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Exploring Fashion Industry Business Models and the Circular Economy

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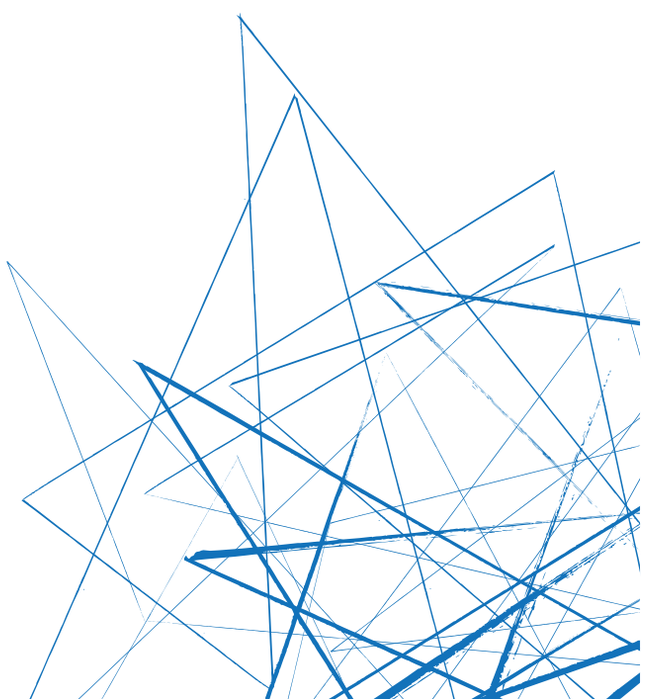

WEAVING A PATH FROM WASTE TO VALUE: EXPLORING FASHION INDUSTRY BUSINESS MODELS AND THE CIRCULAR ECONOMY

PhD Series 06-2016

Kerli Kant Hvass

WEAVING A PATH FROM WASTE TO VALUE:

EXPLORING FASHION INDUSTRY BUSINESS MODELS AND THE CIRCULAR ECONOMY

PhD School in Organisation and Management Studies | **PhD Series 06.2016**

CBS COPENHAGEN BUSINESS SCHOOL
HANDELSHØJSKOLEN

Weaving a Path from Waste to Value:
Exploring fashion industry business models and the circular economy

"In a gentle way you can shake a world"
Mahatma Gandhi

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February 2016

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Kerli Kant Hvass

October, 2016

Copenhagen, Denmark

Abstract

This dissertation examines post-consumer textile waste from the fashion industry's perspective, and addresses how business model innovation can facilitate reuse and recycling of garments and a transition towards a circular economy of fashion. Focusing on the emerging reuse and recycling practices of fashion brands the study builds upon one explorative and two in-depth case studies of industry pioneers and their endeavors of integrating reuse and recycling activities in their business models. Theoretically the study rests on business models, business model innovation for sustainability and circular economy.

The study seeks to provide a unique contribution as it synthesizes the theoretical and empirical insights from the field of business model innovation and circular economy in the context of post-consumer textile waste. By highlighting and extending the idea of business model innovation for circular economy it makes a justification that product end-of-life phases require attention and can include new value propositions that companies can create, deliver and capture.

This dissertation contains three articles, each of which contributes to an improved understanding of post-consumer textile waste management in the context of the fashion industry and its related opportunities and challenges. The findings cover both broad industry-level and more specific company-level discoveries. The industry-level findings provide a general understanding of existing practices among fashion companies while the company specific findings identify key issues and challenges of integrating a product's end-of-life aspects in an existing business model. Collectively, the findings demonstrate that end-of-life management of products is an emerging field among fashion companies and used garments can provide new value propositions for fashion brands. The findings also illustrate that the field is in its infancy and lacks best practices within business models, supply chain infrastructure, technological solutions and consumer engagement. Transition towards a circular economy implies full systemic change, and innovation not only in business models, but also in technologies, society, policies and finance methods as well as consumer behavior. None of these aspects can work in isolation and require that different stakeholders work in tandem.

Resumé

Denne afhandling undersøger post-forbrug tekstilaffald fra modeindustriens perspektiv, og adresserer hvordan innovation omkring forretningsmodeller kan facilitere genbrug og recirkulering af beklædning, samt en transition henimod cirkulær økonomi. Med et fokus på genbrugs- og recirkuleringspraksisser i eksisterende modebrands bygger afhandlingen på eksplorative og dybdegående case studier af denne industris pionerer og deres afsøgninger omkring at integrere genbrug og recirkulering i deres forretningsmodel. Teoretisk tager studiet udgangspunkt i innovative forretningsmodeller med fokus på bæredygtighed og cirkulær økonomi.

Afhandlingen søger at skabe et unikt bidrag gennem at syntetisere teoretiske og empiriske indsigter inden for feltet innovative forretningsmodeller og cirkulær økonomi set i forhold til post-forbruger tekstilaffald. Gennem en videretænkning af idéen om innovative forretningsmodeller bygget på cirkulær økonomi underbygges det hvorledes øget opmærksomhed omkring afslutningen af produkters livscyklus kan bidrage med en merværdi som virksomheder kan drive på.

Denne afhandling er baseret på tre artikler som hver især bidrager til en øget forståelse af hvorledes modeindustrien kan håndtere muligheder og udfordringer i forhold til post-forbruger tekstilaffald, både på et overordnet niveau og på mere specifikt virksomheds-niveau. På det overordnede niveau bidrages med generelle forståelser af eksisterende praksisser i udvalgte modebrands, mens de mere specifikke afsøgninger identificerer konkrete muligheder og udfordringer i forhold til at implementere livscyklus-aspektet i eksisterende forretningsmodeller. Tilsammen demonstrerer analyserne hvorledes håndtering af produktets afsluttende livscyklus er et voksende fænomen i modeindustrien, samt hvordan brugt tøj kan skabe merværdi for det enkelte brand. Ligeledes illustreres det hvorledes hele området befinder sig i en startfase hvor der er behov for eksempler af beste praksis omkring forretningsmodeller, leverandørkæders infrastruktur, teknologiske løsninger og forbruger engagement. En bevægelse henimod cirkulær økonomi kræver en gennemgribende systemisk forandring og innovation ikke blot i selve forretningsmodellen, men også indenfor teknologi, samfund, politik og finansielle praksisser samt blandt forbrugerne. Ingen af disse parametre kan fungere i isolation men kræver at alle interessenter samarbejder.

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1. Introduction

This PhD thesis is part of an emerging field of research that analyses and suggests solutions to the fashion industry from a circular economy perspective. A circular economy opposes a linear economy, where instead of turning material resources via production and consumption into waste, the aim is to keep resources in use as long as possible through reuse and recycling. There is a growing interest in the circular economy. For example, the idea has been adopted by China as the basis for their economic development (Murray et al., 2015) and policy makers in the West are discussing measures to tackle the issues of unsustainable use of resources in current production and consumption practices (EP, 2015). In addition, companies are investigating how to decouple their business growth from resource consumption and safeguard their business models in the future. A recent UN Global Compact study among world business leaders regarding sustainability demonstrates that closed-loop business models, with their aim to decouple growth from resource use and environmental and social impacts, are increasingly attractive to companies (Accenture, 2013). When it comes to fashion, it is suggested that adopting circular solutions for clothing is a significant opportunity to create new profitable businesses and to reduce the use of virgin materials (EMF, 2013).

The global fashion industry is a vast industry when measured by production and consumption. Total annual global consumption of garments amounts to US$ 1.4 trillion or an estimated 91 billion garments sold (EMF, 2013). It is also a very resource intensive industry with several negative environmental and social impacts along the value chain (Alwood et al., 2006). These impacts occur during material sourcing and production phases, but also extend to the consumption and disposal phases, the latter accounting for the largest share of waste in the clothing sector. This raises concern over what happens with all the millions of pieces of garments that are added to the market worldwide every day and who is responsible for cleaning up the post-consumer textile waste.

Stahel (1994) argues that reuse and recycling strategies for waste minimization should lead to a more sustainable and resource efficient society. Despite various solutions that exist today for used clothes, such as donations to charitable organizations, online reuse and resell platforms, consignment stores, flea markets and other small scale initiatives that focus on textile reuse and recycling, there is a global agreement that post-consumer textile waste is a growing problem with a large proportion of used clothing

ending up in global landfills (Domina and Koch, 1999; Fletcher, 2008; Hawley 2008, 2009). It is estimated that only 15% of used clothing is currently collected in the U.S. and 25% in Europe overall (EMF, 2013). In general, post-consumer textile waste is not a new phenomenon, but is growing in importance due to several factors, such as: the increased production and consumption of garments, availability of low cost and low quality garments (known as fast fashion or disposable fashion), the world's growing population and middle class and a decreasing availability of natural resources. Domina and Koch (1997) have studied the textile waste lifecycle and note that recycling of post-consumer waste is a weak component of the textile waste lifecycle and encourage further development of programs and opportunities in this area. The current practices and solutions cannot solve the problem alone because their dimensions are limited and the practices and industries are fragmented and often function in silos. As supported by Hethorn and Ulasewicz in their foreword (2008:xx): "*New* concepts are needed that embrace a rethinking of the process of garment creation, use, and disposal, re-creation, or reuse with the focus on extending the life span of products and the meaning they bring".

Until recently the textile waste issue has mainly been addressed from the recycling and second-hand retail perspectives. However, it is important to look at the waste issue from the fashion industry perspective as they are the designers, producers and marketers of clothes that eventually will turn into waste and decisions made in the design, production and marketing phase influence the purchase, use and disposal of the garment. Fletcher and Grose (2012) propose that making the designer or retailer accountable for the future disposal of products changes the logic of clothing production, distribution and sales and extends the activity focus of producers beyond the upstream manufacturing chain to include downstream actions, resource flows and future consumer behavior. It is the aim of this dissertation to look into this role of fashion companies and how they can work with textile reuse and recycling.

Transition towards a circular economy requires changes throughout many components of an economy and society, such as value chains, product design, new business models, new approaches of turning waste into a resource, to new modes of consumer behavior, financing methods and legislation (EC, 2014). It requires a paradigm shift in the way products are produced and to position sustainability and closed-loop thinking at the heart of each business model (Preston, 2012). This PhD research focuses on business models and builds upon an understanding that business models are useful means of simplifying the complexity of business (Wells, 2013), and they are regarded as strategic innovations (Tukker et al., 2008) that can support the integration of products'

end-of-life matters within existing business models and thus contribute to a transition towards a circular economy of fashion. Until recently fashion companies' business models focussed only on selling new products to the consumer through retail outlets, but phases related to post-retail which cover use, reuse and recycling were not part of business models. This is changing. The increased focus on post-consumer textile waste and decreasing sources of raw material (especially cotton and oil-based fabrics) are forcing companies to reevaluate their current business practices and future sources of raw materials. This raises a set of questions that fashion companies need to answer. What can they do to reduce textile waste? What organizational and business model changes does it take for them to enter the circular economy? What new value creation opportunities does a circular economy-based business model bring? It is the aim of this research to look into how to make the closed loop thinking and circular economy part of fashion companies' business models.

I position the academic context of my dissertation within the field of business models for sustainability with a focus on the circular economy and attempt to make my contribution by demonstrating that the fashion industry has a role to play in minimizing post-consumer textile waste, and that used garments retain inherent value that can be captured by fashion companies through business model innovation. I have chosen to do this via the value centered framework of business models (Osterwalder et al., 2005; Teece, 2010; Richardson, 2008) as this captures the interactions between multiple functions and organizations while focusing on value creation, delivery and the capture of such value; thus it allows me to address post-consumer textile waste from a holistic perspective. As a result, the contribution is also made to the sustainable fashion literature and practices by addressing reuse and recycling aspects from a business model perspective.

Finally, the interest in post-consumer textile waste has grown extensively since the beginning of my PhD research both in industry, academia, NGO and government level with new industry initiatives, academic mappings and policy recommendations introduced. Hence, the research has been conducted simultaneously as the field has developed making it into a dual process of practical experience and theoretical research. As an industrial PhD researcher I worked in close collaboration with companies, however the research reflections extend beyond company level problem solving to a critical reflection of the role of the fashion industry in relation to the growing textile waste problem.

Aim and structure of the dissertation

The aim of this cross-disciplinary research is to explore post-consumer textile waste from the fashion industry's perspective and to provide new theoretical and empirical insights into how business model innovation can facilitate textile reuse and recycling. The overall question this research addresses is:

What is the role of the fashion industry in post-consumer textile waste and how can this role be operationalized through business model innovation towards a circular economy?

The answer to this research question is obtained from the empirical evidence of the practices of several fashion companies and qualitative analyses of this evidence. The dissertation consists of this "overall framing document" and the three research articles that comprise the body of this document. The aim of the framing document is to draw out connections and conclusions across the three articles that all address the research question. I worked on these articles throughout varying periods of this PhD (2011-2015), while the field was emerging both in academia and practice, with the knowledge being created in layers. The framing document therefore is an opportunity to discuss the implications of the findings from this research. This

The structure of the thesis is as follows: Firstly, the motivation for this PhD research is provided which is followed by a summary of the research articles together with the key findings. Chapter 2 on the fashion industry and post-consumer textile waste gives the reader a contextual understanding of the research problem followed by Chapter 3 which is an introduction to the two main theoretical frameworks, namely the circular economy and business models that aim to address the research question. The research strategy and methods are introduced in Chapter 4, followed by Chapters 5, 6 and 7 which each represent a research article. Finally, the discussion chapter looks at the findings in a larger context and draws conclusions on what the potential value of used garments for fashion companies is, what business model innovations need to be created and delivered in order to capture that value and what the implications the fashion industry's involvement with post-consumer textiles might have on other actors in the existing system.

The three research articles that comprise the body of this dissertation (Chapters 5, 6, and 7) are the following:

- (Article 1) Kant Hvass, K. (2014) *Post-retail responsibility of fashion - a fashion industry perspective*, Journal of Fashion Marketing and Management, Volume 18 Issue 4, p. 413-430 (peer reviewed)

- (Article 2) Kant Hvass, K. (2015), *Business model innovation through second hand retailing: A fashion industry case*, special issue on New Business Models for Sustainable Fashion, Journal of Corporate Citizenship, Issue 57, p. 11-32 (peer reviewed)

- (Article 3) Kant Hvass, K. *A bumpy road towards a closed loop fashion industry: an experience from a Scandinavian fashion brand* (under review in California Management Review, special issue on Circular Economy)

In addition, throughout this Ph.D., I authored or co-authored the following articles and book chapters that have informed this dissertation and from which I have drawn content, but are not included in this dissertation document as separate entities:

Journal articles:

- Pedersen, E.R.G; Gwozdz, W.; Kant Hvass, K. "*Exploring the Relationship Between Business Model Innovation, Corporate Sustainability, and Organizational Values within the Fashion Industry*". Journal of Business Ethics (accepted for publication, published online 5 February 2016).

- Skov, L. and Kant Hvass, K. (forthcoming) *"Towards a Sustainable Fashion System: A slightly optimistic look at false starts and dead ends",* Journal of Business Anthropology

Book contributions:

- Niinimäki, K., Pedersen, E.R.G., Hvassk, K.K. and Svengren-Holm, L. (2015) "*Fashion industry and new approaches for sustainability*" in Muthu, S.S. (ed.) Handbook of Sustainable Apparel, CRC Press.pp. 453-474
- Kant Hvass, K. (2015) "*Best practice: Filippa K*", in Hethorn, J. and Ulasewicz, C. (eds.) "Sustainable Fashion: What's next?", Fairchild Books. pp. 124-128

- Krüger, H., Dahl, E.H., Hjort, T. and Planthinn, D.K. (2012), *Guidelines II. A Handbook on Sustainability in Fashion*. Sustainable Solution Design Association.

Conference papers:

- Ulasewicz, C. and Kant Hvass, K. (2015). *Rethinking Textile Waste as a Resource*, conference paper submitted to the 5th International Fiber Recycling Symposium, 8-10 June 2015, San Francisco

- Kant Hvass, K. (2013) *Exploring Business Model Innovation for Closed Loop Fashion, Sustainable Innovation 2013*, 18th International Conference, 4-5 November 2013, University for the Creative Arts, Epson, UK

- Kant Hvass, K. (2012) *Business model innovation for post-retail sustainability of fashion*, EABIS 11th Annual PhD Colloquium, Strategic Innovation for Sustainability, 2-4 July, 2012, Lausanne, Switzerland.

Background and motivation

Peattie (2011) has argued that sustainability research is often intentional and seeks to contribute to the pursuit of sustainability rather than merely an understanding. It is research *for* sustainability rather than just research *about* sustainability. This dovetails with this research, which is problem-driven rather than theory-driven, which takes departure from the real life problem of increasing amounts of post-consumer textile waste that end up in incinerators and global landfills.

My interest in sustainability and fashion is a mix of professional interest and personal passion, which dates back to my childhood. Growing up in Estonia under the curtain of the Soviet Union, where the surplus of fashionable goods in stores was far from a reality, and having a mother with tailoring skills, I was spoiled with high quality, beautifully handcrafted clothes. During Soviet time good quality fabrics were scarce and choice limited, therefore my grandmother's old jacket was transformed into a new beautiful garment; reusing clothes and materials whenever possible was a normal aspect of my clothing consumption. Clothes were never thrown out rather they were carefully taken care of and passed on to friends and family once no longer needed.

In 1991 Estonia regained its independence, which opened up its borders to the rest of the world and transformed the planned economy into a market economy. This transition meant that Estonia, together with other Eastern European countries, became a destination for second-hand clothing from the more developed countries. Soon, several second hand retail outlets were established that sold used garments from consumers in west who had donated them to charities or churches. These open air markets, basement shops, warehouse sales became my favorite shopping places that offered brands and styles that were unique and new to me, and at the same time inexpensive. In parallel with my mother's beautifully crafted clothes my closets became home to many beautiful second-hand garments. This passion has not disappeared and has paved a way for my existing journey of clothes and sustainability.

In 2006 I lived in San Francisco, California, which is a very vibrant region when it comes to sustainability, reuse and recycling, especially within clothing. With my interest to learn more about the field I volunteered and worked in the second-hand industry, talked to many practitioners and visited several used clothing stores. After returning from California, I worked for an Estonian social enterprise, Reuse Center of Estonia, where my role was to innovate their existing second hand retail practices and develop awareness-raising projects within sustainable consumption. During that time I learned how the second-hand clothing market had changed in Estonia since I had been abroad. Several western brands were strongly established on the first hand market, consumers had stronger purchasing power than before and the quality of the second-hand garments that we received from abroad did not always meet the needs of the Estonian market. Estonia was flooded with clothes and it was difficult to resell all of them, at the same time, the main waste management procedure was to utilize landfills. Many garments ended up in landfills.

Meanwhile my life brought me back to Denmark where I was surprised by the volumes of clothes Danes purchased and consumed. I wondered what they did with the clothes they no longer wanted or needed, and realized that they donated them and through different charity channels they end up in Estonia and other reuse markets all over the world.

Working hands-on in the industry opened my eyes to the growing unsustainable patterns of fashion consumption and the destiny of many garments. It urged me to act on this and in 2010 I developed an innovative social enterprise concept, 'Think Re5' that focused on the resell and the redesign of clothes along with education and awareness-raising activities. I had a vision for a place where consumers could come

with their unwanted clothes and get inspiration on how to give them a longer life through resell, redesign and handicraft. Through workshops, where for example a father's old pants could be turned into a teddy bear or an old sweater felted into a pair of gloves, people could get inspiration, skills and an overall awareness of how to give their clothes a longer life. Collaboration with brands, fashion designers, charities and other social enterprises was the cornerstone of the business idea. For this idea, Copenhagen Business Center and Deloitte awarded me financial support and the title "Female Entrepreneur of a Year with a Foreign Background 2010". However, due to several reasons the idea was never fully implemented. At the same time, questions such as "Could we encourage more reuse and recycling if fashion brands were involved in these activities and "What solutions could be developed that encourage consumers to reuse and recycle their clothes instead of throwing them out" continued to occupy me and finally resulted in a PhD proposal. My vision for the PhD was to investigate these ideas in a larger industry context and to create empirical and academic knowledge that would support the development of future practices in fashion that aim to extend the life of our garments, minimize waste and increase recycling.

In 2011 Copenhagen Business School had a Creative Encounter's research project on creative industries where one focus area was fashion and sustainability. Through that project I contacted lector Lise Skov, who warmly welcomed my ideas and provided me valuable feedback and guidance in developing the PhD application. Another partner, Copenhagen School of Design and Technology (KEA), with its interest in design and sustainable fashion, entered the PhD partnership for the purpose of mutual learning to increase their knowledge on clothing reuse and recycling and to educate future fashion industry stakeholders on these matters. Considering my practical background and strong passion to make a change in current reuse and recycling practices of clothes, my strong desire was to conduct the research close to practitioners. Therefore, BESTSELLER, a family-owned Danish fashion corporation that is home to more than 20 global fashion brands was approached and a mutual interest in the field was built. They contributed to the application as a dialogue partner. Finally, in order to learn and understand the existing practices for clothes reuse and recycling, the Danish Red Cross second hand department joined the project for knowledge sharing and mutual learning purposes. In summer 2011 the multi-stakeholder PhD project received financial approval from The Danish Agency for Science, Technology and Innovation and my journey started.

Key findings from the articles

Addressing wasteful practices and unsustainable consumption of fashion is an emerging field in practice and academia, however, research is lacking that studies this from a holistic business model perspective supported by empirical evidence. The research provides a unique contribution as it synthesizes the theoretical and empirical insights from the field of business model innovation and circular economy in the context of post-consumer textile waste. While the research explores the general trends that happen in the fashion industry, with regard to the circular economy and post-consumer textile waste, the most original element of this research is the empirical evidence gained from close collaboration with industry.

The key findings of this PhD research can be divided into a broad industry level and more specific company-level findings. Industry-level findings enable one to create a general understanding of the post-consumer textile waste issue seen from the fashion industry perspective and the existing practices among fashion companies (Article 1) while the company-level findings enable one to identify key issues and challenges of integrating circular economy solutions and product's end-of-life principles in an existing business model (Article 2 and 3). Each article makes its own contribution to ongoing discussions of sustainability within fashion, post-consumer textile waste management, business model innovation for sustainability and circular economy. Collectively, the papers highlight the fashion industry's role and importance in products' end-of-life practices and the associated outlook for innovating business models that aim for a circular economy of fashion. The key findings from the research articles are summarized below.

Article 1: *Post-retail responsibility of fashion - a fashion industry perspective*

This explorative case study was conducted throughout 2011 among nine global fashion brands that were engaged with reuse and/or recycling activities as part of their daily business. The aim of the study was to explore the post-consumer textile waste issue from a fashion industry perspective by providing insights into fashion companies' motivations and chosen strategies in working with textile reuse and recycling and the related opportunities and challenges they encounter. The key findings can be summarized as follows:

- Taking responsibility for the end-of-life phases of products is an emerging field among the fashion companies
- The two main strategies for how fashion companies engage with the end-of-life phase of their products are: reuse/resell platforms for extending the life of existing garments and product take-back schemes for reuse and recycling purposes.
- The three main ways of organizing the product returns management are: a donation partnership with a charity, collaboration with a third party collector and independent in-store collection.
- Partnerships with external stakeholders play an important role in reuse and recycling initiatives of fashion
- Mandatory legislation does not exist to drive the current industry initiatives. Motivation comes from being a responsible company, generating customer loyalty, increasing competitive advantage, strengthening brand image, addressing future resource scarcity, engaging with consumers and taking lead in industry innovation.
- Main challenges that companies encounter in their reuse and recycling initiatives are related to: limited best practices, setting up reverse logistics and redistribution, uncertainty related with take-back volumes and second-hand retailing and lack of consumer awareness.

The article contributes to the existing literature on sustainable fashion by providing a new perspective on post-consumer textile waste management and by advancing understanding of fashion industry's role in prolonging the life cycle of garments and minimizing post-consumer textile waste and the associated opportunities and challenges. This study belongs to the first round of research that directly addresses the post-consumer textile waste phenomenon from the fashion industry's perspective.

Article 2: ***Business Model Innovation through Second Hand Retailing: A Fashion Industry Case***

This article goes in-depth with one of the broad strategies identified in the explorative study, namely, focus on reuse and resell to prolong the life of existing garments. Based on a single revelatory case study of a high-end Scandinavian fashion brand, Filippa K, the article highlights the main issues, challenges and opportunities the brand can

encounter in integrating the reuse and resell focus into its existing business model. The key findings can be summarized as follows:

- Creating value from used products and encouraging sufficiency through reuse and resell can facilitate new value propositions and business model innovation towards sustainability
- In a resell focused business model customers become suppliers of merchandise which requires a new approach to the customer relationship management based on strong customer engagement throughout product's life-cycle
- Main prerequisites for reselling own brand products are a product's high quality, strong brand awareness and market maturity
- Main challenges related with resell business model are setting up a reverse logistics that is convenient, cost-effective and matches the market needs, as well as the uncertainty related to merchandise supply.

The main contribution of this research article lies in conceptualizing second-hand retailing of fashion from a fashion brand's perspective and in identifying a set of provisions that are necessary for fashion brands to consider when integrating the resell activity into their existing business models.

Article 3: ***A bumpy road towards a closed loop fashion industry: an experience from a Scandinavian fashion brand***

The third article explores in depth the second strategy identified by the explorative case study, namely product take-back schemes for recycling purposes. It presents empirical findings from a 34-months engaged scholarship with a leading Scandinavian male fashion brand, JACK and JONES. The paper aims to improve the understanding of closed loop fashion by exploring the relationship between closed loop supply chains and business models. More specifically, the article identifies major issues and challenges that impact the successful integration of product take-back systems and closed loop recycling of used garments in a company's existing business model. The key findings can be summarized as follows:

- Closed loop fashion is a complex matter with several uncertainties and challenges that span across the entire value chain and therefore partnerships with collectors, sorters, recyclers are needed

- Implementing a closed loop fashion system requires a brand's business model innovation and transformation of the existing value proposition
- Organizational learning and organizational alignment are crucial for implementing closed loop supply chain into existing business model
- Consumers are the cornerstone of closed loop business models since without their sufficient product returns, this business model is challenged
- With the current limited sorting and recycling technology it is very challenging for fashion brands to close the material loop of their own products at a large scale.

The main contribution of this article lies in applied knowledge in the emerging and under-researched phenomenon of closed loop fashion. The findings of this empirical research derive from practical experiences of a fashion brand in implementing a product take-back system and recycling practices in the existing business model. The findings provide unique knowledge to practitioners as well as academia. Additionally, the theoretical framework that combines business model framework and closed loop supply chain provides an academic contribution to the existing literature on closed loop supply chains seen from a business process view and a foundation for further development and enquiries.

2. The Fashion industry and post-consumer textile waste

The following chapter provides an overview of the fashion industry, its main characteristics and related sustainability issues. In addition, post-consumer textile waste system, its main actors and the main processes within the system will be described.

Fashion industry characteristics

Fashion has been defined as "…*a broad term that typically encompasses any product or market where there is an element of style that is likely to be short-lived* "(Christopher et al., 2004:367). This dissertation focuses on our everyday clothes that we buy, wear and discard. Several terms, with synonymous meanings, can explain the clothes we wear such as apparel, garment, dress or fashion. For example, Hansen (2004) speaks of garments when referring to specific items of clothing and apparel when addressing issues concerning manufactured garments. In the context of this research, fashion refers to clothes, garments and apparel to designate textile products made to be worn, as opposed to other textile products such as bedding, towels, curtains, carpets etc. that are excluded from this study. Throughout the dissertation the terms: clothes, garments, apparel and fashion are used interchangeably when referring to specific items, manufacturing issues or style. Occasionally the term textiles is used, primarily when referring to waste, which is the same term used within the waste literature.

Fashion companies are companies whose purpose is to provide fashion to consumers through design, garment quality, brand status and outlet stores (Holm and Holm, 2010). This is in line with how fashion companies are understood in the context of this research: companies (often considered brands) whose core activities are design, distribution, branding, marketing and retail. Fashion companies can also be classified into several segments based for example on different quality and price levels, different degrees of consumer loyalty, different economies in terms of sales and marketing mix. Tran and Yen (2010) divide fashion markets into luxury, premium, high, medium and low price segments. Luxury, premium and high-price segments have stronger identity and are design driven, while medium- and low-price segments are more market and cost driven. Another categorization is provided by Ross and Harradine (2010) where they segment the industry in terms of price, design influence and production issues

(Figure 2.1). This dissertation studied companies from designer, high street and value brands.

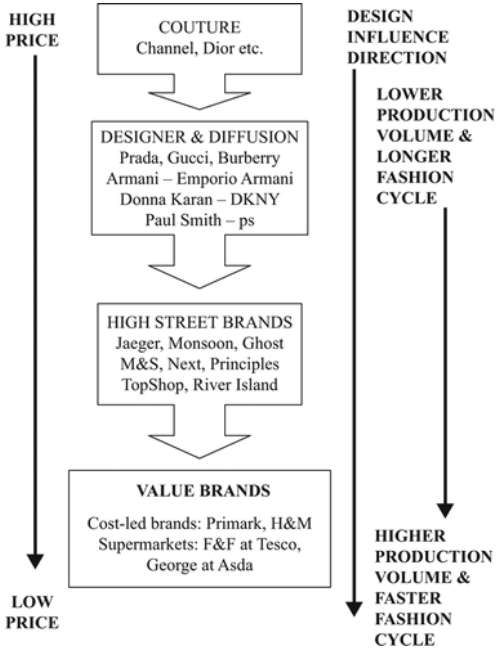

Figure 2.1: Fashion market sectors (Ross and Harradine, 2010)

Fashion is also a global phenomenon as a piece of garment passes through several hands across the globe throughout its life. A piece of a garment that is designed in Denmark, manufactured in Asia, consumed in the US, donated to international rag traders, sorted in Eastern Europe and consumed and disposed in Africa, shows the global spectrum of a garment's life. In general, fashion companies are considered as part of a global textile and garment industry, which is a diverse and heterogeneous industry covering a large range of actors and activities like fiber production, yarn and fabric production, processing, design, manufacturing, distribution and retailing (Gardetti and Torres, 2013). The garment sector is a significant part of the global industry, whose value is considered to be 1,781 trillion USD (Stotz and Kane, 2015). In addition, 7 % of total world exports are in clothing and textiles (Allwood et al., 2008). It is difficult to provide a precise number of people employed in this sector due to the number of small firms and subcontractors that are active in the industry, but it is

estimated that around 60-75 million people are employed worldwide making clothes (Stotz and Kane, 2015). The fashion industry is greatly influenced by the phase out of an international regulatory framework Multi Fiber Agreement (MFA) in 2005 which was established in 1974 to regulate global trade in the garment industry (Nueno and Ghemawat, 2006). The MFA placed import quotas on clothing and textiles, protecting certain markets such as US, Canada and Western Europe. After the MFA was abolished, majority of the production shifted from industrialized countries to countries in Asia, such as China, Bangladesh and Cambodia since American and European manufacturers fail to compete with more efficient and cheaper Asian producers. To illustrate this point, in 1982, US textile and apparel imports were 10 billion dollars while in 2006, the figure was 96 billion dollars. This has resulted in a decrease in prices and a boom in consumption. For example, clothing prices have fallen by 26.2 % in Europe and 17.1% in the USA since that (Brooks, 2015).

Fast fashion

Christopher et al. (2004) have summarized today's fashion markets with the following characteristics:

- High volatility where demand for fashion products is rarely stable
- High impulse shopping where consumers make buying decisions at the point of purchase and therefore there is a critical need for product 'availability'
- Product short life-cycles – the period in which a product is saleable is very short and seasons are measured in months or even weeks

These industry characteristics make fashion companies' survival determinant on flexibility, quick responsiveness, and dependence on cheap labour and cheap raw materials. Fastness and newness have therefore become the two main cornerstones of the industry and well described as a concept of fast fashion. Fast fashion follows a business strategy which aims to reduce the processes involved in the buying cycle and lead times for getting new fashion products into stores as fast as possible (Barnes and Lea-Greenwood, 2006). In earlier days, fashion brands produced 2-4 collections per year. Today there are almost no collections, only products that stores receive weekly in order to provide the newness to the consumers.

In the search for the constant newness, fastness and cheapness, fashion has a buyer-driven global supply chain (Nueno and Ghemawat, 2006) where fashion companies drive the market by determining where to produce, what to produce and at what prices.

They are also called ‘manufacturers without factories‘ that separate the physical production of goods from the design and marketing stages of the production process (Gereffi, 1999). This has accelerated the unethical manufacturing practices as in the fast-fashion era, brands can’t always afford to work with the same suppliers or the lead times are very short and push the suppliers to find alternative solutions to deliver the products using sub-suppliers. Thus, many brands source through manufacturing middlemen which are large conglomerates that take a design, split the production between thousands of factories, box up the goods and transport them to stores in no time (Hobbes, 2015). This practice has brought a situation where brands often do not know how and by whom their products are made.

Fashionable clothes are considered consumer objects (Crane, 2012) and therefore fashion is closely connected with the phenomenon of consumption. Holm and Holm (2010) argue that fashion helps to create identity, personality and meaning which is what consumers seek in fashion consumption. Fast fashion especially is focusing on consumption, as consumers have become more demanding and fashion savvy forcing fashion companies to provide the right product at the right time in the market (Bhardwaj and Fairhurst, 2010). It is about mass-produced fashion that is reasonably priced for most consumers, and easy to obtain, making it easy for anyone to look stylish (Mihm, 2010). As argued by the iconic designer, Tom Ford, high fashion for low cost makes fashion democratic, because it is affordable and accessible for everyone (Agins, 2007). The last few decades have shown a general rise in consumers’ incomes and together with the availability of fast fashion, the overall fashion consumption has grown (Ross and Harradine 2010; Morley et al., 2006). For example, in 1997, an average UK woman bought 19 items of clothing a year, which has risen to 34 items a year in 2007 (Attwood, 2007). The mean average number of clothing items owned by an adult person in UK is 115 (Gracey and Moon, 2012). Another example shows that, on average, Americans buy 64 garments per year, spending $907, which makes $14.17 per garment (Carey, 2015). This enormous increase in fashion consumption has resulted in a premature product replacement and fashion obsolescence (Kozlowski et al., 2012) and created a trend of throw-away fashion with growth in post-consumer textile waste (Birtwistle and Moore, 2007; Brooks, 2015).

