby addressing objective 3 - *"To identify barriers inhibiting suppliers and brands from embedding sustainable product development practices within their operations"*

6.3.1 Increased costs

It is evident from the findings that one of the main barriers for suppliers and brands in implementing sustainable product development is the increased costs involved. As presented in chapter 5, section 5.4.1, environmentally responsible product development generally involves higher costs which is particularly challenging for the ultra-fast fashion sector due to its focus on low prices. For example, using sustainable materials like recycled polyester comes at a premium compared to virgin fabrics and the initial investment required for virtual sampling technologies, which are important for reducing waste and improving efficiency, can be prohibitively high. Furthermore, the costs and time required for 'Fast Forward' accreditation adds another layer of financial burden, resulting in higher prices that are not competitive in the market.

While existing literature widely acknowledges the high costs of sustainable materials as a significant challenge for fashion organisations (Bhandari et al, 2022; Guo, 2022; Jia et al, 2020; Mao and Wang, 2019), this study provides a deeper understanding by identifying additional barriers related to the overall costs associated with sustainability. Findings demonstrate how investments in technology such as virtual sampling software and costs associated with accreditations such as Fast Forward further complicate the adoption of sustainable product

development in fast fashion. Furthermore, the study reveals that while some brands are pushing for sustainability and demand sustainable practices from their suppliers, they are often unwilling to bear the higher costs associated with such practices, creating a major challenge for fast fashion suppliers who are expected to absorb these costs and face reduced margins.

6.3.2 Limitations of sustainable materials

According to Huang et al (2021), the availability of sustainable materials is critical for the successful implementation of 'green' practices in the apparel industry, however this study indicates that 'green' materials in the right quantity and at the right cost are often difficult to obtain in the UK market. There are also limitations on the number of colours available in recycled yarns which limits brands flexibility and creativity in product development. The fast fashion sector relies on a wide range of colours to keep up with constantly evolving trends and consumer demands, making this restricted choice a significant challenge for product development in the sector.

This finding supports existing literature as Todeschini et al (2017) identify the lack of availability of sustainable materials as a significant challenge for the fashion industry, noting that it increases lead times which creates a significant barrier for brands that prioritise speed to market. However, there appears to be a contradiction in the findings of this study. While many insights highlight the lack of availability and restrictions of recycled materials, several suppliers indicated that recycled polyester was, in fact, readily available in the market, albeit at a higher cost. This discrepancy in findings highlights a potential shift in market dynamics, suggesting that the accessibility of sustainable materials may have improved since the publication of earlier studies.

This study also adds a new dimension to the literature on sustainability barriers by highlighting specific quality issues associated with sustainable fabrics. For example, the findings indicate that sustainable materials have a rougher hand feel and poor dye uptake which limits the range of available colours. Additionally, recycled polyester has been found to slow down production processes as it tends to stick on the sewing machines, resulting in a lower volume of stock produced compared to virgin polyester in the same timeframe. These factors add a new layer of complexity to the challenges already identified in existing research,

highlighting the need for improvements in both the quality and availability of sustainable fabrics to increase adoption rates and demand among fast fashion brands and suppliers.

6.3.3 Regulatory and policy gaps

This research also highlights that inadequate support from regulatory authorities presents a significant barrier to the implementation of sustainable product development in the sector as findings reveal a lack of existence of regulations or the enforcement mechanisms required to mandate such practices. Unlike other sectors such as the food industry, where regulatory frameworks like the Groceries Supply Code of Practice (GSCOP) have been instrumental in improving sustainability, the UK fast fashion sector continues to rely on voluntary initiatives which have proven to be insufficient in driving meaningful change.

Although some regulations exist which address social elements within the fashion supply chain, such as the Modern Slavery Act 2015, there is a lack of focus on environmental auditing, highlighting a significant gap in the UK fashion industry's regulations. While social audits involve thorough inspections of working conditions at the factory-level, environmental audits often fall short, relying heavily on organisations' self-reporting rather than on-site evaluations, highlighting a need for more stringent environmental regulations that go beyond superficial checklists to improve sustainability practices. These gaps in regulation and policy result in a lack of standardised sustainability practices in the UK fast fashion sector, which further complicates the pursuit of sustainability for organisations.

This observation is largely consistent with prior studies that also identified regulatory deficiencies as a major obstacle to achieving sustainability goals (Guo, 2022; Majumdar and Sinha, 2019). These insights also support the Ethical Trade Initiative (ETI) and Burkhardt's (2023) view that commitment from the government in the form of legislation is what is required to eradicate unethical practices and rebuild the UK garment industry, as they agree that existing voluntary schemes are simply not enough to encourage change (Ethical Trade Initiative, n.d.).

The success of the EU Textiles Strategy 2030 in Europe exemplifies significant advancements in addressing these gaps. As evidenced in this study, this legislation has already had a substantial impact on the UK fashion industry by promoting ethical sourcing and

environmental responsibility and sets a benchmark for the global fashion industry. Given the success of the German Supply Chain Act in particular, as evidenced in chapter 5, section 5.5, the UK government should consider adopting similar legislation as this would not only level the playing field for businesses operating internationally but also drive necessary improvements in sustainability in the UK fast fashion sector. Overall, these insights point to the need for stronger support from regulatory authorities and better regulatory frameworks to drive sustainability in the sector.

6.3.4 Lack of education and training

Another fundamental barrier to sustainable product development in UK fast fashion is the lack of education and training that exists in the sector. Menon and Ravi (2021) emphasise that human-related issues such as inadequate training and a shortage of qualified staff on sustainability are major obstacles to implementing sustainable practices, highlighting the need for periodic training and monitoring of employees to achieve environmental goals in a company. However, this research reveals a significant lack of training around sustainable practices as discussed in Chapter 5, section 5.3.5, further highlighting a lack of commitment to sustainability in the sector.

There is a particular issue with how ultra-fast fashion buyers perform their roles, which differs significantly from traditional buying practices. Findings indicate that buyers at ultra-fast fashion brands are mostly young and inexperienced and have received very little training on how to accurately cost a garment. Even when presented with detailed cost breakdowns, these buyers continue to push for lower prices despite clear evidence that such targets are unachievable, indicating a gap in their knowledge and approach to ethical sourcing. These findings contribute to the literature by evidencing the lack of sustainability education and training within the UK fast fashion sector, highlighting an area that is overlooked in existing research. By emphasising the importance of educating industry practitioners rather than focusing solely on consumers, this research advances the discussion on the role of education and training in driving change and offers new insights that enhance current knowledge.

The lack of sustainability training has significant implications for the sector because without adequate knowledge and awareness, industry stakeholders are less likely to prioritise sustainability in their decision-making processes, continuing environmentally harmful

practices. In addition, buyers' lack of understanding on how to accurately cost garments can have significant implications for sustainable product development because without a clear understanding of the costs involved in garment production, buyers are setting unrealistically low target prices, pressuring suppliers to cut corners and adopt unethical practices to meet their demands.

The findings also highlight that a significant issue with UK fast fashion lies in its leadership, often composed of young and inexperienced individuals who lack expertise and experience in sustainability. Research has shown for decades that companies with well educated, ethical leadership are more likely to implement sustainable initiatives and adhere to eco-friendly practices (Brown & Trevino, 2005). Therefore, fast fashion organisations should ensure their leaders have the right mindset and adequate sustainability education. According to Liao (2022), leaders who exemplify a sustainability mindset not only set a positive example to staff but also inspire and motivate employees to support and participate in sustainable practices.

Finally, a more complex barrier for organisations revealed in this study relates to a fear of being accused of greenwashing, even when intentions and actions are genuinely aimed at improving environmental practices. This claim supports an idea presented by Font (2016), who defines the phenomenon as 'greenhushing', where companies deliberately withhold information about their sustainability efforts for fear of potential backlash. Surprisingly, Font's research in the tourism industry found that companies only communicated 30% of their sustainability actions due to the fear of criticism, highlighting the significance of this issue. 'Greenhushing' is a concerning trend for the fast fashion sector because publishing green actions has the power to inspire others, shift mindsets, and encourage collaborative approaches (Font, 2016). However, without visibility and communication, the sector may struggle to advance and adopt necessary environmental practices on a larger scale, hindering the overall progress of the sector towards meaningful change.

6.4 Summary of Discussion

This chapter has examined the findings related to the study's three main research objectives, providing a detailed analysis of how each objective contributes to a deeper understanding of sustainable product development in the UK fast fashion sector.

Regarding **existing product development practices,** it can be concluded that UK fast fashion organisations continue to prioritise selling high volumes of poor-quality products, with little focus on sustainability. Despite significant opportunities, sustainable product development is largely absent as organisations continue to focus on short-term gains over long-term sustainability strategies.

