

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
ESCOLA DE ENGENHARIA
PROGRAMA DE PÓS-GRADUAÇÃO EM ENGENHARIA DE PRODUÇÃO

**INOVAÇÃO SUSTENTÁVEL EM MODELOS DE
NEGÓCIOS NA INDÚSTRIA DA MODA**

Bruna Villa Todeschini

Porto Alegre, 2018

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RESUMO

Esta pesquisa tem como pano de fundo o setor de moda, que passou por diversas transformações ao longo das últimas décadas, estabelecendo o *fast fashion* como seu principal *modus operandi*. Apesar do crescimento possibilitado por esse modelo, houve um conseqüente aumento de impactos ambientais e sociais no setor. Em função disso, há uma crescente demanda por produtos e serviços que gerem menores impactos, modificando os modelos de negócios do setor. Portanto, o problema de pesquisa abordado neste trabalho é “como desenvolver modelos de negócio inovadores e sustentáveis no setor da moda?”. Deste questionamento derivam os objetivos da pesquisa, que são: (i) avaliar como ocorrem as inovações em sustentabilidade no setor; (ii) analisar de que maneira essas inovações se manifestam para o mercado; (iii) identificar, em nível agregado, oportunidades e desafios que tipicamente influenciam o sucesso de modelos de negócio inovadores e sustentáveis na indústria da moda; e (iv) realizar uma análise quantitativa de inovação sustentável em empresas da indústria da moda. Para atingir esses objetivos, a pesquisa foi dividida em duas grandes etapas. A primeira delas, apresentada no artigo 1, buscou na literatura e na prática conceitos relacionados a modelos de negócios que buscam a sustentabilidade na moda. Foram feitas uma revisão sistemática da literatura, entrevistas com especialistas e consultas a sites especializados, gerando-se um framework de tendências e direcionadores de inovação sustentável. Oito estudos de casos de empresas brasileiras e italianas ilustraram o funcionamento desses drivers. Ao final, foram levantados desafios e oportunidades para negócios que buscam a sustentabilidade na moda. Na segunda etapa, presente no artigo 2, buscou-se analisar casos de empresas que utilizam os direcionadores apontados no artigo 1 numa análise quantitativa baseada em uma escala de inovatividade em sustentabilidade. Os resultados apontam para uma maior facilidade dos negócios em incorporar conceitos de responsabilidade social e economia circular e uma dificuldade em escalar modelos de negócios que utilizam matérias-primas naturais. Ao final, um framework de caminho ilustrativo para a sustentabilidade foi gerado para negócios do setor.

Palavras-chave: modelo de negócio; sustentabilidade; inovação; moda.

ABSTRACT

This research has as a background the fashion industry, which has undergone several transformations over the last decades, establishing fast fashion as its main business model. Despite the growth that this model made possible, there was an increase in environmental and social impacts caused by this expansion. As a result, there is an increasing demand for products and services that generate smaller impacts, causing changes in the business models of the sector. Therefore, the research problem addressed in this paper is "how to develop innovative and sustainable business models in the fashion industry?". From this question, the objectives of the research are derived, which are: (i) to evaluate how innovations in sustainability occur in the sector; (ii) to analyze how these innovations are manifested to the market; (iii) to identify in an aggregate level opportunities and challenges that typically influence the success of innovative and sustainable business models in the fashion industry; and (iv) to generate a quantitative analysis of sustainable innovation in companies in the fashion industry. To achieve these goals, the research was divided into two major steps. The first one, presented in article 1, sought in the literature and in practice work some concepts related to sustainable business models in fashion. A systematic review of the literature, interviews with specialists and consultations with specialized websites were carried out, generating a framework of trends and drivers of sustainable innovation for this sector. Eight case studies of Brazilian and Italian companies illustrated the operation of these drivers. In the end, challenges and opportunities for businesses that seek sustainability in fashion were raised. In the second stage, presented in article 2, we sought to analyze cases of companies that use the drivers pointed out in article 1 in a quantitative analysis based on a scale of innovation in sustainability. The results show a greater ease for business to incorporate concepts of social responsibility and circular economy and a difficulty in scaling business models that use natural raw materials. In the end, an illustrative framework of a pathway for sustainability was generated for business in this sector.

Keywords: sustainability; business model; innovation; fashion.

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1 INTRODUÇÃO

A mesma indústria que foi uma das precursoras da Revolução Industrial com seus teares no século XVIII é também um grande setor na atualidade. O valor de mercado global da indústria de moda e vestuário é de US\$ 3 trilhões, representando cerca de 2% do PIB mundial e empregando cerca de 58 milhões de pessoas no mundo (Fashion United, 2015). Por ter grandes proporções e ser uma indústria antiga, há diversos tipos de empresas que atuam na área, desde pequenos ateliês, passando por confecções e fábricas, até chegar aos grandes grupos varejistas ao redor do mundo. Exemplo desses *players* são o grupo espanhol Inditex, com valor de mercado de US\$ 112 bilhões, a americana Nike (US\$ 91 bilhões) e o grupo sueco H&M (US\$ 40 bilhões) (Forbes, 2017).

Nas últimas décadas, essa indústria passou por transformações que viabilizaram a expansão do modelo de negócio chamado *fast fashion*, que segundo Cachon e Swinney (2011) é um modelo que combina produções pequenas e *lead time* de produção curto para que, tão logo determinada característica se torne tendência, seja possível entregar produtos relacionados em loja, melhorando a reatividade das empresas de varejo. Um dos objetivos do *fast fashion* é gerar micro-estações ao longo do ano ao invés das tradicionais outono/inverno e primavera/verão para que a cada semana o consumidor encontre novos produtos em loja. Resultado disso é o aumento de 60% no consumo de peças por consumidor entre 2000 e 2014 (Remy et al., 2016).

Para viabilizar este modelo, a cadeia de valor na indústria da moda precisou ser modificada, passando de arranjos verticalizados, nos quais grande parte das atividades (extração de matéria-prima, produção, logística, vendas, etc.) ficava sob responsabilidade de uma mesma empresa, para modelos horizontais, havendo uma descentralização de empresas responsáveis pelas etapas do processo. Essa mudança possibilitou a terceirização da produção para regiões menos desenvolvidas e a consequente redução de custos associados, permitindo o crescimento de redes de varejo ao redor do mundo (Wieland e Handfield, 2013). Porém, este mesmo movimento provocou o aumento de problemas sociais e ambientais, sobretudo nas regiões onde são realizadas a extração de matéria-prima e a produção das peças.

1.1 TEMA E PROBLEMA

Esta pesquisa está focada na compreensão de aspectos de modelos de negócio nos atuais ambientes competitivos, que são caracterizados por intensas mudanças sociais, tecnológicas, ambientais e econômicas. Em função disso, uma discussão importante para esta pesquisa é a introdução de inovações no mercado por novos negócios e a adaptação de incumbentes a essas inovações. Esta situação é particularmente importante no setor da moda, no qual o *fast fashion*, modelo de negócio predominante, tem sido desafiado em função de seus fortes impactos negativos, tanto sociais quanto ambientais (De Brito et al., 2008). Com isso, o tema deste estudo está centrado na interseção entre os assuntos de inovação, sustentabilidade e modelos de negócios limitados à indústria da moda.

Neste sentido, o problema de pesquisa abordado neste estudo tem como ponto de partida algumas tendências sociais, econômicas, ambientais, tecnológicas e culturais que se manifestam pela maior preocupação da sociedade com a sustentabilidade social e ambiental. A partir disso, se revela a necessidade de desenvolvimento e adoção de atitudes e comportamentos mais alinhados com tais demandas e expectativas da sociedade por parte dos negócios estabelecidos e entrantes no mercado.

Em função do tamanho deste setor, dos problemas sociais e ambientais decorrentes do modelo atual e das lacunas de mercado existentes para o desenvolvimento de negócios sustentáveis, o problema de pesquisa a ser abordado neste projeto é: como desenvolver modelos de negócio inovadores e sustentáveis no setor da moda? A partir deste problema, são desdobrados os objetivos da pesquisa na próxima seção.

1.2 OBJETIVOS

Dado o contexto do modelo atual de atuação do setor de moda e os problemas associados à falta de sustentabilidade social e ambiental, o objetivo geral desta pesquisa é identificar mecanismos e direcionadores de inovação sustentável e demonstrar como esses fatores podem ser aplicados em modelos de negócios do setor da moda.

Em particular, a pesquisa tem três objetivos específicos em relação à inovação em modelos de negócio sustentáveis na indústria da moda. O primeiro deles é (i) avaliar como ocorrem as inovações em sustentabilidade no setor e o segundo é (ii) analisar de que maneira elas se manifestam para o mercado. A partir dessa análise, como terceiro objetivo específico, se busca (iii) identificar, em nível agregado, oportunidades e desafios que tipicamente influenciam o sucesso de modelos de negócio inovadores e sustentáveis na indústria da moda. Como quarto objetivo, se busca (iv) realizar uma análise quantitativa de inovação sustentável em empresas da indústria da moda.

1.3 JUSTIFICATIVA E RELEVÂNCIA

Esta pesquisa tem relevância tanto acadêmica quanto prática. Do ponto de vista teórico, esta pesquisa pode contribuir em diversas questões ainda em aberto na interface das literaturas sobre inovação em modelos de negócios, inovação sustentável e empreendedorismo. Além das contribuições teóricas, a pesquisa pode trazer inúmeras contribuições de ordem prática, visto que mudanças no modo de consumo nos últimos anos têm proporcionado significativo destaque aos modelos de negócios que buscam ser mais sustentáveis dentro do setor de moda. Neste sentido, a pesquisa tem relevância na medida em que apresenta *drivers* de inovação sustentável e discute a aplicação desses *drivers* em estudos de casos, propondo desafios e oportunidades para o setor e gerando relações entre tendências, *drivers* e características de modelos de negócio do setor, traçando perfis de atuação para negócios da área. Espera-se, com isso, que essa pesquisa sirva como um guia para empreendedores que busquem inovar de maneira sustentável na indústria da moda.

Em relação às contribuições teóricas, os resultados da pesquisa podem lançar nova luz sobre a problemática dos modelos de negócio baseados em sustentabilidade. De modo geral, a literatura aponta uma série de desafios para o sucesso de modelos de negócio baseados em valores típicos de sustentabilidade ambiental e social, tais como a necessidade por articulação de propostas de valor que contemplem *trade-offs* entre desempenho ótimo e/ou necessário *versus* efeitos ambientais e/ou sociais (incluindo a possibilidade de sobrevivência temporária em situações de desequilíbrio financeiro), a solução de efeitos de aprisionamento associados a dependências de cadeias de fornecedores ou ecossistemas de infraestrutura não otimizados para a sustentabilidade e

a elaboração de mecanismos de receita e interface com clientes que contemplem as particularidades de dinâmicas de relacionamento associadas com sustentabilidade como a co-criação, a cooperação e a desmaterialização (Boons e Lüdeke-Freund, 2013). Além disso, a inovação sustentável em modelos de negócio se caracteriza como um tipo de eco-inovação (Carrillo-Hermosilla et al., 2010) para a qual ainda não se conhece o nível de sistematização das práticas e processos de geração de inovação sustentável em modelos de negócio (Boons e Lüdeke-Freund, 2013).

Outra problemática central de modelos de negócio inovadores baseados em sustentabilidade diz respeito à proposição de valor: se fortemente vinculada aos fatores típicos de sustentabilidade ambiental e social, é possível que seja restrita a nichos de consumidores com altos índices de preocupação socioambiental, o que pode limitar o potencial de escalabilidade do negócio. Porém, até o momento, a literatura que aborda tal problema de pesquisa é fragmentada e baseada em estudos de caso individuais, com baixo potencial de geração de proposições que possam embasar a tomada de decisão de negócios e a formulação de políticas públicas. Mais especificamente, a literatura sobre modelos de negócio que incorporam inovação sustentável na moda está em construção, sendo baseada em observações pontuais de casos de sucesso (ex. Roos et al., 2016; Pedersen & Andersen, 2015; Dissanayake & Sinha, 2012). Exceções a esse contexto são os estudos de Laasch (2017), que propõe uma análise sobre modelos de negócios sustentáveis além da relação comercial, incluindo a lógica de alinhamento de valores entre empresa e clientes, e Pal & Gander (2018), que analisam no setor de moda a relação entre modelos de negócios sustentáveis e a escalabilidade do negócio.

Contudo, ainda não é claro que tipo de padrão predomina em quais condições organizacionais e contingenciais, inclusive quando considerada a inovação em modelos de negócio em direção à sustentabilidade (Inigo et al., 2017). Como os determinantes e mecanismos de inovação em modelo de negócio se comportam em um setor específico cujas bases de criação de valor envolvem intangibilidade e criatividade, tal qual o setor da moda, são questões pouco abordadas que esta pesquisa busca responder.

1.4 PROCEDIMENTOS METODOLÓGICOS

A pesquisa realizada se caracteriza, sobretudo, como pesquisa aplicada e exploratória. Ao mesmo tempo, possui um viés prescritivo, visto que os resultados finais poderão ser usados como guia de orientação para tomada de decisão para negócios, como diretrizes para desenho e redesenho de modelos de negócios e formulação de estratégia competitiva. Quanto à abordagem, trata-se de uma pesquisa multimétodos, pois combina, em diferentes níveis e momentos, procedimentos e fontes de dados de natureza qualitativa e quantitativa. Dessa forma, buscou-se aliar as vantagens da pesquisa qualitativa, sobretudo associadas a um entendimento mais profundo das dinâmicas envolvidas em fenômenos complexos e multifacetados como a inovação de modelos de negócios, com as vantagens da pesquisa quantitativa, que no caso específico se expressam no teste de proposições e hipóteses levantadas durante as etapas qualitativas. Em linhas gerais, a pesquisa se desdobra em duas etapas: (i) identificação de determinantes e mecanismos de inovação sustentável em modelos de negócio na indústria da moda; e (ii) proposição de escalas de inovação sustentável e análise quantitativa.

A primeira etapa consiste na elaboração de proposições a respeito dos determinantes e mecanismos que direcionam inovação sustentável em modelos de negócio na indústria da moda. Inicialmente, foram utilizados em conjunto dois procedimentos metodológicos: uma revisão sistemática de literatura e consulta a especialistas empregando entrevistas semiestruturadas. Com isso, foi possível criar uma lista de determinantes e mecanismos chamados *drivers* de inovação sustentável agregados em blocos de grandes tendências sociais, econômicas, ambientais, tecnológicas e culturais que se manifestam na sociedade em relação a questões de sustentabilidade. Após isso, foram realizados alguns estudos de caso para fins de exploração sobre como os *drivers* identificados atuam em modelos de negócio de empresas reais. Estudos de caso são frequentemente usados em estágios exploratórios de formação de teoria, sobretudo na formulação e teste de proposições gerais (Voss et al., 2002; Gerring, 2004; Eisenhardt e Graebner, 2007). Ao final desta etapa, com os resultados advindos de fontes teóricas e práticas, foram propostos desafios e oportunidades que caracterizam o ambiente de inovação sustentável no setor da moda.