Fashion and sustainability

Sustainability is interpreted as a balance between economy, environment and people also known as the ‘triple-bottom-line’ approach (Elkington, 1999). While sustainability

refers to the ability to sustain our natural environment while meeting the needs of people today and tomorrow (Brundtland et al., 1987) fashion is about taking natural resources and turning these into products to satisfy these needs. Fashion is based on change and newness and garments are mainly produced in a linear model where raw materials are extracted, made into products, consumed and disposed. Throughout that journey, fashion uses several resources from the environment and people often resulting in various negative impacts. For example, major social issues connected with fashion production are use of child labour, unfair pay, corruption, forced labor, unhealthy working conditions and exposure to hazardous chemicals (Krüger et al., 2012; Allwood, 2008). It is for example estimated that there are approximately 300 million poor and vulnerable homeworkers within the fashion industry worldwide (Krüger et al., 2012). In Bangladesh, many garment workers have to work 14-16 hours shifts each day (often six days per week) with the salary of 68 USD per month (Stotz and Kane, 2015). Even though international NGO's, consumer activist groups, industry organizations and international corporations' social sustainability initiatives have attempted to address these social issues for decades, these problems have not been resolved and the unethical practices and poverty associated with fashion remain (Hobbes, 2015).

In addition to negative social impacts, there are several environmental impacts that occur during fabric production, garment manufacture, transportation, use of the product and disposal. The main environmental issues that appear up and downstream the value chain are the use of energy, water and toxic chemicals. In particular during cotton growing and processing the chemicals in the dyeing processes and waste water from wet treatments, solid waste from post-production and post-consumer processes are all hazards to be dealt with (Allwood et al., 2008; Krüger et al., 2012). For example, to produce a pair of jeans requires 3625 liters of water, 3 kg of chemicals, 400 MJ of energy and 16 m^2 of harvested land (Deloitte, 2013).

In order to address these unsustainable practices and achieve sustainability, Huber (2000) recommends three strategies: sufficiency, efficiency and ecological consistency. Sufficiency deals with a reduction in resource use and impacts on the natural environment through a re-design of consumption structures and a stimulation of altered consumer buying habits (Huber, 2000; Lüdeke-Freund, 2009). Efficiency focuses on the production processes and the use of products with the aim of reducing the environmental damage associated with the production of each unit of output. Ecological consistency concerns production processes and products in order to achieve compatibility between the industrial and natural metabolism and aims for circular

material and energy flows (Huber, 2000). These three strategies cannot always be clearly distinguished from each other and collectively they aim to integrate economy and lifestyles in natural cycles while satisfying personal needs and reducing material and energy streams (Schaltegger, et al., 2003). Translating the sufficiency strategy into the context of fashion means that the fashion industry offers high quality and long-lasting products which is supported by business models that facilitate long use, repair, reuse, resell, lease and other forms of sustainable consumption. A good example is product-service-systems (PSS) that utilize schemes such as renting, redesigning, sharing, or lending to reduce reliance on natural resources and focus on function rather than ownership (Mont, 2002; Tukker and Tischner, 2006). From the efficiency perspective, garments are produced with minimum resource input and with practices that avoid toxic chemicals and other environmentally unfriendly practices. Finally, in order to achieve environmental consistency, the products are made based on cradle-to-cradle material and design choices so that materials will stay in circular material flows (McDonough and Braungart, 2013).

The fashion industry has addressed the social and environmental impacts that the business creates through various methods. For example, companies have developed codes of conduct to tackle the unethical practices along their supply chain, joined global multi-stakeholder initiatives to address labor ethics and safety issues (e.g. Accord) or to facilitate organic cotton cultivation (e.g. Better Cotton Initiative), label products with eco- and fair trade labelling (e.g.GOTS, Fair Trade) or to develop sustainable practices within garment processing and production (e.g. Levi's Water Less processing method). However, despite these initiatives, there remains a significant amount to be done to minimize the unsustainable practices, especially when considering the huge impact the industry has on our environment and people. As Palomo-Lovinski and Hahn (2014:87) argue "*Sustainable practices in clothing have not, thus far, created a significant impact… and that the fashion industry continues to work in an inefficient manner that creates massive waste and exploits workers."*

In addition, the primary focus of these initiatives has been on the social issues while the management of the environment along a garment's value chain has been less prioritized. For example, a study among Scandinavia fashion companies shows that while almost half of the companies recognize that risks related to human rights and labor rights are relevant, only 3 out of 10 are focusing on managing the environment and natural resources (Deloitte, 2013). As highlighted by McGregor (2015), *"Recycling, re-using and designing with a closed loop purpose is where action is most lacking and yet it is one of the most crucial stages given limited raw materials,*

especially cotton.". Furthermore, sustainable consumption is a new area for fashion companies and 9 out of 10 companies are not putting sufficient effort into engaging with consumers with regards to sustainability (Deloitte, 2013). At the same time there are no signs that fast fashion, that increases the throughput of resources, capital and labor by continuously presenting new brands, product ranges, products and styles in high volumes and at low prices, is disappearing (Deloitte, 2013). On the contrary, companies behind fast fashion brands such as Inditex, HandM, Marks and Spencer and Bestseller have grown significantly over the last decade and therefore fast fashion is a concept that will continue to affect the fashion industry over years to come and will have a direct effect on the way consumers purchase and react to trends (Bhardway and Fairhurst, 2010). Hence, the problem of increasing amounts of post-consumer textile waste needs effective solutions.

Post-consumer fashion waste

As stated earlier in the dissertation, there is a global agreement that post-consumer fashion waste is a growing problem with a large proportion of used clothing ending up in global landfills (Domina and Koch, 1999; Hawley, 2009, 2015; Bartlett, 2012; Fletcher, 2008; EMF, 2013; Birtwistle and Moore, 2007). It is difficult to estimate how many tons or pieces of garments end up in global landfills or incinerators annually since the mapping has not been carried out consistently or systematically. There are also several unofficial streams where garments can enter the streams. For example, Norris (2012) argues that due to the complex network of global re-export hubs and special economic zones, tracking used garments is extremely difficult and the true volumes and values being traded are likely to be higher. It is estimated that across Europe and North America 15 million tons of garments are discarded annually and end up in landfills (EMF, 2013). However, in reality this number could be much higher. In general the amount of post-consumer textiles that end up in separately collected streams for reuse and recycling are low (Palm et al., 2014; DEFRA, 2007; Tojo et al., 2012). A recent report from Scandinavia shows that the share of textiles that are collected for reuse and recycling purposes is 20% in Sweden and 45% in Denmark (Palm et al., 2014). In the European Union (EU) it is estimated that 5.8 million tons of textiles are discarded every year, of which 25% is collected by charity organizations or private companies with the purpose of reusing or recycling, and the remainder is sent to landfills or municipal waste incinerators (Briga-Sá et al., 2013). A study by Lu and Homouda (2014) shows that 10 % of the fiber waste in China, 12-13 % in Japan and 15

% of the fiber waste in the US is reused or recycled. This represents a significant loss of reuse and recycling value of garments and textiles that can be re-injected into the market.

When considering post-consumer textile waste, a dilemma arises as to when a piece of garment becomes waste and why fashion companies should be concerned about it. The contemporary definition of waste is "*any substance or object, which the holder*[1] *discards or intends or is required to discard."* (EC 2008:312:9). This definition entails three important aspects: materiality, purpose and ownership (Pongrácz and Pohjala, 2004).

First, waste is a material or tangible item. In the context of textiles, waste can occur throughout several phases of a product's life. Domina and Koch (1997) identify three categories of textile and apparel waste: post-producer waste generated by manufacturers, pre-consumer waste generated by retailers, and post-consumer waste generated by the public. Post-producer waste comprises of fiber, yarn, fabric scraps, apparel cuttings, samples and faulty products generated by fiber producers, textile mills, along with fabric and apparel manufacturers. Pre-consumer waste is generated by retailers primarily in the form of unsold merchandise, but also damaged merchandise. Post-consumer waste is generated by private households and industrial (e.g. restaurants, hotels) and public (e.g. hospitals) consumers. This dissertation focuses on post-consumer textile waste from private households, which happens when consumers no longer need their clothes and have decided to dispose of them.

Second, waste no longer has a purpose or has lost its original purpose or is not given a new purpose. The most common clothing disposal reasons are wear and tear, poor fit, and fashion or boredom (Laitala, 2014). In affluent Western countries clothing is often considered outdated when it is still wearable because social pressure dictates the perceived obsolescence of clothes ensuring that new garments are purchased regularly to maintain social status (Brooks, 2015). Brooks (2015:82) argues that: "*As clothes age, they lose their aura of newness, becoming unfashionable or worn out in the eyes of the owner".* For example, a Swedish study showed that 62% of Swedes dispose of usable clothes (not socks or underwear) that they no longer want in the garbage and that 21% of people dispose of clothing because they are tired of them (Ekström and Salomonson, 2014). In order to dispose of their no-longer-needed textiles consumers have several options: discard, donate to charity, reuse, pass on to family and friends, trade or sell at consignment stores, garage sales or flea markets (Domina and Koch,

[1] "Holder" means the waste producer or the natural or legal person who is in possession of the waste.

1999; Joung and Park-Poaps, 2013). Recently, selling over the Internet or exchanging clothes with each other without financial payment have become popular (Morgan and Birtwistle, 2009). But despite the different solutions for consumers to dispose of their unwanted clothes many continue to be thrown away, especially if the user feels that they are of no use to others, due to damage or a fashion change (Laitala, 2014). For example, in the United States and in UK an average consumer throws away around 30 kg of clothing and textiles per year (ibid).

Thirdly, a useful item can be transformed into waste because its holder or owner ceded ownership, which should be understood as a responsibility to act on the waste object (Pongrácz and Pohjala, 2004). Currently, garments and textiles are not regulated by law and there is no expectation on fashion companies to be responsible for the end-of-life destiny of their products. The concept of Extended Producer Responsibility (EPR), which moves the responsibility of product's end-of-life disposal to the producer, is currently not implemented in textiles, with an exception in France where an eco-levy has been established on garments and textile products (see more on EPR in article 1 and 3). However, until the end-of-life responsibility is in the hands of the producer, consumers remain the owners after purchase and are responsible for the decision whether the clothing is reused, recycled, discarded or destroyed. Raghavan (2010:52) argues that "*companies must become more aware of their role in extended product responsibility and start acting on it, lest they are caught unawares by the law and a consumer verdict of undesirable behavior*". This is slowly happening in the fashion industry in an ad hoc way where some companies have started engaging with product end-of-life practices such as product take-back, reuse and recycling schemes. However, the reasons why they are doing it and how has not been studied before. This research aims to address this.

Fashion waste organization and management

Hawley (2006) suggests looking at textile waste through a systems theory lens because of its holistic view, which helps to identify the processes and explain the connectedness and interdependencies between different actors. Previous mappings of the post-consumer textile waste system provide a good overview of the flows of the complex system comprising a myriad of organizations who have a role in the collection, sorting, resell and recycling of textiles (Hawley, 2006, 2015; Domina and Koch, 1997). These actors include a large number of collectors (e.g. both charitable

and professional for-profit organizations), second- hand retailers (for-profit and non-profit), sorters, fiber recyclers, rag producers, dealers, brokers and exporters, and various recyclers (Hawley, 2006; Palm et al., 2014). The dominant actor in current garment collections is the non-profit charity organization (Hawley, 2006; 2015; Palm et al., 2014). For example, in Sweden the charity organizations who collect and handle (sort and resell for reuse and recycling) the used garments represent an estimated 90% of the market and the remainder is handled by private actors (Palm et al., 2014). At the same time, research shows that there is a need to increase the volume of textiles collected (Palm et al., 2014; Bartlett et al., 2012; Allwood et al., 2006) and alternative options for collection have been suggested such as: door-to-door household collection, cash for clothes, collection from businesses, curbside collection or in-store collection by retailers (Bartlett et al., 2012).

While the charity organizations remain the dominant actor in garment collection, sorting and reselling, recent years have brought in new actors who have an interest in textile reuse and recycling. One of these new actors, who have had an insignificant role in previous mappings, is the fashion retailers who have recently started engaging in textile reuse and recycling. While some brands collaborate with charities, the dominant player, others have chosen to set up their own systems. This is not an entirely new phenomenon as already in the 90's some department stores in the US took back unwanted jeans that were donated to a local charity and in return the customer got store credit toward new jeans (Domina and Koch, 1997). The fashion industry plays a very important role in the post-consumer textile waste system as designers, producers and marketers of garments that eventually turn into waste. However, their role and responsibility within the system has not been addressed sufficiently.

According to Fletcher (2008), the most common approach to dealing with fashion industry waste is to implement waste management strategies such as reuse and recycle. The EU Waste Hierarchy (EC, 2008:312:10) defines 'reuse' as any operation by which products are used again for the same purpose for which they were conceived. Recycling on the other hand, is any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. Reusing and recycling of textiles provides both environmental and economic benefits from reducing the need for landfill space, reducing pressure on virgin resources, reducing water and energy consumption and demand for dyes and fixing agents (Bureau of International Recycling, 2015). The EU Waste Management Hierarchy advocates product reuse over materials recycling, which, in turn, is preferable to recovery (e.g. as a fuel in incinerators to generate energy), with landfill

disposal as the least preferable option (EC, 2008). Research shows that waste hierarchy is valid also for textiles, where the emphasis should be on reduction, followed by reuse, material recycling, and finally energy recovery (Laitala, 2014). As concluded in earlier research, the least complicated way for the sector to reduce its environmental impact would be for consumers to reduce the amount of clothing and textiles they purchase each year (Allwood et al., 2008).

Several reuse and recycling practices exist within textiles. The reuse of textiles through second-hand retailing is an old tradition, which has become a global trade, expanding both economically and globally (Brooks, 2015). The estimated value of the global trade in second-hand garments has almost doubled in just half a decade from USD 2.02 billion in 2007 to USD 3.65 billion in 2012 (Palm et al., 2014). In general, used garments are mostly imported from wealthier countries of Europe and North America and exported to Central American Countries, Eastern Europe, Africa and Asia (Hansen, 2006). Consumption of second-hand clothing is popular all over the world. For example, over one third of the population in Sub-Saharan Africa and over 90 per cent of Ghanaians consume second-hand clothing (Baden and Barder, 2005). The trade of second-hand clothing to developing countries has received some criticism and in general, two schools of thought exist. First, that second-hand trade is killing the local economy by destroying clothing industries and the second argues that it has a benefit by creating local jobs (Brooks, 2015). While the majority of the second- hand clothes are consumed in less developed parts of the world, it is also showing an increased popularity in more affluent Western countries (Tojo et al., 2012; Palm et al. 2014). This is especially a case with high quality and high fashion vintage clothes (Cervellon et al., 2012). Over recent years many new reuse and resell opportunities have been introduced to the market, gaining popularity among consumers and making second hand consumption more accessible and vibrant. Some of these opportunities are: online resell platforms, swapping places and events, and clothing libraries.

When textiles are collected by charities, the garments are sorted according to the needs of reuse and recycling markets. For example, when a ton of textiles is collected in the UK[2] it is used for four main purposes: 21% is reused locally in the UK, 52% is exported for reuse, 8% is made into rags or wipers and 14% is shredded for recycling purposes. Some recycling opportunities include: creating new yarn through mechanical recycling, stuffing for furniture and mattresses, and as insulation in homes and cars (EMF, 2013). Currently the main method of garment sorting is manual sorting, which

[2] These flows represent the destinations of all clothing which reaches the end of its use with a consumer in the U.K., including items collected through charity shops, textile banks, resold online, informally traded amongst friends or relatives

operates at a small margin and it is only possible to sort by parameters that humans can readily determine. Thus, it serves well the needs of reuse markets but not the need of recycling markets (Humpston et al., 2014). Some sorting technologies exist, such as fourier transform infra-red spectroscopy (FTIR), radio frequency identification (RFID) tags and 2D bar codes, however these are not yet technically and commercially proven on a large scale (Humpston et al., 2014). Since garments are sorted manually, the sorting facilities that have traditionally been based in Western Europe and North America, have been moved to countries where wages are relatively low, for example Baltic and Eastern European Countries within Europe (Palm et al., 2014).

While prolonging the life of existing garments through reuse is the most resource efficient strategy (Gracey and Moon, 2012), all clothes eventually lose their reuse quality and need to be recycled. For example, it is claimed that only 40% of the original textile material collected by collectors can be sold as clothing while 60% is low-grade material for recycling (Schepke**,** 2003). There are two main types of textile recycling, namely open loop recycling which turns the fiber into non-clothing applications (e.g. furniture fillings) and closed loop recycling which takes post-consumer clothing and textiles and uses it to produce new fiber or yarn that can be used to make new textile products (Morley, 2013). Within closed loop recycling, two recycling processes are identified: mechanical (wool, cotton) and chemical (viscose, polyester and other synthetics) (ibid). In Europe, most of the textiles are currently mechanically recycled to be used in the car industry in the forms of mattresses and upholstery, carpets and other textile products (Palm et al., 2014). For more information on textile recycling Morley et al. (2014) provides a detailed overview of the secondary supply chain of garments that illustrate various open-loop and closed loop paths and procedures for post-consumer garment waste.

Currently textile recycling is facing several barriers that are associated with cost, time, technology and quality (Lu and Homouda, 2014; Peterson, 2015, Morley, 2013; Palm et al., 2015). For example, a large mix of fibers and colours used in the fabrics is a limiting factor in recycling as they pose a challenge in the sorting processes and decrease the quality of recycled materials (Morley, et al. 2014; Zamani et al., 2014; Fletcher, 2008). In addition, there is a lack of technology that is cost-effective on a large scale (Zamani et al., 2014) that can produce high quality yarn. Currently, several new mechanical and chemical recycling technology solutions are under development, with the aim of creating new fibers our of post-consumer textile waste, however these technologies are still under test and are not available on a wider scale. In addition, the market price for reusable clothes is typically far higher than the price for recycled

clothing and currently the resell markets cross-subsidize the recycling markets (Morley, 2013; Palm et al., 2014; Zamani et al., 2014), which makes the recycling of clothes currently less attractive than reuse.

3. Theoretical and analytical framework

After providing the outline of the nature and conditions of the fashion industry and an overview of the current system and practices of post-consumer textile waste the following chapter introduces the main theoretical frameworks applied throughout the research. First, an overarching analytical framework will be presented. This framework allows one to study the industry's transition towards a circular economy and aims to build the connection between various components of circular economy and business models. This is important for understanding the research findings in a wider context. Secondly, a more in-depth introduction to the circular economy and business model framework is given that form the main foundation for analyzing and answering the research question. Although these frameworks are not mentioned specifically in all the research articles, their basic tenets underlie them.

Industry's transition towards sustainability can be studied from several perspectives. The European Commission (2014) for example, highlights that a transition towards a circular economy requires changes throughout many components of an economy and society, such as value chains, product design, new business models, consumer behaviors, technological innovation, finance methods and policies. Earlier academic research on transition from conventional to more sustainable practices suggests a multi-level analytical approach that spans across several structures and actors within a society, as no organization operates in isolation or is insulated from its external environment (Hoffman, 2003). For example, in a study on conversion to organic dairy production in the Netherlands Smit et al. (2009) applied a chain network approach, which allowed the authors to identify opportunities and barriers with a single actor, at supply chain and network levels. Morana and Seuring (2011) suggest a similar approach in studying closed loop supply chain management issues. They place closed loop management within a political and societal context while linking it to supply chain partners and a single company's (actor) activities.

Inspired by Smit et al (2009) and Morana and Seuring (2011) it is proposed in Figure 3.1 that a similar three level analytical framework for the fashion industry's transition towards a circular economy can be used.

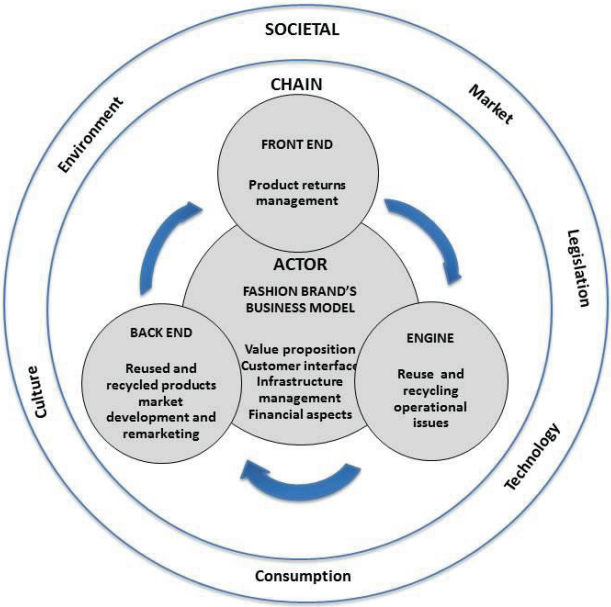

Figure 3.1: Three level analytical framework for a circular economy transition (adapted from Morana and Seuring, 2011; Guide and Van Wassenhove, 2009; Osterwalder et al., 2005).

The Figure 3.1 illustrates how a company's business model (Actor) is linked to its supply chain (both forward and reverse) (Chain) while it is simultaneously influenced by wider societal factors (Society). The societal level incorporates wider societal, political, cultural, technological, and environmental systems that influence both the supply chain and individual companies in their operations. Companies, for example are influenced by: rules, laws, economic incentives, industry standards, best practices, consumer behavior and culture, technological innovations and environmental boundaries. Putting this into the context of waste, Hoffman (2003:73) argues, *"Firms are not free to decide what a waste is and how and where it is to be disposed. They are bound by the definitions prescribed by the social, legal, and technical environments*". A good example from the textile industry is a Turkish legislation that restricts the import of used textiles, which creates a constraint in getting used garments that are collected from different European markets to the Turkish fabric mills for recycling purposes. While this research does not analyze wider societal factors that influence

transition towards a circular economy in great depth, it does integrate various aspects and examples to highlight several influences.

Chain level analyses address the activities of single actors within supply chains and the interdependencies upon each other. A classical textile chain is illustrated in Figure 3.2, which is a simplified description of supplier-buyer relations that allow products to be offered to final customers. The figure shows that several stages in the textile chain are interlinked with each other through material or information flows. For the purpose of a circular economy, this chain should be seen as a cycle where both material and information flow goes back to design and fiber/yarn/fabric production.

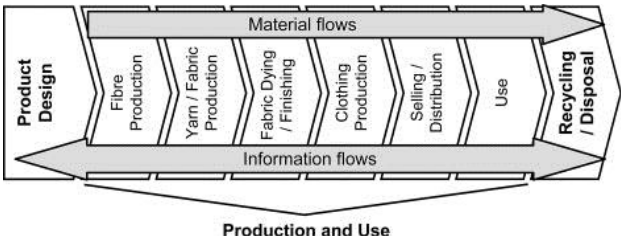

Figure 3.2: The textile chain (Seuring, 2005).

Morana and Seuring (2011) suggest analysing the chain level from a closed loop supply chain management perspective, which is embedded in the material and product life-cycle of products and focuses on business processes required for closed loop production. Closed loop supply chains integrate both traditional forward supply chain activities and reverse supply chain activities (Guide and Van Wassenhove, 2009). These activities include used-product collection, reverse logistics, sorting and grading, resell/repairing/remanufacturing/recycling and redistribution and re-marketing. Based on these activities three main processes within closed loop supply chains are distinguished, namely: product returns management (Front End), re-manufacturing operational issues (Engine), and re-manufactured products market development (Back End) (Figure 3.3) (ibid). Thus, the chain level analyses include several actors, such as garment collectors (e.g. charities, professional third party service providers, private collectors), sorters, second-hand retailers (i.e. non-profit and for-profit), recycling companies (both closed loop and open loop) and fiber/fabric mills.

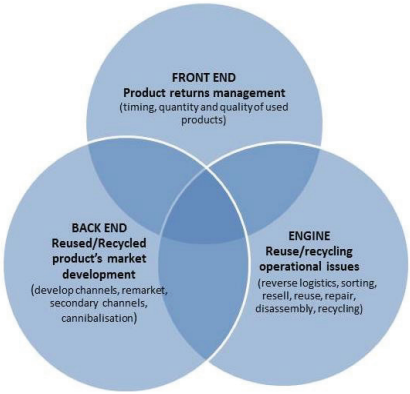

Figure 3.3: Closed loop supply chain processes (adapted from Guide and Van Wassenhove, 2009)

Finally, an actor level analysis focuses on a single company. Morana and Seuring (2011) propose a transaction cost approach for the actor level analyses. However, this research argues that a more holistic approach is needed to analyze companies' processes when it comes to sustainability and circular economy, which includes not only transaction costs, but also broader business aspects, such as value proposition, customer relationships, partnerships, business processes and internal capabilities. For that reason a business model framework is suggested for the actor level analyses. Business models capture the interactions between multiple persons and organizations that support the creation of value, thus it is more holistic than the transaction cost approach and as argued by Zott et al., (2011:1020) a business model is "…*a new unit of analysis distinct from the product, firm, industry*". Hence, the business model framework is well suited to the three-level analytical framework as it allows one to investigate business transformation towards a circular economy through several business processes and interaction with other chain members and societal stakeholders. In addition, central to business models is the focus on value creation (Osterwalder, et al. 2005; Teece, 2010; Richardson, 2008); it allows one to investigate how to keep valuable resources in use and capture used products' value through reuse and recycling from a business perspective.

It is pertinent to apply the three level analytical approach to the fashion and post-consumer textile waste context since a garment is a product of a global industry and its

life-cycle is impacted by several legal, social, economic and technical systems, environmental boundaries, as well as consumer behavior and various actors across the forward and reverse supply chain. It is out of the scope of this PhD research to provide a detailed three-level analysis of a circular economy of fashion. The main focus of this dissertation is at the actor level (i.e. fashion brands), however, some societal and chain level aspects are addressed in all three research articles and in the framing document.

The above-mentioned three-level analytical framework describes the relationship among the various levels that structure the understanding of the field and the industry. The subsequent sections discuss in-depth two main concepts that populate the analytical framework and are relevant to the research question, namely the circular economy and the business model framework. The circular economy concept allows one to see post-consumer textile waste in a wider societal and environmental context while the business model framework enables one to analyze the inner-workings of a company.

The circular economy

The problem of material waste and resource efficiency is closely linked to the concept of the circular economy. The circular economy aims to achieve the decoupling of economic growth from natural resource depletion and environmental degradation through activities that reduce, reuse and recycle materials in production, distribution and consumption processes (Cooper, 1999; Murray et al., 2015). It opposes a linear economy, which is based on a take-make-waste rationale (EMF, 2013). Within linear economy, fast product replacement is a key trend and businesses and economists are occupied with production optimization, economies of scale and fast product depreciation (Stahel, 1986). This has resulted in short product replacement and disposal cycles with problematic environmental consequences, also known as planned obsolescence (Guiltinan, 2009). The linear economy wealth generating model works well in a situation where natural resources are unlimited, however, natural resources are diminishing (Allwood et al., 2011). The above dovetails with the current fashion industry and fast (disposable) fashion phenomenon. Therefore, there is a need for a new economic order that focuses on recovery of material flows and a decoupling of wealth and welfare from resource consumption (Stahel, 2013).

The basic tenets of the circular economy traces back several decades to Stahel and Reday's (1976) work on the ecology behind product life extensions and their sketched

vision for “an economy of loops” or “circular economy”. An abstract from Stahel’s (1982:72) prize-winning paper *“The Product Life Factor”* provides a clear understanding of the fundamentals of the circular economy concept:

> *“The extension of the use-life of goods is, first, a sensible point at which to start a gradual transition towards a sustainable society in which progress is made consistent with the world’s finite resource base and, second, a strategy consistent with an active and independent role for the private sector. Product-life, or the period over which products and goods are used, governs their replacement speed and thus the consumption of natural resources required for their manufacture and the amount of waste they create. Shortening product-life increases demand for replacement goods where these can be afforded. Extending product-life optimizes the total life-span of goods and reduces depletion of natural resources and consequently waste; it builds on and increases wealth. A longer use of products will thus contribute to the transition towards a sustainable society”*

In addition, chemist, Michael Braungart, and architect, William McDonough, have strongly contributed to the development of the circular economy concept. In Hannover in 1992, in connection with the World’s Fair Expo 2000, the Hannover Principles: ‘Design for Sustainability’ were introduced. This is a set of principles was developed for design professionals to provide inspiration and encouragement to applying sustainability principles in their work. In their books “Cradle to Cradle: Remaking the Way We Make Things” (2002) and “The Upcycle” (2013) Braungart and McDonough propose a cradle-to-cradle design model to address the problems of the linear economic model and argue that a circular economy is based on a vision that once products have reached the end of their useful life they either become "biological nutrients" or "technical nutrients". Biological nutrients are biodegradable materials that can re-enter the environment, while technical nutrients are materials that remain within closed-loop industrial cycles. Stahel and McDonough and Braungart agree that circular economy means a radical shift in how materials are used throughout the economy.

Stahel (1994) argues that a product’s reuse and recycling are waste reduction and resource saving strategies that can be applied to production, use and post-use activities. He furthermore distinguishes two distinctively different types of resource efficiency that govern the circular economy (ibid) (Figure 3.4). First is, product-specific, with a focus on reuse and product-life extension (i.e. Loop 1). Here the reuse of goods means

an extension of the utilization period of goods, through the design of long-life goods; the introduction of service loops to extend an existing product's life, including reuse of the product itself, repair, reconditioning, and technical upgrading; and a combination of these. Secondly, there is a material-specific loop, with a focus on material recycling (i.e. Loop 2). Here the recycling of materials means simply closing the loop between post-use waste (supply) and production (resource demand) (ibid).

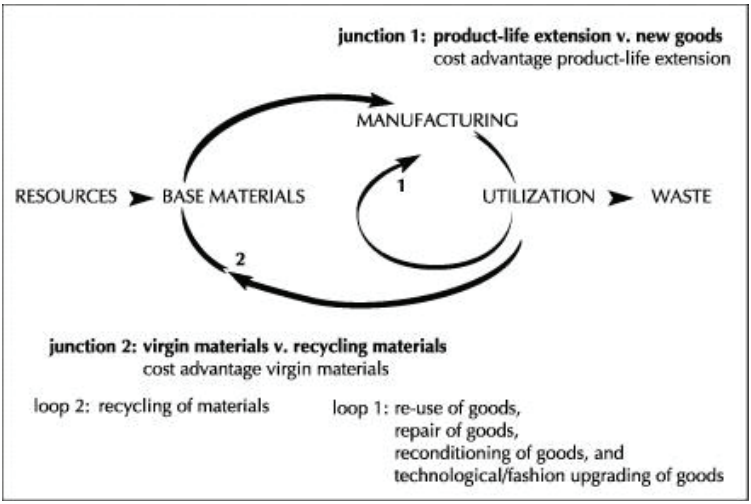

Figure 3.4: The main loops of a circular economy (Stahel, 2013)

However, circular economy is more than waste management as is well argued by Ghisellini et al. (2014:12), "…*it requires* a *broader and much more comprehensive look at the design of radically alternative solutions, over the entire life cycle of any process as well as at the interaction between the process and the environment and the economy in which it is embedded, so that the regeneration is not only material or energy recovery but instead becomes an improvement of the entire living and economic model compared to previous business-as-usual economy and resource management".* Circular economy requires balanced and synchronized consideration of the economic, environmental, technological and social aspects of an economy, sector, or individual industrial process as well as of the interaction among all these aspects, thus it's directly connected with the concept of sustainable development (Ghisellini, et al. 2014; Zhijun and Nailing, 2014).

Several other concepts have been added over the past decades that have many similarities to or are inspired by circular economy principles. One example is the concept of industrial ecology that is very closely linked to the idea of transitioning the linear economy model into circular economy as explained by Frosch and Gallopoulos (1989:95): "*The traditional model of industrial activity – in which individual manufacturing processes take in raw materials and generate products to be sold, plus waste to be disposed of – should be transformed into a more integrated model: an industrial ecosystem. The industrial ecosystem would function as an analogue of biological ecosystems*". Other examples include circulation economics (Ingebrigtsen and Jakobsen, 2006), supply loops (Geyer and Jackson, 2004) and product-service systems (PSS) (Mont, 2002). PSS is a concept that has been widely regarded as helping to achieve sustainable production and consumption. It focuses on product use through services, such as repair, lease of products and other value added services. Mont (2004:71) defines PSS as, "*A system of products, services, supporting networks and infrastructure that is designed to be competitive, satisfy customer's needs and have a lower environmental impact than traditional business models*". A dominant goal of PSS is to minimise the environmental impact of consumption by closing material cycles, reducing consumption through alternative scenarios of product use and increasing overall resource productivity (Mont, 2002), thus directly supporting the main goals of circular economy. While strongly supporting the goals of the circular economy, PSS, within garments, requires a radical change and adaptation, both among fashion retailers but also consumers. Over the last recent years some PSS business models have entered the market that focus on fashion and garments; however they seem to remain small-scale with difficulties expanding to the mainstream market. This is witnessed, for example, through fashion libraries (Pedersen and Netter, 2015).

Despite the fact that the fundamental ideas of the circular economy and the related advantages have been described decades ago, its recognition has been slow, and only recently have some of its ideas entered the national and international agendas of business and politics. Some examples are the 2008 European Union (EU) Waste Directive, which introduces the "polluter pays principle" and "extended producer responsibility"; A Roadmap for a Resource-Efficient Europe, which is a flagship initiative for a resource-efficient Europe under the Europe 2020 strategy that supports the shift towards a resource-efficient, low-carbon economy to achieve sustainable growth. The Horizon 2020 goals promote a circular economy through research and innovation while the EU Raw Materials Initiative aims to boost resource efficiency and promote recycling. Recently, the European Commission introduced a Circular Economy Package, which includes revised legislative proposals on waste to stimulate

Europe's transition towards a circular economy. The circular economy has also gained importance within the fashion industry itself. Several EU countries have developed initiatives to improve the impact of the fashion industry, such as the 'Sustainable Clothing Action Plan' (SCAP) in the UK and the 'Nordic Action Plan for Sustainable Fashion and Textiles' in Scandinavia that address circular economy issues through the reuse and recycling of clothes. In addition, academia is investigating the circular economy within fashion through international interdisciplinary research projects that aim to bridge industry and academia. Finally, circular economy not only requires innovative concepts but also innovative actors. Due to the complexity of the circular economy vision its implementation needs to be supported by innovative designers and businesses who provide products and services with appropriate radical changes in both practices, policies and decision making tools. Increasingly, the business community around the world has become aware of the circular economy and recognized the potential business case for improving resource productivity. A study shows that resource efficiency improvements throughout the value chain could reduce material input needs by 17%-24% by 2030 (Meyer, 2012). A report from the Ellen MacArthur Foundation demonstrates opportunities for significant material cost saving for EU industry when circular economic approaches are applied, and a potential to boost EU GDP by up to 3.9% by creating new markets, new products and services, thus creating value for business (EMF, 2012). Companies across several industries have started to capture these opportunities by introducing new business models that focus on resource efficiency, services that offer functionality rather than ownership and closing the loop of products.