In terms of **attitudes and commitment to change**, the picture is not much better as the research reveals that sustainability is not a priority for a business model driven by low cost and speed. Although brands and suppliers demonstrate an understanding of sustainability, they do not acknowledge its potential as a driver for meaningful change within the sector. Few organisations have implemented specific environmental sustainability policies and there is little evidence of formal sustainability education or training for the workforce, promoting a culture based on short-term gains over long-term environmental responsibility.

Ultimately, fast fashion organisations face significant **barriers to implementing sustainable product development**, largely due to the fundamental conflict between the fast fashion model and sustainability principles. As ultra-fast fashion prioritises rapid speed to market and constant newness, balancing sustainability with the need to keep prices low and meet consumer demand is especially challenging.

Chapter 7: Conclusions & Recommendations

In this chapter the final research objective will be addressed, '*to provide recommendations for UK ultra-fast fashion organisations on improving their product development practices and enhancing environmental responsibility*'. The chapter summarises insights from the research findings to highlight critical areas where brands and suppliers can improve their product development practices. These insights have been developed into actionable recommendations designed to guide organisations towards more sustainable product development practices and are structured to address short-, medium- and long-term goals tailored to organisations with varying levels of resources and commitment to change. In addition to managerial implications, this chapter outlines the study's theoretical contribution, highlighting how these insights are crucial for driving meaningful change in the sector.

7.1 Strategic Recommendations for Industry and Policymakers

When creating strategies to support sustainable product development in the UK fast fashion sector, it is important to understand the factors driving its success to ensure that incentives and regulations support sustainability without significantly compromising business performance. By recognising that affordability and newness are central to consumer demand, policymakers and industry leaders can develop strategies that address these drivers, helping organisations transition towards more eco-friendly practices without sacrificing the elements that drive their success.

The recommendations presented in this section are summarised in Table 7.1, which provides a roadmap to guide short, medium and long-term strategies to improve sustainable product development in the fast fashion sector. This framework serves as a starting point for organisations aiming to adopt more sustainable practices, identifying key challenges and solutions, with long-term strategies aimed at driving lasting improvements. The timeline for progression will largely depend on each organisation's resources and commitment to change, as organisations that prioritise sustainability and allocate the necessary investment are likely to advance more quickly, while those with limited resources or lower commitment may experience slower progress.

Existing Weaknesses	Action	Short, Medium and Long-Term Strategies for Sustainable Product Development			Organisation
		Short	**Medium**	**Long**	
Overreliance on synthetic materials	Switching to sustainable alternatives	Increase proportion of recycled polyester within existing product ranges	Create more durable products derived from natural and semi-synthetic fibres Investing in sustainability certifications	Explore innovative materials derived from plant-based sources	Brands, Suppliers
High levels of pre-consumer waste	Implementing strategies for reducing pre-consumer waste and more efficient production	Implement enhanced fit and quality control processes	Implement improved waste management systems through industry collaboration and partnerships	Invest in technological innovations (3D sampling and laser cutting)	Brands, Suppliers
Unequitable supply chain relationships	Facilitating long-term, collaborative relationships	Eliminate any unethical and exploitative practices (such as unfair fines and cancellations)	Incentivise sustainable practices through partner programs Capitalising on the local supply chain	Commit to full transparency across the supply chain by reporting on Scope 1, 2 and 3 emissions	Brands Brands
Lack of sustainability education and training	Promote knowledge sharing and continuous learning	Implementing mentorship programmes to share expertise Showcasing success stories Incentivise employees to propose and implement innovative solutions	Offering training and professional development opportunities focused on new technologies and sustainable practices	Employ a team of sustainability specialists	Brands, Suppliers
Lack of standardisation or regulation guiding sustainable practices	Government intervention through regulation to enforce sustainability	Support for local manufacturing	Standardised sustainability labelling	Supply chain transparency, EPR, plastic tax	Government

Table 7.1: Recommendations for enhancing sustainable product development in fast fashion

7.1.1 Investing in sustainable materials

A major challenge that must be addressed is the sector's reliance on cheap, synthetic materials like polyester which are difficult to break down and recycle, particularly when blended with elastane (Kahoush & Kadi, 2022). To effectively reduce environmental impact and create more sustainable products, fast fashion brands must shift their focus to the design phase and raw material selection, as prioritising sustainable design standards allows brands to influence the environmental footprint of a garment at every stage of the supply chain.

Currently UK fast fashion brands are focusing on recycled polyester as a sustainable alternative, but even this effort is limited as it is only used in a small fraction of their product ranges. While this is a positive step, it is insufficient for meaningful environmental impact, therefore brands must explore and adopt more environmentally friendly and durable materials to ensure a lower environmental footprint.

- *Increase the use of recycled polyester*

In the short-term, fast fashion brands should increase their use of recycled polyester, which despite being 20% more expensive than virgin fabric, remains affordable and can be locally sourced from Leicester. If brands and suppliers collaborate to share the additional cost by slightly reducing their profit margins, this material could become a viable option. At worst, selling prices may rise by a few pounds to absorb the increased cost, however research shows that consumers are willing to pay more for sustainable products (McKinsey & Co, 2021; Stringer & Mortimer, 2020), making the price adjustment both feasible and attractive to eco-conscious shoppers.

- *Adopt natural and semi-synthetic fibres*

In the medium-term, brands should incorporate more sustainable alternatives such as natural fibres like organic cotton and semi-synthetic, biodegradable fabrics like viscose and Lyocell which are and gaining traction in the UK fashion market (Gividen, 2020). As these materials become more widely adopted and prices decrease, they should become more viable for the fast fashion sector.

- *Invest in sustainability certifications*

Brands should also consider investing in certifications like BCI (Better Cotton Initiative) and GOTS (Global Organic Textile Standard) to improve transparency and build consumer trust (Zujewski, 2021). However, obtaining these certifications requires substantial investment in time and money as it involves redesigning processes from the ground up, starting with sourcing sustainable raw materials and ensuring full transparency in product development. This shift would likely lead to higher prices that reflect the true cost of sustainable production which might explain why many fast fashion brands are yet to adopt these standards. To overcome this challenge, a practical transitionary recommendation would be to gradually shift the product mix to include a larger proportion of higher priced, sustainably certified garments, supported by a clear marketing strategy that communicates the value and benefits of these sustainability initiatives to consumers.

- *Explore plant-based materials*

In the long-term brands should explore innovative materials derived from sources like mushrooms and pineapple leaves. While currently more common in luxury and mid-market fashion (Fashion Network, 2022), plant-based materials have the potential to shape the future of sustainable fashion. As they scale-up and become more accessible, they offer a promising path towards a more sustainable fashion industry.

7.1.2 Strategies for reducing pre-consumer waste

To effectively address the issue of pre-consumer waste in fast fashion, various strategies can be employed aimed at enhancing both efficiency and sustainability.

- *Enhanced fit and quality control processes*

In the short-term brands should prioritise improving fit and quality control processes to enhance product quality and reduce returns. Instead of relying on a single sample for fit approval, brands should collaborate more extensively with suppliers to develop a robust fit process that minimises returns and enhances overall fit accuracy. Investing in advanced fit technology, such as Product Lifecycle Management (PLM) systems and data analytics can improve fit accuracy and reduce sample requirements (Parker-Strak et al, 2020), resulting in reduced waste and product returns.

In the medium to long term, brands could consider investing in body scanning technology to overcome challenges related to poor fit and high return rates. These technologies allow for precise measurements, tailoring garments to individual body shapes, which significantly improves fit and reduces the likelihood of returns (Gill, 2015). As highlighted by Perry (2022), minimising returns not only reduces waste and carbon emissions from reverse logistics, but also improves customer satisfaction and environmental sustainability.

- *Improved waste management systems*

A practical improvement that suppliers could implement to reduce pre-consumer waste in the medium term is improving waste management systems through better recycling and upcycling of rejected samples and fabric offcuts. By repurposing discarded fabrics, manufacturers can reduce their environmental footprint and create value from what would otherwise be waste. Forming collaborative partnerships with other manufacturers can lead to innovative solutions for waste management. For example, suppliers could offer their fabric scraps to other manufacturers who might use them for mattress filling or car upholstery, thereby opening new revenue streams, turning waste into a profitable resource.

- *Investment in technological innovations*

Whilst digital technology has accelerated some harmful aspects of the fashion industry, such as the rise of ultra-fast fashion through e-commerce, it also offers significant potential for improving sustainable product development. Despite challenges like high implementation costs and the need for specialised training, digital technologies can drive efficiencies and support sustainable practices, making them an invaluable tool for the future of the sector.

