



Universidade do Minho
Escola de Engenharia

Creative Collaborative Circular Economics, Exponential System Design for Sustainability in Fashion Design

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Design de Moda

(3rd cycle of studies)

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**Creative Collaborative Circular Economics,
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Esta tese de doutoramento está escrita sobre forma de compilação de artigos com obras e conjunto de obras. Os artigos estão apresentados no formato original.

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**Creative Collaborative Circular Economics,
Exponential System Design for Sustainability in Fashion Design**

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Dedication

I dedicate thesis to my husband Paulo Timm, who is the most important person in my life. He gave me the opportunity to study, always encouraged me and motivated me. No doubt he is the best teacher with wide intellectual scope.

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To those I did not mention, I apologize and wish this work to be a contribution to society in favour of a more sustainable environment.

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Preface

"We are faced with environmental goals and challenges that require great involvement and a strong commitment from the business sectors, academia, civil society, as well as institutional partners, integrating differentiated territorial approaches. Only in this context of partner can one be able to overcome the challenges that arise in the near future (Carlos Manuel Martins, Secretary of State for the Environment Portugal, Circular Europe Network, Sd.p.5)".

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Abstract

The general objective of the thesis is to “systematize an integrative model with approaches and contributions from design to sustainability aiming to raise responsiveness and awareness among fashion design students and local communities about the conscious and sustainable production and consumption of fashion product”.

This thesis fits in the area of design, especially in the applicability of the multidisciplinary way of thinking, creativity, empathy and experimentation that is part of the design thinking methodology with the consumer as the starting point and centre of attention, and its interrelations with social innovation, environmental sustainability, fashion design considering the entire life cycle of products, services and systems.

Undergraduate and Master of Fashion Design students at the University of Beira Interior develop collection projects and the (coordinated) clothes are kept in a closed warehouse, only eventually attending some events. Thus, the following opportunities were perceived: (i) Environmental Dimension: Promote a better designation and destination for these clothes; (ii) Collaborative Economy: Reuse through a new P2P business model; (iii) Social innovation: Sensitize and make society aware of new business models, contributing to and increasing the importance of the designer in the way of thinking and seeking creative solutions to social and environmental problems.

What could one do with these practically stored clothes without public accessibility? Here are the reasons for a proposal to implement a new business model in Covilhã, Portugal. This thesis proposes the business model “**Exponential System Design for Sustainability in Fashion**” that can be called **Exponential** since it is **scalable and modular**, collaborative and sustainable services in fashion products. It may be replicable in its entirety, or in parts, in other places and contexts, adopting modularity as an adaptive resource.

Initially identifies whether the perceived barriers to traditional Portuguese consumer behavior. But, for the new generation is a matter of awareness, as Portugal is also receiving influences from other cultures.

Accelerating sustainable development requires a paradigm shift in terms of the production process in order to migrate from a linear to a circular economy. This comprises changing habits, mindsets and methods rooted in society.

So far in terms of territorial innovation, there is no knowledge of business models that replace access property with the stated characteristics.

Keywords: Circular Economy, Collaborative Creative Economy, Exponential System Design, Sustainable Business Model

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Resumo

O objetivo geral da tese consiste em “sistematizar um modelo integrador com abordagens e contribuições do design para a sustentabilidade visando promover a sensibilização e conscientização dos estudantes de design de moda e das comunidades locais, sobre a produção e o consumo consciente e sustentável do produto de moda”.

Esta tese insere-se na área do design, especialmente na aplicabilidade do modo de pensar multidisciplinar, criatividade, empatia e experimentação que faz parte da metodologia *design thinking* tendo o consumidor como ponto de partida e centro de atenção, e nas suas inter-relações com a inovação social, sustentabilidade ambiental, design de moda considerando todo o ciclo de vida de produtos, serviços e sistemas.

Os alunos da licenciatura e do mestrado em Design de Moda na Universidade da Beira Interior desenvolvem projetos de coleção e as roupas (coordenados) ficam guardadas num armazém fechado, vindo só eventualmente a participarem em alguns eventos. Assim, percebeu-se as seguintes oportunidades: (i) Dimensão Ambiental: Promover uma melhor designação e destinação para essas roupas; (ii) Economia colaborativa: Reutilização através de novo modelo de negócio P2P; (iii) Inovação social: Sensibilizar e conscientizar a sociedade para novos modelos de negócio vindo a contribuir e ampliar a importância do designer no modo de pensar e de buscar soluções criativa para os problemas socioambiental.

O que se poderia fazer com estas roupas praticamente armazenadas sem a apreciação do público? Eis aí as razões para uma proposta de implantação de um novo modelo de negócio em Covilhã, Portugal. Esta tese propõe o modelo de negócio “**Design de Sistema Exponencial para a Sustentabilidade na Moda**” chamamos de **Exponencial por ser escalável e modular**, com prestação de serviços eco-eficientes, colaborativos e sustentáveis em produtos de moda. Ele poderá ser replicável na sua totalidade, ou por partes, em outros lugares e contextos, adotando-se, para isso, a modularidade como recurso adaptativo. Inicialmente identifica se as barreiras percebidas ao comportamento do consumidor português tradicional. Porém na nova geração é uma questão de conscientização, Portugal também está a receber influências de outras culturas. Acelerar o desenvolvimento sustentável requer uma mudança do paradigma em termos do processo produtivo, a fim de migrar de uma economia linear para uma economia circular. Trata-se de mudar hábitos, mentalidades e métodos enraizados na sociedade.

Até o momento em termos de inovação territorial não há conhecimento de modelos de negócios que substituam a propriedade de acesso com estas características.

Palavras-chave: Economia Circular; Economia Criativa Colaborativa; Design de Sistema Exponencial; Modelo de Negócio Sustentável;

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List of Acronyms and Acronyms

CEC	Comission for Environmental Cooperation
COP21	World Climate Summit 2015, Paris
ECO-92	Earth Summit, the Rio Summit, 1992 Rio de Janeiro
EDF	Environmental Defense Fund
ESA	Endangered Species Act
GEF	Global Environmental Facility
EU	European Union
EU2020	European Strategy 2020
UBI	Universitu of Beira Interior
MUDE	Fashion Design Museum
NAFTA	North American Free Trade Agreement
NEPA	National Environmental Policy Act
NORTE 2020	North Strategy Plan 2020
NU	United Nations
ONGS	Non-Governmental Organizations
PCSD	President's Council for Sustainable Development
UNCTAD	United Nations Conference on Trade and Development
G7	Group of Seven

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1. Introduction

1.1 Background

The concept of sustainability went through a long political and academic trajectory until it was established in 1992. It means an advance in the face of traditional ideas of conservationism, which advocated the preservation of natural resources in the face of progress. The 1960s are considered to be the milestone of this change.

In 1962, Rachel Carson published "Silent Spring". In this book, she presented concrete results of investigations in toxicology, ecology and epidemiology, alerting to the risks of the use of pesticides. In the following year, another study, which would last for ten years, evaluated this same issue, becoming the cornerstone of environmentalism as a science, due to the enormous amount of information collected.

In 1967, the EDF (Environmental Defense Fund) was created in the United States, which would warn of the need for legal restrictions in the face of environmental damage. Another important book in this process was the "Population Bomb", which highlighted the close relationship between the human population, natural resources and the environment.

Following, in 1968, the "Club of Rome" was created, led by the Italian industrialist Aurélio Peccei, the Scottish scientist Alexander King and 36 other renowned professionals. They looked at the impact of population growth and the industrial economy on natural resources, which was vertiginous in the 20th century.

All these initiatives started to have repercussions in the media and in society, contributing to create movements and even Green Parties, in protection of the Planet.

In 1969, for example, a group of activists founds "*Friends of the Earth*", a non-profit organization dedicated to protecting the planet from environmental, biological and cultural degradation, and improving citizens' ability to have a say in issues and decisions that affect the environment. This initiative will be followed soon, in 1970, with the involvement of 20 million people, of Earth Day. And the following year, *Green Peace* was born in Canada, a civilian NGO with a strong presence in the environmental struggle to the present day.

The 1970s, a milestone on the environmental issue, was also a decade of major environmental catastrophes, such as the oil leak from the *Amoco Cadiz* ship and the leak

from the *Three Mile Island* nuclear power plant, both in the United States, with wide repercussions in the world press.

Still in 1969, the United States ratified the NEPA (*National Environmental Policy Act*). This was the first environmental legislation created on a public policy, duly institutionalized at the state level, of regulation and protection of the environment.

In 1971, another important Report: "*Founex Report*", articulated the development strategies with the preservation of the environment and pointed out that the major environmental problems resided not so much in consumption, but in poverty and underdevelopment.

The same approach appears in the book by Rene Dubos and Barbara Ward, "*Only One Earth*", which, despite the seriousness of the problems presented, pointed to its administration since it was shared towards a possible common future for the planet.

This sensitized several countries, summoned by the UN, to meet at the Stockholm Conference in 1972, under the leadership of Maurice Strong. International awareness of the environmental crisis was born, with the creation of the UNEP (*United Nations Environment Program*) around the concept of sustainable development.

In 1973, the Club of Rome surprises the world with the publication of "*Limits to Growth*", suggesting the inevitability of a stagnation of growth due to the demographic pressure on natural resources. The Report is openly criticized for ignoring the benefits of technology on agricultural production and for trying to undermine expectations of greater consumption in the poorest countries.

The Club of Rome Report, associated with the oil crisis, in the same year, which was already beginning to point to the end of the era of oil and fossil fuels, increases the debate by elevating the state of the art on environmental matters.

In 1973, several initiatives appear: the EEAP (*European Environmental Action Programme*) was created in the European Economic Community, lobby of the European Union, while the United States launched the ESA (*Endangered Species Act*) with a view to the preservation of endangered species. In India, the Chipko Movement is born, against deforestation and environmental degradation. In Brazil, SEMA - Special Secretariat for the Environment - is created, linked to the Federal Government, today the Ministry of the Environment, Water Resources and the Amazon - MMA, with one of the most advanced environmental legislation in the world.

Since then, environmental activism has spread worldwide, involving women's and youth organizations.

Then, a phase of specific studies on the environmental issue opens, of great activism and expansion of the press in its defense. Important points in this process are the creation in 1975 of the *World Watch Institute*, aimed at publicizing the environmental conditions of the planet and, in 1977, the "*Greenbelt Movement*" was founded in Kenya, a community dedicated to planting trees in the fight against desertification of the African continent, which is the subject of this year's United Nations Conference on Desertification. In the line of studies, the most important, in 1974, was the study on CFC (Chlorofluorocarbon) in the journal *Nature*, showing, with empirical evidence, the decrease in the ozone layer in the atmosphere, with increasing risks of skin cancer. In the same year, the *Bariloche Foundation* publishes "*Limits to Poverty*" in response to "*Limits to Growth*", from the Club of Rome, in a call for equality for the Third World response.

A long decade of 80, which will culminate in 1992, at the Eco-92, opens, already inflamed by the growing awareness of the evil of the century. This decade saw the largest nuclear accident in history, Chernobyl, in the Republic of Ukraine, formerly the USSR (Union of Soviet Socialist Republics). The great famine in Africa and the gas accident in the Carbide Union in India complete the horror scenario at the end of the century. A set of initiatives follows.

In 1980, IUCN (*International Union for Conservation of Nature*) was born, the "*World Conservation Strategy*", which defines development as "the modification of the biosphere and the application of human, financial, living and non-living resources to meet human and improve the quality of life" and calls for a new international development strategy with the following objectives: to balance inequalities, leading to a more dynamic and stable world economy, stimulating and accelerating economic growth. Following, a multitude of events, arise:

1980 - Independent Commission for International Development publishes "*North-South, a Program for Survival*", mindful of North-South relations.

1980 - President Jimmy Carter, in the United States, authorizes studies that lead to the "*Global 2000*" report, in which threatened biodiversity is recognized as a critical characteristic for the functioning of the planetary ecosystem.

1982 - The UN publishes the "*United Nations World Charter for Nature*", which highlights the importance of the individual as a unique and only way of life. In the same year, the United Nations published the "*UN Convention on the Law of the Sea*" aimed at protecting the oceans.

1983 - Australia adopts the "*National Conservation Strategy*" to implement the objectives of the *World Conservation Strategy* and the "World Commission on

Environment and Development" is created, directed by the then Prime Minister of Norway Gro Harlem Brundtland, which points to the interrelationship between social, environmental, economic and cultural issues.

1984 - The *World Watch Institute* publishes the first "*State of the World Report*", focused on changes in natural resources and their impact on the economy, with a warning: "we are living beyond our resources, borrowing from the future".

1984 - The first concerns about global warming appear, while the hole in the ozone layer in Antarctica is discovered, relating to, according to a meeting of scientists in Villach, Austria, the growth of carbon dioxide and other greenhouse gases in the atmosphere.

1985 - Publication of the book "*Our Common Future*", by the Brundtland Commission, in which a direction for the comprehensive solution of environmental problems is indicated, while disseminating the term "sustainable development".