Na segunda etapa, foram realizados 21 estudos de casos com foco na verificação de práticas relacionadas às tendências e drivers de inovação sustentável propostos na primeira etapa. Para isso, foi elaborada uma escala de atuação para os drivers propostos, identificando níveis de atuação em relação a práticas do mercado. Desta forma, foi possível combinar as vantagens de análises transversais típica de pesquisas quantitativas com a análise de cada caso sobre fenômenos organizacionais típica da pesquisa qualitativa. Esta etapa foi desdobrada em seis atividades de pesquisa, a saber: (i) preparação das entrevistas; (ii) aplicação das entrevistas; (iii) criação da escala; (iv) avaliação dos casos; (v) validação dos resultados; (vi) análise dos resultados; (vii) conclusões.

1.5 DELIMITAÇÃO DO ESTUDO

A pesquisa descrita nesta dissertação está focada em inovações sustentáveis, ou seja, são introduções de novidades no mercado que consideram a premissa de desenvolvimento sustentável. Segundo o Relatório Brundtland, desenvolvimento sustentável é aquele que atende as necessidades do presente sem comprometer a capacidade das gerações futuras de atenderem as suas próprias necessidades (Nações Unidas, 1987).

Dentro desse contexto, o estudo buscou compreender como inovações sustentáveis são aplicadas não somente em produto, processo ou outra função dentro de uma empresa. De maneira mais ampla, foram consideradas inovações sustentáveis que geram algum tipo de impacto no modelo de negócio, que segundo Osterwalder e Pigneur (2010) é a maneira como um negócio cria, entrega e captura valor. Dessa forma, as inovações geradas no modelo de negócio têm uma natureza mais sistêmica no que tange o alinhamento do negócio (pela criação, entrega e captura de valor) com aquilo que o cliente espera em relação às suas necessidades (Velu & Stiles, 2013).

Uma das principais delimitações da pesquisa diz respeito ao setor econômico em que foi aplicada. A indústria da moda foi escolhida como grande cenário para a pesquisa em função de ser um dos setores econômicos que mais gera impactos sociais (Dickson e Eckman, 2006) e no meio ambiente (De Brito et al., 2008). Em função disso, cada vez mais empresas buscam incorporar atributos de sustentabilidade em seu negócio

(França et al, 2017), o que torna fundamental estudar o assunto dentro deste setor. Dentro desse contexto, uma delimitação subsequente se relaciona com a necessidade de serem trabalhados novos modelos de atuação por parte das empresas desse ramo a fim de gerarem menores impactos sociais e ambientais em suas atividades. Por isso, o estudo foca em questões relacionadas à sustentabilidade.

Em função do panorama apresentado, foram consideradas atuações que utilizam o conceito de inovação como propulsor da criação de atributos relacionados a modelos de negócios sustentáveis para a indústria da moda. Nesta pesquisa, não foram consideradas práticas já estabelecidas no mercado voltadas a este assunto, mas sim o surgimento de novas práticas e abordagens para uma moda mais sustentável.

As delimitações seguintes consideram as escolhas de método desta pesquisa. A pesquisa partiu de uma revisão sistemática da literatura, considerando três plataformas de pesquisa internacionais. Além disso, a busca por palavras-chave dessa fase desconsiderou pesquisas focadas especificamente no desenvolvimento de fibras e materiais têxteis. Outra delimitação desta etapa é a busca por pesquisas publicadas até o momento em que foi realizada, no início de 2017. Em relação à segunda fase da pesquisa, foram feitos estudos de casos com empresas numa amostra não representativa e, por isso, os resultados não devem ser generalizados para situações de outras empresas inseridas em contextos similares.

1.6 ESTRUTURA DA DISSERTAÇÃO

Esta dissertação foi dividida em quatro capítulos. Inicialmente foram apresentados o problema de pesquisa, tema, objetivos, justificativa e relevância, procedimentos metodológicos e delimitações do estudo. A seguir, são apresentados o capítulo 2 com o artigo “Innovative and sustainable business in the fashion industry: entrepreneurial drivers, opportunities and challenges” e o capítulo 3 com o artigo “Analysis of Sustainability Practices in Business Models in the Fashion Industry”. Por fim, o capítulo 4 apresenta as conclusões, implicações dos resultados e sugestões para trabalhos futuros.

1.7 REFERÊNCIAS BIBLIOGRÁFICAS

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2 ARTIGO I - INNOVATIVE AND SUSTAINABLE BUSINESS IN THE FASHION INDUSTRY: ENTREPRENEURIAL DRIVERS, OPPORTUNITIES AND CHALLENGES

Artigo publicado no periódico Business Horizons

Abstract: Abstract: An issue that is increasingly important to both new and existing companies is how to thrive in the competitive environment with innovative business models while avoiding harming the planet and respecting society. Trends such as circular economy, fair trade, lowsumerism, and sharing economy are some of the many emerging entrepreneurial approaches that address this issue, but there is still a gap between what theory argues and the levels of environmental and social sustainability found in practice. In fact, most research on the topic of sustainable business models is still exploratory and does not fully acknowledge these emerging approaches, whose definitions, boundaries and defining characteristics are still somewhat vague. This study seeks to contribute to the understanding of the inner entrepreneurial dynamics of innovative sustainable business models. In particular, we focus on the fashion business, a resource-intensive industry where opportunities to reduce environmental impacts and to innovate business models abound. The aim of our research is to investigate innovative business models in the fashion industry that have sustainability as their defining characteristic, especially in terms of value proposition. In order to do that, we combine a systematic review of the literature with an empirical research made of: (i) six interviews with specialists in sustainability, business model innovation and the fashion industry; and (ii) eight case studies on innovative fashion startups we define “born sustainable”. As a result, we propose a synthesizing framework disclosing trends and drivers of innovative and sustainable business models in the fashion industry; and we highlight opportunities and challenges for researchers and entrepreneurs interested in this topic.

Keywords: Sustainability, innovation, business model, business model innovation, sustainable fashion; born sustainable startups.

2.1 FAST FASHION: ARE THERE ALTERNATIVES?

The fashion industry underwent a remarkable expansion in the last two decades, especially with the consolidation of the approach known as ‘fast fashion’, which emphasizes an entrepreneurial modus operandi of rapid acquisition and disposal of mass-produced, homogeneous and standardized fashion items (Fletcher, 2010). However, by stimulating widespread consumption of cheap and easily replaceable garments, fast fashion has a significant downside in terms of environmental and social sustainability. In fact, the fashion industry is widely considered highly polluting, as it intensely consumes natural resources in raw material extraction and processing, and employs hazardous chemicals in various manufacturing processes. Similarly, in the late phases of the fashion product lifecycle, garment disposal usually consists of simply discarding it in landfills rather than attempting to reuse or recycle it. Animals mistreatment is also a concern, as inputs of animal origins are sometimes associated with exploitation, as the example of luxury coat maker Montcler’s geese scandal illustrates (e.g. Capelle-Blancard and Petit, 2016), leading to question how even internationally renowned brands select and manage their suppliers. Moreover, fast fashion has often been linked to workers’ rights violations, as manufacturing is commonly outsourced to countries with limited or permissive work regulations (Ansett, 2007). Episodes such as the Rana Plaza collapse in 2013 (Burke, 2013) illustrate why it is important – and urgent – to think about sustainable alternatives to the fast fashion approach.

Consumers seem to be aware of these issues, as evidenced by a growing interest in green products (Very, 2016); such increased awareness is even higher among young consumers, who are the main target of fast fashion companies. Empirical studies (i.e., Medeiros et al., 2016; Jung & Jin, 2016) show that consumers typically recognize added value in environmentally-friendly products, and are willing to pay premium prices under the right conditions. As a response, large-scale retailers such as H&M and Zara have recently invested in sustainable actions (as discussed in the companies’ sustainability reports, which mention initiatives on conscious product and material management, animal welfare and inspirational training programs for employees and customers), and there are reasons to believe this trend will grow. Sustainability reporting is already a common practice in the fashion industry, although there are still

consistency issues (Kozłowski et al., 2015). Not only incumbent companies are making their moves in this renewed entrepreneurial arena. Recently, many fashion new ventures or startups also emerged which make sustainability the core of their value proposition and business model.

At the same time, larger cultural and socio-economic macro-trends such as circular economy (Geissdoerfer et al., 2017) and sharing economy (Martin, 2016) are challenging traditional mass production paradigms, driving the need for new and innovative business models that consider sustainability not as an afterthought, but as a crucial design element. Along these macro-trends, technological innovation in garment materials and manufacturing processes enable a new way to think about business models that goes beyond scale economies and scope advantages generated by fast fashion. It is a time of opportunities for entrepreneurs to build innovative business models that explore these opportunities while pursuing not only economic, but also social and environmental value creation.

While there are numerous examples of innovative sustainable business models in the fashion industry (e.g., Roos et al., 2016; Pedersen & Andersen, 2015; Dissanayake & Sinha, 2012), there is still much uncertainty about how such business models should be structured. This uncertainty applies both to creating new enterprises and reinventing existing ones, as research about the inner dynamics of successful innovative and sustainable business models is still scarce and largely focused on individual cases. No systematic approach to synthesize the drivers of successful innovative and sustainable business models in the fashion industry has been put forward. That is precisely what we set out to do in this research.

This paper has three main objectives. First, we identify the large-scale socio-economic and cultural trends that are pressuring the current dominant fast fashion approach. Second, we explore innovative business models in the fashion industry that have sustainability as their defining characteristic, especially in terms of value proposition. By doing so, a number of generic “building blocks” were identified that describe key working elements (drivers) of such business models. We investigate the interplay between these drivers in eight case studies with innovative and sustainable fashion firms. The final objective is to generalize the findings in a set of challenges and

opportunities to innovative and sustainable business models that could orient academics and entrepreneurs interested in sustainable fashion.

2.2 HOW THE RESEARCH WAS PERFORMED

Although there are studies investigating sustainability-related business model innovation in the fashion industry (e.g., Pedersen & Netter, 2015; Lueg et al., 2015, Kozlowski et al., 2015; Beh et al., 2016), research approaching the topic from an integrative, holistic perspective is still lacking. This paper is positioned in a largely fragmented field where much of the knowledge generated is empirical, derived from lessons learned by entrepreneurs trying to develop and improve sustainable business models. As such, we performed an exploratory research combining: a comprehensive systematic review of the academic literature; interviews with specialists in sustainability, business model innovation and the fashion industry; and a wide search on the specialized press that covers the fashion industry. As a result, a synthesizing framework was generated comprising main trends and drivers of innovative and sustainable business models in the fashion industry. Next, we conducted eight case studies involving innovative fashion firms to illustrate the entrepreneurship implications of the identified trends and drivers. Finally, we used the case studies to frame a discussion of opportunities and challenges for researchers and practitioners interested in this topic.

The first step of the research was a systematic review of literature, defined by Hallinger (2013) as a planned, structured and explicit process of identification, selection, assessment and synthesis of previous published academic research. This technique was used to collect and analyze published examples of innovative and sustainable business models in the fashion industry and to gain insight about how the academia sees the main trends that are driving the fashion industry towards triple bottom line sustainability. Data collection was conducted in five steps, based on Tranfield et al. (2003) and Hallinger (2013): (i) main topic and research objectives definition; (ii) data source definition; (iii) data extraction; (iv) data evaluation; and (v) data analysis and synthesis. For the first step, the following research problem was defined: “which are the sustainability-related business model innovations being conducted in the fashion industry?” Sources of data were papers published in academic

journals and conference proceedings that included the following words set in their titles, abstracts, or keywords: “sustainability” (and variants, such as “sustainable”) AND (“business model” OR “innovation”) AND (“fashion” OR “garment” OR “apparel”). Three different academic databases were searched (Web of Science, Scopus, and Science Direct), resulting in 177 papers. Evidently, not every paper addressed the issue of interest. Thus, each paper was independently evaluated by the four authors using a four-point scale (1 for “certainly not relevant”, 2 for “I think it is not relevant”, 3 for “I think it is relevant” and 4 for “certainly relevant”). Scores were compared, and a complete reading of the 53 papers that obtained an average acceptance score equal or higher than 3.0 (i.e. the mean of means of all evaluations) was conducted independently by the four authors, who identified concepts that drive sustainability in fashion as well as examples of innovative business models that make use of these concepts and direct or indirect mentions to potential challenges and opportunities for sustainable fashion entrepreneurship. Finally, the authors collectively built a synthesizing framework relating the drivers of sustainable business model innovation to specific dimensions of the identified business models, as well as the macro-trends, and consolidated a list of challenges and opportunities.

Next, the systematic literature review was complemented with empirical research. In this step, we aimed at adding knowledge that had not been incorporated in the traditional academic discourse and identifying additional examples of innovative and sustainable fashion business models in order to test and refine the framework developed from the literature review. Data was collected from primary and secondary sources. The former consisted of interviews with six specialists in fashion business, while the latter included news outlets covering the fashion industry such as FFW and Fashion Revolution. We also conducted eight case studies with Brazilian and Italian fashion firms that innovated their business models using the drivers of sustainable business model innovation identified in our framework. In selecting cases, we prioritized interesting entrepreneurial stories whose inner workings are based on multiple drivers. We chose cases that illustrate challenges and opportunities for sustainable fashion entrepreneurship in different contexts. Finally, in order to provide a comprehensive overview of the role of technology in exploring fashion innovation drivers, we included cases whose innovative aspects are both high- and low-tech oriented.

2.3 MACRO-TRENDS SHAPING THE COMPETITIVE ARENA FOR FASHION BUSINESSES

The research identified five socio-economic and cultural macro-trends behind the push for sustainable and innovative business model alternatives to the fast fashion paradigm.

2.3.1 *Consumer awareness*

Consumers constantly change their habits and preferences. Among such recent changes, the trend of increased awareness about sustainability is one of the most important elements behind the surge in alternatives to fast fashion. Evidences of such behavioral change are the increase in interest in green products (Very, 2016), the proliferation of bottom up initiatives such as the maker and do-it-yourself movements (Lindtner, 2016), the consolidation of exchange and sharing platforms (Startup Europe, 2016), and the growing notion that today's youth tend to prioritize experiences over ownership of goods (Goldman Sachs, 2015). Conscious consumers are increasingly adopting sustainability-related habits. A definite cultural (and, perhaps, generational) shift is in motion, as the consumerism that characterized the last few decades is being replaced by principles of reducing, reusing, and recycling (the famous 3Rs of sustainability) in individual and collective routines.