Business models

The term "business model" has since the 1990's, after the initial dot.com period, gained increased interest among business and academia. Richardson (2008) argues that there is a general agreement on the basic definition of a business model, which is a description of how a firm does business. Zott et al. (2011) counter that there is no clear and universally agreed upon definition that encompasses the concept of business models and the literature is developing largely in silos, primarily as a result of the interest of the respective researchers. Teece (2010:192) argues that, "*Like other interdisciplinary topics, business models are frequently mentioned but rarely analyzed: therefore, they are often poorly understood*", however "*…an increased understanding of the essence of business models and their place in the corpus of the social and*

organizational sciences should help our understanding of a variety of subjects including market behavior, competition, innovation, strategy and competitive advantage".

Despite the ambiguity of the concept the literature provides several definitions and perspectives that give a grounded understanding of the concept. Broadly put, business models are a conceptual and architectural implementation of a business strategy and the foundation for the implementation of business processes (Richardson, 2008). For example, Doganova and Eyquem-Renault (2009) define business models as calculative and narrative devices, which "…*allow entrepreneurs to explore a market and to bring their innovation – a new product, a new venture and the network that supports it – into existence".* Arend (2013:391) defines business models as "…*a useful representation of how the organization creates value through transforming and transferring matter, by drawing on available factors, fuelled by an identifiable economic engine".*

An analysis of business model components in academic literature shows that the concept has been employed to address or explain several phenomena. For example, a study by Morris et al. (2005) shows that the most frequently cited components of business models are the:

- firm's value offering
- economic model
- customer interface/relationship
- partner network/roles
- internal infrastructure/connected activities
- target markets

Another study by Zott et al. (2011) identified three main interest areas within business model frameworks: e-business and the use of information technology in organizations; strategic issues, such as value creation, competitive advantage and firm performance; and innovation and technology management. Perkmann and Spicer (2010) claim that there are three conceptions of business models: transactional structures depicting how firms configure their transactions with groups of stakeholders; as mechanisms for creating and capturing value and finally devices for structuring and designing organizations. This research is supported by the notion that business models are mechanisms for value creation and capturing as defined by Teece (2010:179): "*A business model describes the design or architecture of the value creation, delivery and capture mechanisms employed*. This is supported by Wells (2006:287) who concludes,

that "*the concept of the business model is about value creation frameworks*" and by Richardson (2008) who proposes a value-centered business model framework. According to Richardson, a business model consists of three value-centred components: the value proposition (i.e. the offer and the target customer segment), the value creation and delivery system (i.e. the infrastructure management), and the value capture system (i.e. the financial aspects) (ibid). A value centred perspective of business models is in line with this research, which builds on the assumption that post-consumer textiles have potential value that should not be wasted but captured.

Osterwalder et al. (2005) have developed a business model framework, also known as the Business Model Canvas (Osterwalder and Pigneur, 2010). The value proposition, its creation and capture, occupy a central position in this framework which is described through nine business model elements (see Articles 2 and 3 for more detailed presentations). Osterwalder et al. (2005) argue that the main value in the business model framework is that it helps to capture, understand, communicate, design, analyze, and change the business logic of a company.

Business model innovation

Research within business models has widely acknowledged that business model innovation is a key source of competitive advantage (Zott et al., 2011; Baden-Fuller and Mangematin, 2013; Mitchell and Coles, 2003; Teece, 2010). Business model innovation can allow companies to compete in a more efficient manner or expand the entire market by attracting a new target segment. Zott and Amit (2010:7) describe business model innovation as a "…*source of innovation when it connects previously unconnected parties, links transaction participants in new ways or introduces new transaction mechanisms and thus it may complement innovation in products and services, production, distribution or marketing methods and markets*". Wells (2006:364) adds that "*innovative business models are one means to redefine the terms of competition, and hence both a new way of creating value and a new way of capturing that value".*

Cavalcante et al. (2011) suggest a process view of business model innovation and conceptualize business model change from the perspective of a company's core processes by suggesting four different types of change. They argue that not all changes lead to a change in the business model and only changes that affect the core standard repeated processes of a business constitute a change in the business model:

1. Creation (i.e. to get an entirely new business model up and running)
2. Extension (i.e. adding activities and/or expanding existing core processes without affecting existing processes)
3. Revision (i.e. change in existing working practices)
4. Termination (i.e. abandoning/removing processes)

Business model innovation can include a transition to focus on sustainability. The role of business model innovations in facilitating sustainability has been increasingly studied during the last years and business models are recognised as a key towards the achievement of sustainable production and consumption (Schaltegger et al., 2012; Bocken et al., 2014; Boons and Lüdeke-Freund, 2013; Wells, 2013). Bocken, et al. (2014:44) define business model innovations for sustainability as, "*Innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organisation and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions".*

Recent publications show that there is a growing interest in combining strategic sustainability management and business model research, and increasing numbers of authors have addressed the integration of these two fields. One of the first works on sustainability and business models is by Stubbs and Cocklin (2008) who propose a framework for "sustainability business models". The authors highlight the importance of organizations' internal structural and cultural capabilities and collaboration with key stakeholders to achieve sustainability for the exogenous system of which the organization is part. Schaltegger et al. (2012) studied business cases for sustainability and they suggest that the objective in business modeling for sustainability is to identify solutions that allow firms to capture economic value from generating public environmental and social value, thereby establishing the business case for sustainability. Laukkanen and Patala (2014) take this issue further and investigate what the key structural and cultural barriers to the diffusion of sustainable business model innovations are, and identify barriers in three main areas, namely regulatory, market, financial, behavioral and social. Also Boons and Lüdeke-Freund (2013) studied business models for sustainability in relation to technological, organizational and social innovation and they conclude that business models support the strategic marketing of innovative processes, products and services and secondly, business models themselves can be changed and innovated to provide competitive advantage by changing the terms of competition. Wells (2013) have introduced six underlying principles of business models for sustainability that help in the achievement of sustainability which include

issues of the circular economy, such as resource management, resource efficiency and longevity. He further suggests key components of such business models which are PSS: design for re-manufacture and circular value systems, open source innovation and network value creation systems (ibid).

In recent years several new tools and frameworks have been introduced, for example Upward (2013) has developed a comprehensive framework called 'Strongly Sustainable Business Model Canvas' (SSBMC) which departs from the business model framework by Osterwalder (2004). In addition, Wallin et al. (2013) propose an approach using the Business Model Canvas that help manufacturers in the transition towards PSS development by articulating key business elements in developing and analyzing PSS concepts that evolve from their traditional product sales situations. Finally, a "Triple-Layered Business Model Canvas" has recently been proposed by Joyce et al. (2015) that is an attempt to further develop the Business Model Canvas by adding environmental and social layers to the initial canvas that primarily focuses on customer and economic value.

Bocken et al. (2014) argue for the need to distinguish between different forms of value. In addition to an existing value proposition companies should analyse the areas where they have missed or destroyed potential value. For example, missed value can be captured from under-utilized assets, resources and waste streams, while destroyed value can be captured through solutions that address negative social impacts and environmental damage. Integrating the concepts of missed and destroyed value into a company's analyses helps to identify the negative aspects of a current business model and to assist companies in adapting or creating value propositions for the purpose of sustainable business models. It is intended as a primary step in the business model process to embed sustainability into the core purpose of the firm and its network of stakeholders. In the context of the circular economy and waste reduction, this is a valuable approach to identify the post-production and post-consumer value of materials and products, as well as knowing how to capture such value. Furthermore, Bocken et al. (2014) propose eight business model archetypes that link the theoretical concept of business model innovation to a practical transformation mechanism. They argue that the archetypes have the potential to embed sustainability into business purpose and processes, increase the ambition of innovations, accelerate their introduction and reduce risks of implementation through providing examples from practice.

Only few publications can be identified that directly assist in addressing the circular economy within business models. For example, Planing (2015) proposes an outline of

a circular economy model (initially developed by Stahel and Reday-Mulvey (1981) with associated business models where he discusses the reasons for non-acceptance of circular economy business models. Another example is Roos (2014) who synthesizes the theoretical and empirical insights from the business model innovation domain with insights from the circular economy. Roos (2014:267) concludes that, "…*circular economy type business models must capture and monetize every conceivable resource whilst offering services in every loop identified in the circular economy framework. If this is not done, it is likely that the circular economy business model will be financially non-viable*". Finally, Bakker et al. (2014) identify five archetypal business models for the circular economy: the classic long life model; the hybrid model; the gap exploiter model; the access model and the performance model. In line with Stahel's (1994) two loop approach Bocken et al. (2015) propose key business model strategies for the circular economy through approaches to slowing and closing of resource loops. Business models that slow resource loops encourage long product life and the reuse of products through business model innovation. Three key models are described under this: access and performance, extending product value and sufficiency (ibid). Business models for closing the resource loops refers to capturing the value from what is considered waste in a linear business approach (ibid).

The main objective of this research was to investigate how to turn useless post-consumer textile waste into value seen from a fashion company business perspective. For that reason, value centered business model framework by Osterwalder et al, (2005), also known as Business Model Canvas (Osterwalder and Pigneur, 2010), was chosen as main analytical framework for this research. The following section highlights the main reasons and arguments for this choice:

- The Business Model Canvas represents all the main components of what constitutes a company's business model identified in a comprehensive study of business model frameworks by Morris et al. (2005). At the same time, it is an integrative concept that allows reducing complexity of business operations (Arend, 2013).

- Many of the earlier described tools and frameworks that assist in addressing sustainability and circular economy through a business model perspective were not available at the time the research was designed and data collection planned. In addition, these frameworks and tools mainly focus on providing assistance in exploring new ways to create and deliver sustainable value and developing the business model structure for the transition towards circular economy. However,

they provide little assistance in understanding the value creation and capture at a practical level, i.e. what should be focused on within each business model element when implementing circular economy principles in order to build the integrity in the business model. Since the two in-depth case study companies had already developed an idea in which direction they wanted to innovate their business model, the more generic frameworks such as archetypes by Bocken et al. 2014 or circular economy business model categories by Planing (2015) would have offered little value.

- It is a well-conceived and academically grounded framework to support the generic business modelling process (Bocken, et al. 2013). As supported by Bakker et al. (2014:53) it works as, "…a shopping list template of the things you need to take into account, the canvas is indispensable". The canvas is systemic as it offers a full vision of the architecture of creation, distribution and capture of value and interdependent as each building block is related to the others and a modification to one box can impact them all (Sempels, 2013). The canvas centers value proposition and creation, which is in line with the objective of this research: how to create more value from and with used products. By having a value position as a central position, the framework provides an overall view how the value of used garments can be integrated in the business model towards a circular economy.

- Osterwalder et al. (2005) argue that the main value in the business model framework is that helps to capture, understand, communicate, design, analyze, and change the business logic of a company. Hence, the canvas and its nine building blocks is a useful tool to address the circular economy issues of garments as it allows examination of an organization's current value propositions and processes, diagnoses of the needs for change in order to address the product's end-of-life issues, examination of feasible routes towards possible solutions and creating understanding of interrelated elements and processes needed for business model change. It is a useful tool to categorize, analyse and interpret data.

- The Canvas provides a simplified language and visualization allowing discussion and communication of the complex topic of circular economy with collaborators and companies (Sempels, 2013; Arend, 2013).

- One of the main criticisms of the canvas is that it is based on a classical economic model where profit is the main goal (Upward and Jones, 2015), the value proposition primarily focuses on the customer (Bocken et al., 2013) and it does not directly consider the societal and environmental value a company's business model can create and deliver (Upward, 2013). However, Osterwalder et al. (2005:18) define value in rather broad terms, "*Value proposition gives an overall view of a company's bundle of products and services*". This definition is generic enough and does provide a sufficient foundation to extend the interpretation of the value proposition and the linked building blocks in a way that allows studying and understanding the creation of societal and environmental value while allowing an economic perspective as well. For example, how to create and capture value from waste streams by developing new value propositions (i.e. products and services).

Finally, this PhD research acknowledges that the Business Model Canvas has its limitations when it comes to sustainability innovation. However, considering that the aim of the research was explorative the canvas is an all-encompassing model that ensured that all relevant areas were covered.

4. Methodology

In the following section the research strategy is presented and my role as an industrial PhD researcher, underlying ontological and epistemological assumptions and applied methods.

Engaged scholarship strategy

The research departed from my practical experience of working with used clothing. The aim was to understand the problem of increasing amounts of post-consumer textile waste produced by the fashion industry, what their role in it is, and what opportunities and challenges are encountered when producers get involved with the end-of-life management of their products. The research interest is therefore driven by a phenomenon, and as an industrial PhD fellow studying a multidisciplinary, complex and new field, both within academia and industry, I found it important from the beginning to have a close dialogue with practitioners. Therefore, the overall strategy chosen for this research is 'engaged scholarship', which is defined by Van de Ven (2007:9) as: "*…a participative form of research for obtaining different perspectives of key stakeholders (e.g. researchers, users, clients, sponsors, and practitioners) in studying complex problems".*

According to Van de Ven (2007), a central theme of engaged scholarship is the close interplay between theory and reality in order to create knowledge that advances both science and practice. He emphasizes: "*Instead of viewing organizations as data collection sites an engaged scholar views them as a learning workplace (idea factory) where practitioners and scholars co-produce knowledge on important questions and issues by testing alternative ideas and different views on common problems*" (Van de Ven, 2007:7). When the PhD project was planned limited academic research and industry knowledge was available on the research topic. This became the rationale for involving industry, enabling us to address the academia-practice gap and extend the knowledge field to both sides simultaneously. In addition, the Danish Industrial PhD program (primary funding body of this research) expects PhD scholars to disseminate knowledge to a wider audience and create a network between the private sector and academia. Hence the engaged scholarship approach was appropriate and in a alignment with the objectives the program. In addition to close collaboration with case companies and a dialogue with charity organizations, I was also a member of several Nordic reference groups for reports that focused on textile waste, such as "Prevention of textile waste. Material flows of textiles in three Nordic countries and suggestions on

policy instruments" and "EPR systems and new business models: reuse and recycling of textiles in the Nordic region".

The research adapts a constructivist paradigm, which rotates around the assumption that reality is socially constructed and humans interpret the world that they inhibit and attribute meanings to this world (Stake, 1994). Considering my practical professional background and strong interest in the clothes reuse and recycling it is impossible to detach myself from the research phenomenon and therefore as a researcher I bring along my own worldviews and sense making. Hence I am not a detached observer but an active agent in constructing the world with my specific ideas, themes and interests that are incorporated in the research. In line with the choice of engaged scholarship strategy that involves practitioners in my research as dialogue partners and knowledge co-creators, the research is linked to the interpretivist epistemology, which acknowledges the centrality of the interaction between the researcher and the object of investigation and the subjective meanings used in social interaction (Farquhar, 2012).

According to Van de Ven (2007) a research problem can be studied from a variety of perspectives, ranging from an attached-insider to a detached-outsider, or what Evered and Louis (1981) call inquiry from the inside and inquiry from the outside. 'Inquiry from outside' is characterized by the researcher's detachment from the organizational setting which aims to provide universal knowledge of the phenomenon under study while 'inquiry from the inside' creates knowledge of the particular organization in particular settings and the researcher becomes engaged with the actions and experiences within the organization being studied (Evered and Louis, 1981). Both inquiry from the inside and inquiry from the outside strategies were applied throughout the research. More information is provided in Table 2, which presents how this was accomplished for each article. In addition, Van de Ven (2007) distinguishes four alternative forms of engaged scholarship, which vary depending on the research question and the researcher's perspective. These forms are informed basic research, collaborative research, design/evaluation research and action/intervention research. How these forms were applied in this research will be described below.

Case study method

The main research method applied throughout the research was the case study. Yin (2009:18) defines the case study as an "*empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*". In the

context of a business research this means collecting evidence about the phenomenon where it is actually taking place, which is particularly appealing for business and thus relevant for engaged scholarship. Yin (1994:9) proposes that case studies are preferable in situations when *why* and *how* questions are being asked. Thus it fits perfectly with the aim of this research that seeks for a broad understanding of why the fashion industry should be involved with the practices of post-consumer textile waste management and how this takes place (business model innovation). Case study method has also been claimed to be suitable for sustainability research as put by Evans (2011:61) "*given the nature of much sustainability research, which looks at cutting-edge ideas, projects and practices, the case study method offers a methodological approach that allows the researcher to make confident claims of potentialities, causality or development".*

Case studies can involve single or multiple cases, and numerous levels of analysis (Yin, 2009). During this PhD research one explorative case study and two in-depth case studies were conducted where both inside-out and outside-in approaches were applied. The explorative study applied an outside-in inquiry approach in order to obtain universal understanding of the research phenomenon. Two in-depth case studies that followed the explorative study were instrumental case studies (Stake, 2013) where the case was of secondary interest and instead played a supportive role to facilitate the knowledge creation. Both in-depth cases applied the inside-out approach that allowed the development of context specific knowledge and an in-depth understanding of issues that the case companies face in innovating their business models with a focus on post-consumer textile waste. In addition, case study evidence can be qualitative or quantitative or both (Eisenhardt, 1989). This research is based primarily on qualitative methods. Only one in-depth case study was complemented by a quantitative consumer study that was conducted in collaboration with an external partner. Table 4.1 below, provides a more detailed overview of the conducted case studies, the form of engagement and methods.

Table 4.1: Overview of the case studies and data collection

	Explorative study within the fashion industry	**In-depth case study I**	**In-depth case study II**	**Explorative study within second hand and recycling industry**
Company	Eileen Fisher (US), Filippa K (SWE), Levi Strauss (US), Boomerang (SWE), Patagonia (US), Katvig (DK), Jackpot (DK), Marks and Spencer (UandK), JACK and JONES (DK)	Filippa K (SWE)	JACK and JONES (DK)	Red Cross (DK), Myrorna (SWE), KICI (NL), Human Bridge (SWE), Goodwill (US), Humana (EST), ISOBRO (DK)
Aim of the study	General understanding of fashion industry's role in post-consumer textile waste	In-depth understanding of business model innovation with focus on product reuse	In-depth understanding of business model innovation with focus on product take-back and recycling	General understanding of second hand and recycling industry's role in post-consumer textile waste and their response to fashion industry's initiatives
Form of engaged scholarship	Informed basic research	Collaborative research	Action research	Informed basic research
Researcher perspective	Detached/outsider	Detached/Outsider	Immersed change agent	Detached/outsider
Timespan	Over the period of 10 months in 2011-2012	Over the period of 11 months in 2012-2013	Over the period of 34 months in 2012-2014	Over the period of 30 months in 2012-2014
Primary data collection	Secondary sources, 11 in-depth semi-structured interviews	12 semi-structured Interviews, company documents, 2 on-site visits, notes from 1 internal seminar	15 semi-structured interviews with JACK and JONES and 6 semi-structured interviews with collection partner I:CO[3], internal focus group study, company documents, field notes, diary, email inquiries from suppliers	10 Interviews, secondary sources
Outcome	Research article 1	Research article 2	Research article 3	Research article 4 under development

[3] I:CO, part of the SOEX GROUP, is a global garment collection and recycling company that has garment collection points all over the world. Being part of the SOEX Group the company processes 700 tons used garments every day in 90 countries. For more information visit http://www.ico-spirit.com/en/homepage/

Throughout the research, the chosen case study method followed an abductive research strategy. Abduction (Blaikie, 2009) and case studies (Eisenhardt, 1989) are both useful when little is known about the phenomenon under investigation allowing to both describe and understand the post-consumer textile waste seen from fashion brands' perspective. While inductive approaches rely on 'grounded theory' where theory is systematically generated from data, and the deductive approach is concerned with testing theories in the real world an abductive research strategy "*incorporates what the inductive and deductive strategies ignore – the meanings and interpretations, the motives and intentions that people use in their everyday lives and which direct their behavior – and elevates them to the central place in social theory and research*" (Blaikie, 2009:89). Blaikie (2009), furthermore explains that the abductive strategy begins by describing these activities and meanings and then deriving from them categories and concepts that can form the basis of an understanding of the problem at hand. In the context of this research, first an explorative study among fashion industry pioneers who are involved with reuse and recycling activities was conducted. This allowed an understanding of how practitioners in fashion companies see the fashion industry's role in post-consumer textile waste problem, the experiences they had with the initiatives they run and the opportunities and challenges they encountered in this field (see Article 1 for more detail). The findings allowed us to describe and map the field and form a basis for further more in-depth inquiries. In the abductive approach the researcher's objective is to discover new issues and during this process the phenomena should be seen through a conceptual pattern (Van de Ven, 2009) or a theoretical framework (Dubois and Gadde, 2002). Dubois and Gadde (2002:560) argue that the abductive approach builds on refinement of existing theories and *"…where the original framework is successively modified, partly as a result of unanticipated empirical findings but also of theoretical insights gained during the process,*" thus there is continuous interplay between theory and empirical observations. The explorative study among fashion industry pioneers was followed by two in-depth case studies where the theoretical framework of business models was applied during data collection, organization and analysis.

There has been several criticism of the case study method and it has not always been recognized as a proper scientific method (Dubbois and Gadde, 2002). First, the case study lacks objectivity and rigor where objectivity refers to the idea that reality is apart from the researcher (Farquhar, 2012). Response to this criticism is that case study has its own rigor, which is different from the quantitative methods, but no less strict as it allows the studying real-life situations while testing views directly in relation to phenomena as they unfold in practice (Flyvbjerg, 2006). While rigor can be achieved

through consistent and coherent research design, objectivity is something that case study is not seeking to achieve as the aim is to get an in-depth understanding of a contemporary phenomenon, which cannot be gained for example with surveys or experiments. Furthermore, to be out in the field itself is assertive, demanding and even coercive, which may force the researcher to revise the preconceived views, assumptions and concepts thus addressing the issue of subjectivity (ibid). For example, in the beginning of my in-depth case studies at Filippa K and JACK and JONES I had my own views and thoughts on how the reuse and recycling topics could unfold in their business contexts (i.e. constructivist), however, during the interviews many new perspectives were obtained which were formulated with the words of the informants.

Another criticism towards case study research is concerned with generalizability of the research findings also referred to as external validity (Farquhar, 2012). Based on the research findings that include both the explorative study followed by two in-depth case studies, one could argue that together the data exhibit a high level of external validity. They are the realities of fashion companies who pursue the involvement with reuse and recycling activities.

Empirical data

Explorative case study of the fashion industry

Exploratory case studies (Yin, 2009) are argued to be useful for looking at 'cutting edge' sustainability initiatives or innovative practices and ideas (Evans, 2011). In order to find out what the broader understanding of fashion industry's role in post-consumer textile waste is and what practices exists, a multiple case pilot study was carried out by interviewing 14 fashion industry representatives (informed basic research) engaged in post-retail practices. My long term interest and tacit knowledge in the field helped to identify the relevant cases and contact with the informants was easily developed. This could be attributed to the topic being new and exciting for the selected companies and their desire to share their thoughts while at the same time gaining new knowledge themselves. The level of engagement within this study was informed basic research (Van de Ven, 2009), where I was a detached-outsider and there to describe and build explanations on a phenomenon of post-consumer textile waste. Studying a new field for the industry as a detached-outsider required a mutual understanding and trust with the informants during the interviews which also helped to avoid superficial and cautious responses by the informants. As an engaged scholar it is difficult to avoid

getting engaged and sharing my personal experiences, as a result the majority of the interviews became engaged conversations with "give and take" and "emphatic understanding", which Alvesson (2003) calls a romantic view on interviewing. This approach turned out very useful since the field was new to the informants with no established best practices or business cases. This meant that initially they often they did not feel comfortable enough to share their thoughts and experiences. However, when I shared my own experiences and views, they began to open up. As Van de Ven (2009:273) has explained: "*Practitioners tend to appreciate the special expertise of academic researchers in bringing ideas from relevant theories and cases, approaching ideas from the outside, reflecting ideas back to organizational participants and providing opportunities for critical analyses and discussion*".

No specific theories were applied or tested during this study. It was one where exploration and understanding was sought. The thematic analyses method was applied to the data, which is an appropriate method for identifying, analyzing and reporting broad patterns (i.e. themes) within data (Braun and Clarke, 2006). The thematic analyses of the findings enabled me to understand the contemporary issues working with post-consumer textile waste from a fashion industry perspective and thus provided me with the conceptual clarification for further enquiry.

The study revealed that there are two broad strategies that companies pursue when entering the post-retail phase of their products, namely the implementation of product take-back schemes for recycling purposes and resell/reuse platforms for prolonging the life of the garments. These illustrate the two major circular economy approaches suggested by Stahel (2013). Furthermore, the findings showed that the fashion industry is willing to contribute to sustainable practices of end-of-life of their products, but struggle in finding the right model as no best practices exist and they have no previous experience with garment reuse and recycling. They were looking for suitable business models that could address the increasing amounts of textile waste. This paved the way for the next research steps in order to get a more in-depth understanding of how the product's end-of-life management could be operationalized through business model innovation.

In-depth case studies

As a next step, two in-depth case studies were conducted to obtain more knowledge about how these two strategies, namely prolonging life of existing garments through

reuse and resell activities and setting up a product take-back system for recycling purposes, which are implemented at an organizational level. Single case studies are recommended when the aim is to investigate a contemporary phenomenon in-depth and within its real-life context (Yin, 2009), and in situations where little empirical evidence is available (Eisenhardt, 1989).

Filippa K

This was an in-depth case study of the Swedish brand, Filippa K, who has since 2008 run a second-hand store in collaboration with a local entrepreneur in Stockholm. Filippa K was selected as an in-depth case study for two reasons. First, Filippa K is of theoretical interest because they are among the pioneers in the fashion industry that work closely with reuse focused concepts such as extended product lifespan and the resell of their own products. Since very few brands have experimented with this concept, it represents a revelatory case that gives access to a unique phenomenon in real life context (Yin, 2009). The case study focused on Filippa K's experience from their second hand initiative, investigations on the second-hand retail business opportunities and the expansion of the concept outside Sweden.

During the explorative study interview a close dialogue with Filippa K's Sustainability Manager was developed as we encountered the same curiosity and eagerness to find sustainable solutions for the current industry practices. Shortly afterwards the sustainability manager asked me to take part in their internal strategy and business model innovation process for mutual learning purposes. Van de Ven (2009) refers to this as collaborative research which facilitates co-creation of knowledge that is valuable for both scholars and practitioners. Through repeated meetings, observations, an internal focus group study and email correspondence, we discussed ideas, challenges, opportunities and implications of integrating the second-hand retail concept into their current business model. As an outsider, it was easy to ask questions that created an internal awareness of product reuse issues which created an interest in the reuse initiative among employees. Through the sustainability manager, I was encouraged to carry these ideas forward within the company.

The following Table 4.2 exhibits a list of informants who were interviewed during March 2012-January 2013.

Table 4.2: Informant overview

No	Interviewee	Date
1	Filippa K Corporate Responsibility (CR) Manager	1 March 2012
2	Filippa K second hand store manager	1 March 2012
3	Head of retail store operations	7 June 2012
4	CR Manager	7 June 2012
5	Filippa K 2nd hand store owner, local entrepreneur	7 June 2012
6	Internal seminar where the development of second hand retail concept was discussed, 9 participants from different departments were participating. The seminar was recorded and transcribed.	8 June 2012
7	Retail representative	4 September 2012
8	CR Manager	4 September 2012
9	Logistics representative	4 September 2012
10	Design representative	4 September 2012
11	Chief Financial Officer	16 October 2012
12	Wholesale manager	16 October 2012
13	CR manager	16 October 2012
14	CR manager	8 January 2013

More information about the case study is presented in Article 2, "Business Model Innovation through Second-Hand Retailing: A Fashion Industry Case" that was published in a Journal of Corporate Citizenship, Issue 57 March 2015, New Business Models for Sustainable Fashion, pp. 11-32.

JACK and JONES

The second in-depth case study was conducted at the Danish male brand JACK and JONES that belongs to the BESTSELLER group, which sells accessories and fashion products worldwide under 23 different brands.

JACK and JONES was selected as an in-depth case study for two reasons. First, the BESTSELLER Corporate Sustainability department was a stakeholder in the PhD project from the very beginning in the form of a mutual dialogue on textile waste issues. None of BESTSELLER's brands were involved with reuse and recycling activities in 2011 when this PhD project started. However, the Corporate Sustainability

department had a strong interest in learning more about the field. Initially, their role was to help me to understand the generic practices and business models of a fashion company (i.e. informed basic research) by allowing access to their practices. However, four months into the research the Corporate Sustainability department put me in contact with one of their brands, JACK and JONES. They said that JACK and JONES is an innovative and forward looking brand who, since 2011, had worked with methods to lower impacts from denim production which culminated in a range of low-impact denim products (LID) launched in 2012 that have been produced with less energy, waste and water consumption. A logical progression from the LID initiative was to go beyond production and supply chain issues and look for opportunities to take responsibility for the use and end-of-life phases of their products. In the beginning of 2012 the brand started investigating different product-take back models and potential partnerships with the goal to utilize post-consumer textile waste in their future collections.

The second reason for choosing JACK and JONES as a case is directly linked to the pilot study findings where one of the identified strategies applied in the fashion industry was product take-back systems for recycling purposes (i.e. Loop 2, material recycling specific, see Figure 3.4). Again, as this was a phenomenon where only a few brands on the market experimented with the idea, using JACK and JONES was a perfect opportunity to explore the field in-depth at an organizational level in a real life context, thus representing another revelatory case study (Yin, 2009). The unit of analyses of this longitudinal case study was the development and implementation of an in-store take-back system for the purpose of closed loop recycling. A detailed overview of data collection is presented in Table 7.2 in Article 3.

JACK and JONES' business model is focused on offering fast and affordable fashion to the medium-priced market segment. The general culture of the company is to sell more and the product's end-of-life issues have not been their concern. Questions such as 'what happens with the 60 million pieces of JACK and JONES products that are sold each year once they are used by the end consumer' and 'if JACK and JONES has a responsibility to take care of their post-consumer textile waste' had never been properly addressed.

The study interviews made the company consider these issues and ask questions of themselves and colleagues. This resulted in being an 'internal lobbyist for reuse and recycling matters'. My role of the detached outsider soon changed to being an internal researcher immersed in the experiences and activity of the 'take-back' project team.

This level of engagement is called action/intervention research (Van de Ven, 2009), which is described as "*an iterative process involving researchers and practitioners acting together on a particular cycle of activities, including problem diagnosis, action intervention, and reflective learning*" (Avison et al., 1999:94). The field of garment reuse and recycling was very new to BESTSELLER and JACK and JONES and my role became important due to my theoretical and empirical knowledge and reflective approach that helped them to analyze what they wanted to achieve and how. This is illustrated by a quote from their Global Environmental Coordinator at the Corporate Sustainability department:

"Within the last year - and especially in the idea and option generating phase - Kerli and her PhD work has added important inspirational value to our internal Bestseller discussions about addressing post-retail sustainability issues. We look very much forward to the next 2 years of her - and our - PhD"

Table 4.3 below describes the key events and activities that I was part of during the longitudinal case study and my engagement with the organization. This also illustrates the collection of multiple sources of data, which refers to data triangulation (Yin, 2009).

Table 4.3: Research engagement with JACK and JONES

Period	Key Events	Engagement
January 2012	• First meeting with JACK and JONES (JJ) on textile reuse and recycling issues. Meeting participants: two representatives from BESTSELLER Corporate Sustainability department, 2 denim sourcers from JJ who are responsible for the LID collection and one communication responsible.	I presented my research project and gave an overview of existing practices within post-consumer textile reuse and recycling. This started a discussion on problems associated with textile waste, JJ's role in it and what opportunities exist for reuse and recycling. They had ideas for starting a product take-back initiative, but new issues were raised during the discussion, such as who to partner with, what to do with the collected products and what is the bigger goal of the overall collection.
Spring 2012	• Product take-back project development. • Analyses of alternative methods and collection partnerships. • Meeting with I:CO and agreement for collaboration.	In close dialogue with the take-back project key members (LID responsible and communication responsible) we developed several scenarios for product take back. I shared existing research and empirical knowledge on this field and through my network, I facilitated negotiations with Danish Red Cross for potential collaboration and introduced them to the global garment collector I:CO with whom they entered a product take-back partnership. In parallel I conducted interviews with staff members involved with developing the take-back initiative, as well as top and middle-level managers. The aim was to learn about the existing business model and related processes and to understand how JJ sees its role in minimizing textile waste, what their visions were, opportunities and challenges they perceived with the integration of the product take-back and fiber recycling into their business model. Since it was a new field for many at JJ, the interviews were perfectly timed as the questions were thought provoking, initiating discussion and raising internal awareness of the textile waste topic among colleagues and top management.
Summer – Fall 2012	• Pilot product take-back roll out in Sweden and Denmark to test the I:CO model. • Project evaluation: low return rates but a good learning experience and awareness raising project for both JJ employees and consumers. • Decision to expand the take-back model to all JJ markets in 2013.	After the collaboration agreement was made with I:CO I did not participate actively in the practical set up and launch of the pilot project and followed the process from a distance until the evaluation of the pilot. During the pilot evaluation in fall 2012 I had close dialogue with I:CO and JJ take-back team and sustainability manager on the project's progress, the challenges that had occurred and how to overcome them. Since JJ saw I:CO as a service provider rather than a strategic partner, my researcher role shifted to that of a mediator within that relationship.
Winter 2013	• Roll-out of the initiative to 36 JJ markets	Prior the global launch, a launch meeting for JJ regional retail managers from all over the world took place. I was asked to make a presentation at this meeting to present the broader context of textile reuse and recycling and the existing practices.