1987 - The Montreal Protocol is signed, dealing with substances that affect the planet's ozone layer.

1988 - The "*Inter Governmental Panel on Climate Change*" - IPCC - is established with three working groups (socioeconomic, technical and scientific) on climate change warning about the importance of reducing the emission of the main greenhouse gas (CO₂ - carbon dioxide). Two years later, the IPCC informs and warns about the importance of reducing the emission of this main greenhouse gas. In 1995, the IPCC gives a new notice to scientists warning about the first empirical evidence of climate change. After all, this body will play a central role in the issue of sustainability, when publishing its 4th IPCC Report 2007 - in which it states that the Earth's temperature cannot rise more than 2° C. In the year of 1988 is also founded the "Centre for Our Common Future" in Geneva, aimed at monitoring the "Brundtland Report".

The 90's would be the consecration of the concept of sustainable development, which took place in 1992, at the "Earth Summit", when Eco 92, the "UN Conference on Environment and Development - UNCED" is held in Rio de Janeiro. In this, 172 countries met, gathering 108 heads of state and 2,400 civil society representatives.

As a result, Agenda 21, the Convention on Biological Diversity, the Guide to Climate Change and the Rio Declaration are published, with the forum of non-governmental organizations signing a set of parallel treaties resulting on 27 principles to guide countries in their Sustainable Development policies.

Still in 1992, the "Earth Council" was created, to act as a focal point for the implementation of Eco-92 and as a link between the various national councils related to sustainable development.

1993 - Vienna, Austria, hosts the World Conference on Human Rights. In the same year, the USA announced the creation of the PCSD (President's Council for Sustainable Development), while the United Nations continued its activity with the holding of the first meeting of the United Nations Commission for Sustainable Development and the World Conference on Human Rights.

1994 - International Conference on Population and Development is held in Cairo, Egypt. While the NAFTA (North American Free Trade Agreement) starts to function, it establishes the CEC (Commission for Environmental Cooperation). The GEF (Global Environmental Facility) is created, which gives to developing countries more decision-making power.

1995 - UN organizes the World Summit on Social Development in Copenhagen, Denmark when, for the first time, the international community takes responsibility for the issue of eradicating absolute poverty. And in the same year, the WTO (World Trade Organization) is created, which is a formal recognition of the relationships between trade, development and the environment. And in September, in Beijing, China, the IV World Conference on Women is taking place, an important step towards the incorporation of the gender issue in the agenda of development and human rights.

1996 - United Nations Conference on Human Settlements (Habitat II) takes place in Istanbul, Turkey. In this year, Bolivia hosted the Americas Forum on Sustainable Development, which highlights the importance of incorporating the southern hemisphere into the sustainability agenda. Again, in this same year, the ISO 14001 standard is now used as a tool for environmental management at the corporate level, that is, companies begin to commit to sustainability, incorporating it into quality requirements.

1997 - Signature of the Kyoto Protocol, ratified by Brazil on April 29, 1998.

At the end of the century, the successive peripheral economic and financial crises ended up culminating in the great crisis of 2008, with global, wide-ranging and persistent repercussions. Economic growth slows down, unemployment expands and uncertainty surrounds the globalized world again, reissuing the 1930s.

Ecological accidents are occurring, while climatic phenomena are at the centre of concerns about the planet's sustainability. Phenomena identified as La Niña and El Niño stroke the affected countries with severe winters, unusual storms and scorching

summers. A landmark of this concentration of attention on the climate was the publication, in 2007, of the 4th report of the IPCC - Intergovernmental Panel on Climate Change, an organ that gathers scientists specialized in the world's climate - in which they affirm that the Earth's temperature cannot increase any more than 2°C by the end of this century, in relation to the pre-industrial era, or climate changes will be catastrophic.

These factors had already motivated, in 1998, the Kyoto Protocol, not signed by the USA, a commitment by several nations to reduce the emission of gases and which followed in two other International Conferences: COP 15, in Copenhagen, of limited results and COP 21 in Paris, a little more encouraging, due to the greater involvement of USA and China, the two biggest polluters on the planet.

In this context, marked by the impact of a global scenario altered by the 2008 crisis and the failure of the Climate Convention in 2009 (COP-15) and in the Commission on Sustainable Development (CSD 19), in 2012 is held the “Rio + 20”, proposed by the current President of Brazil at the time, Lula da Silva, still in 2007 and convened by the UN on 12/24/2009. After years of decline, poverty, hunger and undernourishment were on the rise again and the hope of achieving the Millennium Development Goals by 2015 was threatened: one third of the world's population continued to live on less than 2USD a day. This issue, of the imperative need to eradicate poverty and social inequalities in the world, associated with the creation of new instruments of Governance for the transition to a Green Economy, dominated “Rio + 20”.

“If Rio-92 showed that economic security and human well-being depend outstandingly on healthy ecosystems and strengthened the notion of the need for global political agreements to promote the transition towards Sustainable Development, on the other hand progress has been slow in the last 20 years and insufficient in the materialization of such agreements in concrete actions to protect the planetary environment”. (RadarRio+20, 2011, p. 17)

The failed 1998 Kyoto Protocol, however, had its positive effect at the 2015 Paris Meeting of the United Nations on Climate Change (UNFCCC) and the Union European. At this meeting, the 21st Conference of the Parties (COP21), hopes were renewed that government awareness would assume greater responsibility for what has been called Climate Change on the Planet, the cornerstone of any advance in sustainability. One of the main objectives is to ensure that global warming remains “below 2°C”, restraining

the increase in temperature to a maximum of 1.5 °C respecting to the one observed before the industrial era.

According to Ban Ki-moon, UN Secretary-General, COP21, in 2015, it was the first time that each country in the world has committed itself to reducing emissions, in unison in defense of the climate and the salvation of the planet. The sustainability of the planet, between advances and setbacks, navigating between unimaginable economic crises, terrifying environmental disasters and growing instability in a world marked by intolerance, is thus establishing its emblematic signature in the 21st century. From these tensions, efforts to implement the recommendations for sustainable development reappear, conditioned, on the one hand, by the major international initiatives in the defense of the climate and the elimination of poverty in the world, on the other, by the advances in each country of the microphysics of sustainability in projects specific to Government, business corporations and NGOs, associated with scientific and technological development for changes in the direction of the planet, for which it is urgent to move forward in a new and cleaner energy matrix, simultaneously with solidarity actions for the development of the creative and collaborative economy, alternatives to the neoliberal mainstream. The latter constitute the indispensable counterpoint of society to global efforts, settled in high-level agreements such as “Rio 92” and “COP 21”. These actions refer to education for changing paradigms about production, trade and consumption of goods and services and reinforce the cooperative dimension of individuals in a sustainability strategy. These are already inscribed, in a way, in the technological changes introduced by the industrial revolution of electro-electronics, which changed the profile of work and the requirements for its performance in an era of post-industrial quality. Large cities outsource around the increase in services to generate jobs and income. The education, health and information complexes have acquired greater importance, culture has become a major segment in the economy of the most developed countries.

“Designers would not be oblivious to this historical process of modelling the future and would come to realize that sustainable development was a basic criterion that should now be integrated into any project. They were bound to incorporate the simultaneous parameters of effectiveness, equity and planetary balance in their creation”, as Faggiani maintains (2000, p. 104)

Therefore, between global efforts and singular initiatives that reinforce the paths towards a better and more sustainable world, in order to shelter the next generations, the Planet's sustainability process advances.

This research in Fashion Design is part of the sustainability area, within the scope of social innovation, with the line of research in circular economy, focusing on Collaborative Creative Economy.

The term sustainable development started to be used in 1987, by the United Nations World Environment and Development Commission with the publication of the report "*Our Common Future*", through the so-called Brundtland Commission that defined it: the development that aims to meet the needs of the present without compromising the ability of future generations to encounter their own needs.

The concept of sustainability was enshrined in the International Meeting on the Environment, convened by the United Nations, at (Eco-92), held in Rio de Janeiro, Brazil in 1992, constituting a strategic step for the survival of life on the planet, after of the Industrial Era. The specific commitments made therein include three conventions: on Climate Change, on Biodiversity and a Declaration on Forests. The Conference also approved documents with broader objectives and of a more political nature: the Rio Declaration and Agenda 21. Both endorse the fundamental concept of sustainable development, which combines economic and social progress with the need for greater ecological awareness. The principle eight of the ECO Declaration 92 says that: "To achieve sustainable development and a higher quality of life to all, countries must reduce and eliminate unsustainable patterns of production and consumption, and promote appropriate demographic policies" (RIO 92, 2012).

Over time, initiatives followed that showed, through various scientific studies, that Climate Change was the cornerstone of any advance in sustainability. Thus, successive international conferences were held with a view to greater control in the emission of air pollutants. Climate change continues to challenge global leadership and the preservation of the human species.

The last climate conference was in 2015, in Paris (COP21). Hopes were renewed to avoid global warming by keeping the temperature at a maximum of 1.5°C above to the one of the industrial era. However, other attentions are added to efforts to control the climate: the issues of population growth and habitat, preservation of biodiversity, innovative technologies and, above all, education for sustainability. One of the global challenges will be to create new economic opportunities and promote a transformation in the use of finite resources.

During G7 France 2019 meetings, 32 leading fashion and textile companies have committed to achieving practical objectives together in the three areas, climate, biodiversity and oceans.

The purpose is to set practical objectives for reducing the environmental impact of their industry. In a historic change, the partnership includes groups and brands in Luxury, Fashion, Sports and Lifestyle, along with suppliers and retailers, all of whom are already involved in separate environmental strategies.

The Fashion Pact's main goals are:

- To stop global warming: by creating and deploying an action plan for achieving the objective of zero greenhouse gas emissions by 2050, in order to keep global warming below a 1.5°C pathway between now and 2100.
- Restore biodiversity: by achieving objectives that use Science-Based Targets to restore natural ecosystems and protect species.
- Protect the oceans: by reducing the fashion industry's negative impact on the world's oceans through practical initiatives, such as gradually removing the usage of single-use plastics.

The Fashion Pact is open to any company that wants to help to fundamentally transform the practices of the fashion and textile industry, and to meet the environmental challenges of our century¹.



Figure 1.1 - Conferences Board

Source: Adapted from Carlo Vezzoli (2018) LeNS in – the Learning Network on Sustainability International in project funded by LeNSin Erasmus+ Programme of the European Union EDIZIONI POLI DESIGN (page 20).

¹ <https://thefashionpact.org/>[accessed in september , 2019]

Table 1.1 - The Problems Caused by Environmental Impacts

ENVIRONMENTAL IMPACT	ENVIRONMENTAL EFFECTS
Global Warming (Greenhouse Effect)	Melting of polar layers, rising sea level, lowland floods Desertification Migration of pathogens
Depletion of the Ozone Layer	Damage of flora and fauna. Increased risk of skin cancer. Deficiencies in the immune system
Eutrophication	Loss of aquatic fauna due to depletion of oxygen. Contamination of groundwater and lakes, resulting in non-potable water. Obstacle to swimming.
Smog	Some organic components (e.g. aldehydes) cause tearing and respiratory irritation. Some substances (e.g. PAN - Acetyl nitrite peroxide) may have toxic effects on plants
Toxic Emissions	Dioxins (TCDD 2,3,7,8 - tetrachlorodibenzo-p-dioxin) cause chronic acne and skin cancer. Inhalation of pyrene and benzopyrene are highly carcinogenic. Lead poisoning (lead poisoning) can cause irreversible neurological effects.
Garbage	The presence of garbage implies: • Pollution of soil and subsoil; • Olfactory pollution; • Risk of explosion in landfills. Trash transport implies: • Fuel consumption; • Noise and air pollution. Marine pollution-Adition by the author
Others	Olfactory pollution. Acoustic pollution. Electromagnetic pollution. Deterioration of the landscape.

Source: Adapted in Carlo Vezzoli (2018) LeNS in – the Learning Network on Sustainability International in project funded by LeNSin Erasmus+ Programme of the European Union EDIZIONI POLI DESIGN (page 29)

In the process of sustainable development, the fashion industry is considered to be one of the most polluting in the world, with the linear life cycle at an accelerated pace due to the ephemeral seasonality of fashion. Fashion industry will have to review its mode of production, while consumers should change their way of consuming. In this context, the new concept of producing and consuming arises based on the circular economy, which has the principle of the three R's (Reduce, Reuse, and Recycle). Within it, it is the Collaborative Economy that

“it refers to the optimization of the use (or even the production) of a product or service through the practice of sharing. Among other aspects, the collaborative economy questions the effectiveness of needs and the necessity of satisfying them through the use of material resources”, according to Circular Europe Network (S.d.p.9).

In the case of a new model of production and consumption, there must be a behavioural change. For this, it is necessary to re-educate society to adopt the requirements of sustainability throughout the chain of production, distribution and consumption of goods. Social innovation takes on a fundamental role in the face of this new challenge:

“We define social innovations as new ideas (products, services and models) that simultaneously meet social needs and create new social relationships, in other words, they are innovations that are both good for society and enhance society's capacity to act (Manzini,2015, p.11)”.