Impacts of this growing awareness about sustainability in the fashion industry have already been noticed as decreasing sales for fast fashion companies (Very, 2016), which in turn responded with initiatives like H&M's 2015 partnership with the Ellen MacArthur Foundation to foster development of circular economy projects and C&A's 2014 program to promote circular economy and zero waste practices. Movements such as lowsumerism (Biz, 2015) and slow fashion (Fletcher, 2010) are direct expressions of changing consumers' perceptions and preferences about fashion consumption which directly impact how firms in this industry design and innovate their business models.

2.3.2 *Circular Economy*

The main idea behind the socio-economic trend of circular economy is to build a model of economic production based on purposeful restoration and regeneration. A circular economy is restorative by design, and aims to keep products, components and materials at their highest utility and value at all times. This economic model strives to decouple economic growth and development from the consumption of finite resources; to do so, it distinguishes between technical and biological materials, and focuses on effective design and use of materials to optimize their flow and maintain or increase technical and natural resource stock. Circular economy provides opportunities for innovation in product design, service and business models, food, farming, biological feedstock and products; as a result, it establishes a framework and building blocks for a long-term resilient system (Webster, 2015).

Circular Economy challenges fast fashion by drawing a sharp distinction between consumption and use of materials, advocating the need for a functional service model characterized by manufacturers or retailers increasingly retaining product ownership and acting as service providers. This paradigm shift has direct implications for the development of efficient and effective take-back systems and the emergence of new design practices that generate more durable products, facilitate disassembly and refurbishment and, as appropriate, support innovative business models (Webster, 2015).

2.3.3 *Social Responsibility*

Corporate Social Responsibility (CSR) aggregates many types of practices, at different levels of proactivity, complexity and time horizons (Dickson, 2005). There is a clear trend towards increased adoption of CSR practices in the fashion industry, including discussions about the ethics of communicating sustainable actions for business purposes and the risk of incurring in greenwashing (Baldassarre & Campo, 2016). A decade ago, Dickson and Eckman (2006) already found growing perceived importance of social responsibility in the fashion industry, with 97% of the respondents agreeing that topics of social responsibility should be considered somewhat or very important by apparel and textile professionals. Socially-oriented indicators featured prominently in the sustainability reports of all 14 fashion brands studied by Kozłowski

et al. (2015). In a few cases, such as that of the apparel retailer Gap (Ansett, 2007), fashion companies even integrate CSR in their business models.

In the fashion industry, CSR seems to manifest more often in supply chain management, as leading fashion brands have to deal with increasingly complex networks of suppliers, geographically distributed all around the globe. In the fast fashion approach, brands usually outsource production to countries with low-cost labor. The fact that fashion manufacturing is so often dissociated from design, marketing and consumption and relegated to far away countries where regulation on working conditions is far from stringent has fueled sweatshop free and fair trade movements, which aim to provide fair wages and working conditions in the upstream supply chain. As a result, global fashion brands tend to adopt CSR measures such as sustainability reporting, voluntary participation in multi-stakeholder monitoring (Wilburn & Wilburn, 2016) and auditing initiatives such as the Fair Trade Association, development of codes of conduct and labor standards assurance programs, and adoption of supplier disclosure and transparency practices all along the supply chain.

2.3.4 *Sharing Economy and Collaborative Consumption*

One of the defining macro-trends behind sustainable and innovative business models in the fashion industry involves the emergence and consolidation of the sharing economy. Among the multiple framings for this phenomenon, we focus on those that consider it a pathway to sustainable consumption and a decentralized, equitable and sustainable economy (Martin, 2016). In this perspective, the sharing economy refers to a global cultural and economic paradigm shift from ownership to access manifested in approaches such as collaborative and access-based consumption, which have the potential to both promote economic growth based on innovation and entrepreneurship and mitigate environmental impacts associated with large-scale production processes.

In this sense, collaborative consumption is not simply a cultural reaction against consumption, but a conscious and efficient alternative for adapting collective and individual needs to available resources. According to Botsman and Rogers (2010), collaborative consumption refers to the expansion and reinvention of exchanging, swapping, bartering, sharing, loaning and donating practices, usually between people not previously connected. The logic of collaborative consumption is simple: instead of

buying products, it is possible to access goods without performing monetary exchanges. Lane (2012) argues that this allows addressing basic human needs in a way that is both sustainable and economically viable.

Among models of collaborative consumption that fit the definition by Botsman and Rogers (2010) there is the Redistribution Market. In this model, web-based platforms match and connect individuals who have obsolete or idle goods with individuals interested in these same goods, acting as marketplaces where exchanges are conducted (Kathan et al., 2016). The collaborative consumption model is commonly employed for fashion items and allows a more efficient use of products and the extension of their lifespans, beyond enabling social interaction. Web-based collaborative consumption models allow traditional bartering and haggling activities, which have always been present in local communities in the form of flea markets, thrift stores and garage sales, in a much wider scale.

2.3.5 *Technological Innovation*

Lastly, there is a techno-economic macro-trend encompassing various technological developments enabling changes towards improved sustainability in fashion. Among the technological innovations which currently impact business models in fashion, sustainable or alternative fibers seem to be the most prominent innovations according to our literature review. Impacts include improvements in clothing durability, reduced waste from cleaning processes and use of alternative (synthetic) raw materials instead of scarce natural resources. An already mature technology making important inroads in the fashion industry is the additive manufacturing, also known as 3D printing (Lipson & Kurman, 2013). This technology is already in use in many industries, helping to reduce production waste by completely altering the logic of production: instead of removing materials (thus generating waste), additive manufacturing builds up the final products adding layers to layers. Finally, short-to-medium term technological trends that have potential to impact fashion business models is that of wearable technology (Seymour, 2008) and augmented reality. Although still in the pre-dominant design phase, smart wearables can revolutionize fashion by opening up many alternatives in terms of monitoring wear and tear of fabrics, so to best detect when and how to discard a piece of garment. Similarly, increased use of electronics in fashion items can stimulate

improvement in the after-consumption process, as adequate disposal infrastructure has to be put in place and efforts to create widespread customer awareness about the need to correctly discard smart clothing must be made. Augmented reality and the related 3D technologies allow to create virtual retail stores filled with objects such as smart mirrors and dressing rooms: this technological innovation can be assumed to hold a positive impact on the sustainability of the supply chain (since in a “3D virtual boutique” you need no or little in-store stock, enabling operation through a make-to-order rather than a make-to-stock logic).

2.4 DRIVERS OF SUSTAINABILITY-RELATED INNOVATION IN FASHION BUSINESS MODELS

Our systematic literature research uncovered eight drivers of sustainability-related business model innovation for fashion businesses: (i) upcycling, (ii) fair trade, (iii) second hand, (iv) sustainable raw materials, (v) slow fashion, (vi) recycling, (vii) sweatshop free, and (viii) zero waste. Additionally, the empirical research revealed seven more drivers: (ix) locally sourced, (x) fashion library, (xi) collaboration, (xii) vegan, (xiii) capsule wardrobe, (xiv) wearable technology, and (xv) lowsumerism. The fact that some of the drivers did not appear in the literature review reinforces the notion that the shift towards sustainable fashion business models is still emergent, and not fully captured by academic literature.

These drivers were analyzed according to how they usually impact each of the nine main components of a business model, as defined by the popular Business Model Canvas framework by Osterwalder and Pigneur (2010): value proposition, customer segment, delivery channels, customer relationship, key activities, key resources, value network, cost structure, and revenue flows. Table 1 summarizes the results, in which we allocate the drivers in groups belonging to the trends that we presented in the section 2.3. This classification does not mean that each driver has only features related to the trend in which it is allocated, but is mainly related to that trend. Next, each driver is briefly described, along the most common innovation impacts in business model parameters.

Upcycling refers to the use of wasting materials to generate new goods of equal or higher perceived value, utility, and/or quality than the original products (Dissanayake & Sinha, 2015). It generates sustainability by reusing resources which would be discarded as raw materials for new products, thus extending their lifespan and decreasing the need for natural resources. In the fashion industry, upcycling has a direct impact on the key resources and activities parameters of the Business Model Canvas, as access to good materials for upcycling can be a source of advantage. Evidently, upcycling is also relevant for the value proposition parameter, as it can provide added value generated from increased perceived quality, sustainability, functionality, exclusivity, authenticity, and equity (Jung & Jin, 2014), as well as alignment with circular economy values.

Fair trade aims at offering a worthy wage for all workers involved, as well as healthy workplace environments and social investment for the communities (Kocken, 2013). It addresses the rising awareness about social sustainability among fashion consumers, and thus requires the adoption of innovative practices of customer relationship. It also impacts the key partners parameter of a business model, as it requires fashion brands to rethink and, in many cases, adopt innovative supply chain management procedures for partner selection, monitoring, and rewarding. An illustrative example of innovative business model based upon fair trade is People Tree, which sells garments manufactured by selected companies in emerging countries according to the fair trade approach, ethics, and transparency (Goworek, 2011). Another case of innovation in fashion business model driven by fair trade was reported by Curwen et al. (2013), and refers to a project of the Eileen Fisher brand employing a Peruvian community for manufacturing.

Collaboration as a driver of innovative and sustainable business models in fashion refers to the adoption of a collaborative mindset by all stakeholders involved in a sustainable value network: suppliers, distributors, customers (who often are involved in co-creating initiatives) and even competitors. In fact, it does not seem uncommon to witness co-opetition efforts among sustainable fashion startups. Collaboration allows the creation of a supporting ecosystem that drives resource and knowledge sharing, promotes the diffusion of sustainable practices and ultimately allows business model experimentation. As a result, it is a critical driver for startups and small businesses, and

impacts the business model parameters related to value creation (key activities, key resources and key partners) and distribution (delivery channels and customer relationship), with potential impacts also on cost structure and revenue flows, as many collaboration initiatives involve revenue sharing.

The **second hand** driver refers to consumers selling or donating apparel no longer in use to other consumers. It promotes reuse of fashion products, thus reducing demand for new manufactured items and the associated environmental pressures in terms of natural resources consumption. This driver is usually associated with items used only a limited number of times, such as baby clothing or party dresses. Impacts on business model innovation are many, usually implying extensive change in value proposition, delivery channels, customer relationship, key activities, and revenue streams.

Sustainable raw materials contemplate the development and adoption of different types of environmentally-friendly raw materials, such as organic cotton, hemp, bamboo, lyocell and recycled fibers. As driver of innovation and sustainability in business models, it mainly impacts the key activities, key resources and customer relationship parameters by requiring, respectively, technological development, reliable access to a source of materials and communication of brand commitment to sustainable practices. Impacts on cost structure are not uncommon, as these technologies often have to be internally developed or externally acquired. An innovative business model built upon this driver is Orange Fiber, an Italian startup that creates sustainable fibers using waste from orange juice production.

The **slow fashion** driver refers to an approach to fashion production and commercialization practices that opposes the paradigm of fast fashion. In its essence, slow fashion represents a social movement akin to the slow food movement that emerged in Italy in response to the expansion of fast food chains in a country where social and cultural traditions favor regionalized cuisine and a very intimate relationship with food and meals (Fletcher, 2010). As such, slow fashion usually implies the provision of higher quality, often locally made apparel, and requires increased awareness about social and environmental benefits associated with this approach by both producers and consumers (Fletcher, 2007). Slow fashion drives innovation in value proposition and customer relationship parameters, as firms orient their offering towards

increased perceived quality and authenticity and address customer concerns in terms of environmental (by reusing or recycling materials) and social (by prioritizing locally-made products and firms that adopt fair trade principles) impacts.

The **recycling** driver is based on converting materials from existing products to create different products. As it often involves high-energy processes, it is considered the last choice among the 3Rs (reduce, reuse, recycle), though it is an important alternative to implement circular economy principles as it reduces the need for new materials and natural resources consumption. Basically, adopting recycling in a business model implies transformations in the cost structure, key activities and key partners parameters, as firms in the fashion industry tend to acquire recycled materials instead of processing it themselves. A high profile example of innovative business model based on recycling is that of Adidas and Parley for the Oceans (McAlone, 2016), who developed a sneaker using plastic waste recovered from oceans.

The concept of **sweatshop free** involves transparency about working conditions in the manufacturing firm, and opposes the practice of outsourcing production to emerging countries that has been widely employed by fast fashion companies in search of low wage labor. This definition comes from American Apparel (2016), a retailer which promotes vertical integration to generate consumer engagement by increasing consumer awareness about fair treatment. This trend deals with the social aspect of sustainability, and impacts customer relationship, key resources and key activities business model parameters.

The **fashion library** driver, also referred to as clothing library, is essentially a subscription service for apparel. In this mechanism, the customer does not own the fashion items, but can access and use them for a limited time (Pedersen & Netter, 2015). A successful business model based on this driver is the Dutch company LENA, which prices its subscription plans according to the volume of clothing a consumer can borrow in a month. By using sharing mechanisms, items which would be used only a few times if owned individually reach a wider audience, thus potentially diminishing the need for new apparel. This driver impacts the business model in terms of customer relationship, as it requires a new way to engage customers and cross-upsell to them, and value proposition, which is completely revamped, in essence going from a product-centered to

a service logic of consumption. Revenue model also changes from selling to usage-based or subscription fees.

The **locally sourced** driver consists of prioritizing product manufacturing in regions geographically close to its consumption. How to measure ‘closeness’ is still debatable and depends on the specific context, but this choice tends to generate sustainability by reducing costs and environmental impact associated with transportation and stimulating local businesses, thus improving employment in local communities. Business model innovation derived from this driver involves how information is communicated to customers, and how customers react. As such, it impacts the customer relationship and value proposition business model parameters. More importantly, it strongly influences key partners selection.

Zero waste is a driver based on the notion of minimizing material waste in apparel production, which accounts for about 15% of the raw materials in traditional design and production methods (Rissanen, 2013). It generates innovation for sustainability by reducing the use of raw materials through the development and adoption of novel and more efficient production processes, such as additive manufacturing. Adopting zero waste requires innovation in key resources, key activities and cost structure parameters. Clothing brand Zero Waste Daniel employs a reroll method to achieve a near zero waste production process.