Spring-Summer 2013	• Survey among store personnel. • Evaluation of the global results. Project was considered unsuccessful and was terminated to rethink the concept and its organization.	Through email correspondence, phone conversations and meetings I provided reflection on the results and shared experience from other cases in the industry. I contributed to develop the store personnel survey. Interview with JJ brand director on garment take-back, reuse and recycling.
Winter 2013 –Fall 2014	• Reassessment of the take-back initiative. • Set up of a new project team with strong presence from retail department. There was strong internal skepticism of the project. • Focus group study. • Global consumer survey. • Internal advocacy among top-management team.	Participation of the reevaluation process, brainstorming of alternative ideas for garment collection (to include online), voucher system and consumer engagement. Sharing experience and ideas with new members of the project team and learning about their concerns in order to address internal skepticism of the initiative. In spring 2014 I was given the lead role to rethink the take-back project and develop a concept that is closer to JJ business model and customer group. I initiated an internal focus group study among 20 employees on the in-store take-back model, collection box, communication framework, incentive system and ideas for future improvement. I actively engaged with middle and top-level employees at JJ retail and brand identity department to understand their views and concerns of the project and engage them more actively in the new concept development. I initiated an international JJ customer survey that was carried out by an external researcher where my role was to assist in the questionnaire design, survey dissemination and internal communication of the results. Interview with BESTSELLER owner and CEO on the circular economy. Invitation to continue the dialogue and continue experimenting with circular economy ideas at JJ.
2014-2015	• Set up of new product take-back project team. • Evaluation of the earlier experiences and survey results. • Redevelopment of the initiative and plan for the take-back re-launch. • Sorting experiment with I:CO for identifying reuse and resell value of JJ used products. Evaluation of the results and presentation to top management.	Active involvement in the redevelopment of the take-back service through meeting participation, reflective discussions and negotiations with I:CO. A follow up meeting with the owner/CEO and JJ top management on future circular economy projects at JJ. I initiated a sorting experiment with I:CO to map and investigate reuse and resell value of used JJ products. The results were analysed and introduced to JJ top management and an idea for a JJ second hand brand was born. Investigation and facilitation of several international collaboration projects for JJ product reuse and recycling purposes. Continuous dialogue with the owner and CEO of BESTSELLER on the circular economy business model opportunities for JJ/BESTSELLER.

The overview in Table 4.3 shows that the take-back project went through several phases with highs and lows. The research engagement also varied across the variations. As in every organization, people leave or change positions which can result in experiences and enthusiasm disappearing. At the same time new people step in who require a new round of awareness rising. Companies also change their focus and priorities and even though the product take-back and circular economy ideas are not yet fully implemented at JJ, the ideas are actual and under development. The case study illustrates the so called 'bumpy road' towards the circular economy of fashion by showing that it is a long process to get the full top management commitment and raise the internal awareness of the topic that is necessary for the business model change. The active long-term engagement with JJ have contributed to discovering new dimensions and in-depth understanding of the organizational, business model, supply chain and consumer related challenges of implementing a product take-back and closed loop fashion system. To follow the case from the inside-out while also being in a position to bring outside-in perspectives allowed me to link different kinds of knowledge and bridge the theory and practice.

The aim of this work is to bring the textile waste issue into the discussion room of a mainstream fashion brand with the hope that they will act on it. By the end of this research period both the JJ top management and owner of the BESTSELLER realized the need for action in this field and were willing to act. Several pilot projects have been initiated and experimented over the last three years and some are under test and development. The future will show how these pilots will be scaled up, thus providing an interesting opportunity for further research.

The JACK and JONES case study is written in Article 3, "A bumpy road towards a closed loop fashion industry: Experience from a Scandinavian fashion brand", under review in California Management Review.

Explorative study of the reuse and recycling industry

There are several actors who have a contributing role in minimizing textile waste. Therefore, in order to understand the phenomenon of post-consumer textile waste from a systems approach, in parallel with the fashion industry, the phenomenon was additionally investigated within the second hand charity industry. Explorative interviews were conducted among nine organizations that are involved with sorting and selling of clothes. The aim of these interviews was to understand their current business

models and practices with textile collection, sorting, reuse and recycling and how they see their role in the current textile waste system. Furthermore, in the light of the findings from the explorative study in the fashion industry that confirmed that fashion brands are slowly entering the textile waste system, the aim of the interviews was to understand how the charity industry perceived the entrance of a new actor in the textile recycling system and what implications it might have on their existing business models.

In total, 13 interviews were carried out with nine organizations across Scandinavia, Europe and USA. Five interviews were conducted with Danish Red Cross second hand department who were a dialogue partner from the beginning of the PhD project. The engagement form of this case study was informed basic research which is often undertaken to describe, explain, or predict a social phenomenon and where I had the detached outsider role. While the in-depth analyses and findings of this exploratory study were unable to be incorporated in this PhD dissertation as I had narrowed its focus as the project progressed, the knowledge gained during data collection provided important input in perspectivising and conceptualizing the overall research agenda and findings. The key findings from the second hand charity sector are summarized in the discussion section in chapter 8 titled, ‘Charity sector under pressure’.

5. Article 1

"Post-retail responsibility of fashion - a fashion industry perspective" The article is published in Journal of Fashion Marketing and Management, Volume 18, Issue 4, p. 413-430, 2014 (peer reviewed).

Abstract

Growing amounts of post-consumer waste is a global problem and, at the same time, there is an emerging focus on economic models based on cradle-to-cradle-thinking. In recent years the fashion industry has begun to pay attention to what happens to their products after the use and disposal by consumers and how to minimize negative environmental impacts of their used products. Through multiple case studies of first-movers on the market and thematic analysis this study explores the emerging organizational field of post-retail responsibility in the context of the fashion industry. The study demonstrates that there are numerous opportunities for fashion companies to take responsibility for the downstream value chain of their products, but also brings along several challenges. Two main strategies are distinguished by how companies engage with the end of life of their products, namely second hand retailing and product take-back schemes. However, the field is still in its infancy and no clear patterns exist.

Key words: fashion, closed loop supply chains, circular economy, post-consumer textile waste, case study

Introduction

Sustainable fashion and sustainability in the fashion industry are terms that are increasingly common. Broadly, these terms are associated with fashion brands' endeavours to improve their social and ecological footprints along their global supply chains, a trend that will continue in the future due to the industry's increasing use of resources, as well as social and environmental impacts. For decades the industry has focused on improving upstream supply chain practices, mainly related to social and environmental issues of production, such as human rights, waste management, toxic-free production processes, and sustainable materials, while downstream supply chain issues, such as use, reuse and end-of-use management issues are only recently gaining more attention (Allwood *et al*., 2008; Dickson *et al*., 2009; Fletcher and Grose, 2012; Ho and Choi 2012).

The post-consumer textile waste issue is not a new problem but is growing in importance in the global fashion industry as increases in purchase frequency, availability of lower quality clothes and a real reduction in price levels has changed our relation to clothes and led to an increasing trend of throw-away fashion and growth in textile waste (Birtwistle and Moore, 2007). Despite several alternatives for used clothes, such as donations to charitable organizations, used-clothing markets and several designer and producer-led initiatives that focus on textile reuse and recycling, there is a global agreement that post-consumer textile waste is a growing problem and demands increased attention as the current systems divert too much used textiles to landfills (Domina and Koch, 1999; Fletcher, 2008; Hawley, 2008; Hawley, 2009). Until recently, the textile waste issue has mainly been addressed from the recycling and second hand retail perspectives. However, in light of the world's decreasing resources, the fashion industry's unsustainable practices and consumers' unsustainable clothing consumption patterns, it is important to study the waste issue from the fashion industry perspective as they are designers, producers and marketers of clothes that eventually will turn into textile waste. There is a general agreement that end-of-use (i.e. redistribution, remanufacturing and reuse of products) is a significant issue that should be addressed at the time of a product's design (Belz and Peattie, 2009; Dickson *et al*., 2009). Concurrently, throughout the world there are several Extended Producer Responsibility (EPR) discussions at the legislative level focussing on textiles, pioneered by French self-financing entity, EcoTLC (Kelly, 2012), which provides an indication that the textile waste recycling sector is under transformation. In this context several fashion brands have started reviewing their business models from a more holistic perspective in an attempt to incorporate complete life cycle strategies into their practices.

It is the aim of this paper to expand the post-consumer textile waste discussion and explore the field from the fashion industry's perspective. Through the analysis of nine fashion brands' endeavours to prolong the life cycle of their clothes and manage their post-retail waste streams the study aims to:

1) map the emerging organizational field of post-retail practices of garments from a fashion industry perspective
2) provide insights into fashion companies' motivations and chosen strategies in addressing the post-consumer textile waste issues and the related opportunities and challenges

Background

Today's fashion world is characterised by its high volatility, low predictability, products' short life cycles and high volume of impulse purchasing where speed and rapid change have become synonyms of fashion markets, making companies' survival determinant on flexibility and quick responsiveness (Christopher *et al.,* 2004). With the exception of the luxury market, the industry is considered a low-value manufacturing industry and the trend toward more complex and faster garment supply chains is leaving behind a negative ecological footprint (Ho and Choi, 2012). A study by Birtwistle and Moore (2007) among fashion consumers further indicates that fast fashion encourages a "throwaway culture" where products and fashion have lost their intrinsic value and encourages consumers to replace and dispose of products before their real life cycle has ended.

The annual world consumption of fibres in 2012 was 82 million tonnes, which corresponds to an apparel fibre consumption rate of approximately 12 kg per capita, a number that has steadily increased since the 1970's (The Fiber Year, 2012). This is a strong indicator that more clothes are being produced, used and disposed. While the increase of fibre production and consumption stimulates the economy, it is a double-edged sword as it also increases the problem of textile waste (Hawley, 2009). For example, in the UK alone, consumers annually produce nearly 2 million tonnes of textile waste, of which 1.2 tonnes end in landfills (DEFRA, 2007).

Traditionally, fashion companies are behind the design, production, marketing and retailing of clothes. Consumers purchase and wear the clothes whose fate depends on consumers' consumption, donation and disposal habits, norms and practices of a particular country and culture and availability of alternative resale channels and recycling schemes. The life of a garment can therefore be short or long with a high or low environmental impact. Research indicates that the convenience of clothing disposal and easy access to donation sites are among the most important factors for consumers to donate their clothes (Ha-Brookshire and Hodges, 2009) and many of the current solutions lack this convenience. At the same time, it can be difficult for consumers to decide which garments are of sufficient quality for donation and which can be used for other recycling purposes. In this confusion and lack of awareness of used clothes' environmental impacts, many garments end up in trash bins. Hawley (2009:179), who has studied textile recycling systems in the U.S. for many years, emphasizes that *"...because textiles are nearly 100% recyclable, attention needs to be given to the recycling and recyclability of textiles so that less ends up in landfills and*

by raising consciousness concerning ecological issues, channels for disposal, and environmentally conscious business ethics, steps can be taken toward a more sustainable use and disposal of post-consumer textiles."

Conceptualisations of the post-retail fate of garments have typically been derived from a textile recycling perspective, focussing on textile recycling channels and practices (Domina and Koch, 1997; Hawley, 2000; Hawley, 2008; Hawley, 2009; Woolridge *et al.,* 2006; Abraham, 2011) or from a consumer behaviour perspective by studying consumers' use and disposal habits of their unwanted garments (Shim, 1995; Domina and Koch, 1999; Klepp, 2001; Ha-Brookshire and Hodges, 2009; Laitala *et al.,* 2011; Bianchi and Birtwistle, 2011; Laitala and Boks, 2012). Post-retail involvement by the fashion industry has received less consideration and only recently is gaining more importance. Ho and Choi (2012) conducted a Five-R (i.e. reuse, reduce, recycle, re-design and re-imagine) analyses for sustainable fashion supply chain management and they suggest that in greening their initiatives, fashion companies should strongly consider the product development process and extend stewardship across the multiple life-cycles of products. Fletcher and Grose (2012) propose that making the designer or retailer accountable for the future disposal of products changes the logic of clothing production, distribution and sales and extends the activity focus of producers beyond the upstream manufacturing chain to include downstream actions, resource flows and future consumer behaviour. However, a more focused discussion of post-consumer textile waste issues from a fashion industry perspective is missing.

Extended producer responsibility within textiles

Initiatives where fashion brands are involved with product take-back, reselling, recycling, downcycling and upcycling activities are referred to as product stewardship or EPR (Kostecki, 1998). The Organisation for Economic Co-operation and Development (OECD) defines EPR as "…*an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle"* (OECD, 2001:18). The EPR concept has two main functions, the first is to shift responsibility upstream to the producer by internalizing the environmental costs of treatment and disposal, which could then be incorporated into the cost of the product, and secondly, with its focus on extending producer responsibility to post-consumer products, EPR can provide a pressure point to drive upstream changes in materials selection and in the design aspects of a product (OECD, 2001). There are many EPR programs in operation globally and an EPR

program can be mandatory, driven by policy or voluntary, driven by industry (Kibert, 2003). The most active use of EPR under both of these methods is product take-back that is applied to specific products (e.g. automobiles), product categories (e.g. electric and electronic products) or waste streams (e.g. packaging) (OECD, 2001). An example of a mandatory government run ERP is the European Union's Directive on Waste Electrical and Electronic Equipment (WEEE), which is based on a polluter pays principle and makes producers responsible for taking back and recycling their WEEE products at no cost to consumers (Kibert, 2003). A good example of an industry-driven, voluntary EPR program is the U.S. carpet industry, led by carpet manufacturer, Interface, who provides a leasing arrangement for consumers to purchase the use of the carpet, while Interface retains ownership. After the lease period is over, Interface takes back the carpet and grinds it up to reuse and thereby creates a closed-loop EPR program (ibid).

EPR and product take-back systems have been studied by several researchers in different industry contexts and product groups, for example power tools in Germany (Klausner and Hendrickson, 2000), electrical and electronic equipment (Hischier *et al.,* 2005) or cars (Krikke *et al*., 2004). In the case of textiles, EPR is a new phenomenon and textile waste has rarely been regulated from the producer perspective (Morana and Seuring, 2007). Only few policy-driven examples currently exist, such as France's eco levy that engages the fashion industry in the recycling of their products at the end of their usage (Eco TLC, 2012) and Canadian legislation with a 2017 deadline that will place textile disposal options with retailers (Kelly, 2012). Currently, in the European Union there are also discussions regarding life-cycle based directives for the textile industry, where one possible measure is EPR for the full life-cycle of products, which would include systems of take-back and post-consumer waste-management (Ecotextile News, 2012a). While policy-driven EPR is slowly emerging, industry-driven EPR seems to take lead where several fashion brands have taken proactive steps to engage with the issue of post-consumer textile waste, with a focus on the uncaptured value creation possibilities that product take-back, reuse and recycling provides. This study explores nine of these initiatives and provides insights from their experiences.

Methodology

Data collection for this exploratory study was conducted in two phases. Phase one was based on secondary sources, several discussions with industry contacts and the author's own practical experience, which supported a mapping of generic industry trends and identification of relevant case companies. The cases were selected from among the

fashion industry's early movers who are involved with sustainability practices with particular focus on post-retail activities. Phase two commenced with twelve in-depth, semi-structured interviews with seven companies, of which ten were individual interviews and two were group interviews. Review of company documents from these seven companies, as well as two additional well-documented cases, were conducted for a total of nine company initiatives. The majority of informants were companies' CSR or sustainability managers, while the remainder represented marketing, production and retail functions. On average the interviews ranged between 60-120 minutes and were conducted within a ten-month period in 2011 and 2012. Nine interviews took place at the interviewee's office location, one interview was conducted by email, and two interviews were conducted over the phone.

The overall interview goals were to have informants describe their current post-retail initiatives, and discuss underlying motives, challenges and opportunities related to development and implementation of the initiatives. The interviews were transcribed and all the data and case materials were analyzed using the thematic analyses approach, a method for identifying, analyzing and reporting patterns (i.e. themes) within data (Braun and Clarke, 2006; Boyatzis, 1998). The qualitative data analyses package, NVivo, was used for coding and analyses. Initially, the transcripts were systematically analyzed to generate meaningful segments of data that addressed the overall interview goals. Second, this data set was coded and organized into meaningful groups, which formed the basis of repeated themes. Third, the identified themes were then organized into global themes (Attride-Stirling, 2001), which were further discussed and supported by citations from interview informants. During the coding process the focus was on searching for concepts, words, ideas and patterns that described and reflected the companies' work with post-consumer textile waste and related challenges and opportunities to this work. Both similarities and differences were deemed to be areas of interest. The intermediate phase one and two are not presented in this paper, which presents the findings alone.

Overview of industry-driven post-retail initiatives

Fletcher (2008) suggests that the most common approach to deal with waste arising from the textile industry is to implement waste management strategies (e.g. reuse, reduce and recycle), which intervene at the end of the industrial chain of clothes. This explorative study analysed nine company initiatives in the global fashion industry addressing products' post-retail phases and demonstrates how these strategies are being interpreted and implemented in terms of post-consumer textile waste in the fashion industry. Initially, the case selection process tried to identify best practices among the fashion companies that are engaged with reuse and recycling practices of used textiles, however, during the data collection it appeared that the field is complex and fragmented and the identified companies were still going through experiential learning based on trial and error, and are gradually adopting new routines, procedures or strategies that lead to favourable outcomes (Levitt and March, 1988). Hence the study ended up as an exploratory investigation of the emerging post-retail field of fashion. An overview of the studied companies and a summary of their post-retail initiatives are presented in Table 5.1.

Table 5.1: Case overview

Company	Turnover 2010/ 2011 (MUSD)	Market segment	Distribution	Price segment[4]	Post-retail initiative
Eileen Fisher Inc.	310[A]	Women's business and casual clothing	55 stores in the U.S. 1 store in Canada and U.K.	Premium	Green Eileen Initiative (U.S.) where donated and pre-owned Eileen Fisher products are sold in Green Eileen second hand stores and revenue is donated to Eileen Fisher Community Foundation; hands-on upcycling workshops for customers.
Filippa K	76,6[B]	Men and women's business and casual clothing	20 markets around the world via 50 Filippa K stores and more than 700 retailers	Premium	Filippa K Second Hand (SE) in collaboration with a local consignment store where pre-owned Filippa K clothes and collection samples are sold.
Levi Strauss and Co	4.761[C]	Denim and other casual wear for men, women and children	55 000 retail locations in more than 110 countries	Medium	A Care Tag for Our Planet campaign by Levi Strauss (U.S.) in collaboration with charity organization, Goodwill, where product care tags, online campaigns and retail store communication encourage people to sustainable use practices and donation of unwanted clothing to Goodwill.
Boomerang	Data not available	Men's, women's and children's clothing and accessories; home collection	6 countries, with 32 own retail shops and over 200 selected retailers	Premium	The Boomerang Effect by Boomerang (SE) where consumers can donate their used garments in the store, which are resold in Boomerang stores or upcycled for Boomerang Home Collection products.
Patagonia	Data not available	Men's, women's and children's outdoor clothing, sportswear, travel	28 retail stores in the U.S, retail stores in 14 other countries,	High	Patagonia's (U.S.) Common Threads Initiative with in-store product take-back scheme and resell platform for

[4] There are different references in segmenting fashion consumer markets. This study applies the classification used by Tran (2010) where the fashion industry is divided into luxury, premium, high, medium and low price segments. Identity-driven firms are categorized in the luxury, premium and high fashion markets, market-driven firms are categorized in medium and low price market.

		clothing	global dealership		used Patagonia apparel in collaboration with eBay.
Katvig	6,7 [D]	Children's clothing	Distribution in 11 markets	High	Katvig's (DK) Swap event and Sustainability School where customers can swap Katvig's clothes and learn about sustainable clothing.
Jackpot	64,1[E]	Women's casual clothing and accessories	900 wholesale customers and 80 own retail stores in 21 countries	High	Jackpot (DK) Closing the Loop initiative with donation of used garments in stores for a discount voucher; donated clothes are sent to local charities.
Marks and Spencer	15.158,8 [F]	Men's, women's and children's clothing; accessories and footwear	Over 361 owned and franchised stores in over 42 territories	Medium	Shwop Initiative by Marks and Spencer (U.K.) in collaboration with charity organization, Oxfam, where used clothes can be donated in MandS and Oxfam stores for reselling and recycling purposes, and customers receive a discount voucher.
Jack and Jones	817[G]	Men's jeans and casual clothing	Distribution in approximately 30 markets worldwide, ca. 1000 shops	Medium	Jack and Jones (DK) in-store product take-back initiative for a voucher in collaboration with recycling company, I:CO, collected clothes are sorted and redistributed by I:CO for reuse and recycling purposes.

[A] Orbis 2012
[B] Filippa K 2012
[C] MarketLine Advantage 2012a
[D] Ideas Compass 2011
[E] IC Companys 2012
[F] MarketLine Advantge 2012b
[G] Jack and Jones, personal communication

The investigated cases illustrate that reuse, reduce and recycle strategies are present but varied across these initiatives and two broad approaches can be identified. First, some companies focus mainly on collecting products for reuse and recycling purposes through different in-store take-back schemes or direct donations to charities (e.g. Jack and Jones, Patagonia, Boomerang, Jackpot, Marks and Spencer, Levi's). This is not a new phenomenon in the industry, as already in the 1960's clothing companies in the U.S. provided consumers with a discount on a new item if they mailed in their old items for disposal or people in need overseas (Packard, 1960). However, this phenomenon is currently a growing trend grounded more in environmental aspects than social issues. Secondly, companies focus on prolonging the life of clothes by developing alternative reuse and second hand retail channels (e.g. Filippa K, Eileen

Fisher, Boomerang, Katvig and Patagonia). However, most of the initiatives are not clear-cut and reuse, recycling and reduce approaches are often intertwined in companies' strategies. For example, the Boomerang Effect initiative includes product take-back in stores; resell of used garments in existing Boomerang stores and recycling practices into new home collection products. Also Patagonia runs several activities in parallel that focus on reuse, reduce and recycle through their Common Threads Initiative.

The analysis suggests that large-scale, market driven brands with complex distribution channels engage with product take-back schemes, since second hand retailing requires extensive handling of products and there is uncertainty related to the products' resell value and stock supply at a larger-scale. Concurrently, premium and high fashion brands with higher quality products try to find ways to reuse their products first through second hand retail channels and other reuse platforms. This supports Fletcher and Grose's (2012) argument that items designed for resale should be made to the highest quality possible to ensure that garments will hold their value and be re-bought many times.

Another phenomenon among several initiatives is distribution of a gift voucher or discount for returned products. While the size of the discount varies across cases the motive behind it seems to be the same: to encourage customers to return their used clothes and increase customer loyalty, which hopefully leads to increased foot traffic in stores and increased sales. One informant said, "…*we have noticed that the redemption rate of these reward cards is nearly 87%, which is very high. This means that people are taking that offer to buy something new. So, it works both sides of the equation*". This highlights that companies are searching for a business case in their post-retail initiatives.

Organization of the initiatives

There is a suggestion that partnerships and collaboration between different industry stakeholders play an important role in tackling many sustainability issues (Googins and Rochlin, 2002; Neergaard *et al.,* 2009) and collaboration brings many benefits to partners through sharing of resources, product or service innovation or access to new markets (Googins and Rochlin, 2002).

Fashion companies can organize their post-retail initiatives in several ways and this study has identified three main possibilities. First, companies enter a donation partnership with a well-known charity organization to facilitate the collection of used clothes. Partnerships between charities and the fashion industry is not a new phenomenon, but have historically focused mainly on overstock utilization where charities assist in finding new purposes and markets for unsold or defective collections. Partnering in used garment collection is a relatively new phenomenon, and it allows fashion companies to benefit from charity organizations' know-how of the second hand market and established sorting and reselling facilities. According to Olesen (2010) the practice of companies running collaborative campaigns with charities, such as cause-related marketing, is one of the fastest growing trends and in addition to mutual benefits for both parties it also facilitates an experience for consumers to act ethically.

Second, fashion brands implement in-store take-back schemes in collaboration with a third-party partner. For example, Danish male fashion brand, Jack and Jones, collaborates with the global textile and shoe collection company, I:CO. This collaboration provides Jack and Jones with a cost-neutral, ready-made solution for managing their global system of reverse logistics. Recently, H&M announced their global rollout of a similar initiative where in collaboration with I:CO they have implemented a voucher-based product take-back scheme at all H&M chain stores in 48 markets worldwide (Ecotextile News, 2012b). This type of partnership with an external global collector seems to be suitable to brands with strong global presence. The organizational landscape of charity organizations can differ from country to country, and reuse and donation traditions vary in different cultural contexts, meaning that building relationships with charities in different markets becomes complex and resource intensive. A partnership with a professional third-party collector allows fashion companies to concentrate on their core activities and offers professional redistribution, reuse and remanufacturing of garments. At the same time, in-store product collection provides fashion brands an opportunity to build customer loyalty, connect customers directly to the brand's sustainability efforts and increase the store traffic.

Finally, there are brands that have chosen to manage their own internal waste stream and post-retail initiatives (e.g. Katvig, Eileen Fisher, Boomerang). This seems to be a pattern among companies who have a high quality product that has a higher perceived resale value and companies see an opportunity to capture that value. However, two out of the four studied cases that focus on second hand retail activities, Filippa K and

Patagonia, have also entered a partnership with an external actor in order to benefit from the partners' know-how and resources. This illustrates that some form of collaboration plays an important role in current reuse and recycling initiatives of fashion.

Findings from thematic analyses and discussion

As previously discussed, fashion brands have generally been absent from the textile recycling discourse and there is no clear understanding of the fashion industry's engagement with textile reuse and recycling. It was therefore the goal of the interviews to shed light on the topic and create a better understanding of what is behind these initiatives. More precisely, this study investigated how fashion companies perceive their role in minimising textile waste and what opportunities and challenges they relate with this new field, with the analysed data grouped under these three areas (Table 5.2).

Table 5.2: Emergent themes related to post-retail initiatives

Research interest areas	**Emergent themes**	**Best example from the interviews**
Role	Showing responsibility for products and processes	*"…it's crazy that today you can just produce very hazardous products and put them out in the markets and forget about it. You have to be more responsible and take care of it. How do you make the company more responsible? By telling the company to take the things back in the end." Katvig*
	Educating and engaging consumers regarding responsible use and disposal of clothes	*"It's all about how can we help consumers make more conscious choices when it comes to consume, use and reuse. We need to find another way to consume. The fast fashion business has been going on and it's not sustainable in a long run, so we need to change peoples' minds." Filippa K*
	Taking the lead in industry innovation and solving future resource scarcity	*"We as corporate citizens really must make these changes. So, we are hoping we can model another way of doing business in the clothing industry" Eileen Fisher*
Opportunities	Building customer loyalty and finding new customer segments	*"We have very loyal customers and most of our customers are over 45. So, we are hoping that as people come to their senses about disposable clothing that we will start to attract a younger audience. While we're not having people buy more clothing but we'll have more people buying our clothing."* *Eileen Fisher*
	Innovating business models	*"It's really about the idea to create a business model. How do we get a lower priced product out on the market to service a different customer by not just creating more stuff?" Eileen Fisher*
	Capturing second hand value of products	*"…we see it as an opportunity because we know that our clothing can really stand the test of time, so that we can actually get more customers. We don't want each customer to buy more and faster but you can have new customers."* *Filippa K*

	Strengthening brand image, good PR and storytelling	"*Regarding extending the lifecycle of our products we see it as a very logical decision in order to close the loop. And at the same time we are able to tell a very good story based on this.*" *Jack and Jones*
	Increasing competitive advantage	*"The benefit is proof of quality, letting the market know that we do care about our environment, building proudness in being part of the brands and diversify us against other brands." Boomerang*
Challenges	Limited best practice	*"..not knowing any other brands that have done that before and just thinking, well, what would that do to the brand image? Is it going to work?" Eileen Fisher*
	Limited experience with reverse logistics and redistribution	*"It would be so easy to just go with the flow and say okay, we take back our clothes. But someone has to calculate on the logistics and if it does make sense for the environment or not." Jackpot*
	Stock related uncertainty	*"One of the challenges is to actually make sure that you have garments to sell. If its not a mature market, people will not have enough Filippa K garments for the second hand concept." Filippa K*
	Lack of consumer awareness	*"The main challenge is to spread the message and get more customers interested in returning old Boomerang garments so that we can increase the amount of garments." Boomerang*

Fashion brands' role in post-retail sustainability of clothes

Responses to how informants perceived their role in minimizing textile waste were largely related to their aspiration of being more responsible and changing unsustainable practices of the current fashion industry. A majority of the studied initiatives were linked to the companies' existing CSR and sustainability agendas, which earlier had primarily focused on environmental and social impacts of the upstream supply chain. Expanding responsibility to the end-of-life of their products was therefore a logical step for these companies to pursue.

Educating consumers and raising their awareness of the negative environmental impacts related to clothing use and disposal was another theme that was brought up by informants several times. As one of the informants stated*, "…we see our consumers more as activists than consumers, we must make them understand and share our vision and make them act…"*. Birtwistle and Bianchi (2011:340), who have studied consumer disposal behaviour in different cultural contexts, support this theme by arguing that, "…a positive recycling behaviour is enhanced by consumer age and greater levels of awareness of the environment. This implies that to achieve higher rates of clothing donation by consumers, educators, the media and charities, as well as, fashion retailers must emphasize and encourage consumers to engage in recycling behaviours*."* Patagonia for example asks any seller who posts a used Patagonia product on Patagonia's eBay store to take the Common Threads Initiative Pledge by committing to

reduce their environmental footprint and to help wrest the full life out of every Patagonia product by buying used products and selling what is no longer needed to keep things in circulation.

Awareness raising activities are also valuable from the company's own perspective. When it comes to post-retail responsibility issues consumer pressure is currently almost non-existent and for companies to succeed in their initiatives they feel the need to get closer to the consumer and engage them in their sustainability practices. This is especially relevant in clothes' use and disposal behaviour, where companies have no control over their products and the post-retail impact of their products is entirely in consumers' hands. This concern was expressed both by the companies who run reuse-focused second hand retail initiatives and those who are involved with product take-back schemes. From a second hand retail perspective this is particularly important as consumer awareness and willingness to bring their products back directly impacts stock availability while in the case of take-back and donation schemes it plays an important role in increasing the number of donations, foot traffic in the stores and eventually increased sales when the vouchers are redeemed. When it comes to raising awareness of product use studies show that different marketing and communication strategies might be required for different markets and segments as the selection of washing temperature, frequency, type of detergent, ironing and use of tumble dryer are very much culturally dependent (Pakula and Stamminger, 2010; Laitala and Boks, 2012).

Additionally, several companies expressed their concerns related to future resource scarcity and their role in finding innovative solutions for future materials and closed loop business models. Statistics show that the worlds' population is growing and by 2025 over 8 billion people will need textiles and clothing (Kelly, 2012). To meet this demand requires increased production of both natural and synthetic fibres, however, it is argued that future oil supplies are limited and agricultural land should be used for future food stocks instead (ibid). As one of the informants stated, "*The biggest threat is a resource part. We are running out of resources or we are using resources that are really damaging the earth…Therefore we need to find new ways and materials for our products"*.

Even though none of the studied companies directly stated the external stakeholder pressure for commencing initiatives interviewed companies referred to each other's initiatives, which indicate some level of imitation. For example, several informants

mentioned Marks and Spencer's donation partnership with Oxfam and Patagonia's Common Thread Initiative during the interviews. Research on diffusion of innovative practices shows that firms often follow a two-stage model: a first group of early innovators adopt the practice because of its intrinsic perceived benefits and a second group of latecomers adopt it because they imitate the first (Abrahamson, 1993). Even though some level of imitation may exist across the initiatives it is assumed that the studied cases still belong to the early innovators group due to their innovative and not-tested approaches.

Post-retail related opportunities

There are three main driving forces for companies to engage with the end-of-life aspects of their products, often referred to as reverse logistics, namely economic, corporate citizenship and legislative (Álvarez-Gil *et al.,* 2007). Economic forces demonstrate that reverse logistics activities have the potential to improve profitability through cost minimization, access to new consumer segments and increased revenues. Corporate citizenship refers to the search for sustainable development from an environmental and social perspective while legislation issues refer to the norms made obligatory by any jurisdiction that dictate the legal obligations of a firm. The findings from the current study show that the main drivers for fashion brands to enter the post-retail field are both economic and corporate citizenship. Companies see several business opportunities connected to the post-retail phases of their product through resale of their used products (companies who focus on second hand retailing), increased customer loyalty and new customer groups. This finding supports Fletcher and Grose's (2012) argument that not just physical garments are deposited in landfills, also design and business opportunities end up buried in a hole in the ground and therefore used textiles should be seen instead as a potential catalyst for business opportunities.

Additionally, CSR and business model innovation related capabilities, such as improving the environmental performance of the company, facilitate development of innovative solutions related to product design, distribution, redistribution and closed-loop solutions to address future resource scarcity were discussed by informants. Alvarez-Gil *et al.,* (2007) argue that even without immediate profit reverse logistics may be helpful to generate potential intangible benefits such as corporate image

improvement, legislation anticipation or competitive advantage creation, which are expected to secure the company's future income.

There is currently negligible legal pressure, except the eco levy in France, on fashion companies to engage with the end-of-life of their products and therefore legislation was not part of the dominant driving forces of the studied initiatives. However, the situation is not static as several discussions that focus on producer responsibility in the context of textile waste are currently happening around the world, which might result in legislation regulating producer responsibility similar to France.

Post-retail related challenges

Engaging with reuse and recycling practices is a new phenomenon for the fashion industry, which brings along several challenges. First, companies have limited knowledge and experience with collection, redistribution and recycling of their products and they see reverse logistics as a challenge. According to Wells and Seitz (2005) there are variations in terms of the reasons for product return, the method of collection, the infrastructure used, the place at which the product is returned, and the subsequent destination of the product. As there are no best practices available and no legislation to guide the industry companies are currently alone in developing reverse logistics system that matches their needs. For example, for fashion brands with strong a global presence and complex distribution channels it is challenging to set up a product take-back and redistribution system and therefore they try to find an external partner to find the most meaningful solution for both the company and the customer.