Recently, social innovation has been gaining significance in government policies. Social innovation therefore appears as an alternative possibility to foster social changes and improvements. The topic of social innovation is of such importance today that, in 2013, the European Commission launched the “Guide to Social Innovation”, supported by the “Europe 2020 Strategy”. For the EU, “Social Innovation can be defined as the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations (European Commission, 2013, p.7)”.

In Portugal, the theme of social innovation has an incentive under the “Portugal 2020.” According to “Portugal Inovação Social (2016)”, social innovation accelerates the improvement of responses to community challenges aimed at sustainability and the social economy.

Between global efforts and local initiatives that reinforce the paths towards a better world, the Planet's sustainability process advances.

1.2 Contextualization of the Fashion Problem

According to Bock (2007), the textile industry was classified by the Environmental Protection Agency of the United States of America among the four that most extract natural resources from the environment. Santos (2007) reports the environmental impacts caused in the production system of the textile industry: water is intensely used and receives, mainly through dyeing, many chemical substances; the air is also contaminated with the release of aerodispersoids; the soil ends up being compromised by the accumulation of chips in landfills, in addition to its involvement by the leachate infiltration; the heat, finally, generated in the production process, also becomes a polluting factor, contributing to global warming.

All of these problems became even worse from the 2000s, when fast fashion chains appear with a fast production and consumption rhythm. This, thanks to the reduction in production and distribution time, has enabled the manufacture of fashion products with an increasingly shorter life cycle. Some fast fashion brands even produce more than ten collections annually. According to Fletcher and Grose (2011), fast fashion industrial production is governed by financial results: producing a lot to generate a lot of profits. In addition to environmental problems, social problems caused by the exploitation of cheap labour and poor working conditions in underdeveloped countries (Refosco et al., 2011), such as China, Pakistan, Bangladesh, India, Mexico, Romania, Camboja, and Turkey. Today, European and US legislation no longer allows this type of labour (Lee, 2009). The fast fashion chain generated easy access to the consumption of fashion products at low prices and sales of often up to 70%. As a result, clothing became a disposable product, thus increasing the accumulation of textile residues in the soil. According to Morley (2009), clothes that are not sold are burned. For (Gansky, 2011. P.72) “the discard economy contributes significantly to climate change”. The consumerism of fast fashion products grows every day to the point that the owner of the Inditex group, Amancio Ortega in 2016, was classified by Forbes as the richest man in the world.

The lack of consumer's knowledge about the production system, the use of natural resources and the exploitation of labour contributes a lot to the success of the fast fashion chains. The fast pace of production and consumption of fashion products results in tons and tons of used clothes thrown in landfills. Clothes that go to landfills and, as most of

them are not biodegradable, take more than 200 years to decompose. They emit methane gas, which intensifies global warming. Usually, consumers dispose of the fashion product by throwing it directly in the trash or depositing it in recycling or donation containers. Another issue that contributes to excess purchase and disposal is the change in people's weight, especially women due to hormonal factors.

Many people must imagine that these products are actually going for recycling. But not. The technology for this reuse is expensive and only allows to recycle fibre with 100% composition. Blended fibres, however, like cotton-polyester, need to go through sophisticated chemical processes and are never reused. In Portugal the recycling of yarn clothing has little expression.

According to Brooks (2015), clothes that are deposited in recycling containers, anywhere in the world, are resold in second-hand stores and the profit is applied in humanitarian missions, however, this is not always the case.

In Portugal, according to “Fashion Revolution Portugal”, due to the supply of donated fashion products being greater than the demand, only around 10% remains in the country. The rest is shipped in containers to underdeveloped countries such as: Eastern Europe, Africa and South Asia. And they are sold for negligible prices, there, this process contributes to destroying the local industry, with losses to employment and income of the working populations. In addition, such industries end up forced to produce at a low price for the Western countries. Americans throw away, on average, 70 kilograms per person of textile waste per year. In UK the estimate is 30 kilograms per person annually. In Portugal alone, in 2015, one of the major NGOs working in the gathering of fashion products collected more than 5,000 tons of donated clothes. Here in Portugal, the population is small, but this process is repeated throughout the world. “The impact of this dynamic on ecosystems and workers is at the focus of the sustainability challenge for fashion (Fletcher and Grose, 2011 p.124).” Another challenge is to change the form of production, from linear to circular. This cycle is characterized by the use of resources, production, consumption and disposal for production and consumption in a closed model based on the theory of three Rs (Reduce, Reuse, and Recycle).

Reducing, in the production system, means reducing the expenditure of natural resources, reducing environmental impacts, reducing the use of raw materials by optimizing production with zero waste. According to (Fletcher and Grose, 2011 p.60): “Reuse, restoration and recycling intercept resources destined for landfills and lead them back to the industrial process as a raw material.”

In contrast to *fast fashion*, there is the *slow fashion* movement, which reinforces the concept of circular economy in the production and consumption system. As the name implies, slow fashion encourages the production and consumption system to be slower. For Jung and Jin (2014), slow fashion is a concept that encompasses economic, social and environmental sustainability. It encourages local production, requires the use and valorisation of material resources, proposes more transparent production systems between producers and consumers and slows down the production of durable goods.

Another idea that reinforces the concept of the circular economy is *upcycling*. According to McDonough and Braungart: “A concept that has been gaining importance is upcycling, which means the reuse of a material already used or the residue of a product as it was found, without recycling. (McDonough and Braungart, 2002, p.53).”

Upcycling fashion means using used clothing and accessories and waste to create a new piece of clothing. In this creative process, creativity in design is very important, so that clothing is not associated with hippie fashion. Already several designers have used upcycling fashion even in haute couture. One of the designers using upcycling fashion is Martin Margiela. Others, like Jessica Ogden, Comme des Garçons, also joined.

According to Fletcher and Grose (2011), the fashionable recycling process consists of recovering fabric fibres with mechanical or chemical processes. The chemical process is used in synthetic fibres; the other types of fibres can be recycled by mechanical means. Manzinni and Vezzoli (2008a) approve this path, however, they consider recycling a less ecological alternative, to be used only in the last case, due to the methods followed that imply the consumption of non-renewable sources and a lot of energy.

There are many alternatives for creating a sustainable fashion product: modular clothes and clothes with changes in shape and customization. Both are part of co-design. They allow the user to participate in the final creation according to the personal style and create an emotional relationship between the consumer and the product, increasing their satisfaction and the life of the products.

1.3 Contextualization of Conscious Consumption

“Collect moments, not things.”

Lena, the Fashion Library
slogan of the Dutch Fashion Library²

Conscious consumption refers to the consumer's best judgment in the act of consuming, with a view to reducing environmental impacts. It presupposes consumers' lifestyle changes and requires a greater sense of social responsibility when purchasing, consuming and disposing of any product. The consumer, in this approach, is considered as an important agent of change for a sustainable environment. According to (Rocha, 2012, p.3) “he is the centre of everything, he begins and ends the cycle. The whole machine that makes the world go around, the culture of consumption depends on it”. To this end, this responsible consumer must begin to review his purchase needs, the compulsive consumption. Usually, fashion product purchases are not made out of necessity or to compose any special look. The most frequent is impulse buying, either for its aesthetic appeal or for its low price.

Allwood et al. (2008) suggests that consumers seek information about the environmental impacts and the conditions of workers in the production process of what they buy. He also suggests: buying clothes in a second-hand store, changing and repairing; wash clothes less often. Buy quality and timeless clothes, customize, transform and repair.

One of the factors that most contributes to the accumulation of unusable clothes in the wardrobes - and consequently, their disposal - is the lack of knowledge of their own body style and biotype. Mostly, many women buy a piece because it pleases them in the shopping window and later they realize that it doesn't suit them. Thus, this piece falls out of use. That is, they are not satisfied with the clothes in the wardrobe. In these cases, a style consultant (personal image or *Personal Stylist*) is required, which will play a very important role for conscious consumption. Consumers who know their style and body biotype become more selective at the time of purchase. They start to buy clothes that value their body types and personal styles. Learning to combine the clothes that are already in the wardrobe is also a good practice (Aguiar et al. 2010.)

Another current consumer trend are the fashion libraries. They are based on collaborative consumption. According to Schulte and Lopez (2007), one of the first

² <http://www.ecouterre.com/amsterdams-lena-fashion-library-lets-you-check-out-clothing-literally/lena-fashion-library>. [accessed in december, 2015]

authors to talk about the consumption of shared fashion products, was Carlo Vezzoli in a lecture at the Polytechnic Institute of Milan in 2006. At the time, the author proposed the consumption of shared fashion products. The first idea was a kind of collective laundry in a residential condominium "where people would take care of the maintenance and cleaning of clothes, without each resident having the need for a washing machine and other products (Schulte and Lopez 2007)". The second suggestion was to hire clothes for everyday life, thus being able to wear different clothes without the need to wash, iron and repair (Gansky 2011). In this case, one is talking about "Mesh business," centred on clothes that make the renovation of an old wardrobe, something fun and easy, without the need to buy new clothes. (Gansky, 2011, p.171). Customers pay an association fee, or change clothes unused through an online platform. The fashion library, modateca, roupateca, already exist in several countries, the name changing according to each country.

In Portugal, so far, there are no records of this type of initiatives. In the meantime, there has been a proposal to implement an Exponential System Design for Sustainability business model, with fashion library integration, at the University of Beira Interior.

According to the "Circular Europe Network" shared consumption will cause a real evolution of behaviours, in favour of sustainability, pointing to the substitution of products for services. That is, rent or loan the clothes instead of buying them. This will increase the life of the fashion product and reduce the accumulation of waste in landfills and on the ground.

1.4 Research Questions

From the brief theoretical framework and contextualization linked to the environmental and social problems of the fashion product, the following questions emerged to which this investigation seeks answers:

- How can Fashion Design collaborate in raising the consciousness and awareness of fashion design students and the local community about the production and conscious and sustainable consumption of the fashion product?
- How can the Designer promote social innovation in fashion?

"As designers, we must ask ourselves whether we want to continue designing only one product or whether we prefer to design man; whether we will choose to show our skills, designing a shape, or whether we will use them to design society; if we want to express ourselves through

hedonistic design or if we have a propensity for humanistic design. By strengthening the values connected to "being" and not "having", the priorities of relationships will be changed in a social and productive scope". BISTAGNINO, (*apud* Lima 2013, p.32)

Faced with these questions it is proposed, affirmatively: It is time to act! Manzini (2008) supports this attitude when questioning the role of the designer. According to the author, until then, designers focused on the option of how to design their products in an open cycle. However, designers can start to play a new and important role when designing solutions, not only for products, but for social and environmental problems, thus collaborating in the construction of a sustainable future.

1.5 Research Objectives

1.5.1 General Objectives

According to Diana (2016), a specialist in the evolution of societies and the future of business, innovation is in the ability of innovative minds to create a combinatorial impact, to connect a point of innovation combined with other points, in order to create value.

This thesis is part of the design area, especially in the applicability of the multidisciplinary way of thinking, creativity, empathy and experimentation that is part of the design thinking methodology with the consumer as a starting point and centre of attention, and in its interrelationships with social innovation, environmental sustainability, fashion design considering the entire life cycle of products, services and systems.

According to Vezzoli (2010), environmental and socio-ethical sustainability are related and interconnected aspects. It is believed that the sustainability theme in fashion needs to be worked together with designers and consumers.

The ambitious goals naturally imply changes in behaviour, which will be faster and more successful, as far as citizen participation is concerned". (Carlos Manuel Martins, Secretary of State for the Environment, *Circular Europe network* (sd, p.6).

Thus, the general objective of the thesis is to "systematize an integrative model with approaches and contributions from design to sustainability, aiming to raise the

consciousness and awareness of fashion design students and local communities, about the production and conscious and sustainable consumption of fashion product”.

1.5.2 Specific Objectives

In a more detailed approach, in this investigation, we seek to analyse the following specific objectives:

- To sensitize and raise awareness among fashion design students and the local community about the production and conscious and sustainable consumption of the fashion product, through social actions / Fashion Revolution UBI / social intervention networks.
- To encourage social innovation through collaborative consumption.
- To project a proposal for the implementation of the Exponential System Design business model for Sustainability in Fashion Design.
- To discuss the concept of sustainability in the context of social innovation, based on a collaborative creative economy.
- To promote the development of a business model applied to the creation of a Fashion Library in the area of sustainability within the framework of social innovation and collaborative creative economy.
- To explore a multiple case study Collaborative Consumption in the fashion industry. It addresses the Product Service Systems (SSP), Redistribution Markets and Collaborative Lifestyles.
- To explore convergence and divergence between business models of circular and collaborative economies in fashion industry and the benefits to sustainable development.
- To promote Fashion Revolution week, fostering knowledge as social innovation for sustainability when launching a concept as a business value proposition.
- To discuss the importance of exponential system design in promoting social innovation and influencing collaborative lifestyles, presenting the growth of a business model "Exponential System Design for Sustainability in Fashion Design".