Vegan refers to an approach to fashion production that deliberately refrains from using raw materials of animal origin. By doing so, it aims to reduce overall energy consumption within the whole system, as animal material extraction and processing tend to require higher energy inputs. The adoption of vegan manufacturing principles potentially impacts four business model parameters: key resources, as it requires access to specialized resources or suppliers; key partner selection; channels and communication content; and value proposition, as it allows the firm to devise its offering in a way that appeals to consumers concerned with animal rights and/or dedicated to the vegan movement.

The **capsule wardrobe** and **lowsumerism** drivers depend fundamentally on the consumer’s behavior and attitude. They involve, respectively, a commitment to owning and using only a limited amount of clothes for a fixed period of time (e.g., a

season or a year) and the adoption of a generally critical approach to consumption that prioritizes conscious and moderate acquisitions of new goods (Biz, 2015). These drivers generate sustainability by opposing compulsive consumption and fostering a minimalist conscience among consumers. These drivers require extensive business model innovation in terms of customer relationship and value proposition, with potential implications also for revenue models.

Wearable technology involves incorporating electronic devices in fashion goods to provide added functionalities, such as health monitoring, or to allow the apparel to change form or appearance (Ringly is an example of wearable technology). It impacts the value proposition parameter, generating opportunities to create additional value through novelty, improved or expanded functionalities, and exclusivity. It also affects key technology-related activities, resources, partners and costs.

Table 1 - Trends and drivers of sustainability-related business model innovation for fashion businesses

Macro-trend	Driver of sustainable innovation	Where does it drive innovation in the business model?	Examples of innovative and sustainable business models in fashion
Circular Economy	Recycling	Cost Structure, Key Activities, Key Partners	Incumbent: Adidas Startup: Orange Fiber
	Vegan	Key Partners, Key Resources, Channels, Value Proposition	Startup: Preza
	Upcycling	Key Resources, Key Activities, Value Proposition	Startups: Colibrii, Revoada, Preza
Social Responsibility	Sweatshop Free	Customer Relationship, Key Resources, Key Activities	Incumbent: American Apparel
	Fair Trade	Customer Relationship, Key Partners	Incumbents: People Tree, Eileen Fisher Startups: Colibrii, Revoada
	Locally Sourced	Customer Relationship, Value Proposition, Key Partners	Startups: Contextura, Lanieri, Orange Fiber, Revoada, Colibrii
Sharing Economy	Fashion Library	Customer Relationship, Value Proposition, Revenue Streams	Startup: LENA
	Second Hand	Value Proposition, Channels, Customer Relationship, Key Activities, Revenue Streams	Startup: Armadio Verde
	Collaboration	Key Partners, Key Activities, Key Resources, Delivery Channels, Customer Relationship.	Startups: Armadio Verde, Preza, Revoada
Product Technology	Sustainable Raw Materials	Key Resources, Customer Relationship, Cost Structure	Startups: Orange Fiber, Contextura
	Zero Waste	Key Resources, Key Activities, Cost Structure	Startups: ELSE Corp, Orange Fiber, Zero Waste Daniel, Contextura
	Wearables	Key Resources, Key Activities, Key Partners, Value Proposition, Cost Structure	Startup: Ringly
Consumer Awareness	Capsule Wardrobe	Customer Relationship, Value Proposition, Revenue Streams	Drivers generated mainly by consumer behavior Startups: Armadio Verde, Contextura, Preza, Lanieri
	Lowsumerism	Customer Relationship, Value Proposition, Revenue Streams	
	Slow Fashion	Value Proposition, Customer Relationship	

Source: the authors.

2.5 FASHION STARTUPS FOCUSED ON SUSTAINABILITY

In order to illustrate the interplay between these drivers and their impact for sustainable fashion entrepreneurship, we conducted eight case studies with Brazilian and Italian firms. The role of technology in promoting and exploring these drivers was controlled by selecting an equal number of cases where high technology is essential or almost absent. We focused exclusively on cases of new businesses, since while the literature already covers examples of business model innovation driven by sustainability concerns within incumbent companies (e.g. Kozlowski et al., 2015), little is discussed about the startups that we label “born sustainable”, that is, which are originally conceived to develop a new business model leveraging sustainability at its core. Analyzing such emerging cases could disclose the entrepreneurial dynamics and trends of the sustainable fashion of the future.

2.5.1 *Preza*

The first case is that of Preza, a Brazilian startup whose original value proposition lies in transforming industrial waste in high-end fashion accessories. Preza’s main product is a line of designer sunglasses made of wood waste from the local luxury furniture industry. Its value creation practices are illustrative of the vegan and upcycling drivers, as all raw materials and production inputs (e.g., solvent-free resins extracted from Brazilian plants) are fully environmentally-friendly. Slow fashion is also a key component of its value proposition: by relying on laborious and time-consuming craft production processes using singular raw materials without any additional painting or finishing, each product is unique and receives an identification number. Preza structured a value network of key partners aligned with the same sustainability principles that guide the firm. In fact, collaboration is essential for establishing distribution channels. While the firm manages its own electronic commerce channel, key partnerships with luxury stores provide a distribution network for direct sales. Recently, the firm has explored new venues for revenue creation by promoting a second value proposition targeting corporate clients: instead of wood sunglasses, Preza combined its core competences in design and technical expertise on treating wood waste to create corporate-branded gifts for large companies wishing to promote or associate themselves with sustainable values.

2.5.2 *Revoada*

Another Brazilian case is that of Revoada, a fashion startup that illustrates the combined use of upcycling, locally sourced, collaboration and fair trade drivers. Its innovative value proposition involves manufacturing backpacks, wallets and briefcases using inner tubes of large vehicle tires and discarded umbrellas as substitutes to leather and nylon. Revoada had to create a supplier network from scratch, as these items were not usually sorted out in Brazilian recycling centers. Fair trade is promoted by paying for this material the prices equivalent to the most expensive materials sold by the recycling centers. As suppliers do not have sustainability as a core value, adopting fair trade is a way to assure supplier commitment. The business model was innovated three times in the four years of Revoada's existence. Initially, individual consumers were targeted directly (e-commerce) and indirectly (collaboration with alternative fashion stores). The high upfront costs of building inventory and low engagement of partner stores in promoting the sustainable value of the products led to a first change in the business model, which pivoted towards business-to-business. This second value proposition was based on manufacturing green products to corporate customers wishing to associate their brands to sustainability. The success of this model stretched Revoada's production capacity, but promoted much needed growth. Nowadays, the firm is experimenting again. It successfully tested a crowdfunding model for direct e-commerce sales, restricting production to a minimum order size, and a consulting model for business clients. Basically, the new corporate value proposition involves providing services based on the firm's expertise with design and green product development for firms who want to create their own innovative sustainable initiatives. The business model of Colibrii, the third Brazilian case, is similar to that of Revoada: the startup also explores upcycling by handcrafting backpacks and purses using waste from the textile industry as raw materials. Production is outsourced to local artisans, which is illustrative of how locally sourced and fair trade drivers are typically employed in low-tech fashion startups.

2.5.3 *Contextura*

Contextura is the fourth Brazilian case, and its business model is strongly rooted in the slow fashion and zero waste drivers. Garments are handcrafted from reused textiles and alternative sustainable materials (i.e., recycled PET, sustainable fibers, etc.). Drawing from the locally sourced driver, production is outsourced to local artisans, which limits scalability

and growth. Following lowsumerism principles, products are designed to be timeless and versatile, so garments can be used in many different ways and situations. A direct sales model is employed combining an e-commerce platform with a locally owned retail store and partner luxury retail stores all over Brazil.

2.5.4 *Armadio Verde*

Four Italian cases were also conducted. All of them report startups that focus on technology to enable the drivers of sustainable innovation. Armadio Verde is an online platform for children clothing exchange which draws from the lowsumerism, second hand, and collaboration drivers. The startup created a point-based exchange mechanism for donating and acquiring second-hand garments for newborns and children up to sixteen years old. By donating used clothes, members can obtain credits to spend on other clothes made available through the platforms, thus triggering engagement and collaboration. Armadio Verde fosters a new fashion experience, based on values such as sustainability, innovation, sharing, saving both money, time and resources, and high quality (since all garments are controlled for quality and brand upon their receipt); by focusing on children, the startup also has strong potential for promoting customer education.

2.5.5 *Orange Fiber*

Orange Fiber is a startup aiming at the creation of sustainable textiles from citrus juice byproducts. In Italy alone, more than one million tons of citrus byproducts are wasted every year: Orange Fiber hence came up with the original and inherently sustainable idea to reuse these wastes (like orange, lemon and grapefruit peels) by transforming them into cellulose fibers, thus developing an innovative fabric to be later used for clothes manufacturing. To do so, the startup designed, developed and patented a process based on nanotechnology which replaces highly polluting raw materials with natural elements. The resulting sustainable textile represents a brand new opportunity for Italian tradition in high quality textiles and fashion. The Orange Fiber business model leverages and resembles the sustainability drivers of sustainable raw materials, recycling, local sourcing and zero waste.

2.5.6 *Lanieri*

Lanieri is the first e-commerce platform to propose entirely Made in Italy, made-to-measure men's clothing online, drawing from the slow fashion and locally sourced drivers. In its platform, the customer may choose among various Italian fabrics, customize the model (choices for buttons, linings, collars, pockets, waistbands and cuffs allow more than 10 million combinations) and inform their measures thanks to a 3D configurator. The firm also provides expert tailors in many European cities for face-to-face interaction, an option that explores locally sourced dynamics.

2.5.7 *ELSE Corp*

Finally, ELSE Corp combines 3D product configurator and hybrid manufacturing technologies in a mass customization platform whose recent versions incorporate augmented reality features. Its main value proposition lies in providing third parties with smart mirror and dressing room technology which can minimize store inventory, thus enabling virtual or no stock retail for the apparel & footwear industry while capitalizing on the zero waste driver.

2.6 **WHAT ENTREPRENEURIAL CHALLENGES AND OPPORTUNITIES LIE AHEAD?**

There are a number of entrepreneurial challenges and opportunities identified in our analysis. Challenges are issues that repeatedly appeared as critical barriers to the success of the reviewed business models. As such, they represent issues that must be solved in order to fully enable a paradigmatic shift towards innovation and sustainability in fashion. On the other hand, opportunities are elements that have already been technically or economically incorporated in viable – and, in some cases, successful – business models, but require additional development, exploitation, expansion or diffusion.

2.6.1 *Challenges*

We identified four challenges in this study: (i) design phase strategy; (ii) consumer education; (iii) consumer expectations; and (iv) aligning the values along the supply chain. Below we present in detail all of them.

2.6.1.1 Rethink the design phase

A key challenge is to rethink the design phase of sustainable product development. Decisions affecting the whole product are made during the design phase, concerning quality, appearance, materials, manufacturing processes, and associated costs (Bhamra & Lofthouse, 2007). As such, design decisions impact the whole business model, but are of particularly critical influence on the translation of sustainability principles to the value proposition (Fletcher & Grose, 2012). In this sense, adoption of environmentally-friendly materials (e.g., sustainable fibers or recycled materials) and production processes (e.g., natural dying techniques, zero waste mechanisms, slow fashion methods) can yield relevant business benefits. However, the decision to adopt such materials still represents a challenge for fashion firms, which still do not perceive it as a strategic priority for the industry (Fletcher & Grose, 2012). Moreover, the design phase is fraught with technical challenges. Dissanayake and Sinha (2015) point out that concept development for goods making use of post-consumer waste is severely limited by dimensions, types, colors, and shapes of available material stock, which often has to be manually disassembled in a time consuming process. Additionally, design decisions must take into account the availability of recycled materials in order to maximize repeatability. As a result, the design phase of apparel that make use of recycled materials ends up being completely different from the design phase of traditional fashion items, usually requiring “high level of design thinking and creativity” (Dissanayake & Sinha, 2015, p.98). The born sustainable startups Preza and Revoada tackle this issue by creating a strong relationship with suppliers that provide somewhat standardized raw materials; while Orange Fiber even redesigned the whole textile development process through patented technologies. The owners of Contextura are design researchers and focus their research efforts on redesigned sustainable materials and processes, which are then applied in the firm.

2.6.1.2 Consumer education

Another potential cause of failure of many of the reviewed sustainable business models is related to consumer education. On the one hand, many sustainable and innovative business models have failed to convince consumers about the benefits of sustainable fashion products. For instance, empirical research suggests that most of the defining dimensions of slow fashion are simply not recognized as valuable by their consumers (Jung & Jin, 2016). Consumer education about such potential benefits can be a first step in the direction of viable

business models based on this approach. On the other hand, consumer education can be a catalyst of changes in consumer behavior towards more sustainable individual practices related to fashion. A key component of this challenge is to convince consumers that is worthwhile to dedicate efforts towards increasing the value of existing garments by expanding their lifespan and creatively finding new uses for it (Wang & Song, 2010; Roos et al., 2016). In this sense, traditional approaches to laundry must be rethought, since this is one of the most energy-intensive processes in a garment lifetime. Thus, consumers could be educated in cleaning methods which not only demand less energy, but also increase clothes' durability such as natural drying and hand washing instead of machine washing (Wang & Song, 2010). Besides, consumers could be oriented towards more sustainable consumption behaviors in order to decrease overall consumption levels, making better use of collaborative consumption business models such as fashion libraries and rewarding upcycling and recycling initiatives (Pedersen & Netter, 2015; Roos et al., 2016). All of the reviewed cases show how critical this challenge is, which manifests in low consumer demand for green products. Preza and Revoada innovated their business models in response to this challenge, adding a new value proposition aimed at corporate customers; Armadio Verde leveraged an online platform to foster collaboration and engagement between members, and explicitly targeted children (the consumers of the future) so as to educate them about aware consumption of resources as well as sharing opportunities.

2.6.1.3 Consumer expectations

A challenge closely related to consumer education involves addressing consumers' sustainability expectations. Consumer education is necessary to expand the awareness about sustainability, which is still rather limited, to large masses of consumers. Paradoxically, however, excessive expectations within the small niche of consumers already oriented towards sustainability in fashion may be a problem. For traditional businesses strongly associated with fast fashion it may be difficult to promote enough change towards sustainability as to effectively shift perceived brand image. Certifications are a first step in this direction, but more is needed to significantly change consumers' perceptions about the actions and intentions of firms in terms of commitment to triple bottom line sustainability (Ansett, 2007). Fast fashion businesses tend to adopt a defensive sustainability strategy due to the risk associated with offer cannibalization and lowered performance, while born sustainable startups created following values and principles of sustainability tend to adopt a

much more proactive strategy, incorporating innovation and working in supply chain models built upon collaboration and innovation (van Bommel, 2011; Nidumolu et al., 2014).