While implementing product take-back schemes mainly concerns reverse logistics, the alternative of developing reuse and resell channels creates challenges in marketing, retailing and redistribution. For companies entering the second hand market one challenge that was discussed by informants relates to stock availability. In a traditional fashion retailing context stock management is highly controlled by retailers based on forecasts and just-in-time systems. In the case of second hand retailing the responsibility of supply of stock lies with private consumers, which introduces uncertainties in the quality, quantity and timing of product returns (Anderson and Brodin, 2005; Halldórsson *et al.,* 2009). A single brand-based second hand store concept requires therefore strong brand awareness and a willingness to participate among consumers, which guarantees the constant inflow of used garments. Companies

engaging with reuse and second hand retailing strategies mentioned limited knowledge of second hand markets as significant challenge as well.

Finally, the informants expressed their concern over low consumer awareness of the negative end-of-life impacts of clothes, which brings uncertainty to the need for an acceptance of innovating their current business models. A study by Morgan and Birtwistle (2009) identified that consumers lack the understanding of how their disposal behaviour affects the environment and suggest that there is a need for more information about textile recycling issues and options and also retailers should take up this responsibility. This challenge drives companies to focus strongly on raising consumer awareness both through education and engagement.

Entering a dialogue with consumers about clothes use, laundry and disposal issues provides new ways of engaging with customers. As one of the informants stated, *"Sustainability is the most powerful driver for our business and how we can grow. So, we work a lot with the storytelling…you can actually tell a super good story about what happens with the clothes after you have used it".* Another informant referred to the central focus of consumer engagement saying, *"For us it is important to raise the awareness but at the same time also get customers in the stores and create the loyalty…The idea behind it is the engagement".* Giving a discount or gift voucher is also central in the current post-retail initiatives as it gives the consumer an incentive for environmental behaviour, while educating them about wider social and environmental impacts of used garments.

Conclusion

The purpose of this study was to explore the post-consumer textile waste issue from a fashion industry perspective. This explorative study shed light on various innovations that are happening in the fashion industry in terms of sustainability and strategic solutions dealing with garments' end-of-life. First, an overview of diverse initiatives of early movers on the market was presented, which was elaborated with the findings from the thematic analyses about the motives, opportunities and challenges behind these initiatives. The study looked into nine different cases revealing a field that is still relatively new with no best practices or established patterns.

The study identified two main strategies that companies apply when entering the post-retail phase of their products, namely product take-back schemes and resell/reuse platforms for prolonging the life of the garments and capturing the resell value they

offer. The analyses also revealed three main ways of organizing the initiatives: entering a donation partnership with a charity, collaborating with an external private actor due to lack of know-how and relevant resources or running their post-retail initiatives internally. Some form of collaboration with an external partner is represented in the majority of the studied post-retail initiatives, which confirms that partnerships play an important role in current reuse and recycling initiatives of fashion. However, the current landscape is not static as new focus areas, strategies and ways of organizing can occur when companies are implementing and developing their initiatives further.

While there is no well-developed and embedded regulation that addresses the fashion industry's role in post-consumer textile waste and other strong external pressures are weak, the post-retail field offers various opportunities for fashion companies to improve their image, find new customer segments, build customer loyalty and engagement, innovate their business models and improve environmental footprint. The main challenges that companies face in their post-retail endeavours are related to limited best practices, setting up reverse logistics systems as well as low consumer awareness of use and disposal-related sustainability issues. The analysis shows that to overcome these challenges requires wider stakeholder engagement and partnerships with charities or other industry actors. Given that the phenomenon of post-retail sustainability of fashion is here to stay and based on the findings above one could argue that downstream value chain responsibility requires fashion companies to rethink their value propositions where the traditional selling act is complemented with other forms of value creation that reuse, resell, re-design and recycling activities provide.

The main limitation of this explorative study is the limited data set and therefore further studies are required to extend the understanding of the phenomenon for more generalized statements about the industry developments and in-depth understanding on an organizational level. Further academic research could provide more insights into fashion companies' business model innovation and the emergence of a business case where post-retail aspects are integrated into the traditional make-sell based business models. Another interesting focus of future research could be a systems approach to textile waste as the future recycling system of textiles will necessarily change given the fashion industry's engagement with reuse, resell and recycling activities. Further investigation of the implications that may have for other actors in the system, namely public/private collectors, charity organizations, second hand retailers, recyclers and what collaboration opportunities emerge would be valuable.

Research limitations

This study explores the emerging field of post-retail sustainability of clothes from a fashion industry perspective, which is new both to academia and practice. The main limitation of the study is the limited selection of cases and therefore a larger data set and further studies are required to extend the understanding of the phenomenon for more generalized statements and in-depth understanding.

6. Article 2

"Business model innovation through second hand retailing: A fashion industry case"

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Abstract

The issue of business model innovation for sustainability is becoming increasingly relevant for fashion companies. This paper investigates how a resell of a fashion brand's own product can facilitate business model adaption towards sustainability. Based on a single revelatory case study the article highlights a premium fashion brand's endeavors in prolonging their products' life through resell activities and the main issues, challenges and opportunities the brand can encounter in integrating this strategy into its existing business model.

Introduction

The global fashion business is a vast industry measured by production and consumption. Total annual global consumption of garments amounts to USD 1.4 trillion or an estimated 91 billion garments sold (EMF, 2013). It is also considered a resource intensive industry, with several negative environmental and social impacts along the value chain. These impacts do not occur only during material sourcing and production phases, but also extend to the consumption and disposal phases, which accounts for the largest share of waste in the clothing sector. At the same time, the vast majority of the fashion industry currently operates a linear production model, based on take-make-waste rationale with a large proportion of all items ending in global landfills. It is estimated that across Europe and North America 15 million tons of garments are discarded annually and end up in landfills (EMF, 2013).

A recent report by WRAP (Buttle et al., 2013) highlights that in the future many retail and consumer-facing brands' traditional business models are vulnerable to rising raw material costs, impacts from growing amounts of waste and developing legislation and therefore need to re-evaluate their business models. It is therefore apparent that in the future business as usual is not an option and there is a need to develop practices that integrate products' end-of-life aspects into organizations' business models. It is also

argued that when oriented towards sustainability strategies, business models can lead to altered consumption patterns, efficiency gains and consistent system designs (Lüdeke-Freund, 2010). Academic research into business models for sustainability does not have a long history and therefore an overall consolidated perspective on what constitutes a business model for sustainability and how sustainability is operationalized in companies is lacking (Stubbs and Cocklin, 2008; Short et al., 2012; Bocken et al., 2013).

The purpose of this paper is to investigate how a resell of a fashion brand's own product can facilitate business model adaption towards sustainability. Based on a single revelatory case study the article highlights a premium fashion brand's endeavors in prolonging their products' life through resell activities and the main issues, challenges and opportunities the brand can encounter in integrating this strategy into its existing business model. First, a background will be provided in which the post-retail responsibility of garments currently unfolds in the fashion industry. Second, a case study of a leading Scandinavian fashion brand, Filippa K, who has since 2008 engaged with second hand retail of its products and is now in the process of expanding the concept will be presented, followed by a short methodology section. Next, the theoretical framework of business models in the context of sustainability will be introduced, which the case study findings are analyzed against. Finally, core findings of the case study will be presented and discussed.

Background

The current fashion industry increasingly operates business models based on complex supply chains, extensive use of resources, products' short life-cycles and high volume of fashion consumption, which leaves behind several social and environmental impacts. In the context of raw material price fluctuations, competition for providing newness in fashion is increasing, companies need to rethink their value propositions and find ways for decoupling material resource use from economic growth. Many fashion companies are trying to address these negative impacts by developing their own sustainability guidelines, code of conducts, implement supply chain and environmental management systems, join voluntary certification systems or multi-stakeholder initiatives (van Bommel, 2011) or enter a closer dialogue with their consumers about consumption and disposal related issues (Kant Hvass, forthcoming). Corporate responsibility in value chains is acknowledged by a majority of fashion retailers, but is mainly practiced in the upstream aspects of the value chain (Larsson et al., 2013) and even though the garment's consumption and disposal related issues are

slowly emerging in fashion companies' agendas, the downstream value chain related issues (i.e. reuse, remanufacturing and end-of-life solutions) has received less attention. Svensson (2007) argues that second-order supply chains, i.e. supply chains that serve second hand markets, are often ignored or are addressed as separate supply chains. The fate of garments after the final sale to consumers has not been an issue for the fashion industry until recently and it has mainly been dependent upon consumers' awareness of textile's recyclability, cultural aspects and available infrastructure for textile reuse, recycling and disposal. At the same time, clothing retailers have a significant role to play in relation to influencing and improving consumers' approach to the sustainability of clothing since they are strategically positioned between primary manufacturers and end consumers (Goworek et al., 2012). Bringing the fashion industry into the discussion of textile waste and making producers accountable for future disposal of their products changes the logic of clothing production, distribution and sales and extends the activity focus of producers beyond the upstream manufacturing chain to include downstream actions, resource flows and future consumer behaviour (Fletcher and Grose, 2012).

The engagement with reuse and recycling of garments provides several benefits, such as an opportunity to strengthen the relationship with existing customers and to reach new market segments, as an income source through different resell platforms for used garments or new raw material for upcoming collections through closed-loop production (Kant Hvass, forthcoming). Currently, two broad strategies can be distinguished of how companies address the downstream value chain issues through business model innovation (ibid). First, implementing an in-store product take-back scheme for recycling purposes which allows consumers to drop off their used garments (often in exchange for a discount voucher). Such take-back initiatives have recently been implemented by H&M, WEEKDAY, Name It, PUMA where the reverse logistics system is managed in collaboration with global collection company, I:Collect. While this strategy seems to be a convenient solution for global retailers to set up a take-back scheme, it can create concerns if the rewarding discount voucher is stimulating more consumption rather than guiding consumers in more sustainable choices.

The second broad strategy is developing resell/reuse platforms for prolonging the life of garments and thereby capturing the resell value they offer. Examples of this can be U.S. female brand Eileen Fisher's Green Eileen Initiative, where donated and used Eileen Fisher products are sold in Green Eileen second hand stores together with upcycling workshops for customers or Swedish, Boomerang, where consumers can

donate their used garments in the store, which are resold in Boomerang stores or upcycled into other Boomerang products (Kant Hvass, 2014). Developing new resell/reuse channels is mainly chosen by premium and high fashion brands with higher quality products as this strategy requires the highest quality possible to ensure that garments retain their value and be re-bought many times (Fletcher and Grose, 2012). This article looks into one of these examples.

In general, in Western societies, the second hand clothing trade in both domestic and foreign markets is dominated by not-for profit organizations and textile recycling firms (Hansen, 2004), but over the years other actors have entered the market such as privately owned consignment and vintage stores, online reselling platforms and clothing libraries. While the history of second hand retailing of clothes dates back centuries, fashion brands' engagement with their used products is a new phenomenon. From a sustainability perspective, reusing a garment as-it-is is considered to bring significant environmental savings and the energy used to collect, sort and resell second hand garments is between 10 to 20 times less than that needed to make a new item (Fletcher, 2008). Reuse should therefore be one of the first steps in a fashion company's strategy to take responsibility for the end-of-life of their products.

Case company Filippa K

Filippa K is a high-quality, leading Swedish fashion brand started by Filippa Knutsson and Patrik Kihlborg in 1993 with the ambition to design, manufacture, communicate and sell fashion with its own timeless style. Filippa K' owners value responsibility with long-term perspectives and the company philosophy is built around core values such as style, simplicity and quality. These values are widely understood and followed across the organization, which are supported by a corporate culture that cares highly for both people and products.

Filippa K currently operates in 20 markets around the world with seven core markets in Scandinavia and Northern Europe. Retail activities are organized via 50 Filippa K stores and 740 selected retailers served by one distribution center in Sweden. Turnover of the company is approximately 70 million EUR with the production of 1 million pieces per year. One informant described a conventional Filippa K customer as, "…*not a fashion slave, but someone who is very loyal, has certain values, likes quality and value for money* " (informant G).

Filippa Knutsson has described her company with the following words: "*Inspired by*

my own needs and of those around me, I set out to build a brand that has substance and truth, not dependence on the superficial trends of the fashion industry". The company's cornerstone is thus being a champion in long-lasting fashion by offering:

- long-lasting products through design and quality
- styles and materials that live for more than one season
- prolonged life-cycle of products through fitting services and repair
- all products longer selling opportunity in the store
- second life through reuse and recycling.

Filippa K's business model aims to shift from a linear to a circular production model, to eliminate the use of toxic substances and waste throughout the production processes and prolong the life-cycle of their products. These aims are supported by working with reduce, repair, reuse, remake and recycle principles. Instead of fast trends in the fashion industry the consumers' wardrobe needs are in the center and customers are seen as users and active parts of a garment's life cycle before being returned back to Filippa K.

Filippa K has worked with environmental and social issues for a long time through their collaboration with Natural Step to develop an environmental policy or their work with Fair Wear Foundation. Since 2009 the work with sustainability took a more holistic sustainability strategy approach and is based on the principle that sustainability needs to be part of all aspects of the organization and everybody's daily work. Sustainability initiatives are strongly encouraged from bottom-up as well as top-down, and cross-organizational teams are set up for different sustainability projects.

In Filippa K's quest to work with the reuse principle of their products they opened their first second hand store in Stockholm in 2008 in collaboration with a local entrepreneur. The local entrepreneur has successfully run another female consignment store, Judit's Second Hand, in Stockholm. The current Filippa K second hand store sells exclusively Filippa K garments and accessories for females and males and is operated as a consignment store where customers bring back their Filippa K clothes, shoes and accessories for resell. The customer retains the ownership of the product and after the product is sold, a customer receives 50% of the profit. If not sold, the product goes back to the owner or is donated to a charity. In addition, the merchandise is complemented with new sample collections from Filippa K. The aim of the partnership with Judit's Second Hand consignment store has been to learn about the second hand business from an experienced entrepreneur and test the market. Currently, the products

can be returned for resell only in the Filippa K second hand store, however, the system is under development where product take-back will most probably happen in all ordinary Filippa K stores. Filippa K is now in the process of analyzing the second hand retail business opportunities and expanding the concept. This research captures parts of this process.

Analytical framework

The study is grounded in an analytical framework of business models in the context of sustainability. Several authors have proposed varying definitions and theoretical frameworks to explain business models. See for example works by Osterwalder (2004), Osterwalder et al., (2005), Teece (2010), Perkmann and Spicer (2010), Zott et al. (2011), yet the term is still vague without a clear and agreed understanding. A study by Lambert and Davidson (2012) of the use of business models in empirical research papers shows three dominant themes: (1) business model as the basis for enterprise classification, (2) business models and enterprise performance, and (3) business model innovation. Osterwalder and Pigneur (2005) have applied a pragmatic perspective to the concept that help to assist in understanding how a firm does business, for analyses, comparison, performance assessment, management, communication, and to assist firms in their innovation. Furthermore, Osterwalder (2004) has proposed a four-pillar framework for clarifying business models that is additionally broken down into nine building blocks (Tabel 6.1). The framework is also known as the Business Model Canvas and it constitutes the essential elements of company's value creation processes (Osterwalder and Pigneur, 2010).

Tabel 6.1: Four pillar template for business models (Osterwalder, 2004)

Pillars	Building Blocks	Description
Product	Value proposition	Overview of products and services and their inherent value a company offers to its customers
Customer interface	Target customer Distribution channel Relationships	Description of segment(s) of customers a company wants to offer value to and means of how to build a strong relationship with them
Infrastructure management	Value configuration Key capabilities Partnerships	Key activities, internal and external resources that are necessary to create value
Financial aspects	Cost structure Revenue model	The revenue model, the cost structure and the business model's financial sustainability

Research by Boons and Lüdeke-Freund (2013) shows, that innovation is a dominant topic in the literature on business models as an important aspect of creating competitive advantage and renewing organizations. At the same time, the authors state that the literature on sustainable innovation is limited due to lack of conceptual consensus. Thus, the current article will not delve deeper into business model innovation literature but instead takes departure from the focus on how a reuse/resell strategy can facilitate business model adaptation for sustainability.

For the analyses of the empirical data of this case study, Osterwalder's (2004) business model framework will be used to analyze the empirical data and investigate how reuse and second hand retail issues are linked to the business model of a fashion company. Even though other conceptualizations of business models for sustainability exist (see references above), Osterwalder's canvas is a systemic and holistic presentation of a business model and its operational approach allows organizing and structuring the case study data into meaningful knowledge.

Business models for sustainability

Lüdeke-Freund (2010) describes a sustainable business model as 'a business model that creates competitive advantage through superior customer value and contributes to a sustainable development of the company and society. He adds, that innovating business models is increasingly recognized as a key to delivering greater social and environmental sustainability in the industrial system (ibid). While traditional business model research mainly concentrates on the generation and delivery of economic value and value for the customer, sustainability-oriented business model literature suggests that value should be understood in broader terms and value generation needs to be threefold through value for the company, its customers and the wider public (Lüdeke-Freund 2009). Stubbs and Cocklin (2008) add that sustainable business models use both a systems and a firm-level perspective, build on a triple bottom line approach and engage a wide stakeholder group with the aim to reduce the 'ecological footprint' of people and organizations. Additionaly, Tukker, et al. (2008) argue that business is probably best placed to respond to sustainability challenges via radical innovative products and services and related new business models. Thus, the business model concept is highly relevant in addressing post-retail textile waste issues from a business perspective since the concept is centered around holistic value proposition (ecological, social and economic value), value creation (seizing new business opportunities, markets and revenue streams) and value capture (earning revenues from the provision

of goods and services) by extending beyond the boundaries of traditional firm analyses to include external partners (Bocken et al., 2013).

The integration of sustainability into the business model concept has been studied by various authors, such as Stubbs and Cocklin (2008), Schaltegger and Wagner (2008), Lüdeke-Freund (2009, 2010), Boons and Lüdeke-Freund (2013), Yunus et al. (2010), Short et al. (2012) and Grassl (2012). Although the above-mentioned works are valuable contributions to the field the research in the context of sustainability is still relatively new and the understanding of what constitutes a business model for sustainability and how sustainability is operationalized in firms is fairly ambiguous (Bocken et al. 2013; Stubbs and Cocklin, 2008).

Recent work by Bocken et al. (2013) propose groupings of mechanisms and solutions that contribute to building up the business model for sustainability. Developed from examples of existing and proven innovations for sustainability, they propose eight business model archetypes. Furthermore, inspired by Boons and Lüdeke-Freund (2013), they have grouped the archetypes into technological, social and organizational based on the dominant innovation component, although they are often paired with other innovations. These archetypes are considered to provide assistance in transforming current business models into more sustainable ones, exploring new ways to create and deliver positive sustainable value, stimulate creativity and facilitate innovation. Although each can be applied in isolation, real innovation for sustainability almost certainly demands combinations of archetypes. Bocken et al. (2013) furthermore argue that these archetypes are currently disparate silos of research but instead should be linked to business model research.

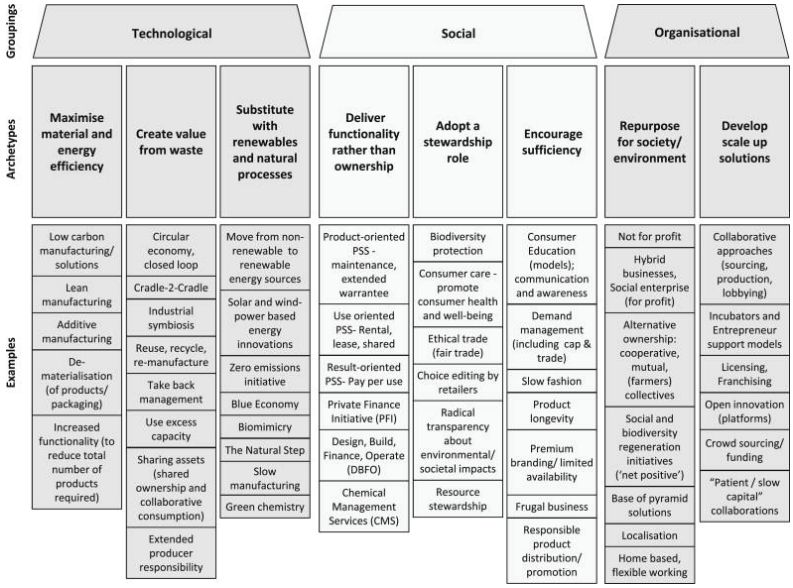

Figure 6.2. Sustainable business model archetypes (Bocken et al., 2013)

These sustainable business model archetypes provide a valuable perspective to the current case study by bridging Filippa K's business model innovation activities with the sustainability discussion, thus addressing the missing link. Two of the archetypes, Create value from the waste and Encourage sufficiency, which consider solutions such as reuse, take-back management and product longevity as contributions to building up the business model for sustainability, are closely related to Filippa K's second hand retailing approach.

Methodology

This article is a conceptual discussion based upon empirical data gathered from a single revelatory case study (Yin, 2003) of the Scandinavian fashion brand, Filippa K. Often fashion producers and brands are hesitant to allow for in-depth study of their practices, however the author was fortunate to follow a novel and unique innovative process as it evolved. Filippa K is of theoretical interest because they are among the pioneers in the fashion industry that work closely with concepts such as extended

product lifespan and timeless design and investigate the integration of second hand retailing into their current business model. While one is often challenged to make generalizations based on a single case study the intention of this article is to initiate a contributing theoretical discussion of business model innovation for post-retail sustainability of fashion and to link that with lessons from an empirical case study.

Twelve in-depth, semi-structured interviews were the primary source of data, which were conducted over the course of 11 months in 2012-2013. The interview participants were selected from all major areas of the company, such as design, retail, merchandising, wholesale, logistics, finance and CSR, in order to understand the second hand retailing from all angles of the company's operations. In addition, an interview with the Filippa K Second Hand store manager was carried out and several in-depth discussions with the corporate responsibility manager, two on-site visits to the existing second hand store, internal document analyses, and one internal seminar focusing on the expansion of the second hand retail concept provided data and input to this study.

A semi-structured interview guide was developed for all interviews to guide the interview questions. The aim of the guide was to aid the interview participants in describing the current company processes and in discussing their experiences, thoughts, expectations and concerns with implementing the second hand concept on a larger scale. The interviews addressed questions regarding risks and challenges associated with creating secondary markets for Filippa K products, which opportunities it offers and what implications it might have on the existing business model.

The interviews lasted one to two hours, which were recorded, transcribed and coded using the NVivo software package. The method of analyses was a thematic analysis, which incorporated the deductive a priori template of codes approach (King and Horrocks, 2010). The coding started with a priori themes based on the research interest and theoretical framework (i.e. main business model elements presented in Table 6.1), which enabled the researcher to organize the text for subsequent interpretations. The a priori codes were entered as nodes and the text was coded by matching the nodes with segments of data selected as representative of the node. Summary of the coding results are presented in Table 6.2 and further discussed under the next paragraph.

Findings and discussion

The following section highlights the main findings from Filippa K's process of developing the second hand retail concept expansion to other markets and to integrate the reuse and resell aspects into their current business model. Through interviews and discussions with the informants and participation at the internal meetings, a set of occurring themes and questions arose, which the author has linked to different business model elements. Table 6.2 is a summary of these findings, which proceeds with a more elaborate discussion of key issues and implications of integrating reuse and resell activities into the existing business model pillars. The discussion is organized around the nine business model pillars and their building blocks, however, many of the emergent themes are discussed as a group because they are interrelated.

Table 6.2: Analyses of Filippa K second hand retailing data

A priori codes Business model pillars and building blocks	**Emergent themes**	**Examples from the case study**
Product/Service		
Value proposition	Long-lasting design Premium quality product Broad assortment that combines recent and old collections Flexible prices Opportunity for consumers to find solution for their unwanted clothes and purchase sustainably Commercial gain for consumer	*"Filippa K is not the most edgy fashion, we are not ahead of anyone, we are not the frontrunners of fashion. We choose to make it long-lasting because it is more like our style rather than actual fashion*"(Informant J)
Customer Interface		
Target customer	Loyal customers who value timeless design and quality Broadened customer segments (e.g. price sensitive and eco-minded) Customers as suppliers and co-producers of value	*"We have different types of customers and they are mostly women and I think they think its too expensive in the regular shop, but they really like Filippa K but they can't afford it"* (Informant B)
Distribution channel	Selection of the proper distribution channel (e.g. store-in-store, stand-alone store, pop-up store) Easy store access and convenience of the resell service Market maturity (brand awareness and second hand shopping behaviour)	"*If the stores are run as separate stores, it will provide greater value for each channel to make sure the concept gets best condition. There are different customers and in that way they can provide different types of experience*" (Informant F)
Customer relationships	Engaging and effective communication and marketing strategy Customer engagement form (e.g. donation, compensation, consignment contract) Convenient and attractive product take-back and incentive system	*"…when you want to create a loyal customer you want to make the service easy."*(Informant F) *"It is very important to get the marketing with it, to make it aware to consumers of what we are doing"* (Informant F*)*

Infrastructure Management		
Value configuration	Reverse supply chain and its management Know-how of second hand retailing and markets Merchandise management	"*I think it's important to have somebody that knows the business in the market you go in, the second hand market*" (Informant G) *"The most difficult part is to get the merchandise to come in. You would really have to focus on getting the awareness out"* (Informant G*)*
Key capabilities	Strategic long-term management Personnel training and engagement Supportive organizational culture Cross-organizational collaboration (i.e. business model integration) Organizational learning	*"Everything we do is supposed to be part of the business model itself, otherwise it's going to be difficult"* (Informant A) *""…we all need to learn, it's a completely new field. When you get garments in the store…. What different price levels? How do you judge it?"*(Informant A)
Partnerships	Partnerships for knowledge and resource sharing (e.g. local charities, local entrepreneurs) Partnership with recycling companies for closed loop solutions Tailor-made set-up for each market if partnering with charities	"*…we need to have partners for these garments that we cannot sell in our stores. We can sell it, but in another channel like Red Cross or they can give it away to homeless people*" (Informant I) "*…we need to find companies that upcycle and reuse…*" (Informant F)
Financial Aspects		
Revenue streams	Revenue from resell of clothes and collection samples Increased revenue from repeat customers Unified and clear pricing strategy for business and merchandise planning Risk of cannibalization (especially with store-in store)	" *The interesting thing actually is that the second hand store today is actually making quite good profit so you can do good business with second hand*" (Informant A) "*….in case of store-in-store concept, there can be cannibal effect. Which one to focus also from the sales personnel perspective*?" (Informant F)
Cost structure	Reverse logistics (i.e. collection, sorting, redistribution and pricing) Discount voucher Uncertain sales and revenue forecasts Cost efficiency related to fewer collections	"*I guess you have to keep it very local, so that we don't send things back and forth. Suddenly all the transport costs… which are even more than the items themselves*" (Informant I)

Product

The central issue of each business model is its value proposition, which consists of five value stages, such as value creation, value purchase, value use, value renewal and value transfer (Osterwalder, 2004:43). Traditionally, the main value for a fashion customer is the buying experience created during a purchase or use during the actual consumption of a garment. However, the value renewal and value transfer stages can provide additional opportunities for customers. For example, repair of a previously owned garment, wardrobe renewal with used garments from earlier collections or getting rid of garments that have become obsolescent through resell.

Long-lasting design and premium quality product

Filippa K's value proposition is high-quality fashion and long-lasting design, which, based on this case study, can be considered as preconditions for reselling own brand products. The Filippa K second hand store is proof of these preconditions and as one of the informants stated, "*...to make a second-hand store with one brand is not easy. But if we can do that, it shows that we are really serious about it. It's really a quality stamp*". Nowadays, a fashion product's life cycle is shorter than it used to be, often because of decreased quality or constant need for wardrobe renewal. Recent research shows that an estimated lifetime of a garment is 2.2 years or less (Buttle et al., 2013) or even only a couple of uses (Goworek et al., 2012), while earlier studies from Scandinavia refer to 7-8 years (Klepp, 2001). An internal study among Filippa K customers conducted by the brand shows that 74% of their customers keep their products more than 4 years, while for 39% of them it is between 5 to 6 years.

Expanded assortment, price flexibility and solution for unwanted clothes

With the second hand retail channel Filippa K provides customers with additional value propositions, such as greater product diversification with previous collections' style and colors at a more flexible price range. The durability of Filippa K products also indicates that there are garments in people's closets that can complement the supply of the second hand store with diverse assortment. In addition, the second hand channel offers Filippa K customers a sustainable way for prolonging the life of their unwanted garments or need for wardrobe newness by not producing and selling more new items but reusing more of the existing

garments while generating commercial gain through a consignment policy. The reselling alternative may even entice the purchase of first hand garments as customers may see the purchase of a high quality product as an investment which can be resold when no longer needed, in this case merging the first hand and second hand customer groups. Based on an internal customer survey carried out by Filippa K 70% of their existing customers in Sweden have Filippa K garments, shoes or accessories in their wardrobe that they would sell in the second hand store and 87 % would buy second hand Filippa K clothes. This confirms that the customers perceive value in the second hand retailing both by getting rid of their unwanted clothes and renewing their wardrobe with used Filippa K garments. Additional value for customers can also be created from repair services and in-store repair and redesign workshops, which was discussed by several informants. Currently, the idea of redesign has not been implemented, but repair service is offered for customers to prolong the life of their garments. Studies show that repair of clothes is occasionally used by consumers, especially in the case of expensive clothing and favorite items that have functional, symbolic, aesthetic, and exchange value (Laitala and Boks, 2012). Giving consumers the opportunity to learn how to repair and up-cycle their garments combined with a store event also provides a value of social gathering.

Customer interface

Based on the case study findings there are three main areas related to customer interface when innovating the business model with a focus on second hand retailing. These are an analysis of how to engage with existing and potentially new customer segments (target customer) and motivating them to return their used clothes and purchase a used product (customer relationship); an analyses of the brand's awareness and market maturity and finally a selection of the right retail format for the market entry (distribution channel).

Broadened customer segments

Fashion retailers engaging with second hand retailing need to redefine their customer groups. In addition to conventional customers the second hand retail channel tends to attract new customer segments. There are several reasons for second hand shopping, such as availability of unusual items that are often unavailable in a new goods market, visual stimulation and excitement due to the

wide variety of goods, the urge to hunt for bargains, and feelings of affiliation and social interaction, as well as motives related to distancing and avoiding the classical market system along with ethical and ecological concerns (Guiot and Roux, 2010). This demonstrates that second hand shoppers' motives are not always entirely economic. There was a wide agreement among informants that the second hand outlet attracts new customers who are more price sensitive or ecologically minded, but also existing customers who are loyal to Filippa K's values and long lasting design. However, there are also consumers who are negatively minded towards second hand consumption. For years, buying and wearing second hand clothes has had some negative stigmatization related to hygienic issues, non-trendiness and because it is embarrassing to buy and wear clothes that somebody else has worn before (Ekström et al., 2012). Here lies a vast opportunity for fashion retailers to change these stigmas. Such opportunities include making the store attractive and exclusive, as it is known that consumers patronize stores whose image complements their self-perceptions and unconscious needs, as well as, perceptions of the store's quality, the availability of products within the store, the image of the store, and consumers' general emotional reactions toward secondhand stores (Darley and Lim, 1999). Making the second hand stores attractive and stylish that reflect Filippa K values was also found to be extremely important by the informants.

Customers as suppliers and co-producers of value

The business model customer interface pillar is directly related to strategic and operational marketing issues and aims to make customers involved and responsible partners in value creation processes (Lüdeke-Freund, 2009) and motivates them to take responsibility for their consumption (Boons and Lüdeke-Freund, 2013). In addition, Sorescu (2011) argues that in many retail environments customers become co-producers of value and this is strongly represented in the case of donation or consignment-based second hand retailing where customers become suppliers of merchandise for the second hand store. One of the biggest concerns expressed by several of the informants was the sourcing of products since the supply of merchandise is a key success factor for a retail store and Filippa K is highly dependent upon their current customers to return their unwanted garments. As one of the informant explained: "*Even though there is an increase in acceptance of second hand retailing, there is still the challenge in getting people to bring their clothes*". Therefore, convenience of the take-back

service is very important in motivating customers to return their products. In addition, effective marketing and communication strategies are essential in both engaging with consumers to return their clothes as well as to purchase used clothes. Strengthening the customer relationship may happen for example through strategies to reward loyal customers through special sales promotions and exclusive information of new arrivals (Darley and Lim, 1999). Finally, in order to manage the supply risk, other types of merchandise could be distributed via second hand outlets, such as collection samples and leftovers from previous collections. Currently, Filippa K Second Hand is selling both second hand clothes sourced directly from consumers, but also samples of past collections, which is, according to the current second hand store manager, a strong attraction element for customers. While this acts as an attraction to customers it also helps to increase the sale of second hand garments.

Distribution channel and market maturity

Another critical dimension that the interviews revealed in relation to merchandise supply is market maturity. This raised issues related to the number of distribution outlets on the market, the brand's length of presence on the market, reputation and awareness, and whether there are enough garments circulating on the market to meet supply needs. The informants found that for Filippa K to enter a second hand market with certainty requires at least five to six conventional stores per market with at least five to six years of operation.

An additional important question that was raised by the informants was if the second hand retail format should be a store-in-store or stand-alone store. While store-in-store carries lower market entry risks and requires less resources, it can also create a cannibal effect for the conventional store with first hand products. Consequently, if the stores are run as separate entities it will create greater value for each channel and customers are provided with different types of shopping experience. Operating a second hand store also requires a specific know-how of the second hand market and competence in handling the used products (e.g. how to value the used garments) that the store personnel of a conventional store might not have.

Customer engagement form

In addition to convenience and effective communication to find motivated customers to bring back their products and purchase a second hand product, a selection of a right engagement form that matches the specific customer segment is essential. Informants discussed two formats, namely consignment store and donation-based store. A consignment store is where customers sell their items based on a consignment contract and the profit is shared once the item is sold. A donation-based store is where customers donate their items for compensation and the retailer becomes an owner of these products. While the consignment store concept is more locally oriented and allows building a closer customer contact, it is also resource intensive and has high transaction costs in the form of item handling, tracking and customer relationship management. The donation-based concept has less customer relationship management and more control over the reverse supply chain since items will be sorted, priced and redistributed centrally. At the same time, the charitable focused format may require more transparency in handling and reselling the clothes as customers may feel that their returned items are worth more than the received voucher or they wish to donate clothes for a social cause and they may not accept the company making a profit on their behalf. Therefore, transparency and clear communication of the environmental and social impacts of the reuse and recycling of the garments, and the overview of the earned and spent funds should be considered.