- To develop a theoretical essay aims to make an outlook with various approaches related to collaborative economics. Also features several collaborative consumption platforms.
- To present the case of study and development of a business model applied to the creation of a Fashion Library platform P2P.

1.6 Motivation

The theme of this investigation was born from the results of the application of the persona methodology to choose the research theme. The creation of a persona is a way of synthesizing the characteristics of the client/user identified in primary and secondary research, and consists of the creation of a character (persona) that translates these characteristics. The definition of the persona may include a fictional name, a profession, where one lives with, work, study, has fun, with whom one relates, what one consumes, his personal things, among other characteristics. The set of these references can also be used to compose a visual panel that synthesizes the context of life of the client/user, called mood board or semantic panel Morace, (2012).

The objective was to apply the persona methodology and to rescue the lifestyle and values built during the researcher's life. It will be presented here in a *storytelling* format for Sibbet (2015). The art of storytelling. It is known how difficult a doctoral research is and its long duration, which is at least three years investigating the same topic. For this, it was thought that it would be necessary to seek the essence of her life. Choose a research topic that is linked to personal values. The researcher was born in the Amazon region of Brazil, the world's largest reserve. She always lived with the Indians a lot, she has a strong relationship with nature. She is passionate about the forest that is being more and more devastated, by agribusinesses. Her first professional training was linked to the area of beauty (hairstyle, make-up). After the image consulting course, the desire to work in fashion aroused, thus beginning studies in the area of fashion design. Since her first graduation, she started working with the local community, in Olhos D'Água Goiás, teaching embroidery, where she used to live the weekends.

The work carried out in the first semester of graduation was published in a magazine "VIP MODA" (P.64) and resulted in the commercialization of the product umbrellas embroidered in stones. She was one of the pioneers to work with coloured and ecological cotton in Brazil, in her work concluding a course at UNIEURO College, Brasília, Brazil. The conversion of free carbon was carried out with the energy expenditure used in the making of the clothes through the donation of 200 seedlings of trees that were planted in the courtyard of the UNIEURO College, Brasília. Having as reference three great

sustainability theorists Ezio Manzini, Carlo Vezzoli and Li Edelkoort, this being considered a leader of the world of sustainability predictions.

After graduation, she has specialized in Visual Arts, Culture and Creation at SENAC, Porto Alegre, Brazil. The final project was the creation of a chair entitled “Bailarina Chair”, which resulted in the exhibition at “Casa Cor Brasília 2010”, in the noblest space that honoured the urban architect from Brasília, Lúcio Costa Café. After the exhibition, the chairs were sold for an art collector. She always liked the relationship between fashion and art. In the Master's degree in Fashion Design, at UBI, with the theme of the Master's dissertation “Surface Design, Creative Technique with the Design Thinking Methodology”.

The influence of the theme was related to her professional experience as a professor in Fashion Design at the Lutheran University of Brazil, Torres. When she finished his Master's degree in 2013, she organized a parade to present all her work developed for the Covilhã community, especially the collection inspired by the architecture of the Palacete do Jardim and Clube União. It was a parade open to the community in the city public garden. The personal lifestyle values healthy eating. Sustainability is not just fashion, sustainability is a lifestyle. Her way of dressing is classic but with a touch of creative fashion. She doesn't follow trends, she always buys second-hand clothes and accessories. It often transforms and adapts to her body style and biotype. She values quality parts with durability. Her biggest concern is having to dispose of a product when its final destination is garbage. She always lends her clothes to her friends (collaborative side).

In the curricular unit of the first academic year of the PhD “Fashion Design and Technology Interfaces” in one of the modules, students had to develop a project that focused on a summary idea of a fashion project based on the specificity of Covilhã and/or the Wool Museum of UBI. It was the opportunity to put the first ideas of the Fashion Library project on paper. The topic was after presented to her supervisor and later it had been accepted by the course's scientific committee. It went through a maturation process with the survey of the state of the art and definition of the theoretical lines of convergence, namely: social innovation, circular economy, collaborative creative economy, proposal to implement the Exponential System Design for Sustainability in Fashion business model.

The researcher has participated in the first physical event Fashion Revolution Portugal. Unconference - “How can we build a sustainable fashion system?” – held in April 23, 2015, at MUDE (Museum of Modern and Contemporary Art), Lisbon. When she arrived at the event, she understood the little involvement of the community and universities, professors and students, in such an event having a so important theme for the fashion

area. In this context, the opportunity arose for the researcher to become ambassador for the Fashion Revolution at UBI, with the aim of locally promoting social education for sustainability.

If one analyses the application of the persona methodology, narrated by storytelling, it is possible to consider the researcher's strong relationship with sustainability, creativity and entrepreneurship. Sharing is something natural to the researcher and entrepreneurship has been present since the beginning of her graduation, everything being done in the classroom, thinking about the final consumer and marketed.

1.7 Rationale and Opportunity for Deployment Proposal

“I just see what's there, but it hasn't been noticed yet”

(Peter Drucker, cited by Laladeheinzelin, 2013).³

According to Bezerra and Pontes (2015, p.6), “Discover and use a new awareness that allows us to progress in all ecological dimensions (human, social, economic and environmental), supporting, conserving and restoring all the resources that planet makes available to us for future generations”. The undergraduate and master's students in Fashion Design at the University of Beira Interior develop collection projects and the clothes (coordinates) are kept in a closed warehouse (See Appendix A, A1), only occasionally participating in some events. Thus, the following opportunities were perceived:

- Environmental Aspect: Promote a better designation and destination for these clothes;
- Collaborative economy: Reuse through a new P2P business model;
- Social innovation: Sensitize and make society aware of new business models, contributing to and increasing the importance of the designer in the way of thinking and seeking creative solutions to socio-environmental problems.

What could be done with these clothes practically stored without public appreciation?

Bring them out to the public. Give them usefulness.

³ <https://pt.slideshare.net/laladeheinzelin/020712-lala-d-palestra-po-a>[accessed in december, 2015]

“I just see what's there, but it hasn't been noticed yet” (translation of the author)

Here are the reasons for a proposal to implement a new business model in Covilhã, Portugal. This thesis proposes the business model “Exponential System Design for Sustainability in Fashion”. It is called Exponential because it is scalable and modular, providing eco-efficient, collaborative and sustainable services in fashion products. It can be replicated in its entirety, or in parts, in other places and contexts, adopting, for this, modularity as an adaptive resource.

It is, therefore, to Re-think, Re-design, Re-educate, Reduce, Redistribute, Reuse, and, in addition, share and preserve the work of undergraduate and master students in Fashion Design at the University of Beira Interior (UBI), in a system design that allows us to progress in all ecological dimensions: human, social, economic, environmental and educational. According to Bock et al (2016), education is seen as fundamental in contributing to the development of a dynamic open system that interacts with society.

For Manzini (2008, p.96) means “to participate in the construction of shared visions and scenarios and combining existing products and services to support the specific creative community with which they collaborate”. This investigation is also in line with the declaration that triggered the “Bologna Process” as it may be seen:

“The Bologna Process, for instance, has pushed higher education institutions in the Union and beyond to develop new forms of organization of relations and interactions to serve the needs of society for knowledge, research and scholarship. In addition, it has been widely recognized that the effective response to societal challenges cannot be made without addressing and changing patterns in consumer behaviour. Presenting attractive alternatives, and informing and educating consumers about the implications of their choices, are important approaches within a broader long-term strategy towards achieving sustainable consumption patterns”. Hubert (2010, p.39)

The purpose of this thesis is to contribute to sensitization and awareness in an attempt to break the supposed paradigm of Portuguese culture, always pointed out as conservative in relation to the concepts of circular economy.

The message of collaborative consumption is that the current culture of ownership can be replaced by sharing and collaboration, but one still have to contribute to this transformation into a tangible sustainability, with the reduction of consumption, the reuse of fashion products.

The Exponential System Design for Sustainability in Fashion business model represents a new and innovative concept that breaks with the dominant business model based on buying and selling.

The integral part of the fashion library can allow a unique experience of using a fashion product. It is also a transformative mentality to start building a new mode of consumption that could become a common practice. It is understood that production and consumption are issues guided by cultural relations and interaction and behavioural changes, with the use of products and services.

The project of Products and Services System (PSS) allows the generation of radical innovations and challenge new consumption habits, organizational structures and regulatory legislation.

1.8 Research Methodologies, Techniques and Tools

How can Fashion Design collaborate in raising the responsiveness and awareness of fashion design students and the local community about the production and conscious and sustainable consumption of the fashion product?

How can the Designer promote social innovation in fashion?

According to Silva (p.20), in design it is possible to have own methods and tools. Design, due to its multidisciplinary and integrating characteristic, can serve as an aggregator and manager of this diverse knowledge. For multidisciplinary problems, it is necessary to use multidisciplinary methodologies. For that, the proposed methodology of this investigation is exploratory, qualitative and with a mixed character: interventionist and non-interventionist. For the results obtained in the investigation on the study subjects, an analysis of relevant literature was carried out by consulting articles in scientific journals and newspapers, conference proceedings, theses, dissertations, books, and others. This thesis is a part of the design area, especially in the applicability of the way of thinking based on interdisciplinary, creativity, empathy and experimentation of design thinking with the consumer as a starting point in the context of social innovation and collaborative creative circular economy. The articles were prepared based on the scope and topic chosen for each conference. However, in order to create a coherent sequence of chapters, what motivated the writing of the thesis was the scientific recognition of the articles published through a positive feedback (See Appendix B, C to C7 and D).

Design Thinking of Product, Service, System (PSS) and its applicability and use of empathetic knowledge of its processes, methodologies, actions and use of tools were considered as methodological scientific approach. Action research was also used. To Franco (2005), according to and Thiollent (2005), action-research is a basically participatory and collaborative process, in which researchers seek to elucidate a given reality by identifying collective problems, seeking through experimenting with solutions and real situations. The qualitative empirical investigation of the fashion revolution organization fits into action research and finds a proposed convergence on this characteristic. In this sense, this investigation is mainly collaborative, since the researcher was inserted with the team to organize the event and seek contributions to it. There were always moments of collective team participation to share, discuss, analyse and generate ideas about the problems identified after each meeting and occasion. The issues and the positive and negative points of the actions behind the feedback from the president of the Fashion Design students group were discussed. According to the feedback, the new event schedule was prepared.

Approaches are considered: rationalist and interpretive to the design process, as shown in the following figure according to Sampaio (2017).

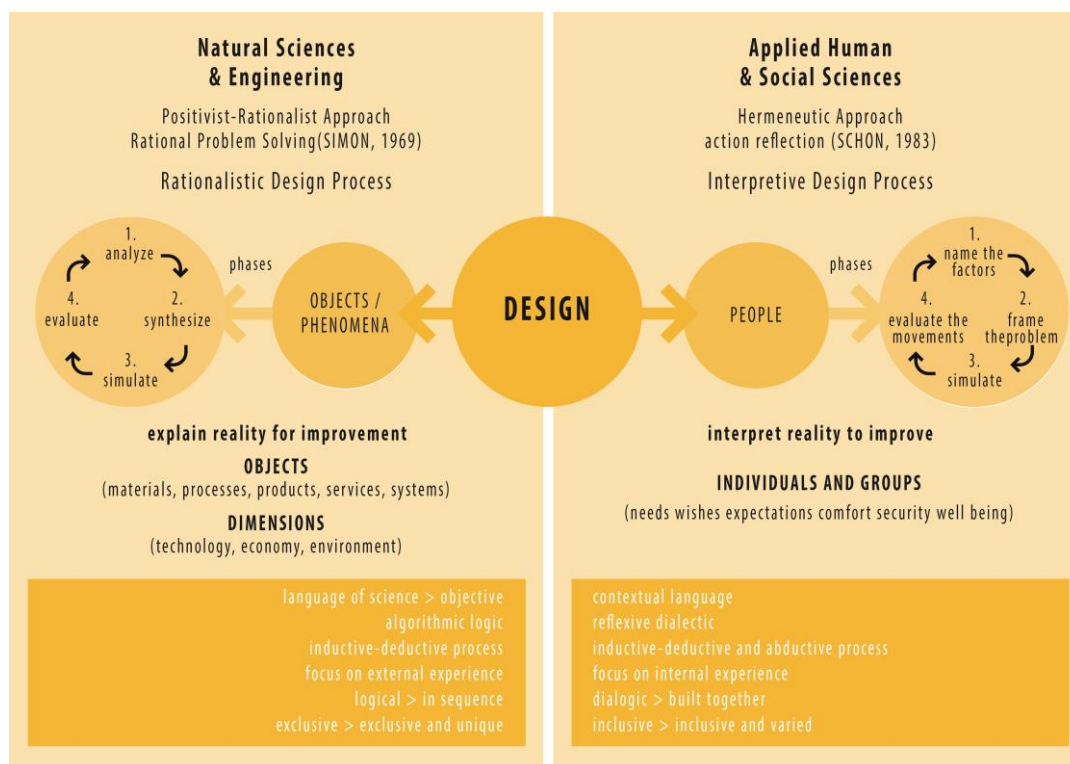


Figure 1.2: Synthesis of rationalist and interpretive approaches to the design process

Source: Sampaio (2017) (translation by the author)

This figure presents a synthesis of the rationalist and interpretive approaches to the design process, with the main characteristics of each approach.