Brands and suppliers should view investing in innovative technologies as a medium to long-term strategy for improving efficiency and reducing pre-consumer waste due to the high costs and time investment required. For example, digital prototyping and 3D sampling technologies such as ‘Clo 3D’ and ‘Browzwear’ offer an effective alternative to physical samples by allowing designers and buyers to create, modify and visualise virtual samples before committing to physical production. By adopting these digital tools, product developers can minimise material waste and reduce the number of physical prototypes required (McKinsey & Co, 2021).

Manufacturers should consider adopting laser cutting technology as it allows for precision that significantly minimises offcuts and fabric scraps during the manufacturing process (Niinimaki et al, 2020). By integrating laser cutting into production, suppliers can improve sustainability, reduce environmental impact and improve cost and efficiency. However, implementing such technologies may not be viable in Leicester at present due to the high investment costs and extensive training required, presenting a significant challenge for a sector that is already struggling to survive in the current economic climate.

UK fast fashion brands should also explore innovative practices from competitors to gain new ideas and improve their sustainability efforts. For example, Choosy, a US-based ultra-fast fashion brand, employs a made to order, zero-balance inventory model that effectively reduces waste and overproduction (Eldor, 2020). By integrating AI-driven insights with research from style scouts, Choosy creates designs that are pre-ordered by customers and produced within 48 hours, eliminating excess stock through on-demand manufacturing. By adopting similar strategies, UK brands could enhance their sustainability efforts whilst remaining competitive in the UK fast fashion market.

Brands should consider investing in digital fashion as an innovative solution to fast fashion, enabling consumers to experiment with virtual outfits using augmented reality (AR) technology. This creates the illusion of wearing new clothes without the need to purchase, wear and return physical garments (Schauman et al, 2023) which not only satisfies fast fashion consumers' desire for fresh looks to share online but also addresses the growing issue of waste associated with the 'wear it once' culture.

By implementing these strategies across the short-, medium- and longer-term, the UK fast fashion sector can make significant progress towards reducing its environmental impact. Each approach offers unique benefits and when combined, can create an effective sustainable product development process.

7.1.3 Adopting collaborative supply chain partnerships

To mitigate the environmental impact of fast fashion, brands must rethink their relationships with suppliers and adopt a more collaborative approach to sustainable product development. As highlighted by Fung et al (2021), strategic, long-term partnerships are essential for

advancing sustainability as they promote greater transparency, foster trust and align goals across the supply chain.

- *Eliminating unethical and exploitative practices*

As a first step towards building stronger, more collaborative relationships, brands should move away from unethical practices such as unfair fines and last-minute order cancellations and address the imbalance of power by treating suppliers as partners rather than vendors. Brands should share the burden of risk associated with fast fashion by committing to fabrics upfront and absorbing cost increases, instead of shifting the burden onto suppliers. Additionally, adopting more equitable payment terms, such as 14 or 30 days, rather than longer, unworkable terms will better align with the ultra-fast fashion business model and foster mutual respect.

- *Incentivising sustainable practices through partner programs*

In the medium-term, brands should consider incentivising suppliers by introducing partner programmes that support their transition to more sustainable operations. Instead of simply increasing orders as a reward for compliance, brands can offer investments in sustainable infrastructure such as new technology and renewable energy, enabling suppliers to meet sustainability criteria more effectively. This strategy not only enhances communication and collaboration, but also benefits both parties by supporting long-term improvements.

- *Capitalising on the local supply chain*

In addition to fostering equitable partnerships with suppliers, ultra-fast fashion brands should capitalise on the opportunities offered by Leicester's local supply chain instead of moving production offshore in search of lower prices. By encouraging collaboration, vertical integration and transparency within this local network, brands can create more resilient and sustainable production practices. Rather than chasing the lowest price, brands should focus on the benefits of local sourcing such as speed to market, lower emissions and stronger supplier relationships, which ultimately strengthen the supply chain and build long-term value.

7.1.4 Sustainability education and training programmes

As this study highlights a significant gap in sustainability education and training within the UK fast fashion sector, brands and suppliers should focus on educating their workforce as sustainability education and training are essential for enhancing the long-term viability of the sector.

- *Promote knowledge sharing and continuous learning*

There are several quick wins that fast fashion organisations could implement to improve sustainability education and training and ensure their workforce remains knowledgeable and forward-thinking. Both brands and suppliers should promote a culture of knowledge sharing and continuous learning within their organisation to drive innovation and sustainable practices. For example, implementing mentorship programs allows experienced leaders to pass on valuable industry insights, promoting collaboration and sharing their expertise. Furthermore, offering training and professional development opportunities focused on new technologies and sustainable practices, along with incentivising employees who propose and implement innovative solutions can also drive change. These strategies can all be adopted quickly without significant cost or time investment, making them effective ways to advance responsible practices within the sector.

- *Employ a team of sustainability specialists*

In the medium- to long-term, organisations should consider employing a dedicated team of sustainability specialists to guide their transition towards more responsible practices. This is especially important for ultra-fast fashion brands that lack in-house sustainability expertise as revealed in this research. A notable example from the fashion industry is the 'Primark Cares' team who have been recruited specifically for their expertise to spearhead innovative initiatives like their 'farm-to-closet' program and the development of a comprehensive audit process.

By implementing these training and education strategies across the short-, medium- and longer-term, organisations can foster a more dynamic and innovative approach to sustainable product development, driving both immediate improvements and long-term success.

7.1.5 Government support through regulation

A major challenge facing UK fast fashion organisations is the lack of standardisation and regulation on sustainability, therefore government intervention is essential to addressing this gap and improving sustainability within the sector. Without stringent regulation, brands can easily engage in greenwashing, making misleading claims about the sustainability of their products without legal repercussions. While the Modern Slavery Act 2015 has introduced some accountability for working practices, there is a need for comprehensive legislation that goes beyond voluntary initiatives, particularly in relation to environmental factors. The UK government should follow the lead of the EU by introducing laws that require full transparency across the entire supply chain to ensure better oversight and genuine sustainability efforts.

The UK government could consider the following legislative measures to drive the fast fashion sector towards more sustainable product development practices:

- *Compulsory supply chain transparency*

In line with the EU, legislation should be implemented requiring brands to disclose comprehensive details of their supply chain, including sourcing practices and environmental impact, with a focus on Scope 1, 2 and 3 emissions. This would include establishing a standardised framework for reporting environmental impact, including carbon footprint, water usage and waste generation, and require mandatory public disclosure.

- *Extended producer responsibility (EPR)*

In addition to existing EPR schemes for packaging and waste electrical equipment, the UK government should introduce a system of EPR specifically for the fashion industry. This would require brands and suppliers to take responsibility for the end-of-life disposal of their products, encouraging them to design more durable, recyclable or biodegradable items. By holding producers accountable for the entire lifecycle of their products, this approach would improve the potential for a circular economy within fast fashion.

- *Plastic tax on fast fashion*

Given the fast fashion sector's reliance on synthetic (plastic) based materials, implementing a tax on plastic inputs could be a pivotal step forward. In a recent Business of Fashion article, Pucker (2024) argues that such a measure would discourage the use of plastic-based materials

in the fashion industry by increasing their cost, making less damaging alternatives more attractive. A successful example of this approach is seen in the tobacco industry, where higher taxes have significantly increased cigarette prices, leading to a substantial decline in smoking rates. Similarly, a tax on plastic inputs in the fast fashion industry could encourage the use of more sustainable materials, while also providing financial resources to combat plastic pollution.

- *Support for local manufacturing*

The UK government should also incentivise brands to prioritise local manufacturing, thereby reducing the carbon footprint associated with long-distance transportation and supporting regional job creation and economic growth. By offering tax breaks or subsidies, the government can encourage fast fashion brands to keep production in the UK, thereby safeguarding the future of key manufacturing hubs like Leicester.

- *Labelling requirements for sustainability*

Finally, the government should consider introducing compulsory labelling requirements for fashion products to improve consumer awareness and drive more informed purchasing decisions. Sustainability labels currently used by fashion brands are often vague and inconsistent, as shown in Figure 7.1 which presents examples used in industry. By mandating a standardised label that details the environmental impact of garments such as carbon footprint, water usage and recyclability, brands can help customers understand the true cost of environmentally responsible products.

Figure 7.1: Examples of fashion product labelling promoting sustainable credentials

7.2 Theoretical Contribution

The theoretical implications of this study on sustainable product development in UK ultra-fast fashion highlight the gap between established sustainability theories and actual industry practices. The research reveals that traditional frameworks such as Hart's Natural Resource Based View and Elkington's Triple Bottom Line have not been effectively applied in practice, highlighting the tension between product stewardship and the need for speed in ultra-fast fashion, making it difficult for brands to fully integrate environmentally responsible practices. By developing a model that captures the complexities of ultra-fast fashion product development, this study advances the discussion on sustainability in the industry,

emphasising the importance of agility and speed. It also encourages researchers to re-consider existing frameworks to better address the sector's unique challenges, ultimately promoting a more effective approach to sustainability.