Infrastructure management

A central part of developing a reuse/resell initiative from an infrastructure management pillar perspective is to analyze a company's current resources and activities, logistical practices and partnerships depending on which new value propositions the company is striving for. One of the key issues for fashion brands that wish to engage with take-back of their products for reuse and recycling purposes is to choose an appropriate reverse supply chain structure that matches the company's needs. While the supply and merchandise management of first hand products are widely practiced, a reverse supply chain is often more complex (Kumar and Putnam, 2008).

Reverse supply chain management

The reverse supply chain for the second hand retail concept requires thorough planning and coordination of additional services, such as customer service for product take-back, sorting (sometimes also repairing or washing), pricing, warehousing, transportation and end-of-life management of lower quality items. Furthermore, expanding the second hand concept to different markets might require a tailor-made reverse supply chain that is both economically viable, consumer-convenient and with low environmental impact.

Merchandise management is another field, which requires answers to questions, such as: how to ensure a steady supply of merchandise, how to price the items and how to communicate and market the fact that often there is only one item of each garment and in one size. Raghavan (2010) argues, that retailers usually do not like product take backs because of the related storage and transportation costs, but there is an immense opportunity for collaboration with other companies.

Organizational capabilities

The third element of the infrastructure pillar is organizational capabilities, understood in the form of strategic management, organizational learning, and innovation management (Lüdeke-Freund, 2009). Entering the post-retail phase of the product life cycle requires a strategic direction for sustainability and long-term perspectives of the company, openness towards innovation, experimentation and learning. As discussed above, reverse supply chain and second hand retailing requires new expertise in procurement of stock, handling of used garments, market knowledge of second hand markets, specifics of textile reuse and recycling and finally the job training that justifies and supports the value of reuse. These are all new areas for a conventional fashion retailer and therefore the organization has to go through an extensive learning process. For the second hand retail initiative to be a success Filippa K tries to integrate it into the company's business model, which requires cross-organizational engagement and representatives from different company functions, such as design, logistics, retailing, marketing, financing, CSR.

Partnerships

Findings from this case study confirm that for developing a post-retail initiative there is a need for partnerships, knowledge and resource sharing in order to set up a system that supports the supply and distribution of used products, as well as for finding sustainable end-of-life solutions for garments with low resell value.

Currently, Filippa K partners with a local entrepreneur who provides daily operation for the second hand store based on her long-term know-how and market experience from the second hand markets. In addition, there are currently partnerships with local charity organizations who are involved with the resell of those collection samples that do not resell in the second hand store. The partnership with local charities allows Filippa K to build a connection with the local community, which allows the company to capture the value of used garments locally as long as possible before transporting garments to international recycling markets. However, charity organizations operate with different business models in different markets and therefore a tailor-made setup for each market is required, which can be resource intensive and requires local coordination. Additionally, Filippa K is in collaboration with recycling companies in order to find final end-of-life solutions for their garments.

Finally, setting up a product take-back system needs to also involve other distributors, such as wholesalers and franchise stores, and therefore a partnership agreement should be expanded with post-retail issues that motivate distributors to provide product collection services in their stores. This may add additional cost, which was addressed by one informant, "…*some would understand and support the concept, but there are not many as I think they would say ok, that is a very good thing for the sustainability but if we lose money? So, we need to take the cost for that*" (Informant L).

Financial aspects

Revenue streams

This business model pillar refers to questions, such as what new revenue streams can resell activities bring and what costs and other financial risks are related to it. Earlier research has argued that second hand retailing reduces a substantial proportion of conventional retailers' revenues (Guiot and Roux, 2010). However, findings from the Filippa K case study indicate that second hand retailing has the potential for financial value for conventional retailers through increased customer base, increased customer loyalty since customers have to come back with the used products, income generated from the resell of clothes and finding a sales channel for collection samples. Currently, the Filippa K Second hand store generates a

stable profit and is proof of its economic viability. Several informants acknowledged that they see a business opportunity behind the idea, as one informant stated, "*We see it as an opportunity because we know that our clothing can really stand the test of time, so we can actually get more customers, we don't want each customer to buy more or faster, but we can have new customers*" (Informant A) or expressed by another informant: "*I would say it's doing the right thing for Filippa K and doing the right thing would, in the end, mean that we actually earn more money. Because it's part of us, and with doing fashion that's long-lasting, that is what Filippa Knutsson said from the beginning when she started, so it's a part of our nature actually"* (Informant K).

A study by WRAP (Buttle et al., 2013) on the financial viability and resource implications for new business models in the clothing sector also suggests that retailers offering a resale channel for their garments is one of the most commercially viable models over the long and short term.

Cost structure

While it is argued that the resell of fashion is a commercially viable model, there are still costs that must be considered. The main reoccurring cost issue discussed by informants was reverse logistics, i.e. costs related to collection, handling, sorting and redistribution. For example, if the product can be handed-in in all regular stores the logistics costs incur at two points, through the transportation of the garment from collection points to the central processing warehouse, and after sorting and processing, to transport them back to second hand retail stores (Buttle et al., 2013). Another issue with reverse logistics is the need for keeping the redistribution as local as possible, both for keeping the costs down as well as not creating an additional environmental impact.

Finally, applying the consignment based system requires sharing the profit with the owner of the garment, where the market practice is an equal share or a 60-40 split with the larger share going to the retailer, while the donation-voucher model brings along costs related to a voucher system and providing every customer a discount on a new purchase.

Conclusion

Until recently, fashion companies' main focus has been on creating and capturing value from the sale of new products, and once the garments were sold these products were not regarded as part of their business model. However, resell can provide additional value creation opportunities. This research is a first step in conceptualising second hand retailing from a business model perspective. The aim of this paper is to provide a framework for better understanding of how to link reuse and resell issues of garments into fashion companies' business models. The Filippa K Second hand case study was analysed in relation to business model framework, which shows that creating value from waste and encouraging sufficiency through reuse and resell can facilitate new value propositions and business model innovation towards sustainability.

The study unfolded several issues that are relevant for the company to address when engaging with the post-retail phase of their products and integrating reselling activities into their current business model. A framework for understanding second hand retail development from a holistic business model perspective was proposed and a set of provisions that are necessary for fashion brands to integrate the resell activity into their current business model was suggested.

The findings suggest that there is a potential for fashion brands with premium quality products to integrate resell activities into their current business models and value propositions. Furthermore, the study demonstrates that resell activities bring additional value to the fashion company, as it allows it to build closer relationship with customers, attract additional customer groups and generate income with used products or collection samples. However, several prerequisites have to be in place, such as a product's high quality, strong brand awareness and market maturity. In addition, redefinition of customer groups and new ways of customer engagement is required since customers become suppliers of merchandise in the context of second hand retailing. The study also reveals that the main challenge with second hand retailing is related to reverse logistics and setting up a collection and redistribution system that is convenient, cost-effective and matches the needs of each market.

The main limitation of this paper is a single case study, however, the proposed framework may have transferability to other fashion brands who are willing to take a wider responsibility for their products and prolong their products' life-cycle through resell. Especially premium quality brands with focus on timeless design might find these case study findings useful. Addressing these issues can guide companies through the process of identifying reuse and resell value of their products as part of their business model and not just an add-on campaign. While engaging with take-back and resell of used products is a novel activity for a fashion company, it raises a question of how much change in the existing business model does this activity actually require. Does it require radical changes or just incremental adjustments in some of the business model elements? This is an interesting area for further research that was out of the scope of this research article. The author hopes that this paper will encourage researchers to further examine business model innovation which links to products' life cycles and end-of-life issues in order to find sustainable solutions for the waste and unsustainable consumption and disposal issues in the future.

7. Article 3

"A bumpy road towards a closed loop fashion industry: an experience from a Scandinavian fashion brand"

The article is under review for a special issue on Circular Economy in California Management Review)

Introduction

The world's natural resources are declining while the human population is growing resulting in a resource imbalance between supply and demand. Resource constraints and end-of-life issues for products, regarded both as an environmental liability and economic opportunity, have become relevant topics for businesses (Geyer and Jackson, 2004). Traditional business models of many retail and consumer brands will become vulnerable to rising raw material costs, impacts from growing amounts of waste, and emerging legislation (Buttle et al., 2013). This situation triggers a re-evaluation of conventional business models and innovation, but also the construction of new business models, where emphasis is on companies retaining ownership or control of the product throughout its entire life cycle (Wells, 2013). Recent literature emphasizes that closed loop supply chains with focus on waste management are a key component of sustainable business operations (Visich et al., 2007). Waste streams can be value creators rather than a cost as they can benefit the environment, provide critical resources, and support customer value creation (Ferrer and Whybark, 2000; Krikke et al. 2013; Atasu et al., 2008).

The fashion industry is a significant player in the global economy. Total annual global consumption of garments amounts to USD 1.4 trillion or an estimated 91 billion garments sold (EMF, 2013). It is a large industry in terms of resource use and social and environmental impacts that occur during a garment's production, use and end-of-life phases (Allwood et al., 2006). Major environmental issues associated with fashion include energy use, use of toxic chemicals, water consumption, processing and consumer laundry and solid waste (Allwood et al.,

2006). The greatest energy and CO2-equivalent savings within clothing and textiles are achieved through longer lifespans and dire ct reuse, followed by material recycling and finally energy recovery, which are all better solutions than landfill disposal (Laitala, 2014). In the European Union (EU) it is estimated that 5.8 million tons of textiles are discarded every year of which 25% is collected with the intention to reuse or recycle while the remainder is sent to landfills or municipal waste incinerators (Briga-Sá, Nascimento et al. 2013). Study by Lu and Homouda (2014) show that 10 % of the fiber waste in China, 12-13 % in Japan and 15 % of the fiber waste in the US is reused or recycled. This represents a significant loss of reuse and recycling value of products and materials that can be re-injected into the market as 95-100% of textiles are considered recyclable (Bouzon and Govindan 2015; Lu and Hamouda 2014; Hawley, 2008).

There are several methods the fashion industry can implement to reduce the environmental impact of clothes and tackle the growing textile waste problem. Examples include reducing production volumes and improving durability and quality, extending the life of clothes, increasing the supply and demand for pre-owned clothing, redesigning used products or collecting products for reuse and recycling purposes. Closed loop fashion, where used garments are recycled into new fibers and garments, is a relatively new phenomenon, both within research and practice (Bouzon and Govindan, 2015). Although several companies can be identified in the textile industry that experiment with innovative business models based on closed-loop principles, such as Patagonia and Nike (Ulasewicz and Baugh, 2013), closed loop initiatives lack scale and scope and best practices are rare (Kant Hvass, 2014). It is argued that closed loop characteristics are highly conditional on product type and industry context (Wells and Seitz, 2005) and therefore more empirical studies are needed (Guide and Van Wassenhove, 2009; Morana and Seuring, 2007; Morana and Seuring, 2011). In addition, Guide and Van Wassenhove (2009) add that in order to address closed loop supply chains' related operational, technical and business related issues a holistic business process view should be applied.

This article aims to improve the understanding of closed loop fashion by exploring the relationship between closed loop supply chains and fashion companies' business models. The paper is based on empirical findings from 34 months of engaged scholarship of a leading Scandinavian fashion brand and it explores the

social and technical complexities and challenges involved in implementing a closed loop fashion system and how it involves organizational learning processes and consumer involvement along with use of new sorting and recycling technologies.

The Fashion industry and post-consumer textile waste

The majority of the fashion industry today operates on a linear business model that follows a take-make-waste rationale with a large proportion ending up in landfills (EMF, 2013). This is closely linked to the dynamics of the industry, such as an increase in the number of fashion seasons and changes in the supply chain, which has forced retailers to constantly seek lower costs and flexibility in design, quality, delivery and speed-to-market (Bhardwaj and Fairhurst, 2010). The outcome is low cost clothing as a response to ever changing consumer demands, also known as of fast fashion (Barnes and Lea-Greenwood, 2006) At the same time fast fashion increases clothing consumption and a throwaway fashion trend where large amounts of clothing are being disposed of before being worn out (Birtwistle and Moore, 2007; Domina and Koch, 1999; Fletcher, 2008). For example, a Swedish study shows that 62% of Swedes dispose of usable clothes (excluding socks or underwear) that they no longer want to use in the garbage and 21% of people dispose of clothing because they are tired of them (Ekström and Salomonson, 2014). The fast-fashion retailers, such as H&M, Primark or Gap are commonly viewed as advocators of disposable fashion and post-consumer textile waste, and the latest research shows that this view may negatively affect the brand image and business performance of the these retailers (Choi et al., 2015). Environmental sustainability and the focus on garments' end-of-life destiny has therefore become an important issue for fashion brands (Kant Hvass, 2014), and implementation of used apparel collection programs is crucial in order to achieve a sustainable fashion supply chain management (Bouzon and Govindan, 2015).

According to Fletcher (2008), the most common approach to dealing with textile industry waste is to implement waste management strategies, such as reuse, reduce and recycle. Several new business models and initiatives have recently been introduced that incorporate these strategies. Kant Hvass (2014) identifies two main strategies that companies apply when entering the post-retail phase of their products, namely resell/reuse platforms to prolong the life of existing garments

and product take-back schemes for reuse and recycling purposes, including closed loop recycling. Examples include brands that collect and resell their own garments, such as Filippa K or Eileen Fisher with its Green Eileen second hand store concept. Closed-loop recycling is a process that takes post-consumer clothing and uses it to produce a fiber or yarn that can be used to make new clothing (Morley, 2013). Two recycling processes are identified: mechanical[5] (e.g. wool, cotton) or chemical[6] (e.g. viscose, polyester and other synthetics). Limited research is available that focus entirely on closed loop supply chains within textiles and garments. A few examples include Morana and Seuring's (2007; 2011) research on closed loop supply chain for polyester apparel, ECOLOG and GETEX return network for used apparel. The ECOLOG case study analysed acquisition aspects of used products and found that even though the closed loop system was technically sound and economically viable if used products were obtained, customer return behavior was not appropriately considered and the initiative failed (Morana and Seuring, 2007).

Another, yet more experimental, approach to address the textile waste issue is product-service-systems (PSS) that utilize schemes such as renting, redesigning, sharing, or lending to reduce reliance on natural resources and focus on function rather than ownership (Mont, 2002; Tukker and Tischner, 2006). For example, clothing libraries, such as dress swap place ReSecond in Copenhagen and the Helsinki Fashion Library (Esben Rahbek and Netter, 2015), or product lease, such as that by VIGGA that leases instead of sells baby clothes. Clothing PSS may provide the industry a mechanism to increase product quality and longevity while also providing alternative consumption models, however, recent studies discuss that clothing might be a challenging product for PSS for several reasons, such as removal of personal ownership, stigma associated with second hand clothing, consumers' emotional attachment to clothing and issues of hygiene (Armstrong et al., 2015).

Influential drivers for clothing companies' end-of-life management of products are related to policy and economic issues (Bouzon and Govindan, 2015). For

[5] Mechanical recycling means breaking down a fabric to fibers through cutting, shredding (size reduction from big pieces to small pieces), carding and other mechanical processes and is used to produce new fibers, fabrics and products (Palm et al., 2014)

[6] Chemical recycling is used for synthetic fibers (e.g. polyester, nylon etc.) or mixed fibers (e.g. synthetic and natural) and the fibers are chemically separated from the original textile. Final products can vary from the car sector such as upholstery to home furnishing, as well as clothing such as 100% recycled polyester by Teijin ECOCIRCLE™ (Palm et al., 2014)

example, in Finland a government decree on landfill will come into force in 2016 which dictates that textile wastes cannot be landfilled after 2016 (Palm et al., 2014). In addition, Extended Producer Responsibility (EPR) is gaining attention within textiles, which is a policy approach in which a producer's responsibility (i.e. physical and/or financial) for a product is extended to the post-consumer stage of a product's life cycle (OECD, 2001). Both mandatory EPR, driven by policy, and voluntary EPR, driven by industry, are distinguished within the EPR regime. Currently, only one functioning mandatory EPR system for textiles exists (France, Eco TLC) with another in the pipeline (Canada) (Watson et al., 2014). In addition, other policy instruments have been highlighted that can help to address the growing textile waste problem, such as minimum warranty periods for clothing, labelling with durability information/criteria, VAT reductions or removal for second hand goods, repair services and leasing, and resource taxation on new textiles (Watson et al., 2014). While there is no well embedded regulation that addresses the fashion industry's role in post-consumer textile waste, the field offers various opportunities for fashion companies to improve their image, find new customer segments, build customer loyalty and engagement, innovate their business models and improve their environmental footprint (Kant Hvass, 2014). Therefore, industry-driven EPR, where fashion brands take proactive steps to engage with the issue of post-consumer textile waste, seems currently to take the lead and is a departure point for this research article.

Case company JACK and JONES

The company JACK and JONES was founded in 1990 and is today one of Europe's leading producers of jeans and casual menswear with more than 1,000 stores in 38 countries. In addition, the brand's clothes are sold by thousands of wholesale partners all over the world. The company's turnover in 2012/2013 was 662 million EUR. In 2013 the brand put 66 million pieces of garments and accessories on the global market, including 5.8 million pairs of jeans, which is regarded as the backbone of the brand. To produce 5.8 million pairs of jeans requires approximately 5.2 million kg of cotton of which 25-30% turns into waste during the production phase and the rest of the material turns into waste after the products have been used by the end consumer (SGS, 2012). JACK and JONES claims to offer fast and affordable fashion to the medium-price market segment.

The brand belongs to a family owned business, BESTSELLER AS, together with 18 other brands, which is headquartered in Denmark.

Since 2011 JACK and JONES has developed methods to lower impacts from denim production and in 2012 they launched a range of low-impact denim products (LID) that have been produced with less energy, waste and water consumption. A logical progression from the LID initiative was to look for opportunities to take responsibility for the use and end-of-life phases of the products. In the beginning of 2012 the brand started investigating different product-take back models and potential partnerships with the goal of utilizing post-consumer textile waste in their future collections, thereby closing the loop of their products. Several charity partnerships were investigated for the product take-back initiative, however, the organizational landscape of charities is very diverse from country to country which made building relationships with charities in different markets complex and resource intensive. Instead, a professional for-profit global garment collector, I:CO[7], was chosen who could provide an unified collection and reverse logistics service to all relevant JACK and JONES markets. In parallel with the in-store product take-back initiative the JACK and JONES denim sourcing team investigated opportunities for post-consumer denim recycling and conducted several tests with their suppliers to integrate the post-consumer textile waste in their collections. Approximately 75 % of the fiber JACK and JONES uses in their collections is cotton; hence mechanical cotton recycling solutions were investigated, which is currently also the main recycling method within cotton. Several chemical recycling methods for cotton are under development but are still at research and development phase (Morley, 2014).

The first in-store product take-back pilot initiative, “Give Back. Reuse and Recycle”, in collaboration with I:CO, was conducted in 2012 in two Scandinavian markets. Used garments were collected in JACK and JONES’ retail stores using in-store collection bins provided by I:CO. Once the bins were filled, I:CO collected and transported the garments to the nearest sorting plant in Germany where they were sorted and evaluated according to more than 350 different sorting

[7]I:CO, part of the SOEX GROUP, is a global garment collection and recycling company that has garment collection points all over the world. Being part of the SOEX Group the company processes 700 tons used garments every day in 90 countries. For more information visit: http://www.ico-spirit.com/en/homepage/

criteria. Depending on the garments' condition, I:CO sells the sorted items as a second hand clothing, upcycle (closed loop recycling) them into new fibers and fabrics or downcycle (open loop recycling) the garments into new products and materials, for example sound and thermal insulation and wiping rags. Very low grade material is utilized for energy (I:CO, 2014). At the in-store garment collection point the ownership of the garments were reverted to I:CO who in return paid JACK and JONES for each collected kilo of garments. JACK and JONES implemented a bonus certificate scheme to reward consumers for their product returns, which was linked to the brand's LID collection in order to promote a more sustainable purchase choice. Customers received a five Euro discount voucher for the purchase of a LID collection if they donated a bag of used clothes to one of the chain stores. All clothes were accepted regardless of brand. The voucher was valid for two months and only in the store where the clothes were returned. Prior to the global launch the initiative was supported by an information meeting with the brand's country retail managers, online in-store personnel training, detailed instructions for store-personnel on how to handle garments, in-store information material for employees and a short movie from the I:CO sorting center to explain the journey of the returned clothes.

This research article builds upon the learning and experiences of the following key events of the case study:

- Spring 2012: Idea generation and project development, building partnership with I:Co.
- Summer 2012: The first in-store product take-back pilot initiative "Give Back. Reuse and Recycle" roll out in Sweden and Denmark to test the model.
- February 2013: Roll-out of the initiative in 17 of JACK and JONES' markets (972 stores excluding wholesale).
- Summer 2013: Evaluation of the results. Product return rates were low (in total 1644 vouchers were redeemed globally) and the project was temporarily put on hold with the aim to rethink its content and assess the consumer readiness.
- Winter 2013 – spring 2014: Internal focus group study and international customer survey among JACK and JONES' consumers was conducted in order to understand the consumer behavior and their interest in recycling.

- Winter 2014: Evaluation of the research results, redevelopment of the initiative and plan for the re-launch.
- 2012-2014: JACK and JONES' denim sourcing team investigates opportunities for post-consumer denim closed loop recycling

Analytical framework

This section presents an analytical framework that the case study analyses draw upon, namely circular economy, closed loop supply chains and business models. These frameworks are subsequently presented as an integrated model.

Circular economy

Minimizing waste through reuse and recycling is closely linked to the concept of circular economy. A circular economy opposes a linear economy that is based on take-make-waste rationale, and where natural resources are converted via production into waste with built-in environmental deterioration at both ends (Stahel 1982). Circular economy, at the same time, aims to achieve the decoupling of economic growth from natural resource depletion and environmental degradation through activities that reduce, reuse and recycle materials in production, distribution and consumption processes (Cooper, 1999; Murray et al., 2015). Circular economy is linked to resource cycling (Murray et al., 2015) and two types of cycles or resource efficiencies are distinguished, namely product-specific and material-specific (Stahel, 2013). Product-specific focuses on reuse and product-life extension, while material-specific focuses on material recycling (ibid). While reuse of and prolonging the life of existing garments is the most resource efficient strategy for managing unwanted clothing (Gracey and Moon, 2012), all clothes eventually lose their reuse quality and need to be recycled in order to utilize the existing material in an efficient way. This article focuses on the latter.

Transition towards a circular economy requires changes throughout many components of an economy and society, such as value chains, product design, new business models, and new approaches of turning waste into a resource to new modes of consumer behavior. This entails full systemic change and innovation not only in technologies, but also in organizations, society, finance methods and

policies (EC, 2014). This article focuses on business model innovation towards circular economy, however, a single company cannot implement and effectively run a circular business model on its own and holistic production and waste management are best realized by a contribution of several actors (Winkler, 2011). Hence it is important to look beyond a single firm, and include its upstream and downstream supply chain members and the interaction between them, which in the case of this research are brands, collectors, sorters and fiber/fabric mills. This research combines closed loop supply chain theory with the business model framework to address the issue from a business process view. The business model framework is holistic in its nature, focuses on value creation and a company's strategic proximity to the end consumer and links both internal and external activities of a company.

Closed loop supply chains

There are many different types of closed loop supply chains in practice and each of these has different characteristics (Wells and Seitz, 2005). For example, there are classifications based on material type: post-industrial, post-business, post-consumer and post-society waste (ibid). Each of these phases has its own specific possibilities and requirements, depending on the type of product, the processes involved and the size of the flows. Furthermore, closed loop supply chains cover both traditional forward supply chain activities and reverse supply chain activities, which include: used-product acquisition, reverse logistics, product disposition (i.e. sort, test and grade), remanufacturing/repair/recycling and remarketing (Guide and Van Wassenhove, 2009). Based on these activities three sub-processes are distinguished, namely product returns management (i.e. Front End), remanufacturing operational issues (i.e. Engine), and recycled products market development (i.e. Back End) (ibid). This paper focuses on post-consumer textile waste during the end-of-life phase and its closed loop supply chain sub-process of product returns management (Front End) and remanufacturing operational issues (Engine). Post-consumer waste is defined as "*any type of garment or household article made from manufactured textiles that the owner no longer needs and decides to discard*" (Hawley, 2006:264). The term remanufacturing is replaced in this research with closed loop recycling since this is the used term within fashion and the case company.

Business models

Over the last years business models are increasingly recognised as a key towards the achievement of sustainable production and consumption (Wells, 2008; Boons and Lüdeke-Freund, 2013). Bocken et al. (2014) argue that business models are considered important in driving and implementing corporate innovation for sustainability, can help embed sustainability into business purpose and processes, and serve as a key driver of competitive advantage. The perspective taken in this article is that business models are a useful means of simplifying the complexity of business (Wells, 2013), and they are discussed as strategic innovations (Tukker et al., 2008) that can support the integration of products' end-of-life matters within existing business models and thus contribute to circular economy of garments.

The field of circular economy and closed loop systems is growing as a business construct (Accenture, 2014; EMF, 2013), yet there is little formal academic debate regarding the topic within the business and sustainability literature (Murray et al., 2015). A few recent works can be highlighted, such as research by Bocken et al. (2014) that propose seven archetypes for business models for sustainability, which focuses, among other aspects, on material and energy efficiency, value creation from waste and product stewardship. In addition Roos (2014) synthesizes the theoretical and empirical insights from the business model innovation domain with insights from the circular economy. Planing (2015) proposes an outline of a circular economy model with associated business models with discussion on the reasons for non-acceptance of circular economy business models. Finally, Bakker, et al. (2014) identifies five archetypal business models for circular economy: the classic long life model, the hybrid model, the gap exploiter model, the access model and the performance model.

For the purpose of this research, a business model framework, introduced by Osterwalder et al. (2005), also known as the Business Model Canvas (Osterwalder and Pigneur 2010), has been chosen (Table 7.1). This is a well-conceived and academically grounded framework that supports the generic business modelling process (Bocken et al., 2013). The framework identifies nine basic business model building blocks that are organized into four pillars, which help a company with creating, capturing and delivering value to its customers, the company and the wider society (Osterwalder et al., 2005). Guide and Van

Wassenhove (2009) suggest a business process view in order to understand the challenges related to implementing a closed loop system. Hence, the business model framework by Osterwalder et al. (2005) is a useful tool to address the closed loop issues of garments as it allows to examine company's value propositions, business processes and resources, relationships with customers, supply chain issues, partnership needs, financial aspects in order to diagnose the opportunities for closed loop supply chain and integrate circular economy principles in the existing business model.

Table 7.1: Business model framework (Osterwalder et al., 2005)

Pillars	Building blocks	Description
Product	Value proposition	Overview of products and services and their inherent value a company offers to its customers
Customer interface	Target customer	Description of segment(s) of customers a company wants to offer value to
	Distribution channel	Describes the various means of the company to get in touch with its customers
	Relationships	Explains the kind of links a company establishes between itself and its different customer segments.
Infrastructure management	Value configuration	Describes the arrangement of activities and resources
	Core competencies	Outline of competencies necessary to execute the business model
	Partner network	Network of cooperative agreements with other companies necessary to efficiently offer and commercialize value
Financial aspects	Cost structure	Sums up the monetary consequences of the means employed in the business model.
	Revenue model	Describes the way a company makes money through a variety of revenue flows.

Closed loop supply chain integration with business model

Earlier research on the transition from conventional to more sustainable business processes suggests a multi-level analytical approach (Smit et al., 2009; Morana and Seuring, 2011). For example, Morana and Seuring (2011) place closed loop management within a political and societal context while linking it to supply chain partners and single actor activities. A similar three level analytical framework is proposed in this research that expands the boundaries of a single firm and organizes the closed loop supply chain and company level business model elements into a coherent analytical framework (Figure 7.1).

Figure 7.1: Three level analytical framework for closed loop business model analyses. Adopted from (Morana and Seuring, 2011; Guide and Van Wassenhove, 2009; Osterwalder et al., 2005)

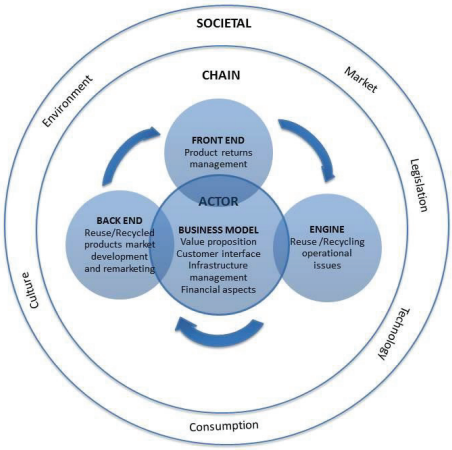

Figure 7.1 illustrates a journey of a product through a closed loop supply chain and the related processes where the actor (a fashion brand) is linked to its closed loop supply chain actors (garment collectors, sorters, recyclers, fabric mills) and is impacted by wider societal aspects. Applying this approach to the garment industry is appropriate since the fashion industry is part of a global textile industry which spans across several countries and continents and is impacted by various legal, social, economic, technical systems, consumer behavior and various actors across the forward and reverse supply chain. A closed loop supply chain is not regarded as a business model in itself but as an innovation to an existing business model.

The above presented analytical framework (Figure 7.1) is applied in a case study analyses where JACK and JONES represents the Actor and the Chain represents collection and reverse logistics partner I:CO and JACK and JONES's supplier mills. The location of the Actor's business model in the middle illustrates its involvement in all three sub-processes of the closed loop supply chain, i.e. in-store

product take-back service (Front End); recycling of used garments through existing supplier relations with fabric mills and manufacturers (Engine) and selling and remarketing the recycled products back to their final customers (Back End). These three processes interact with a firm's business model, which can be performed by the firm itself or outsourced to external partners. The main focus of this article is on the Front End (i.e. product returns management). The Engine (reuse and recycling operational issues) has a secondary focus and is analyzed utilizing data from the collection company I:CO and three of JACK and JONES' suppliers. The Back End phase of the chain is not analyzed because successful and complete product development and consequently remarketing of these products has yet to take place at the case company. Analyses of the societal level factors is beyond the scope of this research article, however, it is difficult to entirely detach this research from the external factors and therefore some of the key societal issues have been discussed throughout the paper.

Methodology

To better understand industry-relevant issues of closed loop systems it is important to collaborate with practitioners (Guide and Van Wassenhove, 2009). This research applies a longitudinal, in-depth single case study method and follows an engaged scholarship strategy, which is a participative form of research for obtaining different perspectives of key stakeholders in studying complex problems (Van de Ven, 2007). The author had an opportunity to become a part of the phenomenon of the study, an inside-out mode of inquiry, which is argued to serve both practical and theoretical purposes (Evered and Louis, 1981). Data collection took place within the period of January 2012 through November 2014. Table 7.2 provides an overview of the mixed method (Yin, 2011) data collection.

Table 7.2: Data Collection Overview

Data Collection Method	**Description**
Actor level (JACK and JONES)	
In-person interviews with JACK and JONES staff	15 semi-structured interviews were conducted that lasted 1-2 hours with the following interviewees: - Buying, Design, Media, Identity Director. Interview focus: JACK and JONES business model; general feedback on the product take-back idea and

	its implications on the current business model - International Sales Director. Interview focus: Current sales and retail practices; general feedback on the product take-back idea and its implications on the current business model - Strategic Sourcing Manager. Interview focus: Current supply chain management; implementation of reverse logistics; general feedback on the product take-back idea and its implications on the current business model - Sustainability Manager (responsible for the product take-back development and implementation) (6 interviews). Interview focus: several interviews during the research period on JACK and JONES sustainability strategy, importance of product end-of-life management, take-back initiative development, implementation and evaluation - Sourcing and product development specialist (initiator of the take-back project) (3 interviews), Interview focus: product take-back project development, implementation, collaboration with I:CO, challenges and technicalities - Communication and branding specialist (facilitator of the take-back project) (3 interviews). Interview focus: product take-back project development, implementation, internal and external communication, in-store implementation, I:CO collaboration. Interview guides were produced, interviews were recorded and results transcribed.
Meeting notes	Meeting notes from the following meetings were collected: - General meetings with BESTSELLER Corporate Sustainability Department (3 meetings) (Fall 2011) - Take-back idea generation meeting (January 2012) - Global take-back launch meeting together with I:CO (January 2013) - Meeting with JACK and JONES Director (April 2013) - Take-back pilot evaluation meeting (October 2013) - Meeting with JACK and JONES Retail Director (May 2014) - Take-back relaunch internal stakeholder meetings (March 2014, October 2014)
Company documents	- Internal email correspondence between take-back project team members during the project development and implementation phase - Email correspondence between denim sourcing responsible and JACK and JONES suppliers in Europe on fiber recycling issues - Take-back information material kit for stores - Store personnel surveys conducted after product take-back pilot in Scandinavia (September 2012; 62 participants) and global launch (March 2013; 178 participants). Surveys were conducted internally at JACK and JONES. - Life cycle assessment: Denim jeans – A comparison of 5 styles. Technical report for JACK and JONES. Confidential. - Take-back marketing and PR plan - Strategy documents and other company documents
European customer survey on consumer's attitudes towards recycling and take-back (2014)	- The survey was conducted in collaboration with sustainable fashion consumption researchers at Copenhagen Business School. The author participated in survey design and communication. - The survey was carried out between July and September 2014 and distributed via the JACK and JONES Facebook group and the customer club. 3,144 customers from more than 30 countries participated. - Survey aim: to understand consumer behavior related to sustainable fashion consumption, in-store product take-back, reuse and recycling of the brand's products.
Internal focus group study	- Demographics: 19 participants from different departments and age groups from JACK and JONES head office who had not been previously involved

	with the product take-back project - Focus group lasted 2 hours. The participants were introduced to the take-back concept and their feedback was asked to 5 issues: general reflections on the take-back idea; design and communication on the in-store collection bin; incentive system for the returned garments; how to communicate this to JACK and JONES customers; how to better integrate this to JACK and JONES business model. - Participants were divided into 4 groups where they had group discussions. Data was produced by the participants on Post-It notes, which the researcher subsequently utilized as data. In addition, notes were taken by the researcher and assistants during the discussions. - A report with summarized results was produced.
Diary and field notes	Throughout the research the author kept a diary
Chain level (external stakeholders)	
In-person interviews with garment collector I:CO	6 semi-structured interviews with I:CO CEO (1) and Global Key Account Manager (6) that focused on: - Description of I:CO business model and its role in textile waste minimization - Global textile collection, reuse and recycling markets - I:CO collaboration with the fashion industry - I:CO collaboration and in-store product take-back implementation with JACK and JONES The interviews were recorded and summaries were produced.
Email correspondence with fabric mills	Email correspondence on post-consumer textile waste recycling with three JACK and JONES's denim suppliers

The data library was created in the NVivo software package from interviews, meeting notes, company documents and surveys. Thematic network analyses method was used for primary data analyses (Attride-Stirling, 2001) using a deductive approach. First, a coding framework was designed based on the theoretical interests and pre-established criteria: 1) challenges occurring at a Chain level during product returns management, sorting and recycling; 2) challenges at an Actor level distinguished by 4 business model elements: value proposition, customer interface, infrastructure management and financial issues. These codes were applied to the textual data and thereafter prominent and common themes in the coded text were extracted. These were arranged and deduced into global themes, which are presented in the next section.