This scheme effectively contributed to illustrate the rationalist and interpretive character, both of which influenced the investigation, as both dimensions are contextualized in the thesis.

1.9 Thesis Overview and Structure

In the first chapter with the Introduction, the framework is presented, the contextualization of the fashion problem and conscious consumption is exposed, the research objectives and the questions to be answered are described, as well as the motivation that was the basis of this investigation and, still, the justification and opportunity for the implantation proposal and the methodological strategy and proposed methods.

After this first chapter with the Introduction and referred to in the previous pages, the following work is based on publications in Journals, Articles in the Proceedings of International Conferences, Chapter in Books, and in Participation in Invited Conferences, as shown:

Articles in Scientific International Journals

- Fernandes, S. *et al*, “Fashion Revolution As Promoter Of Social Innovation And Sustainability In Fashion” 17th Romanian Textiles and Leather Conference – CORTEP 2018 Iasi, 7-9 November 2018 Fernandes, S. *et al*, “Fashion Revolution As Promoter Of Social Innovation And Sustainability In Fashion” 17th Romanian Textiles and Leather Conference – CORTEP 2018 Iasi, 7-9 November 2018. The manuscript titled “Fashion Revolution as Promoter of Social Innovation and Sustainability in Fashion” reference no.RPI-20-02, is accepted for publishing in issue 1/2020 of Leather and Footwear Journal. (See Appendix B)
- Fernandes, S. *et al*, Collaborative Economy: Case Study of New Business Models, Circular and Collaborative Economies as a Propulsion of Environmental Sustainability in the New Fashion Business Models, in Lecture Notes in Electrical Engineering, Volume 505, 2019, pages 925-932.
- Fernandes, S. *et al*, Exponential system strategy for sustainability in fashion design, Procedia CIRP 84 (2019) 447–450 © 2019 The Authors. Published by Elsevier B.V.

Peer-review under responsibility of the scientific committee of the CIRP Design Conference 2019, pages 447-450, **(Scopus)**.

Articles in the Proceedings of International Conferences

- Fernandes, S. *et al*, "**Collaborative Consumption: Sustainable Business Model- Fashion Library**", 24th APDR Congress 'Intellectual Capital and Regional Development: New landscapes and challenges for space planning, ISBN 978-989-8780-05-8, 2017, July 6-7, University of Beira Interior, Covilhã, Portugal.
- Fernandes, S. **Inovação Social e Economia Criativa Colaborativa. Fashion Revolution** UBI 29/Maio 2017, University of Beira Interior, Covilhã, Portugal. Oral Presentation
- Fernandes, S. *et al*, **Theoretical Essay on the Networked Collaborative Consumption**, FibEnTech - Fibre Materials and Environmental Technologies 2018 Symposium, ISBN 978-989-654-398-3, University of Beira Interior, Covilhã, Portugal.
- Sampaio, F., Fernandes, S., *et al.*, **Fashion Marginalization and the Feminine**. FibEnTech - Fibre Materials and Environmental Technologies 2017 Symposium, ISBN 978-989-654-398-3, University of Beira Interior, Covilhã, Portugal.
- Solange, F., *et al*, **Exponential System Design For Sustainability In Fashion**, ITechStyle Summit 2018 Poster the attendance at the International Conference on Textiles Clothing at Cruise Terminal, Port of Leixões from 28 of February to the 2 of March, 2018
Fernandes, S. **Circular Economy club: Fashion club Covilhã Fashion Revolution**
- UBI 2019, University of Beira Interior, Covilhã, Portugal. Apresentação oral
- Solange, F., *et al*, **Biblioteca de Moda: Design de Sistema para o consumo colaborativo na moda**, GT, 14th Fashion Colloquium Curitiba, Brazil, September 6, 2018. Oral Presentation
- Solange, F., *et al*, **Fashion Library UBI-Platform P2P**, FibEnTech - Fibre Materials and Environmental Technologies 2018 Symposium, ISBN: 978-989-654-486-7, University of Beira Interior, September 21, 2018, Covilhã, Portugal.

- Solange, F., *et al*, ACIS: **Design de sistema para a sustentabilidade na moda em Portugal e na Espanha**. Association for contemporary Iberia Studies 40th Annual Conference. Universitat de Barcelona, September 5 – 7, 2018. Skype Video Presentation.
- Fernandes, S. **Inovação Social é a Transformação Para a Moda Sustentável. Fashion Revolution UBI 2019**, University of Beira Interior, Covilhã, Portugal. Oral Presentation

Chapter in Books

- Fernandes, F., *et al*, (2017). **Sustainability, social innovation and collaborative economy in fashion design. In Challenges for Technology Innovation** (Vol. 399, No. 403, pp. 399-403). Published by Taylor & Francis, ISBN: 978-1-138-71374-1 (Hbk) and 978-1-315-19810-1 (EBook) ROUTLEDGE in association with GSE Research, **(Scopus)**.
- Solange, F., *et al*, Collaborative Economy: Case Study of New Business Models in Reverse Design- Broega et al. (Eds)(PP.631-636) 2019 Published by Taylor & Francis Grupo, London, ISBN978-1-138-37011-1.CIMODE 2018 - Cuarto Congreso Internacional de Moda y Diseño, held in May 21 to 23, 2018, Madrid, Spain, <https://www.vitalsource.com/products/reverse-design-ana-cristina-broega-v9780429766329>

Invited Conference Presentations

- Solange, F., *et al*, P2P Platform **-Exponential System Design for Sustainability in Fashion**, Sustainable Solutions for Growth Conference (SSG), September 17-18, 2018, Wroclaw (Poland). Video presentation.
- Solange, F., *et al*, Theme: **Advanced Materials for Sustainability: Exploring new Insights and Innovative Technologies**, Materials Science and Engineering, March 25-26, 2019, Yokohama, Japan. Video presentation.

Thus, in this investigation, when choosing for the elaboration of articles, it was taken into account the scope of the conference, the choice of the topic, as well as the adequacy of the article to the work leading to the Doctoral Thesis being incorporated in the eight chapters of the Thesis, presented as follows:

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Table 1.2 - Thesis Chapters and Publication of Articles

Thesis Chapter	2. Sustainability, Social innovation and Collaborative Economy in Fashion Design
Conference	Conference on Sustainable Smart Manufacturing http://s2m.fa.ulisboa.pt/
Topics	Towards a Circular Economy: Sustainable business models
Scope	<p>S2M 2016 is a three days Conference, taking place in Lisbon in October 20-22, jointly organized by the Faculty of Architecture, University of Lisbon, and The University of Manchester focusing in a new culture of eco-design and innovation, towards smarter and sustainable manufacturing systems.</p> <p>The European Commission recently adopted an ambitious strategy called Europe 2020 to spur a smart, sustainable and inclusive growth, fostering knowledge, innovation, education and a digital society. The innovation challenge will drive a global systemic transformation, bringing forward new business opportunities and fostering prosperity in a world of finite resources.</p> <p>Moving towards a circular economy is a framework for future transformation, an opportunity to rethink and redesign the future to address today´s fundamental challenges, from how we use natural resources, to the way we design and manufacture products, through recycling and re-use towards a zero-economy waste and society</p> <p>[Indexed in SCOPUS]</p>
Thesis Chapter	3. Collaborative consumption: Sustainable business model- Fashion Library
Conference	24th APDR Congress http://www.apdr.pt/congresso/2017/
Topic	RS01.2- Models for Regional Development
Scope	<p>The 24th APDR Congress central theme: Intellectual Capital and Regional Development: New landscapes and challenges for space planning.</p> <p>The APDR's Annual Congress returned to the University of Beira Interior, to position intellectual capital and regional development as a key theme for public policies and the agenda of the collaborative community of politicians, entrepreneurs, researchers and citizens interested in promoting endogenous growth, combined with the institutions, systems and new functional and integrative type designs, for promoting symbiosis among economic, social and political agents, in the joint task of (re) designing a new competitive space, at the regional level.</p> <p>Different questions were addressed, including: What are the regional development models applicable in peripheral and low population density economies? How can intellectual capital promote regional development? Are higher education institutions a vehicle that promotes quality of life and innovation at the level of cities? Can services contribute to sustainable regions? How to plan regional space from a perspective of entrepreneurial and innovative ecosystems? How to finance regional planning and development? What transport networks</p>

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	<p>should the trans-European regions have? What should be the new productive specializations in the regions? Can sport be a motor for regional development?</p> <p>The Congress included a Policy Forum, Plenary Sessions, Special Sessions, Conferences and Round Tables, Workshops and Parallel Sessions</p>
Thesis Chapter	4. Collaborative Economy: Case Study of New Business Model
Conference	CIMODE http://www.design.uminho.pt/cimode2018/pt-PT/
Topic	Sustainability in Fashion and Design
Scope	CIMODE 2018 is the fourth International Fashion and Design Congress, taking place from May 21 to 23, 2018 in the city of Madrid. This year the congress is based on 6 major themes: Fashion and Communication; Fashion, Identities and Cultures; Product Design; Marketing and Consumption; Teaching and Education; Sustainability in Fashion and Design.
Thesis Chapter	5. Circular and Collaborative Economies as a Propulsion of Environmental Sustainability in the New Fashion Business Models
Conference	Regional Helix 2018 http://helix.ipcb.pt/
Topic	Entrepreneurship
Scope	<p>Regional Helix 2018 is an event that, according the Smart Entrepreneurial Ecosystems logic, is not based only in a purely academic but also technological and entrepreneurial dimensions, across the most diverse sectors of activity.</p> <p>The emergence of new business models based on innovation, cooperation networks, and the enhancement of endogenous resources, are assumed to be a strong contribution to the development of competitive economies and European regions.</p> <p>The objective of this conference is to make this moment an opportunity to show the set of entrepreneurial and infrastructural capacities at European regional level, as well as to transmit to all participants an overview about potentiating the foundations for the creation of networks of knowledge and entrepreneurial cooperation, involving Innovation, Engineering and Entrepreneurship stakeholders. This edition is specially focused on Knowledge and Technology Transfer from Academia to Industry and Society, highlighting and proposing solutions for some main problems related with industrial and societal challenges, having as main target the creation of added value for real economy.</p>
	<p>Fernandes, S., Lucas, J., Madeira, M. J., Cruchinho, A., & Honório, I. D. (2019, June). Circular and Collaborative Economies as a Propulsion of Environmental Sustainability in the New Fashion Business Models. In International Conference on Innovation, Engineering and Entrepreneurship (pp. 925-932). Springer, Cham. http://hdl.handle.net/10400.6/6875 [Indexed in SCOPUS]</p>

Thesis Chapter	6. Fashion Revolution as Promoter of Social Innovation and Sustainability in Fashion
Conference	The 17-th Romanian Textiles and Leather Conference http://www.cortep.tuiasi.ro/
Topic	Innovation and entrepreneurship
Scope	International scientific event “The 17-th Romanian Textiles and Leather Conference” - CORTEP'2018 which will be held in Iasi, Romania, on 7-9 November 2018. The Conference is intended to be a meeting of scientists, researchers and specialists from academy, national research institutes and companies in the textile and leather field and other related. The manuscript titled “Fashion Revolution as Promoter of Social Innovation and Sustainability in Fashion”reference no.RPI-20-02,is accepted for publishing in issue 1/2020 of Leatherand Footwear Journal. (See Appendix B)
Thesis Chapter	7. Exponential System Strategy for Sustainability in Fashion Design
Conference	CIRP Design 2019 https://www.cirpdesign2019.org/
Topic	Design as Exponential Technology
Scope	The scope of the 29th CIRP Design Conference, to be held from 08th to 10th May 2019, will be to review and discuss the advances, research results and industrial improvements in the field of design and engineering for products creation, which is facing significant and radical societal and technical changes. The Conference’s objective is to provide an international forum of researchers a place to share and discuss visions, state of the art and innovations in the field, to disseminate the recent advances, views and perspectives, and thus, to generate a significant impact on the future of design and engineering for products creation.
	Fernandes, S., Lucas, J., Madeira, M. J., & Cruchinho, A. (2019). Exponential System Strategy for Sustainability in Fashion Design. Procedia CIRP, 84, 447-450. https://doi.org/10.1016/j.procir.2019.04.283 [Indexed in SCOPUS Impact Factor: 0,73]
Thesis Chapter	8. Theoretical Essay on the Networked Collaborative Consumption
Conference	FibEnTech Unit Symposium on September 21,
Thesis Chapter	9. Fashion Library UBI-Platform P2P
Chapter in book	Fernandes, S. R. Lucas, J. Madeira. M.J., Cruchinho, A., Honório, I. (2018). Fashion Library UBI-Platform P2P, The 2018 edition of the Symposium of the FibEnTech, September 21, ISBN 978-989-654-486-7. https://www.ubi.pt/Ficheiros/Entidades/1020/Livro%20de%20atas%202018%20SIM P%C3%93SIO%20FIBENTECH%20-ISBN.pdf

Source: Author

In the last chapter of the thesis, the main conclusions obtained in the investigation are presented, as well as some limitations of the study and guidelines for future investigations in this theme.