7.3 Limitations of the Study

This study has successfully analysed sustainable product development within the UK fast fashion supply chain and its commitment to change, however some limitations identified during the research must be acknowledged.

Firstly, the data collection was largely drawn from the researcher's network of contacts, limiting the diversity of companies involved in the research and the applicability of the findings to the wider fast fashion sector. The analysis was confined to seven tier 1 and three tier 2 suppliers, suggesting that future research should include a more extensive sample of fast fashion organisations. Additionally, despite the researcher having industry connections, establishing contact with fast fashion buyers and designers proved challenging due to contractual restrictions resulting in an unwillingness to engage on this topic. Nonetheless, the participants provided valuable insights due to their extensive industry experience and expertise which enhanced the study's understanding of sustainable product development practices within the sector.

7.4 Recommendations for Future Research

- *Broader Data Collection*

Future studies could benefit from a larger number of interviews or employing a case study approach which would provide a more in-depth and nuanced view of fast fashion practices. Additionally, incorporating an action research approach could be beneficial, enabling ongoing improvements based on continual learning and adaptation.

- *International Comparison*

This study examines a sample of fast fashion organisations in the UK. Future research could extend this investigation to fast fashion organisations in other countries such as the US as comparing results across different national contexts would provide a more detailed

understanding of varying practices and help to identify unique strategies and tools that could be adopted across different markets.

- *Longitudinal Studies*

Conducting longitudinal research would be valuable for assessing the adoption of sustainable product development strategies over time and evaluating progress related to legislation. This approach would provide insights into how organisations evolve in response to regulatory changes and track the long-term impact of sustainability initiatives.

7.5 Conclusion

In conclusion, this thesis has determined the reasons for the misalignment of product development practices within UK ultra-fast fashion with sustainable goals, revealing a clear lack of commitment from organisations towards implementing meaningful change. By identifying and evaluating the key barriers to adopting sustainable practices, the study provides a deeper understanding of how these obstacles hinder the integration of sustainable product development and suggests actionable solutions which are critical for driving the industry towards a more sustainable future. While some findings reinforce existing literature, this research also provides novel insights that offer practical guidance for industry practitioners and serve as a foundation for future research on sustainability in fast fashion.

To mitigate the environmental impact of the sector with the urgency it requires, organisations within the fast fashion supply chain must move beyond short-term solutions like recycled polyester collections and invest in long-term strategies, including reevaluating the design standard for products, improved energy infrastructure and collaborative stakeholder engagement. The potential for product development to drive meaningful change in the sector is significant, as it can influence the entire lifecycle of fashion products from material sourcing to manufacturing processes and post-consumer use.

Whilst the path to sustainability may be challenging for many fast fashion organisations as they try to balance growth with sustainability, the transition towards more responsible practices is crucial for the long-term viability of the sector. This shift is not only necessary for the planet but will also benefit consumers and brands, positioning them for success in an increasingly eco-conscious fashion market.

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Appendix A: Interview Guides

Appendix A1: Interview Guide for Tier 1 and 2 Suppliers

- Welcome & introductions.
- Aim of study presented to participant.
- Ensure consent forms are signed.

Classification Questions:

- Can you tell me about the organisation you work for and your role?

  Prompts:
  - What does the company produce?
  - Size (no of employees, turnover)
  - Which market do they operate in?
  - Who do they produce for (if not willing to disclose could ask the types of customers/level of the market)
  - Roughly how many customers do you have?
  - In which countries do you manufacture your products? How much of this is made in the UK? What are the lead times associated with this?
  - What is their manufacturing capacity?

Fast Fashion Product Development:

- Fast fashion is very popular amongst consumers in the UK, why do you think that is?

- Can you talk me through the process of how you develop products for your customers?
  Prompts:
  - What are the steps involved? Is this standard industry practice?
  - Why do you do it this way – what are the benefits and drawbacks?
  - What are the average lead-times?
  - What are the order quantities on average?
  - What type of materials do you mostly use in production?
  - How many samples (on average) are involved in the sealing process?
  - How do you manage the quality control process?
  - Does the process differ according to the customer/brand?

- How would you describe your relationships with your customers – are they mostly long-term and collaborative or more short-term and transactional? Does that differ across brands?

- Can you describe any experiences or challenges related to managing production/delivery deadlines?

- How often do you experience order cancellations from customers and what happens to the cancelled stock? Can you give me any examples of this?

- How do you address fluctuations in demand and capacity constraints in your manufacturing operations?

- What kind of digital processes or technology do you currently use to support manufacturing? E.g. to create more efficiency?
  Prompts:
- How are tech packs created? Any 3D virtual CAD software utilised?
- How is fabric cut – laser cutting?
- Any other technology used?

Sustainability:

- What does 'sustainable fashion' mean to you?

- Do you feel that you have a good level of knowledge and awareness on the subject? How do you learn about it – what resources do you use? Is there any training available?

- Are you aware of any impacts that fast fashion is having on the environment?
  Prompts:
- Waste and over-production
- Pollution from chemical dyes and printing
- Water usage from fabric production

- How do you think fast fashion could become more sustainable?
  Prompts:
- Sustainable materials
- Better quality control processes
- Reduced waste from fabric scraps
- Greener production methods – less water, chemical dyes, digital printing?

- Have you or are you considering implementing any of these? If so, can you give some examples?
- What strategies do you have in place to manage/reduce waste in your manufacturing operations?
- Are there any specific policies or regulations relating to sustainability (standards and certifications) that influence your processes and practices?
- How does implementing sustainability impact the manufacturing process? What are the challenges or barriers? Can you give some examples.
- Do any of your customers have any specific requirements/demands which impact your sustainability efforts?
- How do you approach optimising your operations to balance efficiency, sustainability, and profitability?
- Is sustainability important for the future success of your business? If so why/why not?
- Would you like to add any additional information on this topic?

Thank you very much for your time.

Appendix A2: Interview Guide for Brands & Sustainability Experts

- Welcome & introductions.
- Aim of study presented to participant.
- Ensure consent forms are signed.

Classification Questions:

- Can you tell me about the organisation you work for and your role?

  Prompts:
  - What does the company produce?
  - Size (no of employees, turnover)
  - Which market do they operate in?
  - Who are the target consumers?
  - Where do you source your products from? How much of this is made in the UK?

Product Development:

- Fast fashion is very popular amongst consumers in the UK, why do you think that is?

- Can you talk me through the process of how you develop products with your suppliers?

  Prompts:
  - What are the steps involved? Is this standard practice in fast fashion?
  - Why do you do it this way – what are the benefits and drawbacks?
  - What are the lead-times when sourcing from the UK?
  - What types of materials do you mostly use?
  - Are of these recycled/organic/sustainable?
  - How many styles do you buy on average per week/month?
  - What are the average order quantities?
  - How do you undertake quality control? What is the fit process?
  - How many fit samples do you receive on average?

- How would you describe your relationships with your suppliers – are they mostly long-term and collaborative or more short-term and transactional? Does that differ across brands?

- How often do you cancel orders with your suppliers and for what reasons?

Sustainability:

- What does 'sustainable fashion' mean to you?

- Do you feel you have a good level of knowledge and awareness on what it means to be sustainable in fashion?

- How do you learn about it – what resources do you use?

- Is there any training available within the company you work for?

- Are you aware of any impacts that fast fashion is having on the environment?
  Prompts:
  - Waste and over-production
  - Pollution from chemical dyes and printing
  - Water usage from fabric production

- How do you think fast fashion could become more sustainable?
  Prompts:
  - Sustainable materials?
  - Better quality control processes?
  - Reduced waste from fabric scraps?
  - Greener production methods – less water, chemical dyes, digital printing?
  - Recycling initiatives

- Is your company currently implementing any of these practices? If so, can you give some examples.

- How important do you think sustainability is for the company you're working for?

- Does the company focus on communicating their sustainability credentials to their customers and stakeholders?

- To what extent do a supplier's sustainability credentials influence your decision to work with them? Why is it important or not important?