Findings

Based on the findings from the JACK and JONES case study the following section presents and discusses key issues and challenges in innovating business model towards circular economy of garments by establishing a closed loop supply chain for post-consumer waste and integrating post-consumer recycled fibers in future products. The findings are categorized according to the Chain (closed loop supply chain) and Actor (brand's business model), as presented in Figure 7.1. The main focus of the analyses is on Actor level issues, which is complemented by broader contemporary issues and challenges at the chain level. The key findings of the research are exhibited in Table 7.3 and elaborated in sections below.

Table 7.3: Summary of key findings

CLOSED LOOP FASHION-RELATED ISSUES AND CHALLENGES

CHAIN LEVEL

FRONT END

Product returns management

- Limited access to sufficient volumes of used garments
- Chemical issues related to cross-brand collection and recycling

ENGINE

Sorting

- Resource intensive manual sorting
- Missing technologies for efficient and economically sound sorting
- Geographical diffusion of actors and lack of consolidated actors that can handle big volumes

Recycling

- Non-viable recycling markets due to lack of economically viable sorting and recycling technologies
- Significant loss in fiber length and quality
- Unpredictable quality of input material
- Resource intensive
- Used textile export/import restrictions
- Limited best practices
- Lack of standardized quality parameters for recycled yarn

BACK END

Not Applicable

ACTOR LEVEL

BUSINESS MODEL

Value proposition (VP)	Customer interface	Infrastructure	Financial
• Definition of closed loop VP for customers, employees, partners and suppliers • Integration of VP with existing business model	• Lack of customer awareness and acceptance • Complex topic to communicate • Cross-cultural communication • Customer engagement and motivation	• Need for partnerships for reverse logistics • Lack of organizational alignment • Need for organizational learning • Lack of knowledge, competencies and routines	• Shift from short term profit orientation to long term value creation • Need for minimizing transactional costs

Chain level challenges

The following section highlights the broad issues and challenges at a supply chain level related to product returns management (i.e. Front End) and sorting and recycling (i.e. Engine). The findings are based on secondary data sources and primary data from JACK and JONES, garment collection partner I:CO, and JACK and JONES's supplier mills.

The findings from this case study show that it is challenging to access sufficient volumes of used clothing from end consumers. Access to the necessary amounts of used products as one of the key challenges of closed loop systems is also highlighted by previous research (Geyer and Jackson, 2004; Guide and Van Wassenhove, 2009). The return rates at JACK and JONES were very low even though all garments were accepted regardless of brand. Internal store personnel surveys showed that there was an overall positive feedback among consumers about the initiative; however, this did not result in sufficient product returns. Taking into account the low return volumes it would not be realistic at this stage to implement a JACK and JONES own brand-based closed loop system, therefore other brand's garments must be collected as well. However, this raises a chemical concern with the recycled product, as it is unknown which dyes and other chemical substances other brands have used during their production and finishing processing. This may challenge quality or conflict with JACK and JONES' chemical guidelines for garments.

The main challenge in the sorting phase is that currently the majority of textile sorting is carried out manually, which is a widely used practice. This method is based on sorting according to a garment's quality and is suitable for the purpose of reuse markets. However, the process is not capable of accurately determining fabric content, which is important for closed loop systems as for example some fibers require chemical recycling while others require mechanical recycling. Some technological solutions have been proposed and assessed to improve sorting practices, but these are not yet technically and commercially proven on a large scale (Humpston et al., 2014). Due to the cost of sorting and the lack of sorting technology that can handle large volumes of low grade garments, the current recycling markets are not competitive for sorting for closed loop recycling purposes and are waiting to be scaled up once the technology is available.

The main challenge of closed loop mechanical recycling is significant quality loss in respinning cotton and the lack of technologies that could retain longer fiber length. Quality issues lead to uncertainty in recycling economics and issues of product responsibility. While fabric mills have long practiced pre-consumer cotton recycling (i.e. where factory leftovers are respun with virgin material), the case with post-consumer textiles is more complicated. The input quality of the yarn varies (e.g. used by consumers, chemically treated, unknown mix of fibers, badly removed metals and other parts) thus the strength, color, and look of the recycled yarn is not predictable. JACK and JONES has made several tests with their supplier mills to use post-consumer textiles in their denim collections, however, the results so far have not been satisfying as described by informants both from the brand and mill side:

"*…we are hearing from many of the fabric vendors that the fibers are not strong enough once they have been collected, shredded and washed again. We have high company expectations for our fabrics in terms of fabric strength and the JJ look is always to have aggressive washes to the garment. A very aggressive wash to a fabric with low strength is making it a high-risk for broken jeans – which means unhappy customers with negative experiences in our jeans and with the recycling project*" (Informant, Sourcing at JACK and JONES)

"*…the weaving process was a nightmare because of the continuous loom stops. We realized it is not possible to produce a reasonable quality by using cotton coming from second hand shredded garments. The fiber coming from this operation is too weak and even mixing it with standard cotton was not enough*" (Informant, Supplier Mill)

Recycling economics is another hindrance. Since the quality of the used input material is unpredictable the process becomes more resource intensive. This can lead to a significant amount of fabric loss, as described by one informant:

"...we faced a 25% second choice during the production due to weft breakages. We had to employ more people on the looms during the production of this fabric because of the high quantity of loom stops and consequently a slowdown of productivity " (Informant, Supplier Mill)

Mills often lack the necessary technology and best practices for working with post-consumer fibers and therefore they often try to avoid to accept responsibility

for the final product.

"*…many of the vendors do not want to do these post-consumer recycled fabrics without signed contracts from the suppliers. This is to prevent the suppliers from blaming the fabric vendors if there are claims on the fabrics.* (Informant, JACK and JONES Sourcing)"

Finally, different chain members, such as garment producers, brands, collectors, sorters, fabric spinners and recyclers are diffused over different countries and continents, which challenge global closed loop supply chain management and its integration. For example, Turkey is one of JACK and JONES' main supplier countries for denim. However, Turkish legislation restricts the import of used textiles, which creates a constraint in getting used garments that are collected from different JACK and JONES European markets to the Turkish fabric mills for recycling purposes. Worldwide, more than 30 countries, mainly in Africa, Asia or South America have introduced import bans on used clothing in order to try to protect their local textile productions, and for health and sanitary reasons (Palm et al., 2014). However, in order to reach the critical mass of closed loop textile recycling vertical and horizontal coordination, collaboration and transparency across different parts of the value chain are needed (Krikke et al., 2013). Furthermore, other enablers, such as textile waste legislation, new product design approaches that support recyclability and market demand for recycled fibers as well as consumers' willingness to buy products with recycled content are crucial. At the same time, merely having an in-store product take-back system might not be enough to collect sufficient volumes. Krikke et al., (2013) argue that multi-channel collection may be needed for customers' convenience and increased rates of returns. A partnership with local charities, other brands and/or local municipalities as part of an existing in-store collection or a mandatory industry-wide approach might be needed for the collection of critical volumes (for a more detailed discussion see (Watson et al., 2014).

Actor level challenges

The following section presents key findings on main issues and challenges related to implementing a product returns management system at JACK and JONES. The key findings are presented within the four business model pillars as presented in

Table 2: the value proposition, infrastructure, customer interface and financial aspects.

Value proposition

There are two main challenges associated with the value proposition element, namely defining the closed loop value proposition and its integration into the current value proposition of a company's business model.

The findings demonstrate that the value proposition of implementing a closed loop system could be perceived differently by different departments (e.g. retail, branding, sourcing, sustainability, store personnel). There is a degree of complexity around the closed loop agenda, which can be hard to comprehend, thus making it difficult to communicate and obtain the necessary commitment from various internal stakeholders that influence the outcome of the initiative. For example, the value of the in-store take-back initiatives was defined differently by JACK and JONES informants: increased foot traffic in stores and increased customer loyalty (retail), proud employees and brand value (brand communication, store personnel), volumes of returned clothes for recycling purposes, increased consumer awareness of reuse and recycling and product stewardship (sourcing, sustainability).

As described by one informant:

*"I think it's so difficult to measure the success. We should not only look at the numbers, but also at other things like feedback and comments and so on…. And we think in very different ways: retail people see the very instant impact and we see it much broader, so people are looking at it in very different ways" (*Informant, Sourcer*).*

The findings therefore suggest that a holistic value proposition needs to be defined that describes the closed loop value for different stakeholders. This is necessary in order for both internal and external stakeholders to collaborate and commit to transform the industry towards circular economy. Especially retail partners may be hesitant to commit to the initiative since it takes retail space away from their store and creates extra work for their employees. The value proposition for customers was also strongly emphasized both by interview informants and focus group

participants. Informants questioned why consumers should bring their clothes back to the retailer instead of giving it to a charity. As expressed by an interview informant:

*"It's all about the value the product-take back can give to our consumers. What's in it for them when they return a bag of clothing, and what value will it give to educate them on closed loop? (*Informant, Brand Identity*)"*

Customer Interface

The findings identify three main challenges towards consumers. These are a lack of consumer awareness and acceptance, how to communicate the initiative to consumers and how to engage and motivate them to participate in the recycling.

The first challenge is related to limited understanding of consumers' behavior during the use and disposal phases of their garments. While retailers are experts in knowing their customer needs and behavior when it comes to marketing and selling new products, product's post-purchase phases (use, reuse and disposal phases) are a new field for brands, which has not been a priority when in contact with consumers. When setting up an in-store garment collection program the brand expects a new behavior from its consumers, which is not based on their need for new clothes, but rather environmental concerns for recycling and minimizing textile waste. Therefore, it is crucial to understand the consumer behavior in order to engage them in the end of life processes of products. The JACK and JONES international consumer survey showed that 62.8% of the respondents show interest in recycling and that they currently recycle clothes by giving them to charities or passing on to family/friends. At the same time, consumers who were aware of the in-store take-back service were likely to try the service, thus the likelihood of using such a service increases with customers' awareness and prior experiences. Despite this feedback from the consumers the return rates were very low.

This leads to another challenge within customer interface, which is how to communicate this new agenda to the end customer and engage them in contributing to a closed loop fashion system. While marketing a pair of jeans can be a straightforward message, asking customers to return their old clothes to a

store is more complex, especially since clothes are usually passed on to friends and families or donated to charities helping people in need. The findings show that there is a need for a comprehensive communication strategy where the brand has an educative role to increase consumer awareness on these matters. This should be communicated through the proper message, tone of voice, communication mode and channel. This was clearly expressed by an informant:

*"We need to communicate the initiative from the consumer's perspective aligned with our general sustainability communications. We need to communicate this matter in a cool and innovative way, to create awareness about closed loop and show that we dare to speak up about 'serious matters' and to make sustainable consumption cool for a young guy… We need cool visual material to support the initiative, a collection box that stands out, staff competitions to secure their engagements, we need more products made of recycled material to make it easier for our consumer to understand and for us to communicate this as a cool campaign and we need to find a good award when consumers are returning their clothes" (*Informant, Brand Identity*).*

In addition, store personnel play a crucial role in communicating the message. The store personnel survey showed that 93% of the personnel felt that customers did not know about the service when they entered the store, which shows that even though communication through social media, store windows and other channels is important, store personnel has a central role in informing and engaging with consumers on these matters.

"*…we need to educate our store personnel to tell consumers the story, engage them in JACK and JONES discussions, tell the jeans story. If store personnel won't engage and communicate on this, then we can forget about the whole project. Therefore, we have to do our best to get the store personnel on board and say that this is a requirement from JJ to be part of it, communicate it and run it. We have to emphasize that this is what JJ wants, these are our values and to make them proud of being part of JJ" (*Informant, Retail*).*

Communicating and engaging with consumers on closed loop issues in the context of a global market brings along another interesting challenge, namely how to communicate, market and brand the closed loop initiative across different markets. JACK and JONES' brand value differs across markets, at the same time consumer

behavior towards recycling and their environmental awareness related to clothes donation differs from market to market (Bianchi and Birtwistle, 2012). Thus, customers in different markets may perceive the product take-back message and engagement strategy of the brand differently. This leads to a challenge on how to motivate consumers to act and return their unwanted clothes to the store. As explained by one informant:

"…we have to motivate our consumers to go home and get their old clothes. I think it's very difficult. They are young guys between18-24, they are not so disciplined to bring their products back and they might not be so worried about the environmental issues if compared with females. They also shop less often than girls do. When are they coming to the stores again to redeem the voucher? (Informant, Communication)

Findings from the JACK and JONES customer survey illustrate that the main reasons for not bringing the clothes back to JACK and JONES is the preference for charity (50,3 % of respondents) or inconvenience (25,5 % of the respondents). Earlier research suggests that a financial incentive is often needed in order to increase the return volumes from end-consumers, especially in the case of market-driven systems (Guide and Van Wassenhove, 2009; Ramani et al., 2010). JACK and JONES provided a financial reward in the form of a discount voucher for each returned bag of used clothes (all brands were accepted) that could be redeemed when buying a new JACK and JONES Low Impact Denim (LID) collection, thus nudging consumers towards a more sustainable product purchasing. However, this did not result in large return volumes. 69% of the store personnel found that the LID linked voucher was not motivating enough and 85% found that it would be more helpful if the voucher was given as a discount on a general purchase. In addition, consumer survey and focus group study respondents suggested other forms of incentives, such as supporting a charity, having the opportunity to choose between a financial reward or benefitting a charity, and participating in a game or competition.

Infrastructure

Three main important areas related to the infrastructure pillar can be concluded from this case study, namely identifying a right partner for reverse logistics, organizational learning and organizational alignment.

The findings show that the traditional infrastructure, internal capabilities and partnerships of a fashion company are not sufficient for setting up a closed loop system. Krikke, et al. (2013) argue that due to the need for new competencies and specialized skills and the nature of reverse logistics most product return operations are outsourced to professional third-party service providers. These providers tend to show higher return rates as this is their core business. In the early phases of the project development JACK and JONES investigated partnership opportunities within the charity industry or setting up a take-back system by itself.

"Our initial idea was to campaign with a charity organization, however, as our goal is a global launch this seems close to impossible as it varies a lot from country to country who is the main charity organization and it is very different how a charity organization operates from country to country… and because the way we are organized we cannot handle it ourselves, we don't have the manpower. It will also be much more expensive and we would not have all the same agreements with different companies. We can easily do the collection but what do we do when we have all the garments?" (Informant, Sourcing)

JACK and JONES entered a partnership with I:CO to benefit from their global reverse logistics infrastructure and the relevant know-how of the collection, sorting and recycling industry, as was explained by an informant:

*"…we are not experts and we will probably not be experts on this for many years so we are totally dependent on finding companies like I:Co who can take care of this" (*Informant, Buying).

Another infrastructure related finding from the case study is the importance of organizational alignment, which is the extent to which strategy, structure, and culture create an environment that facilitates the achievement of organizational goals (Semler, 1997). The literature distinguishes between vertical alignment (i.e. configuration of strategies, objectives, action plans, and decisions throughout the various levels of the organization) and horizontal alignment (i.e. coordination of

efforts across the organization which can be defined as cross-functional and intra-functional integration) (Kathuria et al., 2007). The findings show that both vertical and horizontal organizational alignments were relatively weak. The product take-back initiative was not directly linked to the overall strategy and action plans and the value proposition of it was not clearly defined. As highlighted by an informant:

*"When we do something like this, it has to be integrated into the whole organization, from the management, to the philosophy and structure. Then there will be a much broader understanding in the whole organization for it" (*Informant, Communication*)*

In terms of horizontal alignment, the initiative failed to establish a strong cross-functional project management, which resulted in a silo campaign without an owner. As one informant commented on the challenges:

*"I think it was an internal failure, an ability to understand how much this actually takes from us. If we do something like that who should have the ownership. So that it comes all the way out to the shops and that it is not just a campaign run from the headquarters. That it is clearly communicated and that is clearly understood from the shop mangers, that this is not a choice, this is a decision taken from our core values" (*Informant, Sustainability*)*

The weak alignment also made it difficult to integrate the concept in a horizontal retail organization where the majority of the retail outlets are franchised partner stores, as was expressed by one informant:

"*It's difficult to convince retail to spend one square meter per shop and, let's say, one hour for the shop, because when you multiple it becomes lots of square meters and lots of hours" (*Informant, Buying*).*

Levitt and March (1988) argue that different groups in an organization often have different targets and evaluate the same outcome differently. From a holistic perspective the different interpretations of the closed loop related values and activities are interlinked. It can however be difficult to translate these values into a cross-organizational commitment and specific overall rational success. For that

reason it is vital to align the closed loop processes to the company's strategy and action plans, as well as to establish a cross-functional management of the initiative (Sernler, 1997).

Finally, the third infrastructure related key finding is related to internal awareness and organizational learning. The overall learning culture of JACK and JONES is learning by doing and this approach was also applied when conceptualizing and implementing the take-back initiative. An experiential trial-and-error learning approach is suggested in situations where the viability of new business models is uncertain (Sosna et al., 2010) and there is need for identifying routines, procedures, strategies and success stories that could lead to favorable outcomes (Levitt, March 1988). This describes well the internal context of the case. The findings show that the existing routines could not be used as implementing a closed loop system requires a whole set of new procedures, strategies and knowledge. As was expressed by an informant:

"*I don't think we are ready for that as a company I think we need to create some kind of small success stories with a few countries before we roll out to all markets*" (Informant, sustainability).

In addition, failed attempts to collect sufficient volumes of clothes brought along employee skepticism of the initiative and their weak commitment:

"*Even though people believe in it, it's still uphill. At some point people will end up saying it's too early. You have a certain time to prove some kind of success in an organization and that's key if we should get the buy in, also from partners and store personnel. If they have a box in the store and they have had training going on and there has been the PR going on and you can say that we had more or less the perfect set up, but consumers still do not deliver any clothes. How long will you then keep the box in the shop*? (Informant, Sustainability)

*"... still a few retail managers are skeptical about it: will a young guy ever bring his used clothes back to the store? Is the collection box the right thing? No wonder, we are all in this field in an infant stage" (*Informant, Communication)

Financial Aspects

The main issue related to the financial element is how to build an economically sound product take-back system and how to get the collected fibers back into new products at an expense that the company and the market can bear. Since the data was collected during the development and test implementation of the in-store take-back system, the information on detailed transaction costs was not available. Therefore, the findings highlight the very broad issues related to closed loop implementation costs and revenues.

Morana and Seuring (2007; 2011) suggest a transaction cost approach for analyzing the cost of customer return and cost of disposing products, both from the consumer and company perspective. They propose that setting up a take back system involves several transaction costs, such as information costs, planning costs, inventory costs, travel and transportation costs, time costs and psychological costs (ibid).

The findings from this case study show that product returns management-related transaction costs can be minimized to a great extent if entering into a partnership with a professional collector, hence finding the right partner for the take-back and reverse logistics is of key importance (Savaskan et al., 2004). For example, when partnering with I:Co, JACK and JONES was not responsible for storing, sorting and disposal costs and the transportation costs were balanced out by the volumes of returned goods that I:CO compensates JACK and JONES for as these enter the global reuse and recycling market as valuable material.

The main transaction costs that JACK and JONES faced were related to the lost store space, store personnel's time to handle the product take back, related marketing/communication costs and administration costs at the head office for project management and I:CO collaboration. In addition, there was a discount voucher for customers to reward their returns. In case the take-back system is offered as an all-year round service to customers with an incentive, the cost of it is a considerable investment. However, it can also have a rebound effect, by potentially bringing back the customer to redeem the voucher.

Finally, even though creating profits from the end-of-life management are important (Ramani et al., 2010), the findings suggest that implementing a product take-back system requires the company to move from a profit mentality to value

mentality, as the value related to the product returns management cannot always be tangibly measured, especially in cases where the industry is still in its infancy. As the case indicated, the return volumes were very low and the project were put on hold and it was therefore impossible to measure the tangible financial return of the system through increased traffic in the stores and increased sales through redeemed vouchers.

Discussion and conclusion

This research paper's aim is to improve the understanding of closed loop fashion by exploring the relationship between closed loop supply chains and business models. The article identifies issues and challenges that impact the successful integration of closed loop practices, namely product take-back system and closed loop recycling, in a fashion company's business model**.**

Wells and Seitz (2005) argue that implementing a post-consumer closed loop in practice is the most difficult. The challenge of how to close the loop of the textile supply chain by recycling used clothes into new ones has been widely discussed (Bouzon and Govindan, 2015; Morley, 2013; Morley et al., 2014; Palm et al., 2014). This study's findings confirm that closed loop fashion from post-consumer textile waste is a complex matter with several uncertainties and challenges that span across the entire value chain.

Besides a lack of technology for efficient and economically viable sorting and recycling, one of the main difficulties identified at the supply chain level, was limited access to post-consumer waste, which is also highlighted by previous research (Geyer and Jackson, 2004; Guide and Van Wassenhove, 2009). Geyer and Jackson (2004) argue that limited access to end-of-life products leaving the use phase can be one of the main constraints of successful supply loops, which supports the importance of understanding consumer behavior. This research highlights that consumers are the cornerstone of closed loop business models since without their sufficient product returns the closed loop-focused business model will not be realistic. This is supported by Anderson and Brodin (2005) who argue that through recycling the consumer is given a new role as a supplier rather than as a seller in traditional terms. This stresses the importance of designing a product take-back system that is based on the need and interest of a specific customer segment. Therefore, the system should be understood in terms of customer

relationship management and customer service and satisfaction. In addition, the results show that providing consumers personal benefits in the form of a discount voucher is important however this may be inadequate. Jena and Sarmah's (2015) study on consumer behavior with regard to returning used products in the electronics industry shows that besides a financial incentive, awareness and education associated with product return-related issues and benefits are important. A fashion brand can take a proactive role in this; however for a larger scale consumer impact a wider societal approach is needed where both government and industry work together to support awareness and a positive image for consumers for returning used products. Furthermore, Choi, et al. (2015) found that used garment collection schemes offered by fast-fashion companies are positively correlated to brand awareness and brand image. Closer engagement with consumers should be seen as an investment in customer loyalty that should be supported by a consistent and long-term strategy of the fashion company. It is therefore crucial to see the closed loop system in terms of customer relationship management where customer engagement, education and motivation are in focus since the whole closed loop system is strongly dependent on customer returns.

The study reveals several organizational challenges that may hinder the successful implementation of a closed loop supply chain, such as a need for organizational learning and a common understanding of the closed loop business model value proposition among internal stakeholders. These findings are in line with existing research on challenges related to business model innovation. Findings by Laukkanen and Patala (2014) highlight aspects that are the main barriers to sustainable business model innovation, which include a lack of awareness and understanding, attitudes and values. Cavalcante et al. (2011) add that resistance, uncertainty and ambiguity can be challenges to business model innovation, especially when creating new processes or changing existing business model processes. In addition, unsuccessful experimentation can create skepticism among employees and thus requires an approach towards organizational change through awareness raising, culture building and double loop learning (Levitt, March 1988).

In addition to organizational learning, the findings highlight the need for organizational alignment. This is both in terms of aligning the closed loop initiative with overall strategies and action plans of the company, but also

horizontally in the form of cross-functional teams. The former requires values and beliefs among management that support a circular approach to products and processes. Seitz (2004) argues that product take-back and remanufacturing are unlikely to become truly cost-effective until management thinking includes them as part of the product lifecycle rather than as an afterthought. The need for horizontal alignment is further supported by Choi et al. (2015), who argue that cross-functional teams are required for effective planning and implementation of used garment collection programs, as closer collaboration between companies' different functions will increase communication and enhance the effectiveness of the initiative. Organizational alignment should be complemented by strong integration with external stakeholders, such as developing partnerships with collectors, sorters, recyclers and supplier mills (ibid).

The findings of this study conclude that implementing a closed loop system requires a brand to implement business model innovation and the related organizational change, transformation of the value proposition, rethinking customer engagement and building new partnerships with collectors, sorters and recyclers. In addition, with the current limited technology available and limited consumer readiness to return used products back to the point of sale it is very challenging for fashion brands to close the material loop of their own products at a large scale. As current industry challenges cannot be solved by brands alone a more collective approach is recommended for closed loop fashion where the fashion industry joins forces through collective investments and collaboration with other sectors to drive the needed technological innovation and customer engagement. For example, in order to collect sufficient volumes an industry-wide collective multi-channel take-back approach can be one solution (Ekström and Salomonson, 2014). One could also critically ask what is the overall impact that the fashion industry's voluntary circular economy initiatives have on minimizing the growing textile waste problem. Perhaps a mandatory EPR legislation or other regulatory instruments (e.g. raw material tax) are needed in the future to collect the necessary volumes of used garments for reuse and recycling purposes move towards a circular economy of fashion and textiles.

Managerial implications and further research

This research article provides an original contribution to the relatively new and under-researched phenomenon of closed loop fashion. The contribution of this article is the identification of the challenges related to a closed loop supply chain and business model innovation seen from a fashion brand's perspective. While the chain level challenges are more specific to the fashion industry, the actor's business model issues and challenges have broader implications that can pertain to organizations in similar situations in other industry contexts. In addition, the research findings, combined with existing research, form a foundation for a more comprehensive theoretical framework for further investigations. The results of this paper are grounded in a single case study therefore the common limitations associated with broad generalizations apply.

A brand-centered three level analytical framework for closed loop business model analyses was proposed which was a useful tool to categorize, analyze and interpret the case study data. Even though full analyses of the suggested three level framework was beyond the scope of this research, it allowed for conclusions that span across the boundaries of a single brand and highlights the need for a holistic approach when developing closed loop business models. This framework can be applied to different contexts of consumer goods. Since the consumers' role in product returns is one of the key issues in making a single brand closed loop supply chain successful, the author suggests modifying the framework and including consumers at the chain level as co-suppliers of raw materials for the closed loop product system.

The article addresses several challenges while providing few answers thus there is a need for additional studies to allow more in-depth understanding of the phenomenon. Such studies could investigate the interaction between several closed loop supply chain members' business models and the necessary prerequisites within and across these business models to achieve a successful implementation of a closed loop fashion system. In addition, more comprehensive analyses of wider societal aspects, such as political, economic, environmental and technical opportunities and constraints of closing the loop of fashion in order to understand the global context the business models operate within. The article did not investigate product reuse related issues and market development for

remanufactured fibers. It is suggested that future research should focus on all phases of the life cycle of a product with the aim to develop and implement an integrated and economically viable business model that aims to close the loop of fashion products.

8. Discussion: Transitioning towards circular economy of fashion

The following chapter discusses the research findings in the wider context of post-consumer textile waste system and circular economy of fashion. First, value of post-consumer garments will be discussed and how fashion companies can be involved in creating and delivering that value. Second, what business model innovations are required in creating, delivering and capturing that value while transitioning towards a circular economy and what implications these have on the existing logic of the fashion business. Finally, what implications fashion industry's involvement with post-consumer garments has on other stakeholders, more specifically, second hand charity industry?

Value of post-consumer garments

From the perspective of a linear economy a piece of garment accrues value through a number of steps such as design, production, retail, marketing, branding and reaches its maximum value when it is sold to an end customer. From the circular economy perspective, as argued by Brodin and Anderson (2008), the end consumer is not the endpoint for a product's value as the product continues to retain value in the end-of-life phases by different actors. When the end consumer is finished with a product, the value of that product is at its lowest; however the value starts increasing again once the consumer decides not to discard the product in the trash bin but to forward the product for reuse and recycling. For example, if a garment is collected for reuse and recycling, it is a valuable item for the second-hand industry, where it is reused or resold in its original condition or as raw material in the recycling industry for the production of new materials or goods. Hence the circular economy perspective introduces new values associated with a piece of garment that extends the use, reuse and recycling phases of a product's life. At the same time, the end consumers have a crucial role in this value creation process as the fate of a garment lies in their hands. This is supported by Stahel (1986) who argues that a product's lifetime is primarily determined by the user and not the manufacturer. Therefore, it is very important to collect used clothes from the end consumer and to transfer the ownership of the garment to different actors in reuse and recycling industries who can then develop and capture varying

amounts of value from these garments. The various post-consumer value points of garments are illustrated in Figure 8.1.

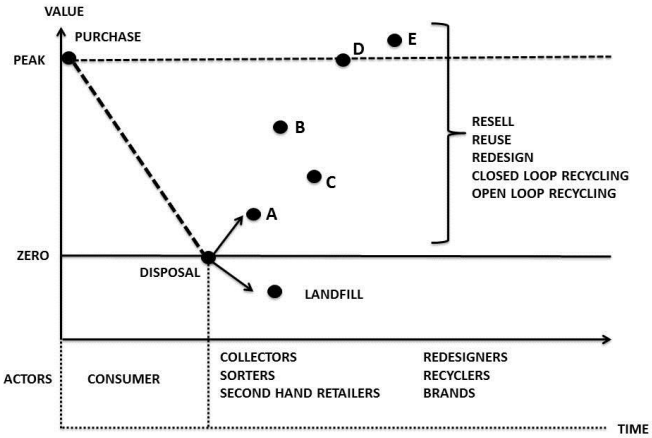

Figure 8.1: Post-consumer value of garments (adapted from Brodin and Anderson, 2008)

The Figure 8.1 commences with a consumer's purchase of a product where the product's value (i.e. monetary, extrinsic and intrinsic) has reached its peak level. During the use phase the value decreases and reaches its lowest when the consumer is ready to dispose the product. The disposal moment is when the consumer stops using the product and makes a decision to reuse it in his/her household, discard or send it further in the system for reuse and recycling purposes; it is at this point that the product's value transformation commences. The future value of the product is therefore strongly affected by a consumer's disposal behavior and the chosen disposal channel (e.g. donation to charity, direct resells, return to retailers' product take-back scheme, and pass on to friends/family).

Points A, B, C, D and E illustrate varying value points of a used garment that has entered the post-consumer textile value system. Through the activities of reuse, resell, redesign and recycling new value can be developed. For example, A represents the value point of a cotton T-shirt down-cycled into industrial wipes, B represents the resell value of a garment at a charity store, consignment store or internet resell platform, C represents the value point of a garment that is cut-up and redesigned into a new product, D represents a new polyester garment that has gone through a chemical closed loop recycling process and E represents a pair of old original jeans that are sold in a vintage store at higher price than initially purchased, in other words a higher value point than the original purchase. In this case, time is a decisive factor that adds value to the original product. It is important to note that the value creation from A to E is not a linear process and a garment can for example go from disposal moment to E and bypass intermediate steps. Furthermore, these value points are only illustrative to show that there is a potential value in used garments if bin disposal is avoided. What the actual value is and how it is created and delivered requires further research on specific examples and case studies as reused/recycled product and material value consists of several factors such as business models and market conditions, available sorting and recycling technology, labor costs, virgin raw material prices and legislation.

The aim of the mapping of post-consumer textile value is to demonstrate potential opportunities for fashion companies to capture the post-consumer value of their products, which until recently was captured by other actors on the market, such as second-hand retailers, collectors, recyclers, or the value was just destroyed when clothes were disposed in trash bins. The figure can therefore assists fashion companies in mapping the previously missed and uncaptured value (Bocken et al., 2013) that their products' post-consumer phase might include. The following sections will demonstrate how fashion companies are trying to create and capture this value.

Fashion companies as new players in the post-consumer textile value system

This research has shed light on various innovations that are happening in the fashion industry in terms of post-consumer textile waste. The findings demonstrate that mandatory EPR (Extended Producer Responsibility) legislation, that aims to organize producers' responsibility of end-of-life management of textiles, is currently missing. Instead, industry-driven voluntary EPR initiatives are an emerging phenomenon where fashion brands take proactive steps to engage with post-consumer phases of their products and try to capture the value that these phases offer. As designers, producers and marketers of garments that eventually turn into waste they have a role in resolving the textile waste problem by finding alternative uses for their used products and materials in order to avoid material inefficiency and environmental pollution.

The findings from the explorative study (Article 1) show how fashion companies exercise this new role and what strategies they apply for the post-consumer textile waste management of their products. These strategies are summarized in Figure 8.2 and they demonstrate that both product-specific and material-specific approaches for circular economy are applied (Loop 1 and 2 in Figure 3.4). The product specific approach aims to prolong the life of garments and focus on durability and reuse by emphasizing the post-consumer value of garments against the ease of acquiring new ones while the material specific approach focuses more on material recycling and aims to close the material loop of textiles. These findings demonstrate that fashion companies see both product and material value in their used products and that there are new possibilities for value creation and capture within garment reuse and recycling. Based on these findings it cannot be clearly stated which strategy is chosen by which fashion market segment as the reuse and recycling strategies are often intertwined in companies' practices. However, a broad conclusion can be drawn that premium and high fashion brands with high quality products try to first focus on capturing the reuse value of their products, while companies with higher production volume, lower priced and often lower quality products engage primarily with product collection for recycling purposes.