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2. Sustainability, Social innovation and Collaborative Economy in Fashion Design

This article is part of PhD research in Fashion Design and discusses the concept of sustainability in the context of social innovation, based on a collaborative creative economy. The application of this concept will be through a Fashion Library to be hosted at the University of Beira Interior (UBI), Covilhã, Portugal. This Library will lend the garments created by students of bachelor and master's degree in Fashion Design (UBI), to the community. A web site also will also be created to publicize and preserve the memory of the work of these students. The Fashion Library will promote social activities with students and the community, all focused on dressing in a sustainable way. The objective of these actions is the extension of the useful life of the fashion product.

2.1 Introduction

The concept of sustainability has been used since 1987, with the publication of the report "Our Common Future". However, this would only result in international meeting on the Environment, convened by the United Nations, on (Eco-92), and held in Rio de Janeiro, Brazil, 1992, constituting a strategic step for the survival of life on the planet. The specific commitments signed there include three conventions on: Climate Change, Biodiversity and Declaration on Forests. The Conference also approved documents with broader goals and more political in nature: the Rio Declaration and Agenda 21. Both endorse the fundamental concept of sustainable development, which combines economic progress and material with the need for environmental awareness. According to the World Commission on Environment and Development-WCED (1987), sustainable development meets the needs of the present without compromising the ability of future generations to come across their needs

Followed later initiatives which demonstrated through several scientific studies, that Climate Changes were the reference of any breakthrough in sustainability. So, successive international conferences were held with a view to greater control on the emission of air pollutants.

The last Climate Conference was in 2015, in Paris (COP21), now ratified by China and United States on 04 and 05 September (2016) at the meeting of the G-20 in Beijing. Renewed hopes, thanks to the support of these two countries, the world's largest atmospheric polluters, to prevent global warming, keeping the temperature at a maximum of 1.5° C, over the observed before the industrial age. A global challenge, with local initiatives, which will lead to new economic opportunities and promote a change in the use of finite resources of the planet, in order to house the next generation.

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Additional attempts, however, have been made in order to increase efforts to have climate changes under control: the issues of population growth and habitat, preservation of biodiversity, innovative technologies and, in particular, education for sustainability.

Sustainable development requires an urgent overhaul of the current patterns of production and consumption to achieve social, economic and environmental equity.

According to "(Fletcher and Grose 2011, p. 100) the starting point for an innovation towards sustainability is trying to decouple the business success of the relentless expansion of material consumption, seeking to minimize the depletion of resources, the pollution and the associated effects, such as climate change."

It can be said that the current system of creation, production and product consumption of Fashion is inconsistent with sustainable development. Fashion has an accelerated pace of production and consumption by its seasonality, some brands come to produce more than ten collections per year. According to Fletcher and Grose (2011) the fast fashion industrial production is ruled by financial results: produce much to generate profits. The problem is that there are social and environmental impacts. The fast fashion chain generated an easy access to fashion product consumption at low price and sales up to 70%. This clothing has become a disposable product increasing thus the accumulation of textile residues in the soil. Another issue is the lack of consumer knowledge in relation to the production chain starting with the depletion of natural resources, high levels of pollution and exploitation of cheap labour and bad working conditions in underdeveloped countries (Refosco et al., 2011), such as China, Pakistan, Bangladesh, India, Mexico, Romania, Cambodia and Turkey. Today, the European and the US legislation no longer allows this kind of workmanship (Lee, 2009).

According to (Rifkin, 2016, p. 274) "Decrease compulsive consumption, optimize the economy and stimulate a more sustainable way of life is not only praiseworthy but essential if we are to ensure our survival."

In this context, the new concept of producing and consuming based on circular economy principle as the 3Rs (Reduce, Reuse, Recycle). Inside it is the Collaborative Economy that:

"Refers to the optimization of the use (or even of production) of a product or service through the use of sharing. Among other aspects, the collaborative economy questions the effectiveness of needs and the mandatory to satisfy them through the use of material resources.

The collaborative economy covers several areas: collaborative production (to facilitate the design and production of material goods through bricolage, fablabs and makerspaces), collaborative consumption (exchange and rental networks, loan, donation or exchange of goods and services), and collaborative development (Circular Europe Network S.d. p.22).

In the case of a behavioural change, it is needed to re-educate society to adopt the requirements of sustainability throughout the chain of production, distribution and consumption of goods.

2.2 Literature Review and Discusses the concepts

2.2.1 Circular Economy in Production and Consumption of Fashion

The concept of circular economy was created by the Ellen MacArthur Foundation created in 2010. In 2012, "Towards circular economy: economic and business rationale for accelerated transition". Was published by this Foundation, the report. In the same year the European Commission published the "Manifesto for an efficient Europe in resource utilization", which addresses the need for Europe to a regenerative circular economy. In 2015 the European Commission launched the "Circular Economy Package".

According to the Circular Europe Network (S.d.p. 9) "the concept of circular economy relates not only recycle but also to the 3Rs (Reduce, Reuse, Recycle) and goes beyond the problems of waste; that is, the circular economy entails a "closed cycle" management of all energy and material resources, including biotic resources such as biomass, water and biodiversity, so that the consumption of these resources is reduced and its use and re-use are optimized.

The Slow Fashion Movement reinforces the concept of circular economy in the system of production and consumption. As the name implies, slow fashion encourages the system of production and consumption to be slower. To Jung and Jin (2014) slow fashion is a concept that encompasses the economic, social and environmental sustainability. It encourages local production, requires a use and appreciation of material resources, proposes more transparent production systems between producers and consumers and decreases the speed of production of durable goods. Another idea that reinforces the concept of circular economy is upcycling. "A concept that is gaining importance is upcycling, which means the reuse of a material already used or the residue of a product the way was found, without having carried out the recycling. (McDonough and Braungart, 2002, p. 53). "

2.2.2 Production

The upcycling fashion means utilizing used garments and accessories as well as waste to create a new piece of clothing. In this process of creation is very important creativity in design so that the clothing is not associated with hippie fashion. Several designers adopt the upcycling fashion. It can be beautiful and is already being adopted even in high fashion. One of the designers using the upcycling fashion is Martin Margiela. Others, like Jessica Ogden, Comme des Garçons, have also joined.

According to Fletcher and Grose (2011) the recycling process in fashion is to retrieve the fibres of fabrics with mechanical or chemical processes. The chemical process is used in synthetic fibres; other types of fibres can be recycled by mechanical means. Manzinni and Vezzoli (2008a) consider this a recycling alternative less ecological to be used as a last resort due to the methods used which involve the consumption of non-renewable sources and energy.

2.2.3 Consumption

Consumers should begin to review their needs to buy, with a view to reducing the compulsive consumption. Here are some recommendations:

Buy quality and timeless clothing, customise, transform, and repair. Buy clothes that value personal body biotype. For this the consumer really knows what his body biotype is. Buy clothes which agree with personal style, knowing their own. Know, finally, how to match the clothes that are already in the wardrobe. A good investment can be made through personal image consulting, as one of the factors that leads to the accumulation of non-usable garments in the wardrobe is being unfamiliar with the facts referred to above. According to Aguiar et al. (2010), the Personal Stylist profession contributes to the conscientious consumption.

Purchasing versatile clothes that allow various combinations. Buying clothes at second-hand stores, exchanging and borrowing clothes between friends or renting clothes in fashion libraries, which is a current trend.

According to the "(Circular Europe Network SD. p. 21) the eco consumption can still target a real evolution of behaviours, towards sustainability, which may include the replacement of products for services [...]"

In front of these notes, the question arises: is the Portuguese society "consumers" culturally prepared to adopt conscious consumption of fashion products?

Let's see the answer of the Fashion Revolution Portugal coordinator in an interview with Lifestyle.publico.pt that mentioned the consciousness behaviour of consumers.

Are Portuguese consumers different from others?

"Yes, because they are in the tail of the new behaviours and thoughts. They are very reluctant to act, talk bad first and when we see that it's a common behaviour in London, Paris, or in Northern Europe is when they start thinking seriously on the subject. But they also have many people coming in and out of the country and this facilitates the input of ideas [...]. In the case of Fashion Revolution turns out to have been stubborn to accept certain things, there's a difficult stigma to accept around the sustainable fashion, for them still is associated with the

ugly clothes, hippie clothing. They don't think of chance to see this from the point of view of innovation. (Salome Areias, lifestyle.publico.pt/noticias).”

One can understand the truth of this statement by the very few people who attended the *Fashion Revolution Portugal* movement, held on 18 and 24 April 2016. However, it needed a research to really prove the behaviour of the Portuguese towards eco fashion product consumption.

Thus, in order for the concept of circular economy to be adopted in the system of production, distribution and consumption of fashion products, social innovation must play a key role in inducing the change.

2.2.4 Social Innovation

Recently, the social innovation has been gaining space in government policies with two objectives: diminishing social inequalities and seeking solutions to the problems of climate change. Social innovation arises as an alternative to foster changes and social improvements. The social innovation subject is of such importance today, that in 2013, the European Commission launched the guide of Social Innovation, supported by the Europe 2020 Strategy. For the EU "Social Innovation" can be defined as the development and implementation of new ideas (products, services and models) to meet the social needs and create new social relationships or collaborations. (European Commission 2013, p. 7).

Social innovation is therefore a concept and an incentive, in the European context, both academic, as a policy, to overcome environmental challenges. According to Phillips et al. (2008) innovation is looking for a new solution to a social problem, which produces more effective results, more efficient and more sustainable, with greater added value to society. For Bignetti "the result of knowledge applied to social needs through the participation and cooperation of all actors involved, generating new and enduring solutions to social groups, communities or society as a whole" (Bignetti, 2011, p. 4).

“We define social innovations as new ideas (products, services and models) that simultaneously meet social needs and create new social relationships, In other words, they are innovations that are both good for society and enhance society’s capacity to act”(Manzini, 2015, p. 11).

Social innovation refers to the creation and implementation of new ideas, products, services, or templates that generate socio-environmental value for society. Social innovation improves value added not only to society, but also to citizens involved in the process of implementation and design social and environmental solutions.

Thus, according to Manzini (2008b, p16), the role of the designer in the innovation underscores this importance when stating that "creativity and design skills as effectively required to move a social and technological innovation process of such magnitude requires the transition towards sustainability."

The social designer seeks, therefore, to implement innovative solutions, creative, collaborative and sustainable for not well perceived problems by society, turning them into Social Innovation. Thus, effective responses to society and best practices through the behavioural changes are generated.

The designer operates as a translator of the emerging desires of society, being a true cultural intermediary of production and consumption processes. As a manager of ideas and solutions, he promotes new ways of thinking, creating, designing, consuming and acting, in search of a better future for all.

Bistagnino, cited by Lima 2013, p. 32, asks himself: "as designers, we should ask ourselves whether we want to continue to design only a product or if we prefer to design the man; If we choose to show our skills, designing a form, or use it to design the society; If we want to express ourselves through a hedonistic design or if we have the propensity for the humanistic design. To strengthen the values connected to "be" and not to "have", the priorities will change in relations under social and productive field. "

In relation to environmental problems Manzini (2008b) questions the role of the designer. According to the author, the designers create the problems by way of designing their products in an open loop. They can, however, exercise an important role when designing solutions, not just products, but to social and environmental problems and to cooperate, as well, in building a sustainable future.

The goal of this investigation is to attain the degree of doctor in UBI is fostering social innovation for the development of sustainable projects in Fashion Design in order to disseminate the conscientious consumption. Thus it is intended to promote social activities with students and the community; stimulate wear in a sustainable way, acquiring knowledge about a smart wardrobe, style consulting, body biotype and upcycling.

To strengthen the social actions of conscientious consumption it will be important to join the next edition of the "Fashion Revolution Portugal" in 2017, hoping UBI to be the host. It is worth registering that the social activities will be continued with students and community. With this, the social innovation, created by behavioural changes will be able to generate a new lifestyle and sustainable habits for the sake of society and the environment. And it will come into Covilhã, offering itself as a model not only for

Portugal, but for the EU. In this process, the designer plays also a key role in innovative designing, creating, managing and influencing society for a sustainable well-being.

2.2.5 Collaborative creative economy

Collaborative actions aim to promote interactions between the University, students, companies and society through active, creative and conscious participation of all these agents, in the benefit of sustainability. To Manzini (2008b, p. 96) "to participate in building shared visions and scenarios and combining existing products and services to support the specific creative community with which to collaborate."

Undergraduate and master's degree students in Fashion Design from UBI develop collection projects, but the garments are stored in a closed warehouse, coming eventually to participate in some events. We will bring them to the exterior with the applicability of the concept of collaborative creative economy in the Fashion Library. This will give life to the work of the students, putting into service these jobs that are closed and without visibility. The Fashion Library will also register, organize, disseminate, use and promote the interaction of academic work of students of other courses towards society. This will act as final consumer and may thus contribute to the improvement of the work of the students through the opinion about the products.