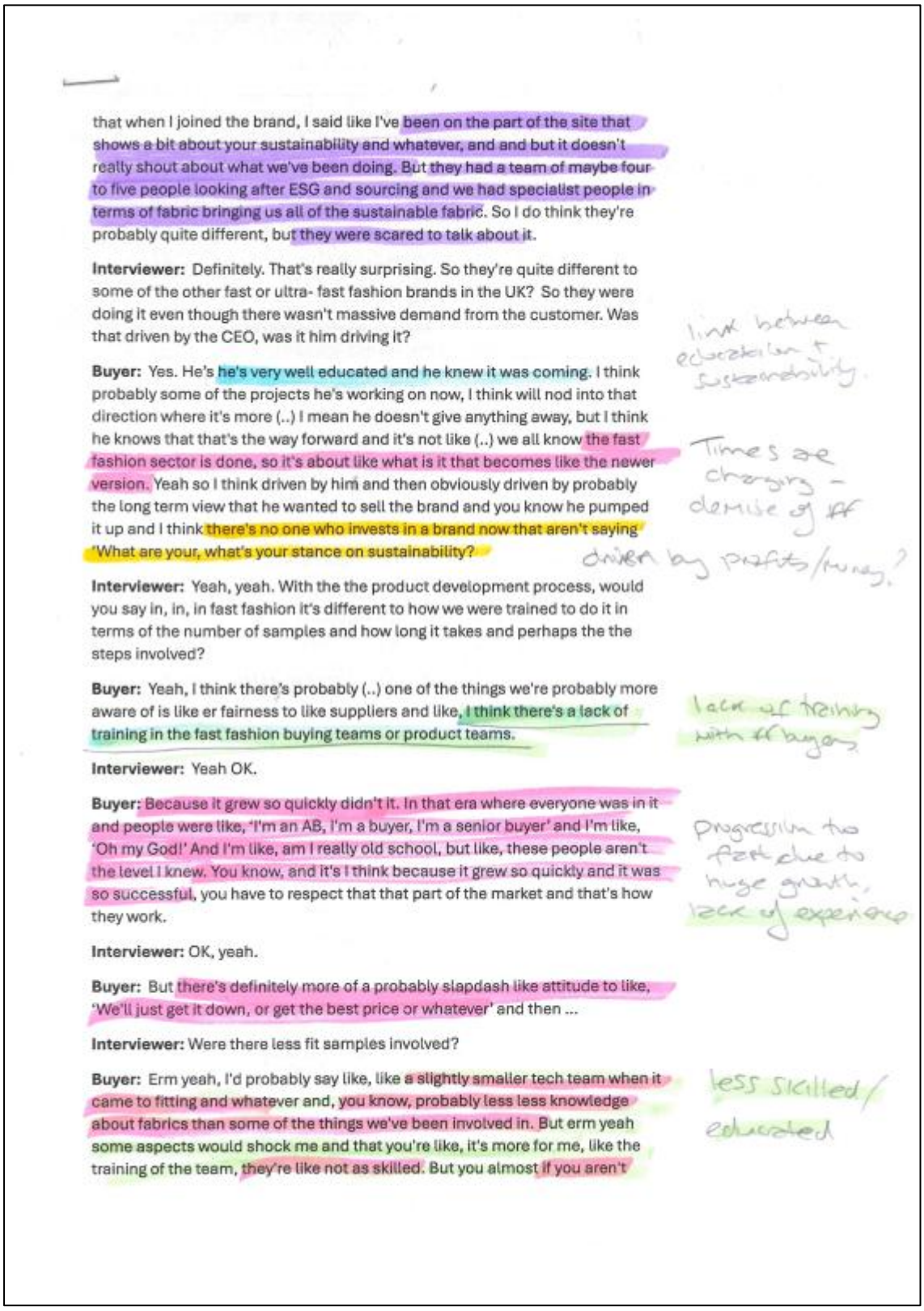
- Are there any policies and regulations relating to sustainability that influence your product development practices (such as standards and certifications)?

- What are the challenges of integrating sustainability into your product development practices? Can you give some examples?
  Prompts:
  - What are the financial implications?
  - Does it undermine the company's ability to compete with other brands?

- Would you like to add any additional information on this topic?

Thank you very much for your time.

Appendix B: Extract from Data Coding



that when I joined the brand, I said like I've been on the part of the site that shows a bit about your sustainability and whatever, and and but it doesn't really shout about what we've been doing. But they had a team of maybe four to five people looking after ESG and sourcing and we had specialist people in terms of fabric bringing us all of the sustainable fabric. So I do think they're probably quite different, but they were scared to talk about it.

Interviewer: Definitely. That's really surprising. So they're quite different to some of the other fast or ultra- fast fashion brands in the UK? So they were doing it even though there wasn't massive demand from the customer. Was that driven by the CEO, was it him driving it?

link between education + sustainability

Buyer: Yes. He's he's very well educated and he knew it was coming. I think probably some of the projects he's working on now, I think will nod into that direction where it's more (..) I mean he doesn't give anything away, but I think he knows that that's the way forward and it's not like (..) we all know the fast fashion sector is done, so it's about like what is it that becomes like the newer version. Yeah so I think driven by him and then obviously driven by probably the long term view that he wanted to sell the brand and you know he pumped it up and I think there's no one who invests in a brand now that aren't saying 'What are your, what's your stance on sustainability?

Times are changing - demise of FF

driven by profits/money?

Interviewer: Yeah, yeah. With the the product development process, would you say in, in, in fast fashion it's different to how we were trained to do it in terms of the number of samples and how long it takes and perhaps the the steps involved?

Buyer: Yeah, I think there's probably (..) one of the things we're probably more aware of is like er fairness to like suppliers and like, I think there's a lack of training in the fast fashion buying teams or product teams.

lack of training with FF buyers

Interviewer: Yeah OK.

Buyer: Because it grew so quickly didn't it. In that era where everyone was in it and people were like, 'I'm an AB, I'm a buyer, I'm a senior buyer' and I'm like, 'Oh my God!' And I'm like, am I really old school, but like, these people aren't the level I knew. You know, and it's I think because it grew so quickly and it was so successful, you have to respect that that part of the market and that's how they work.

Progression too fast due to huge growth, lack of experience

Interviewer: OK, yeah.

Buyer: But there's definitely more of a probably slapdash like attitude to like, 'We'll just get it down, or get the best price or whatever' and then ...

Interviewer: Were there less fit samples involved?

Buyer: Erm yeah, I'd probably say like, like a slightly smaller tech team when it came to fitting and whatever and, you know, probably less less knowledge about fabrics than some of the things we've been involved in. But erm yeah some aspects would shock me and that you're like, it's more for me, like the training of the team, they're like not as skilled. But you almost if you aren't

less skilled / educated

Appendix C: Quotation Tables

Theme	*'The Shift in Industry Dynamics'*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *In the past three years, there have been no predictable patterns. It's just whenever (..) whenever. So this is a problem we face, but we just have to manage it the best way we can … (P10)* • *The number of customers varies. It can go from servicing one client to maybe five or six and then back to one again. (P1)* • *The business fluctuates. So it's gone from being a small team to a bigger team and back to a slightly smaller team. Depending on the timing and the level of business that we can generate we might need to recruit or we might need to downscale just to ensure the survival of the business. (P1)*	Fluctuating levels of demand	Increased market volatility
• *We have lots of different product but it's smaller volumes, so you've got more variety and less quantity, which makes it more tricky for us. (P6)* • *At the moment we have lots of orders that are more towards the 500 mark, not like before when they were bigger. (P5)* • *Fast fashion has changed, it's not the fast fashion it used to be. Previously you'd be ordering 20-30 thousand of a style but now you'll be lucky if you get something more than 500 pieces. (P1)* • *"You're having to work a lot harder now, previously when you worked on a sample, you've done the work for 10,000 units, but now you're having to produce twenty times the amount to achieve the sales of that one order. So your designers are having to do twenty times the amount of samples, twenty times the amount of refits just to achieve the profits which you've been used to on one style previously." (P1)*	Smaller order quantities	
• *There is no long term in this industry it's all based on price. I could be working with a brand for the last five years and that relationship might result in regular orders, but if you're not good on price, that relationship's gone (P1).* • *Forget commitment there is no long-term relationships, it's strictly a monetary business. it doesn't matter how strong your relationship with the buyer is, that order will go somewhere else because it's just about which manufacturer offers the right price. (P1)* • *We worked with loads of suppliers, yeah loads. I wouldn't even know how many to name I'd say probably twenty or thirty plus. There were quite a lot in the UK, I'd probably say about 15 to 20 yeah, there was quite a lot. (P14)*	There are no long-term business relationships	