2.6.1.4 Aligning values along the supply chain

Next, it is necessary to improve solutions for aligning values along supply networks, thus creating truly collaborative arrangements and building stakeholder commitment in sharing knowledge, resources and abilities. The search for sustainability within fashion supply chains goes through the perspective of recommercialization, for instance by selling products from past collections or second hand items (Meyer, 1999), similarly to what happens in the Armadio Verde case. In the first case, participants in the value network are required to set up a reverse supply chain, that is, to move the product backwards from consumer to manufacturer, and redirect the product to a new sales channel, usually in the form of outlets. In the second case, different participants in the value network are involved, because a new segment consumers is targeted (Brace-Govan & Binay, 2010). In both cases, however, beyond nurturing technical competences associated with logistics and commercialization, partners in the value network are required to exchange information and knowledge about consumers, marketing strategies, and channel operation. Advantages arising from sharing competences and knowledges in such cases involve significant reduction in associated costs and improved market performance (Beh et al., 2016), but the operationalization of complex collaborative efforts involving more than knowledge sharing is a significant challenge for participating firms, as attested by the example of Revoada's supply chain orchestration. Not only there are technical issues to be solved (e.g., integrating logistics and information systems, setting up norms and rules for exchanging knowledge, establishing collaborative marketing strategies in different regional contexts, etc.), but misaligned organizational culture and values can derail efforts to effectively engage in strategic partnerships. The challenge of aligning values along the value chain extends to clients. In the Preza case study, an interesting potential dilemma was reported by the partners: would they accept orders from a corporate customer whose public image was unmistakably linked to industries with high environmental impacts?

2.6.2 *Opportunities*

We also identified a number of entrepreneurial opportunities which may be acted upon to expand the reach and success of sustainability-based innovative fashion business models.

2.6.2.1 Enhance focus on CSR

In this light, a first opportunity is to enhance the focus on Corporate Social Responsibility. Consumer perception of Corporate Social Responsibility actions is constantly improving, to the point that CSR is starting to be a factor of influence when it comes down to purchase decisions. More importantly, aspects of fair equity and social responsibility impact both the market's upper end (i.e., luxury fashion, as shown by Pavione et al., 2016) and lower end (Lueg et al., 2015). The importance of communicating CSR practices stands out as a significant opportunity for expansion and improvement (Lueg et al., 2015). Contextura partners with a social organization that develops entrepreneurship opportunities in socially vulnerable communities, hiring women (mostly mothers without other sources of income) as artisans to work at home. In this context, it builds upon the sweatshop free, fair trade and locally sourced drivers. It is also worth noticing the expansion of CSR efforts as an opportunity to address a challenge we mentioned before: that of consumer education about the benefits of sustainable fashion. The recent business model innovations by Armadio Verde, Lanieri, Preza and Revoada illustrate how this opportunity is being explored by born sustainable fashion startups. On the one hand, green products can be customized and sold to corporate customers, who often use it as gifts to promote commitment towards sustainability. On the other hand, fashion startups can use their expertise in sustainable product development to provide consulting services, knowledge and networking for large firms wishing to further their CSR commitment by developing their own green products and sustainable initiatives.

2.6.2.2 Service-based business models

The latter is also an example of the second opportunity we identified: the development of service-based business models that reduce stock requirements (like in the Lanieri and ELSE Corp cases) or even forego production entirely. Other than consulting, this includes mechanisms such as fashion libraries of garment subscription schemes. Services were always present in the fashion industry, but the scale of fast fashion firms seems to have diminished

interest in service-based business models. Armstrong et al. (2016) mention that service-based models such as fashion libraries require resource-intensive activities such as packaging, theft prevention and product sanitation, while Pedersen and Andersen (2015) suggest alternatives such as swapping, leasing, repairing, hiring and reusing services. Armstrong et al. (2015) mention the use of product-service-systems (PSS) to close material loops, in accordance with the principles of circular economy. The idea is to migrate from the acquisition of new fashion goods towards the reinvention and restyling of existing goods. After-sale services are suggested by Wang and Song (2010) in order to help customers to maintain (hand washing instead of machine washing, drying naturally) and recycle garments.

2.6.2.3 Monetizing voluntary simplicity

A final opportunity involves monetizing the voluntary simplicity embedded in drivers of sustainable innovation such as upcycling and second hand which are central to many of the successful business models reviewed in this article. In the fast fashion model, consumers are usually distant from production processes. This distance implies less emotional appeal in the acquisition and use of fashion goods, which is necessary for large-scale immoderate consumption. Voluntary simplicity (Alexander & Ussher, 2012) focuses on the careful use of apparel and a broader usefulness in order to diminish the production, acquisition and disposal, thus decreasing the amount of fashion goods and the associated consumption of natural resources (Ruppert-Stroescu, 2015). In the reviewed business models, voluntary simplicity is operationalized by upcycling and second hand, which have already been proved viable in small-scale initiatives, but are yet to be incorporated in scalable business models. The case of Contextura is a typical example of fashion startup that explores this opportunity with little technology investments, as their products are purposely designed as classic, timeless, and versatile; while Armadio Verde shows how technology can be leveraged to set up an two-sided platform simplifying and fostering the exchange of second-hand clothes.

2.7 IMPLICATIONS FOR FASHION ENTREPRENEURSHIP

Although our study is mostly exploratory, it puts forward a number of implications for fashion entrepreneurs. A first general implication is that sustainability-oriented business model innovation in fashion tends to be markedly different for incumbents and startups. A

similar result had been previously reported by Cortimiglia et al. (2016), but for a general context; evidence that this dynamic is replicated in a very specific setting is an important contribution to the literature on business model innovation. Indeed, fashion startups are typically “born sustainable”, as commitment to promoting social and environmental sustainability tend to be key values and motivations of founders and partners; as a result, these entrepreneurs leveraged the startups’ flexible state to design innovative business models that deliberately embed many of the trends and drivers we pinpoint in this study. Incumbents, however, are clearly characterized by resource rigidity and a strong legacy with the established fast fashion entrepreneurial paradigm; therefore, they tend to proceed with more caution, experimenting with small-scale green initiatives and addressing structural issues such as promoting transparency in supplier selection and management.

A second general implication refers to the role of technology in enabling sustainability-oriented business model innovation for fashion startups. Our selection of cases suggests that high technology is helpful when it comes to radically rethinking manufacturing processes (as Orange Fiber did); still it is not a hard requirement for successful innovative fashion business models. In fact, small-scale initiatives using limited technology can be an important launch pad for business model experimentation. When a viable model is found, however, technology can be useful to scale up the business. Preza is illustrative of this dynamic. After a slow start building technical competences and proving the viability of the product, investments in production technology allowed them to increase production capacity to match the controlled growth of the distribution network of partners and, consequently, demand.

A third implication stemming out from our cases is that sustainability drivers are seldom exploited alone and as such by born sustainable startups: consistently with entrepreneurship literature (e.g., see Shane and Venkataraman, 2000; Alvarez and Barney, 2001), in order to pursue market opportunities, startups create their unique value proposition by originally recombining different approaches, resources and competencies with synergic effects (see Orange Fiber’s combined use of sustainable raw materials, recycling, local sourcing and zero waste; or Colibrii’s leverage on locally sourced components, upcycling and fair trade). The resulting new business model proves capable of both generating and capturing value.

Specific findings from the case studies are insightful. First, several cases highlighted the importance of partner commitment and engagement. This leads to at least two open issues with strategic relevance: how to align values and interests along a typically complex value network and, more specifically, how to promote the sustainability aspects of the value proposition (and, indirectly, promote consumer education) when partnering with indirect sales channels. The cases also suggest typical challenges for scaling up successful fashion startups. Among these challenges, a common theme is that of “keeping true” to the core values of sustainability, which are normally strongly tied to essential drivers of sustainable business model innovation such as fair trade, commitment to recycling, upcycling, and use of sustainable raw materials. A third specific insight refers to the critical importance of a supporting business ecosystem comprising likely-minded firms who share sustainability values. Shared values promote knowledge and resource sharing and facilitate the establishment of collaborative efforts that foster business model experimentation, especially at the startup stage. This finding leads to another major challenge in the development of a sustainable fashion industry: closing the gap between incumbent fashion companies willing to innovate their business model towards sustainability and born sustainable startups striving to make their business model replicable and scalable. As incumbents are relatively more effective in establishing competitive advantages but are less able to identify new opportunities and change accordingly, while startups are inherently more innovative but less successful in developing competitive advantages needed to appropriate value from those innovations (Ireland et al., 2003), a strategic collaboration between these players within an open innovation framework would be beneficial to the industry as a whole.

To summarize, this study addressed the pressing issue of sustainability in the fashion industry. By combining literature review and empirical research, it discussed the major entrepreneurial drivers, challenges and opportunity to pursue sustainable business model innovation. It also depicted how such phenomena impact fashion companies’ business models. The study’s limitations refer to possible sample selection bias in the cases analyzed, and observer bias characterizing qualitative research based on interviews. Based on our findings, future research should disentangle how to tackle the challenges and to fully take advantage of the opportunity for a sustainable evolution of fashion business models and industry as a whole, driven by both enlightened incumbents and born sustainable startups.

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3 ARTIGO II - ANALYSIS OF SUSTAINABILITY PRACTICES IN BUSINESS MODELS IN THE FASHION INDUSTRY

Abstract: The fashion industry, as well as other industries, has been under pressure from a growing portion of the consumer market to operate its businesses in a more sustainable way, with less social and environmental impacts. Such demand has led several companies to rethink their business models and has motivated the creation of new ones. Despite this, initiatives are still dispersed and there is a difficulty in measuring the impacts of these changes. Due to this situation, this article has the objective of quantitatively analyzing the sustainability actions of companies in this economic sector. In order to achieve that, case studies were done in 21 companies and a scale of sustainability innovation was created, allowing a correlation analysis and cross-case comparisons. As a result, it was identified that actions related to social responsibility and circular economy are the most applied in the analyzed cases and that the use of natural raw materials is negatively correlated with the scalability of the business. Finally, an illustrative pathway of sustainable actions was proposed for the sector's businesses.

Keywords: sustainability scale, business model, sustainable innovation, fashion.

3.1 FASHION BUSINESSES AND ITS IMPACTS

Fashion is one of the greatest current economic forces, valued at 3 trillion dollars and employing 57.8 million people around the world (Fashion United, 2014). This large industry has impacts that go beyond the economic sector, reaching also the environment. According to De Brito et al. (2008), the fashion industry is one of the most harmful to the environment mainly due to manufacturing phases of dyeing and drying, which use natural resources and chemicals intensely.

In the last 20 years, a single business model came to dominate the fashion industry. Defined by Cachon and Swinney (2011) as a system which combines short production and distribution lead times and highly fashionable product design, fast fashion became the path for big companies in this sector. This model is characterized by a high competition between

supply chains, marketing activities done by global brands and suppliers offering high flexibility and cheap labor (Wieland and Handfield, 2013).

In this sense, sweatshop is a challenge that seems unsurmountable in this industry. The first big scandal happened in 1996 when a Nike factory in Pakistan was discovered using child labor (Locke, 2002). Other events like the Rana Plaza building collapse in 2013 have intensified the discussion about social responsibility in fashion supply chain (Wieland and Handfield, 2013). On the other hand, Caniato et al. (2012) suggests that firms can use the sustainable approach to survive against competition for price dictated by countries with low labor costs.

Trying to deal with social and environmental damages created in the fast fashion, consumer-oriented movements like slow fashion and circular economy have arisen in recent years. The new business models these movements are demanding and creating in terms of sustainability seem to be promising, but they are still not the rule nowadays. Due to global scale and recurrence of environmental and social problems, business in the fashion industry deserves attention in terms of sustainability.

Business model innovation is a rather recent and challenging theme; as it comprises a more systemic view, innovative practices associated with business models are less predictable than in areas such as products and/or processes (Velu, 2015), although appropriability and imitation may be harder to solve (Teece, 2010). Business model innovation towards sustainability is an even more complex issue, since the company must incorporate sustainable values to its routine, sometimes developing new activities and/or taking over its supply chain management. Challenges related to finding a match between customer and sustainability values and achieving scale are particularly difficult in the specific case of fashion industry sustainable business model innovation (Pal and Gander, 2018).

Although the topic is not new, there are few previous works that shed light on tools which may support the phase of innovating business models towards organizational sustainability (Joyce & Paquin, 2016). In this regard, the main goal of this study is to analyze how fashion companies are developing sustainable practices and incorporating these practices in their business models. Moreover, we aim to investigate how fashion firms are dealing with the challenges and opportunities for sustainable business model innovation identified by Todeschini et al. (2017).

The article is structured as follows: after the introduction, section II exposes the references used in the study and section III presents the research method. The fourth section analyzes the case studies and section V presents the conclusions of the research.

3.2 BUSINESS MODELS AND SUSTAINABILITY IN FASHION

There's a dearth of clarity about the meaning of the business model concept in the literature, leading to dispersion rather than conversion of perspectives, and promoting confusion in terminology, as business model, business concept and revenue model are often used interchangeably (Zott et al, 2011; Morris et al, 2005). According to a review conducted by Zott et al (2011), business model is frequently studied without an explicit definition of the concept.

In the literature, the term business model can be referred to as a conceptual tool (George & Bock, 2009), a method (Afuah & Tucci, 2001), or a framework (Afuah, 2004), among others (Seelos & Mair, 2007; Timmers, 1998). For this paper, the definition of business model adopted was presented by Osterwalder & Pigneur (2010) as the rationale of how an organization creates, delivers, and captures value. In this sense, business model innovation is more systemic in nature than product and/or process innovation, for instance, as it concerns the alignment of the customer value proposition with how value is created and captured (Velu & Stiles, 2013), including a firm's position and role in the value network. According to Velu (2015), this may result in less predictable challenges for firms due to the complexity involved.

A growing number of businesses are starting to consider and embed challenges and opportunities to work with sustainability in some way, whether adopting sustainability values or new management systems (França et al, 2017). In order to shift from unsustainable to sustainable, a company must realign its system components around a new conceptualization of value, since the value definition determines whether sustainability issues are considered to lie within a firm or not (Bolton & Hannon, 2016; Rauter et al, 2017). In this context, business models must be adapted or extended in order to incorporate social and environmental issues perceived to be relevant for organizations to become sustainable (Stubbs & Cocklin, 2008; Rauter et al, 2017). Consistent with Lüdeke-Freund (2010), a business model that creates

competitive advantage through superior customer value and contributes to a sustainable development of the company and society can be interpreted as a sustainable business model.