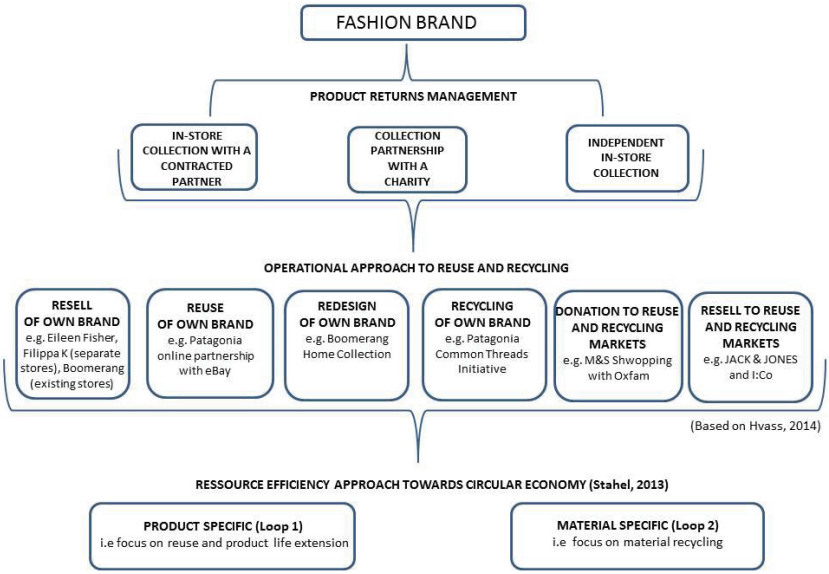

Figure 8.2: Explorative mapping of the fashion industry's involvement with post-consumer textile waste

The above mapping of the fashion industry's involvement in post-consumer garment reuse and recycling is among the first within the field[8] and indicates that fashion industry's involvement with textile reuse and recycling is a growing phenomenon where fashion companies have become a relevant actor in post-consumer textile waste practices. As discussed in chapter 2, previous research fails to recognize the importance of fashion companies in post-consumer textile waste streams. See for example Hawley (2006; 2015) who provides a detailed mapping of different post-consumer actors and textile waste streams, however, fashion companies are not included. As a result of this research, a modification is proposed to the previous mapping (Figure 8.3) that includes fashion companies and the potential reuse and recycling streams they are involved with (marked in

[8] Watson, et al. (2014) provides another mapping of new business models, which is partly based on the preliminary findings of this study.

grey). This modification highlights fashion companies' presence in garment reuse and recycling and potential streams they are involved with in a wider system. It furthermore illustrates the strategic position fashion companies have with regard to having a direct link to customers as well as closeness to recycling industry through their own product take-back schemes and recycling of own garments.

In addition, it is argued that the term post-consumer textile waste implies that there is no or very little value in used garments. However, both Figure 8.1 and 8.2 illustrate the potential value of used garments and the related streams where both product and/or its material value could be redeveloped. It is therefore suggested to rename the textile waste system to *post-consumer textile value system*.

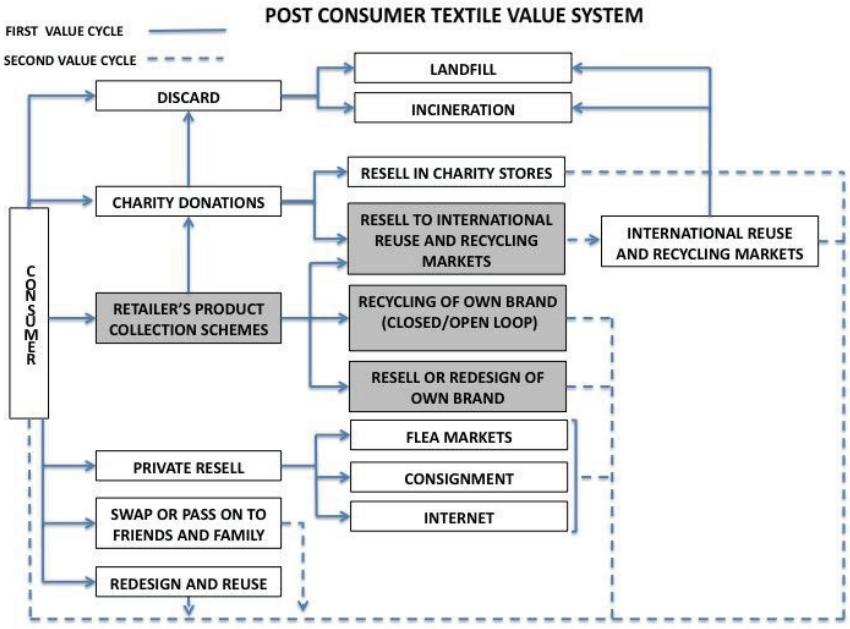

Figure 8.3: Post-consumer textile value system (adapted from Hawley, 2006; 2015)

Business model innovation for circular economy

Transitioning from a linear economy towards a circular economy is a process that entails a change of how companies operate. The following section discusses what business model innovations are needed from fashion companies to create, deliver and capture the value of their used garments. As argued by Roos (2014), the circular economy requires a rigorous approach to business model innovation since the scope of the business model is both broader and more complex than in the traditional linear model. The complexity to adapt to circular thinking and circular business processes were illustrated in both of the in-depth case studies of this research that studied the practical aspects of integrating reuse and recycling strategies in existing business models (Article 2 and 3). The findings conclude that in order to integrate circular economy principles of reuse and recycling into the existing business models, rethinking existing value propositions and modifying several or all business model elements is required.

Based on the empirical findings from the two in-depth case studies, a list of business model innovations is proposed that can assist fashion companies in transitioning their business models towards a circular economy (Table 8.1). These are generic innovations that are structured around Osterwalder et al. (2005) value-centered business model framework. These proposals apply to both product (reuse) and material (recycling) specific approaches as being logically linked to truly pursue a circular economy, hence both need to be addressed and managed by companies. Specific innovations are company-specific therefore the table is not a detailed account of what firms should do exactly, but rather a discussion and thought-provoking exercise for companies.

Applying these innovations in fashion companies' business models may bring along radical changes to how the company perceives its products and relationships with customers and other stakeholders. Instead of seeing themselves solely as producers and sellers of products, in the context of circular economy, fashion brands need to see themselves as managers of product life-cycles, where they have the power to influence both upstream and downstream value chain activities. The findings provide an important scholarly contribution to further develop and refine theoretical frameworks of business model innovation for sustainability with a focus on product and material circularity.

Table 8.1: Circular economy focused business model innovations

Business Model Components	**Circular Economy-Focused Business Model Innovations**
Value Proposition	
The product and service offering	Extended product and service offering: • Extended value proposition that incorporates product's post-consumer value flows in product or service offerings • Shift from customer focused value proposition to more holistic value proposition (i.e. value for different stakeholders, both internal and external)
Customer interface (i.e. target customer and customer relationships)	Extended customer perspective: • Customers as suppliers and value co-producers • Customers in first and second hand markets Customer relationship management throughout a product's life-cycle: • Engagement with customers during pre-purchase, purchase, use and disposal phase of products • Customer education on reuse and recycling issues • Incentive system for customer involvement
Value Creation and Delivery	
Infrastructure management (i.e. value configuration, distribution channel, core competencies, partnerships)	New activities: • Product returns management system • Development of reuse platforms and second hand retailing • Closed loop supply chain development • Sourcing practices of recycled fabrics • Marketing of reused and recycled products Extended distribution channels and their alignment: • Product take-back channel and reverse logistics • Reuse and resell channels • Redistribution channels (for reused and recycled products) Development of new skills and competencies:

	• Design for circularity (longevity and recyclability) • Organizational learning and staff training on circular economy • Know-how of reuse and recycling markets • Organizational alignment on circular economy Development of partnerships with: • Charities • Second-hand businesses • Public and third party collectors • Sorting and recycling companies • Industry wide initiatives, multi-stakeholder platforms, NGO's, public sector organizations and academia for knowledge sharing and joint solutions
Value Capture	
Financial aspects (i.e. cost structure and revenue model)	Extended view on cost structure: • Transaction costs for reuse and recycling loops • Cost of cannibalization • Cost of uncertainty of reuse and recycling flows Extended view of revenue streams: • Revenue from customer loyalty • Revenue from reuse and second hand retailing • Revenue from recycling loops • Cost advantage of material efficiency • Cost advantage of product life extension and resell of own products

Value proposition

The central issue of the entire business model is the value proposition. The majority of the business model literature is based on the presumptions that value must be created for the company and the end customer. From a linear value creation perspective a piece of clothing accrues value through a number of steps such as design, production, retail, marketing, branding and reaches its maximum when it is sold to an end customer. From a circular economy perspective the product has value both when the consumer purchases a piece of clothing, during the use phase as well as during the reuse and end-of-life phases. Hence the value

proposition of a business model should be extended so that it incorporates a product's post-consumer value flows. As argued by Bocken et al. (2013) waste streams can be seen as missed, destroyed or wasted value for companies. Instead, waste streams can offer an opportunity for value innovation by capturing missed value through new activities and relationships. For example, Filippa K extends their value proposition through second-hand retailing by offering customers an opportunity to dispose of their unwanted garments with financial benefit. At the same time, value to Filippa K is increased through additional income, new and loyal customers and improved brand reputation that is related to high quality products and an environmental approach towards waste.

From a value proposition perspective it is therefore important for companies to recognise and understand the broader value of their products and how to capture that value. This raises the questions below which are new to the fashion industry but can facilitate companies in identifying business model innovation opportunities and capture currently missed value through new product and service offerings:

- What is the quality and durability of products offered today and what is their value in reuse and recycling markets?
- What alternative products and services can be developed to capture the reuse/recycling value of products?
- What added value can the experience of reusing and recycling garments bring to customers?
- What competitive advantage does the resell or recycling activities offer?

Additionally, innovating business models towards a circular economy requires a value proposition that describes and explains the circular value for both internal (e.g. different departments within a company, wholesale and retail partners) and external stakeholders (e.g. supply chain partners and a wider society). This is necessary so that the different stakeholders can work in tandem to create and deliver the value proposition. For the purpose of wider societal value, Lüdeke-Freund (2009) proposes public customer value approach, which creates public benefits, i.e. positive social and environmental externalities. Public customer value can be created for example, when a brand uses sustainable materials (e.g. certified recycled cotton) and processes that follow circular economy design practices (e.g. design for reuse, disassembly and recyclability) to produce a high quality product

that a customer desires. It is also important to provide a repair or redesign service to extend the life of the garment and collect the product back for reuse and recycling purposes. In this case the extended customer value provides support for sustainable farming and processing practices of cotton, waste minimization and resource efficiency through longer life of products and end-of-life recycling.

Customer interface

In the context of circular business models, a customer interface requires a modified approach. First, secondary markets can provide new target customers and it is therefore important for companies to investigate if there are new customers to be reached through reuse and recycling activities. Second, and a more important modification, is the extended understanding and role of customers as suppliers and co-producers of post-consumer fashion value. This is supported by Anderson and Brodin (2005) who argue that through recycling the consumer is given a new role as supplier. Seen from a fashion company's perspective this is extremely relevant as circular economy focused business models are dependent on consumers returning their used garments, thus they become suppliers of the merchandise (for reuse and resell purposes) and suppliers of raw material (for recycling purposes). Therefore companies need to see their customers as suppliers and co-producers (Wikström, 1996; Anderson and Brodin, 2005; Holm and Holm, 2010) of the garment's post-consumer textile value where the interaction between them and consumers should generate more value than a traditional transaction process where they exchange the ownership of products and then go their separate ways. Consumers therefore play a crucial role in the shift towards a circular economy (Planing, 2015), and they should be considered as important actors in the circular value chain. This is illustrated in Figure 8.4 (a further development of Figure 7.4 in Article 3) and shows their strategic role and position in the circular value chain of a garment and how linked consumers' purchase, consumption and disposal behavior is to the other activities in the chain.

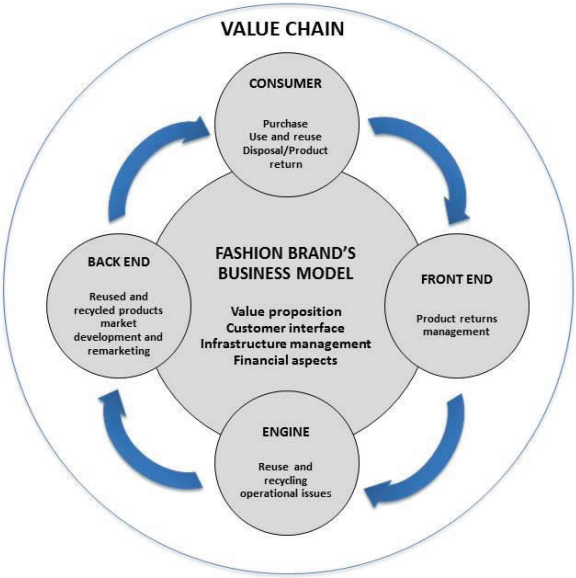

Figure 8.4: Consumers' role in garments' circular value chain (adapted from Morana and Seuring, 2011; Guide and Van Wassenhove, 2009; Osterwalder et al., 2005)

However, it is not clear if consumers are aware of their new role and how to perform it. Research shows that consumers are not always aware of the need for clothing recycling and that there is a general lack of knowledge of different textile reuse and recycling possibilities (Morgan and Birtwistle, 2009; Joung, 2014; Ekström and Salomonsom, 2014). They also lack knowledge of what happens to the textiles after they are donated to textile collectors and where to draw a limit on what could be delivered to reuse (Laitala, 2014). At the same time the likelihood of consumers bringing clothes for reuse and recycling increases with their awareness and prior experiences (Gwozdz, 2014). Findings of this PhD research confirm the above where several company informants expressed their concern over low consumer awareness of the negative end-of-life impacts of clothes, which

brings uncertainty for companies wishing to innovate their business models with reuse and recycling activities.
Seeing customers as suppliers and co-producers demands a new approach to the customer relationship that aims to make customers involved and responsible partners in the value creation processes (Lüdeke-Freund, 2009) as well as motivate them to take responsibility for their consumption (Boons and Lüdeke-Freund, 2013). Companies therefore need to get closer to their customers in order to understand, influence and satisfy their purchase, consumption and disposal needs. To actively communicate the circular value proposition to customers, a life-cycle focused customer engagement strategy is required that informs customers about the reuse and recycling value of the products they have purchased. This can be achieved through product life-cycle centered sales and marketing messages. For example, Patagonia's Common Threads Initiative, asks customers to take a formal pledge and be partners in the effort to reduce consumption and keep the products out of landfills, while offering several services that help customers to reuse and recycle their products. This is a strong strategic and operational marketing approach. Engaging with consumers on circular economy matters is thus a strategic choice that requires companies to find answers to the following questions:

- What is our target customers' current garment reuse and recycling behavior?
- How do we motivate our customers to return their products so that they provide sufficient supply for the second-hand concept and/or closed loop product system?
- How to motivate them to reuse their products and buy second-hand clothing?
- How do we communicate the complex textile reuse and recycling story in a cross-cultural context across different markets?

Infrastructure management

The process of creating and delivering the circular value proposition is organized through a company's internal and external infrastructure management. This part of a business model integrates internal and external activities, capabilities and

partnerships and links companies' value creation chain to other market players or whole industries (Lüdeke-Freund, 2009).

Several innovations are required within the infrastructure pillar to create and deliver circular value proposition. First, it brings along new activities for fashion companies, such as setting up a product returns management system, developing reuse and resell platforms and a closed loop supply chain for recycling purposes and finally marketing the reused and recycled products to new or existing customers. These activities are in general new to fashion companies and therefore requires the assessment of internal capabilities necessary to implement these new activities. In broad terms, organizational capabilities deal with the issues of competitive advantage, organizational learning and innovation management (Lüdeke-Freund, 2009), which are all important for transitioning the business model towards a circular economy. Based on this research, the following key areas for innovation within capabilities were identified. First, new skills are needed within design for cyclability (Goldsworthy, 2012), where both longevity and recyclability are in focus. While a product's longevity is a pre-condition for reuse and is supported by long lasting design and high quality garments (both material and production quality), recyclability aims to send the products back to technical or biological material cycles. Design for cyclability means that designers must adapt a life-cycle thinking to the products they design (i.e. fabric selection and design, treatment processes, product use and care practices, disassembly and recycling) and understand the processes that occur at a product's end-of-life phases in order to ensure it can be fully incorporated back into the materials pool (ibid). A key issue therefore is to identify the design principles that can be applied to products to support the capture and delivery of the reuse and recycling value.

The second area of new capabilities lies in organizational learning and staff training on the circular economy (at individual, organizational, and inter-organizational level), know-how of reuse and recycling markets and how to partner with other players in the industry. For example, establishing a resell initiative requires knowledge of second-hand markets, which in many aspects operates differently from conventional markets, such as garment sorting, pricing and customer engagement. In addition, organizational alignment with circular economy initiatives is crucial as the new activities often span across the entire

organization and therefore the existing business strategies, action plans and targets need to be aligned with the new circular economy value proposition.

Finally, building partnerships with wider industry stakeholders is required in order to synchronize the logistics infrastructure and investments in innovating technology and to assemble different knowledge and skills needed for circular economy solutions (Preston, 2012). For example, implementing a global product take-back system requires companies to choose the appropriate reverse logistics channel structure that matches the company's size, market segments and geographical location. This was the case with JACK and JONES, where internal capabilities did not allow them to set up such as system in isolation and they needed a partner to collaborate on the garment collection. Companies therefore need to be aware of their need for external expertise and identify the activities that should be outsourced along with potential global partners in each market for reuse and recycling activities.

Financial aspects

The financial component of a business model justifies the whole business model from an economic perspective by connecting the other business model components through cost and revenue structures. Transitioning towards a circular economy and creating and delivering circular value propositions can bring companies additional revenue streams, but also costs and other financial risks. For example, both reuse and recycling activities can bring new revenue streams (e.g. revenue from second-hand retailing or used garments sold to collection companies). In addition, increased revenue from loyal and returning customers can follow as a result of a successfully implemented product in-store take-back scheme. At the same time, several new costs are introduced (e.g. transaction costs for product take-back, reuse and recycling), including risks associated with product return uncertainty (supply for second-hand retailing and closed loop recycling) or a risk of cannibalisation of the core business when entering the second-hand business.

In general, moving towards a circular fashion system requires a shift from a short-term profit generation mentality to long-term value creation mentality. In the short-term the revenue increase and business growth from a circular business

model might be challenged as the value from reuse and recycling of clothes is less than selling a new product and the volumes handled need to be high in order to meet profit expectations. Therefore, mature second-hand markets and well-functioning recycling markets are needed for economic efficiency in reuse and recycling. Hence, capturing the value of the circular business model requires a long-term perspective that prepares the company for future legislation, future raw material prices and independence from virgin raw materials. From a customer related perspective, companies need to be alert to finding new customer segments, building customer engagement throughout products' life cycle and improving brand image.

Charity sector under pressure?

The innovations presented in the previous section and fashion industry's subsequent transition towards more circular business models has implications beyond fashion companies. Egri and Pinfield (1999:223) argue, that "*…organizations cannot be easily separated from the environments in which they are embedded. They not only adapt to their environments but also strongly influence the nature of those environments*…". They furthermore add, that (ibid: 477) "*…an incremental change in one small part of the system may, over time, amplify a large-scale transformation in macro-level systems*". The findings of this research show that the fashion industry's involvement with post-consumer waste adds new streams for used clothing, which can bring along a need among the existing actors in the industry to rethink their operations. This is especially the case within the non-profit charity second hand industry who is currently the main actor in garment collection, sorting and resell.

Currently the main method for consumers to dispose of their unwanted clothes is via donations to charity (Domina and Koch, 1999; Birtwistle and Moore, 2009; Ha-Brookshire and Hodges, 2009) thus the garment reuse and recycling system relies greatly on consumers' altruistic behavior (Brodin and Anderson, 2008). This has been sufficient to keep the system operational and has helped to keep millions of garments out of landfills. However this ad hoc approach is not perfect as post-consumer textiles are a growing problem in the world. Brodin and Anderson (2008:14) argue that consumers' time is scarce and "*when the free time becomes*

an even more scarce resource it cannot be taken for granted that the activity of recycling products is prioritized at the cost of, e.g. time with family or time for leisure activities". An alternative garment collection system that is provided by fashion companies, combines shopping and product return for a discount voucher which can bring competition for used clothes. Even though the findings of JACK and JONES case study clearly illustrate that consumers are reluctant to return their clothes to the stores despite the financial incentive offered to them, this might change when consumer behavior adapts to this new product take-back offer and the incentives offered by brands. Yet, one potential implication of fashion industry's increased focus in reuse and recycling can be the charity industry's survival in competition with a fashion industry, which has the ability to provide monetary incentives for product returns. Many charity organizations employ volunteer labor and support socially disadvantaged groups in society. They are a vital vehicle in promoting social inclusion in local communities by offering both volunteers a space for social interaction, work placements and offering clothing to the local community at relatively low prices (Broadbridge and Parsons, 2003). For example, Danish Red Cross has 234 second-hand retail stores that are run by 8000 volunteers across the country (Røde Kors, 2015). Hence, the decrease in donations to charity organizations might negatively impact the people involved in charities and the social projects that are financed from the resell of these donations.

When looking at charities' role from the circular economy perspective, it is important to make a distinction on two levels: i) product-specific that focuses on reuse and ii) material-specific that focuses on recycling (Larsen, 2015). Charities are currently the main actors in product-specific activities in the form of collecting donations from consumers and manually sorting items to serve the needs of local charity stores and global reuse markets. Sorting according to refined categories required by the reuse markets cannot be automated as a human touch is required in order to identify the style, brand, and overall quality of the garment (Hawley, 2006). At the same time, manual sorting is very resource-intensive, making charities, with access to unpaid volunteer work, well positioned to do this work.

When looking at charities' role from the material-recycling perspective, the situation is different. In order to identify the appropriate materials for recycling technologies, post-consumer materials need to be sorted accurately according to their exact fiber composition. This is not usually suitable for manual work and

therefore the potential recycling value can be lost. For textile recycling purposes there is a need for an advanced technology that can identify the exact material content, deal with the complexity of the mixed materials used in garments and be able to process large volumes efficiently. Currently this technology is not fully available for market use and even if it was, it requires significant investment beyond the scope of many charities. Charities, whose mission is centered on social issues, will most likely not have the financial resources to invest in these technologies and therefore might lose in the competition with professional collectors and sorters.

In summary, I argue that for charities to stay involved with the end-of-life practices of clothes, they need to rethink their current practices and business models. The majority of their business models today focus on the social bottom line as they see themselves as social charitable organizations and engage with environmental issues of reuse and recycling to a very modest extent. However, in order not to be negatively impacted by the growing competition for used clothes, charities need to find new value propositions, engage more actively with consumers, and develop new partnerships among the garment value chain actors (e.g. fashion companies, third party collectors, recyclers). Several charities are already reacting to this, for example by building strategic collection partnerships (i.e. Oxfam and MandS garment collection collaboration Shwopping), and investigating product reuse and recycling opportunities (e.g. G-Star and KICI collaboration on closed loop jeans) with brands. Another potential future collaboration scenario for charities with the fashion industry can be a collection and sorting service for various brands, which offers fashion brands a steady supply for their own-brand second-hand retail business and raw material for closed loop products. Since charities are currently the most preferred places for garment donations by consumers, they still have the potential to collect larger volumes. At the same time, it allows the charity sector to stay involved in textile reuse and recycling and through this collaboration fashion companies can create a wider societal value.

Concluding remarks

The benefits of circular economy are obtained by minimizing use of the environment as a disposal place and by minimizing the use of virgin materials for economic activity. In the context of the fashion industry this means minimizing waste throughout a product's entire life cycle by applying more efficient and sustainable practices within production, producing products that are durable, introducing business models that focus on reuse and recycling and finally integrating recycled fibers in new products thus minimizing the use of virgin materials.

Until recently, the term circular economy was unheard of within the fashion industry. Sustainability-oriented fashion conferences focused primarily on minimizing environmental and social impacts of the forward supply chain while the post-consumer waste and garment reuse and recycling were not seen as a concern of fashion companies. The situation looks different today. Several global key players such as H&M, Levi Strauss, Nike, PUMA and Patagonia, have started to address the end-of-life matters of their products, and the numerous garment take-back initiatives and the growth of the recycled of fibers are visible signs of brands attempting to move towards a circular economy of textiles (Mathews, 2015). A global garment collector, I:CO, has today more than 50 brands all over the world that use I:CO in-store product collection services. H&M Conscious Foundation recently announced the Global Challenge Award worth €1 million to catalyze green, groundbreaking ideas that will close the loop of fashion (Dove, 2015). Additionally, Filippa K launched a Lease the Look online initiative where consumers can lease a piece of garment instead of buying it, thus educating consumers about circular consumerism. At the same time, politicians at national and international levels are addressing resource efficiency issues within garments and textiles and several legislative measures that support reuse and recycling of garments are currently being discussed. These developments are an indication that textile waste has become a relevant topic for the fashion industry, which is hopefully here to stay.

Findings from this research confirm this trend and despite the fact that the studied examples represent only a fraction of what is currently happening in the industry, it enabled to identify main patterns of how existing companies are getting engaged

with the end-of-life issues of their products. It shows that the industry is currently organized around voluntary initiatives where fashion companies are proactively developing solutions to address the textile waste problem. However, there is a likelihood that the field will be regulated in the future and for example, extended producer responsibility (EPR) within textiles is made mandatory. Those proactive companies who have experience with product take-back and reuse and recycling will have a competitive advantage. At the same time, if mandatory legislation fails to materialize, the industry needs to consider how the current scale of voluntary initiatives will drive the much needed systemic change in how products are designed, produced, consumed and disposed. Unfortunately, without legislation the increasing resource-intensive fast fashion business model that focuses on cost reduction and increased consumption and production will be tacitly legitimized. How the circular economy of fashion agenda evolves in the future will therefore depend on many factors and actors. For example, on fiber supply and demand, prices of virgin materials versus recycled materials, technological developments in textile recycling, future legislation together with corporate willingness and readiness to implement circular economy principles in daily practices and participating in garment's end-of-life management. Not to be overseen, public awareness of the importance of garment reuse and recycling needs to be increased, as consumers are gatekeepers when it comes to sustainable consumption and responsible disposal practices. Raising public awareness of the value of used garments and developing a system that diverts used garments from landfills and incinerators into reuse and recycling value is a collective task for businesses, NGO's, policy makers, educational institutions, consumer and industry organizations and public authorities.

The study highlighted some positive circular innovations, some incremental while others more radical, however, it remains to be seen if the fashion industry in a broader sense is willing to take significant steps (i.e. as listed in Table 8.1) that are sufficient to bring the needed systemic change and make the circular economy of fashion happen. Even though the examples presented in this research enable the industry to prolong the life of some clothes and divert them from landfill to reuse and recycling markets, it is not clear if these initiatives actually bring along more sustainable consumption and production of clothes thus alleviating resource depletion and environmental degradation or are they perhaps mechanisms for increasing consumption volumes and consequently use of resources, a so called

rebound effect (Dyllick and Hockerts, 2002; Málovics, et al. 2008;). For example, when a brand offers a discount voucher for used garment returns that provides discount on a new garment purchase, it could be argued that it might push consumers to buy new garments instead of slowing down consumption. At the same time, it is not clear that the brand is offsetting the production of new garments as part of these initiatives thus the total contribution to sustainable development and resource use might not be achieved. In order to avoid the rebound effect, companies need to develop a holistic circular economy business strategy that focuses on the absolute amount of input resources (e.g. raw materials, emissions, energy, water etc.) and output products and by-products and make intelligent decisions on how to manage these inputs and outputs in a way that reduces use of virgin raw materials, natural resources, energy and amount of waste while satisfying customer demands.

From a broad industry perspective, the field is still in its infancy and while the group of industry innovators is advocating the circular economy agenda through experimentation and innovation, the majority of the industry is followers who are waiting for best practices and workable solutions that can be imitated. Transitioning an existing business model towards a circular economy is full of complexity and requires top management commitment, investment and long-term thinking. At the same time, a short-term business case model is not realistic, especially in the case of closed loop recycling since the returned garment volumes are too low, the currently practiced manual sorting is unable to serve the recycling needs and the existing recycling methods are too small scale to make them economically efficient. The circular economy of fashion can only become a reality when there are well-functioning garment collection systems, sorting procedures that can efficiently serve both the reuse and recycling markets, recycling technologies that can recycle textiles (including mixed fiber fabrics) into high quality fibers and fabrics that meet the market needs and consumer readiness to reuse, recycle and buy second-hand products or products with recycled fiber content. Regulations and removal of trade barriers, investment in technology, transparency and collaboration in industrial interaction and consumer engagement could catalyze these prerequisites. None of these aspects can work in isolation and requires that different stakeholders work in tandem.

At the same time, naturally, the main benefits of circular economy are that materials should stay in reuse and recycling loops and that material waste is minimized in physical terms. However, as argued by Andersen (2007), this approach is based on physical, rather than economic observations and therefore the question of how far the society and industry can go in recycling textiles remains to be answered when regarded through an economic lens. With the majority of the current textile recycling technologies there is a cut-off point where recycling becomes too complex to provide a net benefit. At the same time, in a market economy, the prices of materials and natural resources currently do not reflect the costs associated with depletion of the environment and natural resources and therefore the recycled fibers can often be more expensive than virgin fibers.

Taking the above into consideration, currently only a limited range of circular economy business models make sense from an economic perspective, such as resell of own brand. Research by Buttle et al. (2013) suggests that fashion retailers reselling pre-owned own-brand garments is one of the most commercially viable business models over the long and short term, while also being one of the most effective at generating waste savings. The findings of this research complement this as both Eileen Fisher and Filippa K, who have their own second-hand stores, see it as an important value creation opportunity that also supports the economic bottom line. Therefore, it could be argued that currently the business case within the circular economy of fashion may lie in reuse and second-hand retailing. Perhaps the first step for the fashion industry in adapting circular business models lies in producing high quality, long-lasting products and prolonging the life of these products through reuse and resell platforms. While this may seem idealistic in the industry where quantity is valued over quality, it maintains the very important aspect of satisfying consumers with the newness. As a starting point, companies could start investigating the reuse value of their products in the existing second-hand markets to see if there is value that can become a part of their current value proposition. In reality, how many fashion companies will choose the reuse path of their products is not certain. The industry level discussions today focus greatly on recycling issues rather than prolonging the life of existing clothes, even though from a circular economy perspective that is the first strategy to choose towards a more circular and sustainable fashion future.

It is also unclear how much longer the fashion industry can continue to produce high volumes of low quality clothes while using vast amounts of natural resources and creating waste. In circular economy it is imperative that companies decouple their business success from resource use and grow while halving resource use. There are no garments today that can be reused and recycled endlessly so there will always be a need for new garments, but current fashion has become 'disposable fashion' and the need for new clothes is artificially created. From an environmental perspective it would be better if there were fewer but higher quality clothes. The newness that consumers seek in their fashion consumption can be provided through buying second-hand or getting it or redesigned. At the same time, brands would save money by designing and producing fewer styles rather than today's abundance that the market cannot bear which forces companies to find costly solutions to dispose of their unsold stock. It is also unclear as to how many clothes are enough to satisfy the needs of today's demanding consumers and the growth goals of fashion businesses while also staying within the ecological boundaries of our planet. This research agrees with Brooks (2015) in that shoppers cannot be trusted to shop less or consume differently and fashion offers are shaped by fashion companies who, in turn, stimulate consumer demand. Fast fashion brands justify this by saying that it is the consumers who demand the wide selection and diversity of fashion styles today. However, Livia Firth, the founder of the Green Carpet Challenge, responded to this statement during a panel debate with H&M at a Sustainable Fashion Summit in Copenhagen in 2014 by saying that her children want candy all the time but that does not mean they should get it, and that as a parent she has a responsibility in addressing this want. Therefore, fashion companies have a significant role in influencing consumers' demands and taking proactive steps towards a less wasteful fashion system. Designing high quality products out of sustainable materials based on design for circularity principles and by facilitating extended life of these products and materials through reuse, repair, resell, redesign and recycling will contribute to resource efficiency and be a vital step towards a circular economy.

Limitations and future research

The circular economy within a specific industry context is a comprehensive field, which requires a holistic approach and an in-depth understanding of relevant

actors and societal aspects as proposed in the three level analytical framework in Chapter 3. It is outside the scope of this PhD research to analyze all the three levels (i.e. societal, chain and actor). This dissertation studied the fashion industry's role in post-consumer textile waste as seen from a voluntary extended producer responsibility perspective. It did not go in-depth into the legal environment that is needed for operating circular business models, or consider the advantages and disadvantages of mandatory versus voluntary extended producer responsibility schemes. Therefore, further research is needed that delves into the wider societal level aspects in order to better understand what external enablers are needed for transitioning the industry towards a circular economy.

The mapping of the fashion industry's post-consumer reuse and recycling initiatives (Figure 8.2) is among the first within the field and therefore has limitations. The initiatives are new, resulting in companies experimenting with business model innovation by trial and error. Therefore, the mapping is not static as new focus areas, new strategies and new ways of organizing can occur. For example, this mapping did not identify PSS related business model innovations, such as sharing platforms for clothes (e.g. clothing libraries), product lease, repair services and product re-purposing, which play an important role in extending the life-cycle of garments. Despite the fact that PSS business models are a growing interest within fashion, it is more start-ups and SME's that experiment with shifting the garment ownership from the consumer back to the producer, and not a sector for this research, which focused on well-established fashion companies and their endeavors towards a circular economy of fashion existing brands. Therefore, the mapping serves as a preliminary conceptual mapping tool and for more solid conclusions an in-depth study of a larger sample of initiatives is suggested. In addition, the findings of this research primarily focus on the value proposition, value creation and delivery, and less on value capture. The reason for this is that the majority of the case companies were too early in the process of developing and implementing the circular economy initiatives which did not allow me to delve deeper into the value capture phase and investigate the business case of these initiatives. Further in-depth empirical research is needed on value capturing of circular business models to provide tangible results from the economic perspective.

Finally, the research concentrated on one type of waste, namely post-consumer waste, and the related opportunities and challenges for business model innovation within existing business models. For a full understanding of circular fashion, other waste streams, such as post-production (e.g. fabric leftovers from the cutting) and post-retail waste (e.g. samples, unsold collections, defected collections) should be investigated and included in circular business modelling. Furthermore, transition towards circular economy requires interactions and interdependencies along the whole value chain and therefore by focusing primarily on fashion brands, this dissertation provides only a part of the circular fashion industry story. Further research is needed that investigates the business model innovations that are necessary among other chain members and their interdependence on each other.

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