Table C1: Illustrative quotes highlighting increased market volatility

Theme	*'The Shift in Industry Dynamics'*	
• *So those ultra-fast fashion brands have changed the landscape (of the sector) because they tend to seal more or less on the first fit. (P1)* • *Some of the fast fashion buyers because they are so fast it means they come in, see the sample, you agree the price and fit the sample while in the meeting, confirm the colour for the yarn, raise the order in the meeting and you can ship within two weeks. So one fit job done. (P2)* • *Sometimes you would confirm an order based on a picture and just go for it (..) because the order was so small it was just a risk we took. (P15)*	Cutting corners to achieve a shorter fit process	The Need for Speed
• *The product doesn't really matter anymore, it's just an order which is a bit sad, it didn't used to be like that. They're more about just getting products on the website now, getting colours on, numbers on, items on. Three skirts, five tops, two dresses, it doesn't really matter what it is anymore. (P4)* • *Fast fashion doesn't generate real design, it's just something somebody has seen before and you're making some alternation of that style, it's different to how it was before. (P2)* • *People are getting used to so much newness all the time (..) it just becomes a bit samey. There's only so many slogans sweat designs that you can come up with (..) it's exhausting .. (P15)*	Reduced design input in fast fashion products	
• *I would say now the buyers actually don't really come here, you're actually expected to go to their offices. So everybody from Leicester would go on a Wednesday to their office and it'd be a bit like a cattle market, it was like a free for all so you'd go in and hope for the best. (P4)* • *The older more experienced buyers would come to Leicester and physically work with us so we can change this colour or that colour while they're here, we used to get it right. But now I don't see that. The young buyers don't come here anymore ….(P11)* • *So we'd meet with suppliers normally on like a Wednesday in our office. My buyer would go to theirs sometimes but not very often, normally they came to our office. (P14)*	Buyers working less collaboratively with suppliers on product development	

Table C2: Illustrative quotes highlighting changes to product development practices

Theme	*'The Shift in Industry Dynamics'*		
Illustrative Quotes (Representative Data)		**First-Order Codes**	**Second-Order Code**
• *The brands are dictating the market, we do not have the power to say no to the customer. If we say no somebody else is going to do it so you're gonna lose the business and lose that customer for the future. (P1)* • *The brands rule the roost, it's either you give us what we want or you're out, it's as simple as that. (P3)* • *To survive we need to agree to making 100 to 150 pieces as we need to keep the production lines going. (P3)*		Suppliers unable to negotiate	Imbalance of power between brands and suppliers
• *We worked with loads of suppliers.. I wouldn't even know how many, maybe twenty or thirty plus. There were quite a lot in the UK, I'd probably say maybe about 15 to 20 yeah, quite a lot. (P14)* • *There is no long term in this industry it's all based on price. Today you could have a long term relationship … I could be working with a brand for the last five years and that relationship might result in regular orders, but if you're not good on price, that relationship's gone (P1).*		Brands work with hundreds of suppliers to get the best price	
• *There's no credit insurance anymore, it's all at your own risk. (P5)* • *It's not fair because when they (the brands) are flooded by their importers goods in their warehouse they ask us to hold back our stock in our own warehouse and they don't pay you anything for it. So you have to hold the stock for two to three weeks, sometimes four weeks until they're ready to take it in. (P2)* • *The problem (with recycled fabrics) is who should be carrying the stocks (..). Nobody will commit and say, OK, I'm gonna buy 100,000 metres of sustainable fabric from you and we'll commit to this, they won't put their money where their mouth is. (P8)*		Suppliers expected to take all the risks	

Table C3: Illustrative quotes highlighting the imbalance of power between brands and suppliers

Theme	*'The Shift in Industry Dynamics'*	
• *I've seen so many design houses produce 80 to 100 samples a week and if you ask them what their order ratio is, they say that about 70% to 80% of samples are just being dumped in the bin or are left in the showroom because they're never ordered (P2)* • *So normally what happens is when we make a range, we usually would take a minimum of two hundred samples to the meeting. So we take about four suitcases of samples which we've developed for those customers (P3)* • *It was high churn across everything, even in the office there were so many samples, so much material for design purposes. The office was full of rails in the studios where they shoot, full of rails around buying merchandising. I don't know what they do with them after but just so much stuff all the time. (P17)* • *The buyers struggle to visualise something with a small change like a short sleeve, so they insist on asking for another sample. So we then send another sample which gets made, there's more work with the sample team and more costs involved for us as they don't pay you that £100 to cover the cost of making the sample.*	High levels of sampling	High Levels of Waste
• *The sector was booming during Covid but it shouldn't have been, but then the returns were terrible. In lockdown people were buying stuff because they were bored but then when they were allowed to go out again the returns would come back and it would just be a never ending cycle. Returns rates were at like 80% at one point, it was terrible. (P13)* • *We actually did some returns for ASOS, we took all their returns and sorted them into good, bad and what shouldn't have been returned. There were some shocking things in there, you know people buy a garment, wear it, and then send it back, you could smell the customer's perfume or deodorant (..) the garment was fine but you could smell that people had worn them. (P19)*	High levels of consumer returns	
• *This business is very, very wasteful, you're always left with waste and there's not a lot you can do with it. We get some rolls (of fabric) back from customers saying it's underweight or it's see-through so OK it's our fault (..) but we're then left with the lightweight fabric in their colour that nobody else wants. (P10)* • *The fabric can't be recycled because once it's knitted it's got elastane in it, it's blended, so you have a problem there.(P10)* • *New Life has its own issues. In theory it's a great idea, but they are way over their capacity and in over their head. They get stock from all the brands because they can make claims that they're doing good and donating to this disabled charity, they can put their logo on their website, but New Life don't have the capacity to deal with all the stock that they have and they just don't know what to do with it all. (P13)*	Lack of sustainable waste disposal options	

Table C4: Illustrative quotes highlighting the high levels of waste

Theme	*'They Just Don't Care' (about sustainability)*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *Nobody that we know of or that we deal with is interested in sourcing recycled materials because they're more expensive. (P1)* • *Recycled materials for European clients is massive but I don't think the UK market is so much into it at the moment, I don't think they're really bothered, honestly speaking. (P3)* • *We were selling it (recycled fabrics), but since this year it's slowed down dramatically. Before Covid, in 2020 recycled was a buzz, it was on trend, we were selling a tonne of recycled yarn every week. But now nothing (..) I think it's price because when you buy a fabric for £2.25 in polyester, in recycled it would be minimum £2.90. (P10)* • *We have been asked for recycled poly in the past, we went through a whole phase where it was all recycled, recycled, sustainable, sustainable, but it's all died a death to be honest with you. They were on it but nobody cares anymore. (P6)*	No demand for sustainable materials	Business as Usual Mindset
• *We've invested in the 3D system, Browzwear, as it's a must from our European clients. Not the UK though, I think they're way behind, the UK is way behind, they will not do it. I don't think it's affordable for a lot of people here if I'm honest with you because it's not cheap. (P3)* • *It'll be a long time before the UK gets on to investing in new technologies. We do try doing more design CADs but not the 3D ones. The problem is the buyers because when you send 3D to the buyer, they say, 'what the hell is that? I can't do anything with that, I need a sample!' (P1)* • *The 3D software cuts out a lot of work for their (garment) techs. In fact I'd be worried if I was in their tech department because they're actually being made redundant by this new technology, it's taking people's jobs. (P4)* • *We've been looking into using 3D software but the downside is because the buyers don't want the 3D model they want to see the physical sample because they want to feel the fabric so it's not worth the investment. (P2)*	Resistance to new technologies	

Table C5: Illustrative quotes highlighting the business as usual mindset

Theme	*'They Just Don't Care' (about sustainability)*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *I think a lot of the resistance (to recycled fabric) is price driven at retail to the consumer. So if you're doing this dress in non-recycled, it's going to be cheaper and in recycled it's going to be more expensive. Obviously the consumer is going to keep buying the cheaper product. It's always price driven, especially in this category. (P5)* • *It all comes down to one thing, the cost, everything in this industry is to do with cost. If the cost for sustainable fabric was the same as a non-sustainable fabric then they would use the sustainable ones. (P1)*	Sustainable materials are too expensive	It's All About the Money
• *There are some big names invested in AI tech but it's mostly high-end customers at the moment because it's so expensive, not a huge amount in the UK either. (P19)* • *It's a lot of money for the technology. It's a lot of money for the all the extra stuff like all the graphics cards, it's not just one graphics card, all the stuff to go on it. It's really high tech." (P4)*	Investing in sustainability technologies is too expensive	
• *Some of the customers started pushing for Fast Forward, which a lot of factories weren't willing to do because the price for Fast Forward was just crazy, it was way too expensive. (P5)* • *We had our own Fast Forward audited factory in Leicester, but we closed it down about a month back because we just weren't getting any support from brands (..) we couldn't afford to keep it open as we weren't getting the work as the prices were too high. (P6)*	Accreditations are too expensive	
• *We're not making anything in the UK anymore, it's 100% Morocco now because the minimum wage is too expensive in the UK. (P6)* • *A lot of the manufacturing businesses have now moved their operations to Morocco, Turkey and Tunisia even. But all they're doing is transitioning the problems over there and also those countries are now becoming quite expensive to manufacture as well and hard to manage. (P18)*	Local manufacturing costs are too high	