Also Baloch and Bridges (2003, p. 6) propose: "discover and use a new awareness that will enable us to make progress in all the ecological dimensions (human, social, economic and environmental), supporting, preserving and restoring all the resources the planet puts at our disposal for future generations".

2.3 Conclusion

This research, with the purpose of obtaining the PhD degree in fashion Design in UBI, comes to situate the role of Designer to the sustainability challenges of the planet, assessing the importance of the concepts and practices of Social Innovation and Collaborative Economy in this process. It is summarised in the establishment and permanent operation of a Fashion Library at UBI with active participation of the community. The investigation is in the early stages. Its development will only be possible with the collaboration of students, community, teachers, and those responsible in all spheres that involve administrative issues in their various phases. The challenge will be to break the paradigm of Portuguese culture, as conservative as it is in relation to concepts of economy and sustainable consumption through its reduction, product reuse and recycling. However, it is intended to verify that the social innovation through actions for conscious consumption of fashion product is truly capable of bringing effective answers to society, best practices and behavioural changes. The purpose of this research is to

produce results and mutual benefits for all involved in the process of collaboration. Will stimulate the social innovation based on sustainable consciousness directed from a new designer's role in the contemporary world.

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**Creative Collaborative Circular Economics,
Exponential System Design for Sustainability in Fashion Design**

3. Collaborative consumption: Sustainable business model- Fashion Library

This work has as objective the development of a business model applied to the creation of a Fashion Library in the area of sustainability within the framework of social innovation and collaborative creative economy. Therefore, it is a sustainable entrepreneurial project.

The sustainable business model (SBM) presents an innovative approach to consider embed sustainability into business purpose and processes, and serve as a key driver to competitive advantage. It is important in driving and implementing collaborative creative economy and social innovation for sustainability and can help embed sustainability into business purpose and processes. Sustainable business model considers a wide range of stakeholder interests, standing out environment and society/community.

The project is based on the methodology of the circular economy with a focus on collaborative creative economy. Through the project search optimization and promotion of clothes created by students of master's degree in Fashion Design at the University of Beira Interior (UBI), Covilhã, Portugal. The project aims at the dissemination of fashion creations of students through a site using of clothes that are stored in UBI, with access via loans to the community. The Fashion Library will also promote workshops on upcycling with students and on smart wardrobe, style consulting and body biotype with community. The Fashion Library will be a practical replicable pilot model with eco-efficient services.

The Fashion Library consists of an innovative project based on a practical, replicable business model pilot, with a sustainable and eco-efficient service delivery.

3.1 Introduction

This article is part of a PhD research in Fashion Design at the University of Beira Interior in association with the University of Minho, in the area of sustainability, in the context of social innovation, focusing on the creative collaborative economy. This article aims to define and situate the importance of collaborative creative economy within the framework of sustainability through a literature review. To this end, talks about the emergence of the concept of sustainable development consecrated in the International Conference known as ECO-92, in which authorities around the world have signed the understanding of the limitation of the planet's natural resources in the pursuit of a development process more and more intense and extended to a global population that had grown about six times in a century. ECO-92 guidelines pointed to the necessity of profound technological changes in production systems and consumption of goods and services, parallel to great efforts in the field of re-education for

a new era. The article highlights some conceptual advances in the field of collaborative consumption in the fashion industry, considered the world's most polluting, capable of changing procedures and create new mentalities through social innovation. The article emphasizes the role of circular economy essential to sustainable feedback process of production and consumption of products. It introduces a new business model developed by the author entitled "Exponential System Project for Sustainability in Fashion Design" articulated with the methodology of product-service system (PSS).

3.2 Literature Review

3.2.1 Sustainable Development

The concept of sustainable development has been used since 1987 by the World Commission on Environment and Development of United Nations with the publication of the report "Our Common Future", through the so-called Brundtland Commission that thus defined: "a development that aims to meet the needs of the present without compromising the ability of future generations to meet their own needs" Vezzoli (2010:20).

The term sustainable development was consecrated in the International Meeting on the Environment, convened by the United Nations, on (Eco-92), held in Rio de Janeiro, Brazil, 1992, constituting a strategic step for the survival of life on the planet. The conference endorses the fundamental concept of sustainable development, which combines economic and material progress without compromising the needs of future generations.

The last Climate Conference took place in 2015, in Paris (COP21), ratified then China and United States on September 04 and 05 of 2016 at the G-20 Meeting carried out in Beijing, China. This agreement prioritized the world commitment to avoid global warming, keeping the temperature at a maximum of 1.5°C over the observed before the industrial age. Vezzoli (2010:24) cites the main types of environmental impacts:

- "Global warming (greenhouse effect);
- Reduction of the ozone layer;
- Eutrophication;
- Acidification;
- Pollution;
- Toxic emissions;
- Accumulation of waste".

The sustainable development is a global challenge, with local initiatives, with a view to reducing the effects of environmental impacts arising from new economic opportunities capable

of promoting a change in the use of finite resources of the planet, in order to house the next generation.

According to Fletcher and Grose (2011:100) "the starting point for an innovation towards sustainability is trying to decouple the business success of the relentless expansion of material consumption, seeking to minimize the depletion of resources, the pollution and the associated effects, such as the climate change."

Sustainable development requires, in short, an urgent overhaul of the current patterns of production and consumption in order to achieve greater social, economic and environmental equity through new business models.

3.2.2 Collaborative Creative Economy

The term creative economy in this article is used by the fact that Fashion Design is classified by UNCTAD (2010) as an integral part of the creative industries. Creative economy means activities that are related to creativity as intangible added value in the production of goods and services. They can be, as well as creative, collaborative, too.

The creative economy interconnects with collaborative economy, also known as sharing economy. For Santos (2008:56) "the Creative Economy is based on creativity based on connectivity and linked by collaboration of services". Botsman and Rogers (2011) follow the same line, with respect to collaborative consumption associated with the creative economy: goods and services are shared with or without money brokering, rental, exchange, loan, and donation, through digital networks or in physical spaces.

For Deheinzelin (2012:13), one of the pioneers in using these terms linked "intangible resources as culture, knowledge and experience, are infinite and multiplied by the use. They can represent an economy of abundance, based on models of collaboration." Another author, Reis (2008:24), treats the subject: "the creative economy comprises sectors and processes that have as input creativity, especially culture, to locally generate and globally distribute goods and services with symbolic and economic value."

The circular economy is another methodological concept which also comprises the collaborative economy in their different areas: "collaborative production (to facilitate the design and production of material goods through bricolage, *fablabs* and marketspaces), collaborative consumption (exchange networks, rentals, loans, donations or exchange of goods and services), and collaborative development" (*Circular Europe Network*, s. d:22).

3.2.3 Circular Economy and Collaborative Creative Economy

The circular economy is being associated with the collaborative economy.

The concept of circular economy was created by Ellen MacArthur Foundation, founded in 2010 in the United Kingdom. In 2012, published the report "towards the circular economy: economic and business rationale for accelerated transition". During the same year, the European Commission published the "Declaration for a Europe efficient in resource utilization", which addresses the need for their countries to change to a regenerative circular economy. In 2015 the European Commission launched the "circular economy package". According to Circular Europe Network (s. d:9), "the concept of circular economy refers not only to recycling, but also to the 3Rs (Reduce, Reuse, Recycle) and goes beyond the problems of waste; that is, the circular economy implies a closed cycle management. This means that all the natural resources, energy and raw-materials, shall be reduced in production and that its use and reuse should be optimized.

Thus, the circular economy aims to find a new economic paradigm that integrates environmental concerns and opens the way for new, more sustainable business models, with or without financial intermediation.

In 2016 the Commission has launched "The future of the EU collaborative economy – Using scenarios to explore future implications for employment", which recognizes the potential of collaborative economy in creating new sources of income, offering benefits for consumers through new business, by temporary use of goods and services, such as accommodation, sharing of cars, bicycles, televisions, lawn mowers, drills, appliances, clothes among others Bock et al (2016).

"Companies are moving towards providing services with their products rather than selling them, and business models based on online platforms, once called ' collaborative economy ', are becoming mainstream". Bock et al. (2016:16).

To Botsman and Rogers (2010) the collaborative consumption is divided into three systems: product service systems (SSP), redistribution markets and the collaborative lifestyles.

The collaborative economy also includes non-profit activities for public and social innovation services, such as social cohesion, common property, and collective benefits. Responsibility and sense of community, as far as sharing and solidarity, are regarded as common values related to environmental sustainability.

3.2.4 New Collaborative Business Models In Fashion

New business models have emerged lately related to sustainability such as the share of clothing, fashion libraries and clothing exchange fairs.

The concept of shared wardrobe is increasingly gaining followers in several countries. In English it's called Fashion Library, in Spain it is used the name Ropateca, in Brazil either Modateca, or Roupateca are common names. In Portugal, for the moment, still there is no history found.

In Italy, in Milan and Brescia, the company EGO, Ecological Wardrobe Organizzato, also follows the eco-concept for shared fashion products, Vezzoli (2010). EGO offers 365 different clothing pieces per year, with eight styles ranging from classic to casual, romantic, diva, dandy, ethnic sports and technical. There are two collections a year: a fall/winter and spring/summer. Each with 120 pieces. Registered customers go to EGO once a week and are entitled to a look for every day of the week. The monthly value is 86 euros per month plus an annual subscription of 89 euros. Customers do not need washing and ironing the clothes before returning them. In Germany, in Hamburg, the Kleiderei follows the same concept of sustainability, with the shared use. Customers buy a 14 euros monthly ticket and customers can borrow a couple pieces of clothing a month. The clothes must then be returned clean, after seven days. The slogan of the store is: "lend as if to a friend". Customers can try out new styles and quality clothes with low prices.

In Amsterdam, in the Netherlands, one of the best-known Fashion Libraries is Lena store in which customers make a subscription worth 19.95 euros monthly, and have at their disposal high quality and vintage clothing of famous and ecological brands. The slogan is "Collect moments, not things." The clothes should be delivered clean. The store receives donations of clothes in good condition.

In Copenhagen, the Fashion Library Resecond was inaugurated in 2012. It has about 200 members and can change their own dresses having a stock of around 300 pieces. Those who are interested pay for six months 600 Danish kroner. To become a member it is required to bring clothes in order to contribute to the stock of the library.

In Helsinki in Finland the Fashion Library was founded in 2011 and has 750 clothes, being most of Finnish fashion designers. Today it has about 100 members. This library offers three types of associations, ranging from 160 to 460 Euros for a period of six months, Pedersen, et al., (2015).

In Brazil, in Sao Paulo, the House of Bubbles follows the same concept of library of clothes, who preferred to call "Roupateca". The space has more than 100 clothes and accessories. There are Brazilian brands like Animale, Cris Barros, Le Lis Blanc, Osklen and Reinaldo Lourenço, and international brands, like Comptoir des Cotonniers, Cristian Dior and Zadig & Voltaire. Works by subscription, in the amount of 100, 200 or 300 reals (approximately 23, 46 and 67 euros);

clients can withdraw from one to six pieces at a time, and these must be returned clean within 10 days. The space also features self-service laundry.

In Barcelona, Spain, the Ropateca, with the same concept, is located in the Raval district. The space has 400 pieces of clothing and different accessories. It has vintage style, contemporary, for parties and casual use for all season's clothes. Associated customers pay a 15 euro value. They can take three pieces of clothing per month. In this case, must also bring clean clothes. They have the option to pay 20 euros and do not need to give clothes clean. Another alternative is to pay 5 euros and rent one piece per week.

According to Botsman and Rogers (2011), regardless the kind of return, the redistribution market aims to stimulate reuse, reducing waste significantly. The optimization and the reuse of consumer goods, as clothing, increases the life of the product thus reducing the waste in landfills.