In this sense, Bocken et al. (2014) present a model describing mechanisms and solutions to build sustainable business models. The study points out emerging themes like technology advancement and level of innovation, innovation in collaboration and the education in order to facilitate successful adoption of sustainable business models. The idea is to move the focus from individual firms to a systemic perspective. Trends such as sharing economy (Benkler, 2012; Botsman and Rogers, 2011; Lowitt, 2013) and circular economy (Biwei et al., 2013; Su et al., 2013; Lewandowski, 2016) are some of the emerging approaches on this matter that undoubtedly impact how sustainable business models are designed and innovated.

In the specific context of the fashion industry, a number of drivers of sustainability have appeared in the past few years. The Fair Trade concept deals with the way trade happens by increasing worker revenues at the weakest links of a supply chain and providing decent work conditions to them (Goworek, 2011, Hutchens, 2013; Jones and Williams, 2012). Another trend is upcycling, which is the process of creating new value from old or out-of-fashioned clothes, helping to diminish the production and consumption of new garment (Binotto and Payne, 2016; Sinha, 2014; Huang et al., 2014; Hemmings, 2010; Kim, 2013).

Following these – and other – sustainability trends, there is a growing number of business seeking new alternatives for reducing the social and environmental impacts of the fashion industry. In order to compile these new ways of making business, Todeschini et al. (2017) created a framework of drivers of innovation in sustainable business models in the fashion industry and pointed out challenges and opportunities for fostering sustainability in this industry.

This study is based on a conceptual model presented by Todeschini et al. (2017) regarding concepts that a business model in the fashion industry has to deal with in order to innovate in a sustainable way. In the sequence of the literature review, we present some definitions about this model (Figure 1).

Figure 1 - Sustainable trends and drivers for business model innovation

Macro-trend	Driver of sustainable innovation	Where does it drive innovation in the business model?	Examples of innovative and sustainable business models in fashion
Circular economy	Recycling	Cost structure, key activities, key partners	Incumbent: Adidas Startup: Orange Fiber
	Vegan	Key partners, key resources, channels, value proposition	Startup: Preza
	Upcycling	Key resources, key activities, value proposition	Startups: Colibrii, Revoada, Preza
Corporate social responsibility	Sweatshop free	Customer relationship, key resources, key activities	Incumbent: American Apparel
	Fair trade	Customer relationship, key partners	Incumbents: People Tree, Eileen Fisher Startups: Colibrii, Revoada
	Locally sourced	Customer relationship, value proposition, key partners	Startups: Contextura, Lanieri, Orange Fiber, Revoada, Colibrii
Sharing economy and collaborative consumption	Fashion library	Customer relationship, value proposition, revenue streams	Startups: LENA, Rent the Runway
	Second hand	Value proposition, channels, customer relationship, key activities, revenue streams	Startup: Armadio Verde
	Collaboration	Key partners, key activities, key resources, delivery channels, customer relationship	Startups: Armadio Verde, Preza, Revoada
Technological innovation	Sustainable raw materials	Key resources, customer relationship, cost structure	Startups: Orange Fiber, Contextura
	Zero waste	Key resources, key activities, cost structure	Startups: ELSE Corp, Orange Fiber, Zero Waste Daniel, Contextura
	Wearables	Key resources, key activities, key partners, value proposition, cost structure	Startup: Ringly
Consumer awareness	Capsule wardrobe	Customer relationship, value proposition, revenue streams	Drivers generated mainly by consumer behavior Startups: Armadio Verde, Contextura, Preza, Lanieri
	Lowsumerism	Customer relationship, value proposition, revenue streams	
	Slow fashion	Value proposition, customer relationship	

Source: Todeschini et al. (2017).

According to Todeschini et al. (2017), there are big trends that lead the entrepreneurial dynamics of innovation in sustainable business models. These trends are related to the economy, technology, society, researches and environment and are decoupled into practical concepts so called drivers of sustainable innovation. The drivers describe key working elements that highlight the sustainable innovations in business models. The framework composed by the drivers and the big trends was developed after some phases of the research, including a systematic review of literature about innovation, sustainability and fashion, interviews with experts, and a research on the specialized press about fashion business.

The first trend identified in the study is circular economy, which is related to the development of economic models based on restoration and regeneration. The drivers related to this trend are recycling, vegan and upcycling. Next, corporate social responsibility is a trend that spread as the supply chains became globalized, which means that nowadays the companies don't have the control about social and mainly labor practices of its suppliers as they did when the processes were verticalized. The drivers that compose this trend are sweatshop free, fair trade and locally sourced (Todeschini et al., 2017).

Sharing economy and collaborative consumption are related to a paradigm shift from ownership to access and experiences that usually happen between people not previously connected, what was made possible mainly by the technology growth in social networks in the last decade. Collaboration, second hand and fashion library are the drivers identified in this trend. Technology is a topic related also to the next trend, called Technology Innovation. This trend is about product materials and processes, with emphasis in sustainable raw materials, zero waste and wearables. Consumer awareness is the last trend and embraces the behavior shift from a consumerist to a more conscious and aware of environmental impacts society. This trend has a diverse characteristic as it is driven by the consumer, and not by the business as the formers did (Todeschini et al., 2017).

Although previous research on the topic and the conceptual model shown above represent alternatives to better manage a sustainable business model, it remains difficult to explain how the concepts can be translated into practice. This research focuses on this issue, using case studies from Brazilian firms which are dealing with this theme.

3.3 METHOD

In order to accomplish the goals of the research, case studies were carried out along with interviews to support the conduction of the research and then the results were analyzed by qualitative and quantitative analysis. Even though this research was applied in a limited number of cases, the method resembles a case survey, a methodology that employs a large number of cases to enable the inference of values for certain variables that describe the constructs under analysis (Larsson, 1993).

The 21 cases were chosen by a convenience sample, as we couldn't find a proxy for the population of sustainability related fashion business to affirm that this is a representative sample. All the cases are business that sell products or services to the consumer, in a business-to-consumer model, and have at least one sustainability fashion driver (Todeschini et al., 2017) in their business models.

The focus of the study is to verify how these businesses are dealing with the concepts proposed by Todeschini et al. (2017) in their conceptual model of a sustainable business model in the fashion industry. Specifically, we wanted to verify if the concepts are used in the cases and how much they are applied in the routine of the business. The cases were chosen in order to have a sample with different characteristics of business models. The characteristics analyzed in the sample selection were chosen based on the concepts that define a business model according to Osterwalder & Pigneur (2010) and some features found in fashion business. The characteristics used are: (i) if it sells products or services; (ii) if it produces or outsources what is sold; (iii) operation scale; (iv) if the business begun as a startup; (v) technology intensity; (vi) level of the value chain articulation; (vii) the stage of the consumption (pre or post consumption).

The first step of the method was to interview the managers of the businesses asking them about: (i) the business history; (ii) the current business model; (iii) if there are aspects related to sustainability and how they are applied; and (iv) questions about the drivers of sustainable innovation presented by Todeschini et al. (2017). The interviews lasted about one hour, complementary information was collected from company websites. The second step was the creation of the scales. For each aspect, performance levels focused on sustainability were created, generating a sustainability innovation scale for each analyzed aspect. Again, the researchers evaluated, refined and validated the drivers and respective performance levels resulting in a single type of scale for all the sustainable innovation drivers. The scale was based on a perception of the presence of the driver in the analyzed business compared to what the businesses of the market in general do. The scales followed the rule presented in Table 2, that shows the level of sustainable innovation regarding each driver found in the business. The values of the scales (1, 3, and 9) were chosen to segregate the differences between intensive or high level innovation and a mainstream use of the drivers. If the business did not present any aspect related to some driver, the value attributed to that case was zero.

Table 2 - Sustainability scale

Value	Meaning
0	The business do not present the driver.
1	The business present the driver as the majority of the market does.
3	The business present the driver more than the majority of the market does.
9	The business present the driver much more than the majority of the market does.

Source: the authors.

After that, the cases were evaluated according to the levels of the scales for the characteristics of the business models and then they were validated by contrasting the results of the cases in order to change data from wrong outlier values in the evaluation between the cases. These characteristics were used also to analyze the cases against the score results of drivers and trends. As well as the values of the scales for each sustainable innovation driver, a codification also generated for the classification of the characteristics of the business models (Table 3).

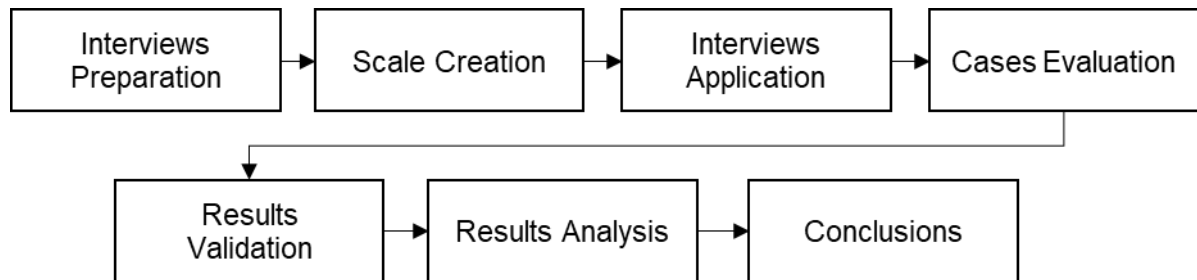
Table 3 - Codification for the business models characteristics

Variable	Value	Meaning
Production resources	0	Produces
	1	Outsources
What is sold	0	Product
	1	Service
It began as a startup?	0	No
	1	Yes
Operation scale	0	Low
	1	High
Technological intensity	1	Low
	2	Medium
	3	High
Value chain orchestration	1	Low
	2	Medium
	3	High
Consumption stage	0	Pre – consumption
	1	Post – consumption

Source: the authors.

The results were examined between trends, drivers and characteristics of the business models for the cases of the sample. A Pearson correlation index was used to help highlight the interconnections between these variables and then the results were synthesized, and some conclusions were proposed. The method steps are presented in Figure 2.

Figure 2 - Method used in the research



Source: the authors.

3.4 RESULTS AND DISCUSSION

In this section the results obtained and some discussions regarding the research are presented. Initially, the analyzed cases are described according to the model of Todeschini et al. (2017). Next, the scales analysis is presented and then the results of the correlation analysis between drivers, trends and characteristics of the business models are discussed.

3.4.1 *Initial analysis of the cases*

As described in the method section, interviews were conducted with representatives of each studied business. In all interviews we asked the interviewee to explain the operation of the business and its brief history until the moment of the interview. After the initial explanation, we asked some questions about each construct of the conceptual model, helping the interviewee to present the panorama of the practices the company has in relation to the drivers of sustainable innovation. What follows is a brief description of each case:

Insecta: Footwear brand that uses old clothes, recycled plastic bottles and surplus of the textile production as raw materials. The sale occurs in its own stores, and mostly in the e-commerce of the brand.

Revoada: The company uses tire chambers as substitutes for leather and nylon from damaged umbrellas as lining for backpacks, wallets and briefcases. Product sales occur through the company's e-commerce, partner stores and crowdfunding for limited editions. In addition, the company provides consulting services about sustainability for other businesses.

Preza: Company that uses waste from the furniture industry to create sunglasses. All raw materials are ecofriendly and each product is unique, receiving an identification number. The company manages its own e-commerce and has some sales partners as optics and jewelery stores.

Green is Great: This company produces clothes for babies and children using natural and sustainable fibers. The marketing process occurs via social networks and the sale is carried out directly with the owner and in local fairs.

Closet Detox: Unlike other cases, the value proposition of this company is delivered through a fashion consulting service specialized in reducing the consumption of customers. Initially, a sorting of products is made with the customer and then fashion looks are created that increase the use of the remaining pieces. The eliminated pieces are donated or sold in flea markets.

O Amor é Simples: Company that produces simple wedding dresses. Doing that, less fabric is spent. Another important point is that the company encourages local production and is concerned to ensure the well-being of the dressmakers. The company sells the products exclusively through their own e-commerce.

Renner: This is a large Brazilian company of fashion retail. There are some sustainability initiatives such as reverse logistics for used clothes and collections that use sustainable fibers such as lyocell and recycled fabrics in the firm's portfolio.

Contextura: It works as a lab for new fashion products. It produces collections of fashion items in an experimental scale using sustainable raw materials, according to the slow fashion paradigm. Sales mainly take place in the physical store itself and in partner stores.

Colibrii: They create and produce backpacks with donations from the textile industry. The workforce is made up of artisans from low-income communities, encouraging

and valuing local production. The revenue is based on the sale of products to individuals and companies.

Delazeri: Sewing studio that makes women's clothes on demand focused on social and couture classic clothes, which leads them to adhere to the principles of slow fashion. Besides that, the company returns to the customer or donates all leftover fabrics that still can be used.

Recman: Brand of circular accessories developed through the recycling of harmful raw materials such as discarded tire chambers and fire hoses. The company's goal is to develop design products that can bring awareness about sustainability to the final customer.

Vert: Sneaker brand that uses organic or recycled cotton, PET fiber and Amazon rubber in soles. The company practices fair trade with its suppliers and with the workers in the factory where the sneakers are produced. Sales occur in their own physical stores and e-commerce, and in partner stores in Europe and America.

3JNS: The company has a model based on the circular economy concept. It produces jeans and makes up to three cycles of receiving the product back from the customer that no longer wants to use it. Then, the jeans are upcycled and resold. After the three cycles, the product goes to recycling.

Panosocial: This company's workforce is composed by ex-convicts, using ecological raw material and sustainable processes as a way to reduce criminal recidivism.

Nosso Tecido: It is a market of fabrics that were discarded by the fashion industry. The material is selected and sold in an e-commerce platform, helping to close the cycle of the circular economy.

Manui: Starting from the own need of the founder due to a skin disease, the company began to develop collections in which the main value proposition is the use of natural fabrics and dyeing from natural herbs such as macela, pau brasil, jaboticaba, etc..

Apoena: Their products are handmade using butiá leaves, which makes each piece different from the others depending on the characteristics of the leaves used in the product.

Passa Passará: Flea market of baby and children clothing. The purchases from the families to the store follow a strict sorting in which only products of consolidated brands are acquired in excellent condition. This ensures a high selling value and a great reputation in the market.

Enjoei: A second-hand marketplace, where individuals advertise their products in individual stores like a profile in a social network. Doing that, the platform helps to increase the life cycle of second-hand products.

Herself: The company developed a product that substitutes menstrual pads using technological textiles in panties, reducing the consumption of cotton, non-woven fabric, and other materials used in disposable menstrual pads.

Horvath: Brand of shirts resistant to stain and odor. It contributes to sustainability by decreasing in the number of washes during consumer usage, which has a great environmental impact in the product lifecycle.