Table C6: Illustrative quotes highlighting sustainability is too expensive

Theme	*'They Just Don't Care' (about sustainability)*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *Retailers are making money out of fines, they're all doing it now because it's actually the way they're making money. You might have heard the Boohoo one recently, the 10% blanket discount they demanded on orders already produced? (P5)* • *Sometimes they (the brands) will get the orders and after the production is made one of the buyers will call them and say, 'OK, we need to reduce the price'. So they try and renegotiate after the garments have been made but before delivery, it puts the supplier in an impossible situation. (P3)*	Brands demanding discounts after goods are made	It's All About the Money
• *Cancellations happen a lot in this industry. If the style's gone out of flavour they'll probably find something wrong with it (..) because you can always find something wrong with it, and then lumber the garment manufacturer with it (the stock). (P8)* • *Some directors give instructions to their buying teams to go and find reasons to cancel an item just to get out of stock. They'll get their garment techs to find reasons like the garments are not to spec, when if business was good, they wouldn't even look at it. (P1)*	Brands cancelling orders without a valid reason	
• *There is pressure on buyers to get the margins. Some buyers they'd ask for an open costing, look at it but still want it cheaper (..) So how does that work? Somebody's got to cut corners somewhere to do that order. (P9)* • *We hear those stories even now about some of the brand owners saying 'I don't care how you do it, I want that price'. (P18)* • *The buyers will say that 'we've been given this task of achieving this percentage on this item, how we achieve it, we don't care' (P1)*	Buyers focused on margins targets above all else	

Table C7: Illustrative quotes highlighting brands generating income through unethical practices

Theme	*'They Just Don't Care' (about sustainability)*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *We were selling (recycled fabric), but since this year it's slowed down dramatically. Before Covid, in 2020 recycled was a buzz, it was on trend, we were selling a tonne of recycled yarn every week. But now nothing (..) I think it's price because when you buy a fabric for £2.25 in polyester, in recycled it would be minimum £2.90. (P10)* • *I don't know of any brands that have told us to use recycled materials other than when the media spotlight was on recycled fibres … so at that time brands decided to stock up on some recycled products on their websites or their stores, but that was few and far between and it was only when the media had a spotlight on recycled (P5)* • *We had conversations about recycled a few years ago (..) it was driven by our customers when they were trying to push that agenda, it was a lot of tick boxing after the media stuff in Leicester.. (P5)* • *There was interest in recycled maybe for a couple of months a few years ago, everybody was just getting into it to tick a few boxes. But now I don't think the fast fashion online stores are really bothered because it's more expensive. (P3)*	Sustainability initiatives driven by media scrutiny	Reactive not Proactive Approach to Sustainability
• *The European clients want us to start using the 3D software, so to carry on working with them we had to start. It was voluntary but really, two years down the line, if you haven't got it you're out, so we had no choice. (P4)* • *The Europeans are our main clients and that's what our survival is about, so yeah we're doing it for them. If they hadn't pushed us to invest it would be way down on the bottom of our list. (P3)*	Sustainability initiatives driven by EU legislation	
• *A lot of investors, when they're investing in brands are asking "what's your ESG strategy, what are your goals?" And you're accountable for that so I think we got into a position where as a brand we had to have a pretty good ethical sourcing team. (P12)*	Sustainability initiatives driven by investors	

Table C8: Illustrative quotes highlighting reactive approaches to sustainability

Theme	*'They Just Don't Care' (about sustainability)*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *To be honest, people put fabric in front of us and if we like it we start buying it. You would never ask where or how, we ask what's the composition, but we wouldn't go any further than that. (P5)* • *I've never asked the question where the yarn comes from actually. (P9)* • *Fast fashion don't ask questions about where the fabrics come from no. It's something that some other customers are asking for but not the fast fashion brands. (P2)*	Brands and suppliers are not asking the right questions	Lack of Sustainability Education and Awareness
• *I don't think the retailers think it's important as the customer's still buying the product whether you like it or not (P10).* • *I didn't look too much into the recycled fabrics because at the end of the day the fabric guy told me that it's all approved, so realistically it's down to the client really. We give the certifications, any questions raised are sent to the fabric supplier and they will look at it. (P5)*	Lack of responsibility for sustainability	
• *I think this is an issue with sustainability across the industry, the brands are run by young people who don't have any experience in this field … (P13)* • *Everything was run by the CEO rather than by experts in their fields who know what should be right. It was what the CEO wants, what celeb he wants to get, what events he wants to do with the business. (P17)* • *The person writing the Modern Slavery Statement had no idea what she was doing. She kept trying to put claims in there that just weren't true, it was a marketing gimmick she'd copied off some other website because it sounded good … (P13)*	Lack of expertise in sustainability	
• *I think there's a lack of training in the fast fashion buying teams. Because the sector grew so quickly and it was so successful, they were promoted too quickly so don't have the right skills or experience. (P12)* • *One of my biggest gripes is with buyers (..) by and large a lot of them don't have the experience to buy. They're just told to get the cheapest price possible, they have no concept of how to cost a garment (P18).*	Lack of training and experience in sustainability	

Table C9: Illustrative quotes highlighting lack of sustainability education and awareness

Theme	*Sustainability Challenges*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *I can tell you without a doubt that the sustainable fabric that we've used which is recycled polyester sticks on the machines and doesn't go through the machines as quickly and therefore slows down production. I think it's to do with the recycling process, it doesn't take the dyes as well either. (P19)*	Recycled materials have issues with dyes	Sustainability compromises quality
• *With recycled yarn you have to compromise on hand feel and look because you can't have recycled yarn in white because if it's recycled, it comes as off white. But that challenge is minor I suppose you can say, 'OK, I won't run a white or whatever', but there's a compromise in the hand feel and the quality. (P8)*	Recycled yarn has a rougher hand feel	
• *So all the digitals (prints) will be on poly base. You can't print onto other fabrics unless it's treated. So a lot of people treat the cotton with a polyester coating at the top, and then they can do that on it. But it's a massive cost all that. (P11)*	Can only digitally print on a polyester base	

Table C10: Illustrative quotes highlighting sustainability compromises quality

Theme	*Sustainability Challenges*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *Trying to be sustainable is impacting the business because every customer is asking for different rules or regulations, there is no one common rule or one standard audit. Every customer wants a different way for the audit to be done which costs a lot of money (P2)* • *There are lots of different technologies out there for different parts of the job. Clo 3D are garment makers so if you're a designer or a buyer, you're gonna want to use Clo 3D. Optitex are brilliant for fits and seals and getting your actual garment right whereas Style 3D sort of encompasses the two so it's the best of both worlds. Some of the bigger brands have got Optitex and Clo 3G as well and that's not right, you don't want to be paying two huge charges for two different systems. (P19)* • *Customers think sustainability certification is important which is annoying because one minute it's all about BCI and then everyone is saying BCI isn't reliable because you can't really decipher where it's coming from, there's no consistency, (P20)*	Lack of standard practices around sustainability	Sustainability is Too Complicated
• *There is a lot of problems with transparency as customers want to know where our fabric is from but the merchants don't want to give out their mills and we can understand that because their mills are their mills and they found them and worked with them. But then what's to stop the retailer going direct to the mill so that's a real issue .... it's a devil's job to get that information out of our suppliers ... (P19)* • *How the GRS works, it's quite complicated as you have to have a dedicated space where the recycled fabric is stored so you know who touches the garments at every stage. So I cannot go and give it to any old printer to print the fabric, if they're not approved by GRS I can't use them. (P3)* • *The issue at the moment is that everyone has to invest in the same technology for it to work. So when we do the fit sessions the customers would need to have the equipment at their end so they can look at garments and change garments in order to shorten the garment or change the print or whatever, they like to have some ownership of what's going on. (P19)* • *The challenge with 3D sampling software is that H&M are using it but Primark aren't using it and Harding aren't using it. (P20)*	It requires too much cooperation across the supply chain	

Table C11: Illustrative quotes highlighting sustainability is too complicated

Theme	*Regulation is the Only Solution*	
Illustrative Quotes (Representative Data)	**First-Order Codes**	**Second-Order Code**
• *We need some legislation from the government because we don't have any voice from the manufacturer side to stand up to the retailers about the way they're dictating the market (P2)* • *There isn't enough buy in to sustainability at the moment, which is why the government need to get involved to actually force the issue. (P19)* • *I can't really tell you right now how important sustainability is for the future, but if the requirements are there, I'm sure we'll follow suit. (P6)*	Suppliers need support from Government	Voluntary initiatives are not enough to drive meaningful change
• *We had to have the Higg accreditation for Zalando so because Zalando's lines were pulled from the main pool of stock there wasn't any point doing it separately, so the audit covered all the stock in the UK too which was good. (P13)* • *The German supply chain act is probably the most interesting legislation that's come in, it came in last year. It's having a massive impact, they've prosecuted some people for supply chain issues already (..) it's about making sure that every single policy and process you have is written down and formalised, there's a lot of reporting involved. (P13)*	EU legislation is already driving change in the UK	
• *There's definitely a gap for audits looking at the environmental side, I think it's more reporting currently. It's not going to the factory and auditing them in the same way that the social one is done (..) (P19)* • *Fast Forward did have some environmental questions but in the same was as the SMETA audits which just have one page of questions around whether you have those policies. (P13)*	Lack of focus on environmental regulations	

Table C12: Illustrative quotes highlighting voluntary initiatives are not enough to drive change

Appendix D: Participant Information Sheet

Participant Information Sheet

Project Title

Sustainable product development in fast fashion – An investigation into product development practices within the UK fast fashion sector.

Invitation to research

My name is Catrin Cousins and I am undertaking this study for a Masters by Research (MRes) degree from Manchester Metropolitan University. This is a self-funded project which is being undertaken independently with the support of two project supervisors, Dr Patsy Perry and Sam Chandrasekara who are both academics within the Manchester Fashion Institute at Manchester Metropolitan University.

We would like to invite you to take part in the above-named study but before you decide whether or not to take part, it is important for you to understand why the research is being undertaken and what it will involve. Please therefore take time to read the following information.

Why have I been invited?

You have been asked to participate as you are currently an owner of/working for an organisation within the UK fast fashion supply chain and we are keen to seek knowledge regarding sustainable product development practices within the sector. You have been selected as you are an existing industry contact of the researcher or someone who has been recommended for the study.

As part of the research you will be interviewed on questions relating to your product development practices and opinions regarding sustainability within the fast fashion sector. The interview will be used to gain an insight into the current business environment and help identify any challenges and influences on the market and its future ambitions. Areas of interest will include:

- Organisational background information
- The fast fashion market
- Existing product development processes
- Sustainable fashion (including sustainable materials & production processes)

- The target consumer
- Future ambitions regarding sustainable practices

Do I have to take part?

Your participation is entirely voluntary and you may withdraw from the study up to 3 days after the interview has taken place without giving a reason.

What will I be asked to do?

The research involves participation in an interview which will be audio recorded for transcription and analysis. The interview will last approximately 45 minutes and will be arranged at a time and location which is convenient to you. This could be on your premises or online via Microsoft Teams. The interview will consist of approximately 10 questions which will be asked by the interviewer and your responses will be transcribed and analysed to identify key themes. You will also be given the opportunity to ask any questions at any point during the study.

Are there any risks if I participate?

We are not seeking to collect any sensitive data - this study is only concerned with sustainable product development practices within the fast fashion sector. We do not think there are any significant risks associated with this study. You can decline to answer any questions and you can stop at any time during the interview. Furthermore, you can change your mind and withdraw from the study up to 3 days after the interview without giving a reason and your data will be deleted from the project.

Are there any advantages if I participate?

There are no rewards or compensation involved with participation in the study. However, if you do wish to receive a summary of the project outcomes this can be made available to you. The researcher will be happy to discuss key findings from the study with you following submission of the final thesis.

Informed consent

You will be asked to provide your consent to take part in this study through the completion of a Consent Form which will be provided in advance of the interview. You will be asked to

confirm that you have read and understood the Participant Information Sheet for the study and have had the opportunity to consider the information, ask questions and have these answered satisfactorily. You will also be asked to confirm that you understand participation is voluntary and that you are free to withdraw up to 3 days after the interview without giving any reason and that you understand that once data analysis has been completed you have the right to be forgotten and can request erasure of personal data recorded during the project.

What information about me will you collect and why?

The data used within the project will be generated from your responses to the questions asked within the interview. Findings included within the thesis and presentations/publications will be anonymised so that your identity cannot be revealed.

How will my information be stored and how will you look after it?

Your personal details (e.g., signature on the consent form) and the interview transcripts will be kept in a secure and confidential location by the researcher at the University. When we have finished the study and analysed the information, all the documentation used to gather the data will be destroyed following the examination of the thesis and no archiving of data will take place.

How will you use my information?

Following the interview, the data will be transcribed and analysed to identify key themes relating to the study. The analysed data will be included in the researcher's MRes thesis and it is hoped that the findings will be presented at an academic conference and published in an appropriate academic journal. In all cases, the findings will not contain any information that will reveal the identity of participants as we will ensure anonymity throughout. In addition, a summary of key findings and recommendations will also be available as a report for participants if requested, which again will be fully anonymised.

Will my data be sent anywhere else, or shared with other people or organisations?

No third parties will be involved in the data handling. Access to the anonymised data will be provided to the project supervisors only.

When will you destroy my information?

The audio recordings of the interview will be held in a secure and confidential environment during the study and will be destroyed alongside all documentation used to gather the data once the thesis has been examined.

Data Protection Law

Data protection legislation requires that we state the 'legal basis' for processing information about you. In the case of research, this is 'a task in the public interest.' If we use more sensitive information about you, such as information about your health, religion, or ethnicity (called 'special category' information), our basis lies in research in the public interest. Manchester Metropolitan University is the Controller for this information and is responsible for looking after your data and using it in line with the requirements of the data protection legislation applicable in the UK.

You have the right to make choices about your information under the data protection legislation, such as the right of access and the right to object, although in some circumstances these rights are not absolute. If you have any questions, or would like to exercise these rights, please contact the researcher or the University Data Protection Officer using the details below.

You can stop being a part of the study at any point up to 3 days after the interview has taken place, without giving a reason. You can ask us to delete your data at any time, but it might not always be possible. If you ask us to delete information within 3 days after the interview, we will make sure this is done. If you ask us to delete data after this point, we might not be able to. If your data is anonymised, we will not be able to withdraw it, because we will not know which data is yours.

What will happen to the results of the research study?

The results of the study will be presented as a thesis for a Masters by Research qualification. The aim is also to publish the findings in an appropriate peer reviewed academic journal, but the findings will not contain any information that will reveal the identity of participants as we will ensure anonymity throughout. In addition, a summary of key findings and recommendations will also be available as a report for participants if requested.

Who has reviewed this research project?

This project has been reviewed by Manchester Metropolitan University Faculty of Arts and Humanities Research Ethics and Governance Committee.

Who do I contact if I have concerns about this study or I wish to complain?

1. **Catrin Cousins** Principal Investigator catrin.cousins@stu.mmu.ac.uk
2. **Dr Patsy Perry**, Lead Supervisor p.perry@mmu.ac.uk
3. **Sam Chandrasekara**, Supervisor s.chandrasekara@mmu.ac.uk
4. **Research Ethics and Governance Committee, Arts & Humanities**
   artsandhumanitiesethics@mmu.ac.uk
5. **Manchester Metropolitan Data Protection Officer** dataprotection@mmu.ac.uk
   Tel: 0161 247 3331 Legal Services, All Saints Building, Manchester Metropolitan University, Manchester, M15 6BH
6. **UK Information Commissioner's Office**
   You have the right to complain directly to the Information Commissioner's Office if you would like to complain about how we process your personal data:
   https://ico.org.uk/global/contact-us/

THANK YOU FOR CONSIDERING PARTICIPATING IN THIS PROJECT

Version: 1.0 **Date:** 20 June 2023
Ethical approval number (EthOS): 54697

Appendix E: Consent Form Template

CONSENT FORM

Sustainable product development in fast fashion – An investigation into product development practices within the UK fast fashion sector.

Participant Identification Number:

	Please tick your chosen answer	**YES**	**NO**
1.	I confirm that I have read the participant information sheet version 1.0 dated 20th June 2023 for the above study.	☐	☐
2	I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐	☐
3	I understand that my participation is voluntary and that I am free to withdraw up to 3 days following the interview without giving any reason, without my legal rights being affected.	☐	☐
4	I agree to participate in the project to the extent of the activities described to me in the participant information sheet.	☐	☐
5	I agree to my participation being audio recorded for transcription and analysis.	☐	☐
6	I understand and agree that my words may be quoted anonymously in research outputs.	☐	☐
7	I wish to be informed of the outcomes of this research. I can be contacted at: _____	☐	☐

Name of participant	Date	Signature
Name of person taking consent	Date	Signature