3.4.2 *How trends and drivers are manifested in the cases*

In this phase, the 21 cases were evaluated according to the scale of intensity for each sustainable driver. A table (Table 4) where the rows represented the cases and the columns the drivers was created to facilitate cross-case comparison.

During the research, it was noticed that many cases that employed the vegan driver, also used natural raw materials. Therefore, an adaptation in the initial model proposed by Todeschini et al. (2017) was made adding a more generic “natural” feature to the driver that initially considered only vegan materials. Given the scale values for each driver, score sums were generated for drivers and trends. There is a greater score concentration (64%) in the first two trends: circular economy and social responsibility. In these trends there are also the drivers with the highest scores: upcycling (17%), vegan / natural (14%), followed by fair trade (12%) and locally sourced (10%), that is, together they have 52% of the total score. These are drivers that demand only basic knowledge and technology and have low cost involved in the execution of its activities.

Table 4 - Cases Evaluation

Cases Evaluation	Circular Economy			Social Responsibility			Sharing Economy			Technological Innovation			Consumer Awareness		
	Recycling	Vegan / Natural	Upcycling	Sweatshop Free	Fair Trade	Locally Sourced	Fashion Library	Second Hand	Collaboration	Techn. and Sust. Raw Materials	Zero Waste	Wearables	Capsule Wardrobe	Lowsumerism	Slow Fashion
Insecta	3	3	3	1	0	1	0	0	0	0	0	0	0	0	0
Revoada	0	0	9	0	9	1	0	0	9	0	0	0	0	0	0
Preza	1	3	3	1	1	3	0	0	1	1	0	0	0	0	0
Green is Great	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0
Closet Detox	0	0	1	0	0	0	3	0	1	0	0	0	1	1	1
O Amor é Simples	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0
Renner	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Contextura	0	1	1	1	0	0	0	0	0	0	1	0	0	0	1
Colibrii	0	0	3	1	3	1	0	0	1	0	0	0	0	0	0
Delazeri	0	0	0	1	1	0	0	0	0	0	0	0	0	1	3
Recman	0	0	9	0	3	1	0	0	1	0	0	0	0	0	0
Vert	3	9	0	3	0	3	0	0	3	0	0	0	0	1	1
3JNS	0	0	9	1	0	0	1	0	1	0	1	0	0	0	0
Panosocial	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0
Nosso Tecido	0	0	3	0	3	0	3	1	1	0	0	0	0	1	0
Manui	0	9	0	1	0	3	0	0	0	0	0	0	0	0	0
Apoena	0	9	0	1	1	9	0	0	1	0	0	0	0	0	0
Passa Passará	0	0	0	0	3	0	3	9	1	0	0	0	0	0	0
Enjoei	0	0	1	0	3	0	3	9	1	0	0	0	0	0	0
Herself	0	0	0	1	0	0	0	0	0	9	0	1	0	1	0
Horvath	0	0	0	0	0	0	0	0	0	9	0	1	1	0	0

Source: the authors.

Given this scenario, one of the hypotheses for the score concentration in the two first trends is a low entry barrier: these activities can be performed by a larger number of new players because they do not demand specific knowledge and technology. In addition, these are activities associated with a previous era when markets were not fully globalized and people needed to use natural products, bought from local producers following the fair trade precepts, and were used to renewing old products by practicing upcycling due to the difficulty of acquiring new products.

On the other hand, the trend that had the lowest score was consumer awareness, with 5% of the total score, which reinforces the results of the previous research by Todeschini et al. (2017). In this regard, the authors stated that there still seems to be no consolidated solution in the fashion industry for consumer awareness issues, so they pointed out as a challenge for the sector the development of new businesses that deal with raising consumer awareness about the environmental and social impacts generated by fashion production. In addition, they suggested that this subject should seek for an effective way to reward the consumer for the voluntary simplicity behavior, which refers to the careful use of consumer goods (Alexander & Ussher, 2012), which is a powerful way to decrease the fast cycle of production, consumption and disposal and then decreasing also the consumption of natural resources (Ruppert-Stroescu, 2015).

The drivers that had the lowest scores were Zero Waste, Wearables and Capsule Wardrobe, which together got only 2% of the total score. Two of them are related to technology and one to consumer awareness. Regarding technology drivers, one of the issues raised in some interviews is that the use of technology and the application of sustainable concepts can be contradictory, since using technology may seem to make intensive use of resources such as energy and low use of human labor, thus causing social harm with unemployment.

The trend that had the most unequal distribution was Technological Innovation, with 83% of its score concentrated in the driver Technological and Sustainable Raw Materials. Zero Waste and Wearables technologies had scores close to zero, evidence that these technologies are poorly developed in the cases studied in this research. Technologies for sustainability in fashion are still sparse, and many of them are in the initial development phase in the cases they can reach a potential for commercialization in startups. The most advanced

developments in this area are, in fact, in new materials for the production of clothes and accessories. An example of this is the case presented by Todeschini et al. (2017) of the Italian startup Orange Fiber, which uses citrus juice byproduct to produce new yarns in a patented nanotechnology process. This example illustrates the fact that new material technologies have often been generated in universities and laboratories to become startups. Other business examples that involve research and development for the creation of new materials are startups like Evrnu, Vegea and Piñatex. In any case, these businesses are still not ready to serve the general consumer due to limitations of raw material availability, installed capacity and, in many cases, delays in the patenting process for the subsequent commercialization of the product, factors that end up increasing the selling price of products that employ these materials.

3.4.3 *Analyzing and discussing the results*

The full assessment of the case studies regarding the characteristics can be seen in Table 5. Two of the characteristics had identical behaviors in the allocation of values for the analyzed cases: what is sold (product or service) and the consumption stage (pre or post consumption). This behavior shows that all the companies of the sample that operate providing consumer services also work in the post-consumer stage.

Regarding the Pearson correlations results found among the variables, three types of correlations were tested: characteristics x drivers (Appendix A), drivers x drivers (Appendix B), characteristics x trends (Appendix C). Given the results of the correlations among drivers, two were highlighted. The first is a 0.80 correlation between locally sourced and vegan / natural. This means that businesses that make use of one of the drivers also tend to use the other in their business models, seeking the commercialization of vegan and natural products made locally. In addition, there is a strong negative correlation of -0.47 between the operation scale and the vegan / natural driver, which also corroborates this perception. There seems to be, therefore, a situation in which natural and vegan production fails to expand its market (or chooses to remain small), which resembles a craftsmanship model in relation to operation scale.

Table 5 - Evaluation of the characteristics of the case studies

<i>Characteristics</i>	<i>Production resources</i>	<i>What is sold?</i>	<i>It began as a startup?</i>	<i>Operation scale</i>	<i>Technological intensity</i>	<i>Value chain orchestration</i>	<i>Consumption stage</i>
<i>Insecta</i>	1	0	0	1	2	2	0
<i>Revoada</i>	1	0	0	1	2	3	0
<i>Preza</i>	0	0	1	0	2	0	0
<i>Green is Great</i>	1	0	0	0	1	1	0
<i>Closet Detox</i>	0	1	0	0	1	1	1
<i>O Amor é Simples</i>	1	0	0	1	2	2	0
<i>Renner</i>	1	0	0	1	2	3	0
<i>Contextura</i>	0	0	0	0	1	1	0
<i>Colibrii</i>	1	0	0	1	1	2	0
<i>Delazeri</i>	0	0	0	0	1	1	0
<i>Recman</i>	1	0	0	1	1	1	0
<i>Vert</i>	1	0	0	0	2	2	0
<i>3JNS</i>	1	0	1	1	2	1	0
<i>Panosocial</i>	0	0	0	0	1	1	0
<i>Nosso Tecido</i>	0	1	1	0	1	1	1
<i>Manui</i>	0	0	0	0	1	1	0
<i>Apoena</i>	0	0	0	0	1	1	0
<i>Passa Passará</i>	0	1	0	1	1	1	1
<i>Enjoei</i>	0	1	1	1	3	3	1
<i>Herself</i>	1	0	1	1	3	2	0
<i>Horvath</i>	1	0	1	1	3	2	0

Source: the authors.

Another strong correlation was between collaboration and fair trade drivers (0.82). This result makes sense given that the collaboration driver considers the work in group between stakeholders mindset, what leads to a major care with the work and compensations given to the suppliers, which is an assumption to the existence of fair trade.

Analyzing the correlations between characteristics and trends, there is a strong correlation (0.75) between the “what is sold” and “consumption stage” characteristics and the sharing economy trend. This result may mean that selling services and acting in the post consumption phase are good ways for business to develop sharing economy precepts. Entrepreneurs that want to have this trend in their business can look for these characteristics to build or to transform their companies.

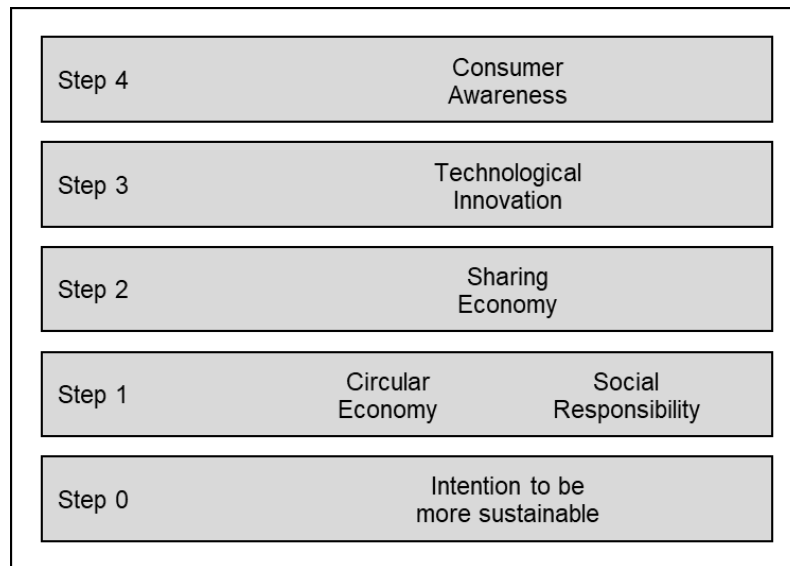
Regarding the business effects for the consumer, the comparison between operation scale characteristic and consumer awareness trend showed a -0.42 correlation index. This suggests that the bigger is the operation scale, the lesser are its effect in raising consumer awareness about sustainability. This fact reinforces the challenge presented by Todeschini et al. (2017) about changing the thoughts and actions of consumers, the ones that create the demand for all the fashion supply chain. In this regard, we indicate some hypotheses for this result. First, it may mean that consumers do not believe that big companies are able to be oriented by sustainable values as many scandals of big companies' unsustainable practices are revealed in the media every year. Second, sustainable business models may be linked to grassroots movements that act in a small pace and thus are not able to scale. Other hypothesis is that the level of details that have to be cared in sustainable business models is so big that they cannot spread the operations at the same pace as other fast fashion models do. About that, the study presented by Pal & Gander (2018) emphasizes that sustainable businesses have been facing obstacles to scale the business models, as the innovations proposed by this type of companies contain unscalable value proposition features in its operations and customer relationship. Some of the features that hinder the potential for scalability are the technological limitations for closing the loop in circular business, institutional inertia, the immiscibility of slow fashion precepts and dynamic customer preferences, and the costs of coordinating supply chains under the conditions of a sustainable business model (Pal and Gander, 2018).

Considering the technological innovation trend, two correlations are highlighted. The correlation between this trend and the technological intensity was 0.63, which makes sense, since they deal with similar topics. Besides that, a 0.56 correlation index of this trend with the characteristic of beginning the company as a startup is another data that reinforces the idea of startups as scalable businesses based on technology (Blank and Dorf, 2013). Lastly, the technological intensity characteristic is associated to the use of technological and sustainable raw materials (correlation index = 0.63). This situation may mean that developing new raw materials is a promising way to technological innovation regarding sustainability. Alternatively, it may indicate that the development and use of new materials is the only way entrepreneurs are employing technology to innovate sustainable business models in fashion.

From the results and discussions presented in this study, an illustrative framework of a common pathway to sustainability was created for the analyzed cases (Figure 3). We point the intention of the company to have more sustainable practices as step zero for this path. The

majority of the cases presented evidences of drivers related to Circular Economy and Social Responsibility. Furthermore, the drivers of these trends are those with the smallest entry barriers and seem the most developed and mature for practical work. Because of that, these trends are the step one of the illustrative pathway to be covered by companies that wish to develop sustainable business models in the fashion industry.

Figure 3 - Illustrative path for sustainability in fashion business



Source: the authors.

Next, issues about Sharing Economy are the following step given the percentages of scores for this trend. There is a little more difficulty for business to adhere to drivers of this trend because of the barriers that some companies have for sharing information and aligning values with partners, suppliers, customers and other possible stakeholders. Additionally, collaborative consumption, a key aspect of the larger socio-cultural sharing economy movement, is not always associated with sustainability (Barnes and Mattsson, 2016; Lang and Armstrong, 2018), which may hinder the positive impacts of sustainable business models in the fashion industry.

After these values and practices are infused in a business model, the third step involves the Technological Innovation trend. The adoption of technological drivers requires specific knowledge about methods and technologies as well as investment in technical resources and assets. As a result, advancing to this step may require external funding and a perspective of rapid growth in operations scale. Finally, a sustainable fashion business model

may advance in the Consumer Awareness trend, which already seems to be a great challenge for the studied companies given the scores in this area and the lack of familiarity of the interviewed people with this topic. Reaching this level of maturity in business model sustainability may require a strong brand associated with sustainability values, which again points to larger, established companies further along their growth trajectories.

3.5 CONTRIBUTIONS OF THIS STUDY

This research systematized results from an empirical study about sustainability actions aiming to quantitatively analyze fashion case studies. For that, sustainability intensity scales for fashion business were created, thus enabling the analysis of the cases given the theory presented by Todeschini et al. (2017). As a result, a pathway to guide fashion business wishing to develop and implement a sustainable and innovative business model in the fashion industry was proposed.

Among the conclusions, it is emphasized that the studied cases already incorporate many drivers of Circular Economy and Social Responsibility. These concepts are largely diffused among the analyzed cases because they have been discussed for a longer time than the other trends and because they embrace activities of relatively easy implementation that do not require large investments in technical resources and specific knowledge. On the other hand, there seems to be a widespread lack of knowledge and resources to advance in technology drivers and a small number of initiatives that make intensive use of consumer education and awareness drivers.

A contribution to the conceptual model of Todeschini et al. (2017) used as the basis for the application of the scales was generated during the assessment of the cases: as many of the cases had natural raw materials concomitant with vegan ones, an adaptation of the initial model was made, adding the natural characteristic to the driver that initially considered only sustainable innovations with more strict vegan characteristics. Thus, the application of the model using scales for real cases allowed an improvement of the model for future applications.

As a limitation of the study, we highlight the use of a convenience sample of companies for the application of the scales. Despite this, some implications can be generated

from the results obtained. Fashion entrepreneurs can use the insights generated in the research to analyze how much their business has been addressing the themes summarized in the sustainability drivers and trends using the examples of the 21 companies studied. We suggest that future research proceed with a similar empirical evaluation of cases using a representative sample of a country, region or business population so that the results can be generalized, thus providing a true map of sustainable and innovative fashion business models.

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3.7 APPENDIX

3.7.1 Appendix A – Correlation index between characteristics and drivers

<i>Characteristics x Drivers</i>	<i>Production resources</i>	<i>What is sold</i>	<i>It began as a startup?</i>	<i>Operation scale</i>	<i>Technological intensity</i>	<i>Value chain orchestration</i>	<i>Consumption stage</i>
<i>Recycling</i>	0.34	-0.22	-0.19	0.07	0.24	0.33	-0.22
<i>Vegan / Natural</i>	-0.16	-0.26	-0.24	-0.47	-0.14	-0.18	-0.26
<i>Upcycling</i>	0.34	-0.12	0.14	0.37	0.00	0.02	-0.12
<i>Sweatshop Free</i>	0.15	-0.49	-0.30	-0.25	-0.03	-0.03	-0.49
<i>Fair Trade</i>	0.04	0.20	-0.07	0.31	-0.03	0.34	0.20
<i>Locally Sourced</i>	-0.21	-0.27	-0.20	-0.36	-0.19	-0.22	-0.27
<i>Fashion Library</i>	-0.47	0.98	0.29	0.02	-0.06	-0.04	0.98
<i>Second Hand</i>	-0.34	0.70	0.17	0.27	0.14	0.17	0.70
<i>Collaboration</i>	0.20	0.00	-0.11	0.15	0.10	0.37	0.00
<i>Techn. and Sust. Raw Materials</i>	0.29	-0.17	0.54	0.29	0.63	0.16	-0.17
<i>Zero Waste</i>	-0.02	-0.16	0.15	-0.02	-0.05	-0.21	-0.16
<i>Wearables</i>	0.31	-0.16	0.51	0.31	0.62	0.19	-0.16
<i>Capsule Wardrobe</i>	-0.02	0.26	0.15	-0.02	0.17	-0.01	0.26
<i>Lowsumerism</i>	-0.14	0.30	0.14	-0.36	-0.01	-0.09	0.30
<i>Slow Fashion</i>	-0.29	-0.02	-0.26	-0.43	-0.26	-0.18	-0.02

3.7.2 Appendix B – Correlation index among drivers

<i>Drivers x Drivers</i>	<i>Recycling</i>	<i>Vegan / Natural</i>	<i>Upcycling</i>	<i>Sweatshop Free</i>	<i>Fair Trade</i>	<i>Locally Sourced</i>	<i>Fashion Library</i>	<i>Second Hand</i>	<i>Collaboration</i>	<i>Techn. and Sust. Raw Materials</i>	<i>Zero Waste</i>	<i>Wearables</i>	<i>Capsule Wardrobe</i>	<i>Lowsumerism</i>
<i>Vegan / Natural</i>	0.32													
<i>Upcycling</i>	-0.12	-0.25												
<i>Sweatshop Free</i>	0.31	0.32	-0.34											
<i>Fair Trade</i>	-0.28	-0.27	0.55	-0.38										
<i>Locally Sourced</i>	0.08	0.80	-0.11	0.23	-0.05									
<i>Fashion Library</i>	-0.24	-0.28	-0.03	-0.49	0.18	-0.30								
<i>Second Hand</i>	-0.16	-0.19	-0.17	-0.34	0.26	-0.20	0.69							
<i>Collaboration</i>	0.00	0.03	0.55	-0.18	0.82	0.10	0.00	-0.01						
<i>Techn. and Sust. Raw Materials</i>	-0.14	-0.17	-0.21	-0.15	-0.22	-0.17	-0.18	-0.12	-0.17					
<i>Zero Waste</i>	-0.15	-0.12	0.32	0.02	-0.22	-0.18	-0.03	-0.12	-0.08	-0.11				
<i>Wearables</i>	-0.15	-0.17	-0.21	-0.15	-0.22	-0.18	-0.17	-0.12	-0.17	1.00	-0.11			
<i>Capsule Wardrobe</i>	-0.15	-0.17	-0.16	-0.33	-0.22	-0.18	0.24	-0.12	-0.08	0.44	-0.11	0.45		
<i>Lowsumerism</i>	0.07	0.02	-0.22	0.03	-0.16	-0.15	0.28	-0.16	0.00	0.19	-0.18	0.20	0.20	
<i>Slow Fashion</i>	0.01	0.00	-0.22	0.09	-0.17	-0.13	-0.04	-0.15	-0.07	-0.14	0.10	-0.13	0.10	0.57

3.7.3 Appendix C – Correlation index between characteristics and trends

<i>Características x Tendências</i>	<i>Circular Economy</i>	<i>Social Responsibility</i>	<i>Sharing Economy</i>	<i>Technological Innovation</i>	<i>Consumer Awareness</i>	<i>Production resources</i>	<i>What is sold?</i>	<i>It began as a startup?</i>	<i>Operation scale</i>	<i>Technological intensity</i>	<i>Value chain orchestration</i>
<i>Social Responsibility</i>	0.51										
<i>Sharing Economy</i>	-0.08	0.17									
<i>Technological Innovation</i>	-0.31	-0.36	-0.23								
<i>Consumer Awareness</i>	-0.23	-0.31	-0.11	0.10							
<i>Production resources</i>	0.22	-0.07	-0.27	0.29	-0.25						
<i>What is sold?</i>	-0.34	-0.21	0.75	-0.18	0.17	-0.51					
<i>It began as a startup?</i>	-0.12	-0.29	0.15	0.56	-0.07	-0.03	0.23				
<i>Operation scale</i>	-0.06	-0.11	0.25	0.29	-0.42	0.62	-0.02	0.18			
<i>Technological intensity</i>	-0.05	-0.16	0.12	0.63	-0.12	0.42	-0.08	0.63	0.55		
<i>Value chain orchestration</i>	-0.04	0.08	0.28	0.14	-0.15	0.51	-0.01	-0.02	0.63	0.60	
<i>Consumption stage</i>	-0.34	-0.21	0.75	-0.18	0.17	-0.51	1.00	0.23	-0.02	-0.08	-0.01

4 CONSIDERAÇÕES FINAIS

Nesta seção são apresentadas as conclusões e implicações da pesquisa, assim como sugestões de trabalhos futuros.

4.1 CONCLUSÕES E CONTRIBUIÇÕES

Esta pesquisa buscou identificar mecanismos de inovação sustentável para negócios de moda e apontar soluções sobre como esses fatores podem ser aplicados em empresas do setor. Para isso, o trabalho foi dividido em duas grandes etapas. Na primeira etapa (artigo 1), foram estabelecidos drivers de inovação sustentável para a indústria da moda, apresentando aplicações e apontando desafios e oportunidades para o setor. Esta etapa contemplou os três primeiros objetivos da pesquisa: (i) avaliar como ocorrem as inovações em sustentabilidade no setor; (ii) de que maneira elas se manifestam para o mercado; e (ii) identificar em nível agregado oportunidades e desafios que tipicamente influenciam o sucesso de modelos de negócio inovadores e sustentáveis na indústria da moda.

Já na segunda etapa (artigo 2), foi realizada uma análise com viés tanto qualitativo, uma vez que gerou estudos de casos, como quantitativo, por transformar as atividades de cada negócio em escalas de inovação sustentável e gerar análises de correlação entre os casos analisados. Com isso, a segunda etapa da pesquisa contemplou o quarto objetivo específico: (iii) gerar uma análise quantitativa de inovação sustentável em empresas da indústria da moda.

De maneira geral, o artigo 1 buscou apresentar o estado da arte sobre inovação em modelos de negócios sustentáveis na indústria da moda. Iniciando por uma revisão sistemática da literatura, complementada com entrevistas a especialistas e consultas em sites especializados, conseguiu-se gerar um framework de tendências e direcionadores de inovações neste assunto. A partir disso, foram realizados oito estudos de casos em startups brasileiras e italianas a fim de demonstrar como esses conceitos são aplicados na prática. Por fim, foram apontados desafios e oportunidades para negócios que buscam a sustentabilidade no setor da moda.

Já o artigo 2 buscou analisar casos de empresas que utilizam os *drivers* apontados no artigo 1 numa análise quantitativa. Essa análise foi baseada em uma escala de inovação sustentável relacionada a práticas do mercado em que esses negócios estão inseridos. Os resultados gerados mostram que as empresas analisadas já incorporam conceitos relacionados à Economia Circular e à Responsabilidade Social, que são abordagens consideravelmente mais difundidas do que as demais. Como contribuições, um framework de caminho ilustrativo para a sustentabilidade foi gerado a partir dos resultados obtidos e uma adaptação do modelo gerado no artigo 1 foi apresentada.

De maneira geral, pode-se afirmar que esta pesquisa contribuiu para a estruturação de um corpo de conhecimento antes disperso sobre os temas de inovação, modelagem de negócios e sustentabilidade dentro do contexto da indústria da moda. Ao conectar conhecimentos teóricos e empíricos, a relação entre academia e mercado fica mais próxima e mais se consegue contribuir com a realidade de empresas que vêm trabalhando neste tema e com o desenvolvimento de seus negócios.

4.2 IMPLICAÇÕES E SUGESTÕES DE PESQUISAS FUTURAS

Esta pesquisa aponta algumas implicações para o cenário explorado. Inicialmente, percebe-se que a maneira como empresas incumbentes e *born sustainable* se comportam em relação à sustentabilidade é diferente. Decisões de negócio são tomadas considerando diferentes premissas para os dois casos, o que gera efeitos distintos na operação do modelo de negócio de cada caso. Em função disso, os modelos *born sustainable* têm maior facilidade em manter valores associados à sustentabilidade no negócio. Além disso, percebe-se que os incumbentes têm maior rigidez na tomada de decisões, fazendo isso de maneira mais cautelosa e em uma pequena parcela do negócio, enquanto os *born sustainable* conseguem agir de maneira mais rápida em direção à sustentabilidade.

Uma segunda implicação refere-se à cadeia de valor. Por ser um setor com operações fortemente horizontais, identificou-se que aquelas empresas que buscam ser mais sustentáveis precisam se conectar a parceiros com os mesmos princípios. Além disso, a verificação de práticas adotadas na sua cadeia de valor e o tema de rastreabilidade se apresentam cada vez mais como uma necessidade neste setor, impulsionada pelo comportamento das novas gerações.

Além disso, o segundo artigo aponta para uma maior facilidade por parte das empresas em aplicar conceitos relacionados à Economia Circular e Responsabilidade Social do que aqueles relacionados às demais tendências. Essas evidências sugerem que há ainda uma lacuna para o desenvolvimento de iniciativas relacionadas a tecnologias, colaboração e consciência do consumidor. Esta lacuna, por um lado, pode ser motivada pela falta de interesse das empresas em despertar a consciência do consumidor, o que os levaria para um movimento contrário ao atual *fast fashion* empregado pela maior parte das empresas do setor.

Por outro lado, questões relacionadas a tecnologias e colaboração parecem não estar sendo explorados por falta de conhecimento das empresas sobre como gerar soluções nessas áreas, ou mesmo por falta de aceitação por parte do público consumidor. Nesse contexto, ainda se percebe uma distinção entre negócios escaláveis e sustentabilidade, num cenário em que sustentabilidade remete a modelos artesanais de produção. Para se tornarem escaláveis, os negócios analisados enfrentam uma significativa barreira de entrada relacionada ao conhecimento de e investimento em tecnologias de produto e da informação, além da natural desvantagem competitiva em relação aos incumbentes. Este cenário ilustra a importância de um ecossistema de negócios voltado à criação de um relacionamento entre incumbentes e negócios *born sustainable*. Neste sentido, um ambiente de compartilhamento entre negócios facilitaria o compartilhamento de conhecimento e recursos e o estabelecimento de esforços colaborativos que viabilizassem o processo de experimentação de modelos de negócios e por conseguinte o processo de inovação. Com isso, alianças de colaboração entre esses atores numa estrutura de inovação aberta seria benéfica para a indústria como um todo.

Para pesquisas futuras, sugere-se uma maior exploração das grandes tendências identificadas e sua relação com a sustentabilidade na indústria da moda, gerando pesquisas aprofundadas sobre como essas tendências podem gerar efeitos mensuráveis em questões sociais e ambientais. Outra sugestão relacionada à primeira etapa da pesquisa seria a análise de casos que, no futuro, venham a atender as expectativas levantadas nos desafios e oportunidades em sustentabilidade para a moda.

O trabalho realizado na segunda etapa pode ser complementado com uma quantidade ainda maior de casos, seguindo os padrões de um formato de *case survey*. Além disso, sugere-se realizar uma análise contemplando uma amostra representativa de uma região ou país, como forma de possibilitar que outros negócios consigam alinhar suas estratégias com base

em um resultado generalizável. Estudos como este poderiam servir como direcionadores para a criação de políticas públicas para o setor.

Além disso, sugere-se que estudos futuros apresentem iniciativas e possibilidades de educação em sustentabilidade para toda a cadeia de valor de moda, desde a educação do consumidor (já abordada nesta dissertação), mas também voltada a empresários, colaboradores e um esclarecimento para a cadeia como um todo sobre como evoluir neste aspecto. Neste sentido, poderiam ser exploradas dificuldades cognitivas no processo de evolução para uma moda mais sustentável, abordando vieses individuais que dificultam a adoção de valores sustentáveis.

Esta pesquisa buscou explorar conceitos relacionados à sustentabilidade e não tem a intenção de entregar respostas definitivas às questões de inovação sustentável para negócios de moda. Tem, por outro lado, a intenção de criar pensamento crítico por parte do leitor a fim de analisar o seu contexto, tanto no papel de academia, como no de negócio e como consumidor, e com isso gerar atitudes mais conscientes dos impactos que cada um gera ao estabelecer uma relação de compra e venda na indústria da moda. Espera-se, por fim, que esta pesquisa possa contribuir para o desenvolvimento de negócios de moda que buscam alternativas com menores impactos sociais e ambientais ao mesmo tempo em que geram desenvolvimento e prosperidade à sua comunidade, *stakeholders* e ambiente envolvido.