3.3 Fashion Library: Exponential System Design for sustainability in fashion design

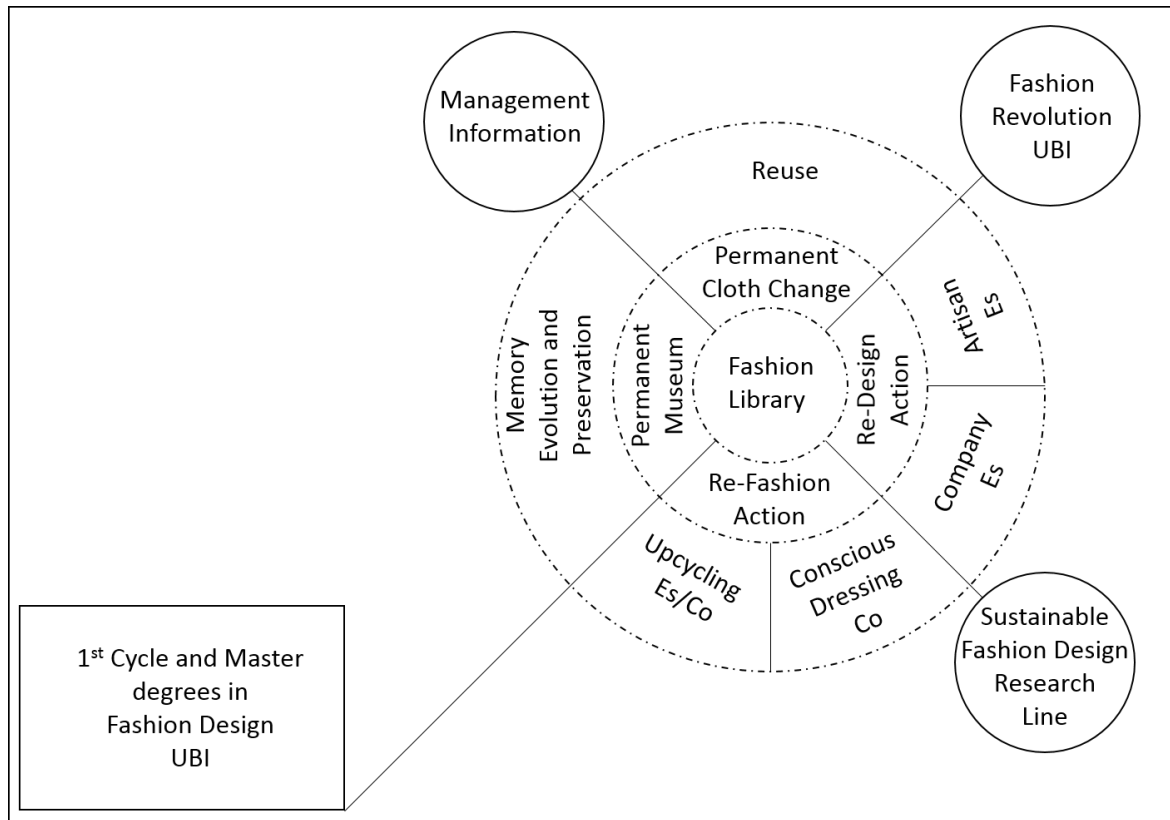
3.3.1 Sustainable Business Model (Sbm)

According to Vezzoli (2010:55), a Sustainable Business Model (SBM) of product-service (Product-Service System PSS) consists in the introduction of the innovation of subsystems and is the "result of an innovative strategy that shifts the centre of business from the sale of products to offer them and services systems that, together, can satisfy specific demands".

This supports the business model of Exponential System Design for Sustainability in Fashion Design, being a part of the empirical research, with a local application in Covilhã, Portugal, with the provision of collaborative and sustainable eco-efficient services in fashion products, which can be reproduced entirely or partially, in other places and contexts, adopting for that the modularity as adaptive feature. So it is Re-thinking, Re-designing, Re-educate, Reduce, Reuse, and, in addition, share and preserve the work of students of 1st Cycle and master's degrees in Fashion Design at the University of Beira Interior (UBI), in an exponential system that will enable to make progress in all dimensions of human, social, ecological, economic, environmental and educational character. According to Bock et al (2016), education is seen as having a main significance in contributing to the development of a dynamic open system that interacts with society. To Manzini (2008:96) it is of major interest to "participate in building shared visions and scenarios and combining existing products and services to support the specific creative community".

Exponential system design for sustainability in fashion design.

Figure 3.1: Exponential System Design for sustainability in fashion design



Source: Author, Solange Fernandes, (2017)

The aim of this project is to create exponential systems innovations in the method of production with a view to socio-environmental valuation of goods and services (PSS). This will be brought to effect through systems interconnections that generate other systems, fed with radical innovations guided by the concept of sustainability. The approach will have a holistic method with eco-efficient service delivery and the promotion of students' interaction with the community via the product-service system (PSS).

As you can see in Figure 1, the exponential system design in Fashion Design proposes an intervention and the interaction of the Fashion Design courses in (UBI) with the community. Since it is the case of a new model of production and consumption needs to be behavioural change of community. For that, we need to re-educate students and society to adopt the requirements of sustainability. We need to encourage students to use the circular methodology in the new collections and encourage the community to join the new models of consumption of fashion products, without owning them.

The promotion of social innovation plays a key role in the accession of the students and community to new challenges of circular economy. For this, we organized in UBI the Global

Fashion Revolution Movement with the goals of raising awareness and enhance the actions directed to the conscientious consumption

Fashion Revolution is an international movement created after the collapse of the Rana Plaza building in Dhaka-Bangladesh, on 24 April 2013, where operated five garment industries. 1,138 people died and more than 2,500 were injured. The Fashion Revolution exists in more than 90 countries, including Portugal. The movement aims to collect transparency in the chain of production of the fashion products, being considered the second industry with greater social and environmental impact. The abuse in the use of natural resources and the exploitation of labour in underdeveloped countries, the pace of production and product consumption that results in tons of used clothes thrown in landfills with severe emission of methane gas, should be increasingly reported and corrected.

The Fashion Revolution event in UBI, the first promoted at a University in Portugal, as part of the project Fashion Library actions, have the purpose to bring together teachers, students, companies, professionals and the local community to discuss the conscious consumption and sustainable development. In fact, it would be a continuous movement promoting collaborative actions between the students and the community, comprising the thematic areas of sustainability, social innovation and creative collaborative economy, with the purpose of fostering the collective consciousness of social welfare commitment in its different (social, environmental, cultural and economic) dimensions.

3.3.2 Fashion Library: A Model of Business (Pss)

The Fashion Library is a project of sustainable community-oriented public. Will borrow clothes and accessories created by the students of the 1st and 2nd cycles in Fashion Design (UBI), which are stored without visibility.

The Fashion Library will register, organize, advertise on the Website, use and promote the interaction of these products resulted by academic work with the society. The society will act as a final consumer, and may thus contribute to the further improvement of the student's work through information management by a computer system.

In the Fashion Library project at Covilhã, all the works of the students will be photographed and published on the site. The collaborations aimed at articulating interrelationships between University, students, companies and society with the active, creative and conscious participation of all these agents, in the benefit of sustainability. The region's textile companies sponsor the fabrics for students' collections, but they don't know the products that were developed by the students. Through the information management, companies not only will be able to see the final product on the site as they will get their due credits for the collaboration.

Creative Collaborative Circular Economics, Exponential System Design for Sustainability in Fashion Design

This initiative results from a new culture in Fashion Design, more wide, expressive and interactive between the creation, production and community. This will enrich the creative scientific production in the areas involved. Will stimulate the social innovation based on sustainable awareness, supporting the transformation of consumer behaviour towards sustainability. According to Rifkin (2016:274), "decrease compulsive consumption, optimize the economy and stimulate a more sustainable way of life is not only praiseworthy but essential if we are to ensure our survival." Baloch and Bridges (2003) also highlights the importance of a new awareness for the opening of new ecological dimensions.

The exponential system design of the Fashion Library will include the following elements:

Museum: it will work on a part of the Fashion Library in which the coordinated concept of each collection will remain and may be borrowed for special events. The new collections of the students will be exposed for a period of one year, to participate in parades and events. Fashion is a creative cultural representation in constant transformation and reinterpretation. Is of great importance to preserve the memory and narrate the evolution of what was and is created at the University along time.

Re-Fashion: it will be an eco-efficient service delivery activity. With it, social activities among students of Fashion Design and the community, focused on creation and conscious consumption of fashion products, dressing creatively and sustainably will be promoted. Students will be made aware of developing products based on circular methodology. The main focus will be the upcycling and codesign, to enable interaction with the community in the process of creation. Example: once a month it will be promoted in the UBI a workshop where the community could take clothes to adjust and transform. Whereas the lack of knowledge of the body biotype is one of the factors that leads to the accumulation of clothes in the closet, it will also be promoted workshops on topics such as: personal style, body Smart wardrobe biotype and others. Enhance personal style elevates the self-esteem and reduces compulsive shopping. Wardrobe smart is to use what's in the cupboard and know to combine the pieces to assemble several different looks.

The Re-design will provide consulting and advisory services to companies and artisans to add value to the products and raise your market potential.

Swap clothes store (swap market) is permanent: Sustainable Project with the slogan: "If you don't want to change you can donate. If you do not have to swap you can take ". It won't have profit and will act as a space with a view to increase the product life cycle. This means the reduction of expense across the value chain, starting from raw materials to disposal. The store will work with clothing, accessories and footwear to be exchanged by people. Rule: Change clothes, while the number of pieces placed in the store are in good condition and clean.

The concept of cloth-trading is inspired by the new consumer trends as "Swishing Party." This new fashion, as a new way to exchange clothes that are no longer used in the closet, has been already extended to several countries like Brazil, United States of America, South Africa and China. Already promotes events such as "Clothing Exchange", which takes place in several countries, the "Lady Clothing Swap, in Oregon, in the US", the "Pink Cow Clothing Swap" in Tokyo, Japan, and the "Fashion Reloads Clothing Swap ", in Berlin, Germany. In Portugal, Lisbon, has excelled the "Swap Market ", promoted by the "Fashion Revolution" movement. The change allows people to always be wearing different clothes, however, without buying them, Gansky (2011). According to the "Circular Europe Network Sd", the shared consumption will cause a real evolution of behaviours, towards sustainability, pointing to the substitution of products by services. That is, rent or lend clothes instead of buying them. This will increase the life of the product and reduce the accumulation of waste in landfills and on the ground.

According to Belk (2013:5) "sharing makes a great practical and economic sense for the consumer, the environment and the community."

The UBI is sorted by "Regional strategy of smart specialization, Norte2020.pt" as one of the centres of competence in the field of culture, creation and fashion. The Fashion Library of UBI repeat this role, advancing in the field of circular economy and collaborative creative economy. The sharing of common goods, anyway, it's a way to change, to overcome outdated behaviours such as hyper consumption which enshrined the idea that "I have, therefore I am". In the collaborative consumption economy, it can be said:

3.4 Conclusion

This article presents the theoretical elements articulated the new business models for sustainable development in the fashion industry, such as collaborative creative economy, circular economy, product-service methodology (Product-Service System, PSS). Notice that all these concepts and practices, especially the creative collaborative economy, are all quite recent, as is that of sustainable development enshrined in Rio 1992. The circular economy methodology, for example, was created in 2010. So it is in construction fields that require new business models induced by social innovation in the field of Fashion Design. This is exposed in the "exponential system project for sustainability in fashion design", created by the researcher, and that will be deployed in Covilhã, Portugal. It will allow to explore the opportunity to host an innovative and integrated project as a response to the challenges posed by regional, national, and global public policies. Deployed through a collaborative practice between community, businesses and consumers, will give the citizenship, the opportunity to enjoy the multidimensionality of sustainable development in its three dimensions: Social-promotion of quality of life and well-being; Economic integration of collaborative and solidary creative economy with active and conscious participation of all agents, which attracts and retains

population and improves the image of the city; and environmental: promoting good environmental and eco-efficient practices.

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4. Collaborative Economy: Case Study of New Business Model

Sustainable development is directly related to the economic model of production, distribution and consumption. Collaborative consumption has gained worldwide strength through new business technology models, offering shared use products and services. The purpose of this paper is to explore a multiple case study Collaborative Consumption in the fashion industry. It addresses the Product Service Systems (SSP), Redistribution Markets and Collaborative Lifestyles.

Methodological approach: It is based on a bibliographical survey of several business models and classification in the concept of collaborative consumption. It is concluded that business models of collaborative consumerism in the area of fashion are growing and there are several alternatives to be explored, both for the user and for the investor.

Collaborative consumption can be considered more sustainable than individual consumption, since it increases the use of fashion products (clothing and accessories), not requiring the need to produce new.

The article, which deals with collaborative economics, with a focus on collaborative consumption, is a scientific contribution to the recent economic phenomenon.

4.1 Introduction

The linear industrial economy, based on the production and sale of the new products, generated the depletion of natural resources. The fashion products, in this traditional process, is among the most consumed: people buy more than they use and often discard products with the label. "“Large amounts of non-renewable resources are extracted to produce clothes that are often used for only a short time, after which the materials are mostly sent to landfill or incinerated. More than USD 500 billion of value is lost every year due to clothing underutilisation and the lack of recycling. Furthermore, this take-make dispose model has numerous negative environmental and societal impacts EMF (2017)”. This has led to new concepts and procedures regarding the production, commercialization and consumption of goods, and among them the collaborative economy. The collaborative economy, through new shared business models and the redistribution of fashion products, can increase the period of their use. It intercepts the early discard of the fashion product and reduces the pressure on the use of natural resources, reducing negative impacts throughout the production chain.

Creative Collaborative Circular Economics, Exponential System Design for Sustainability in Fashion Design

From the beginning of the century the collaborative economy has been a more present object of study in the scientific productions and it is perceived an advance in both its understanding and its application. In 2001, Rifkin published the book "The Age of Access," in which he presented the future transitions of economic activities based on access to goods and services through shared use. The term collaborative consumption was consecrated in 2010 with Rachel Botsman and Roo Rogers in the book "What's mine is yours." In the same year, Lisa Gansky created the term Mesh, which refers to interconnectivity through digital technology, used to give to people access to goods and services. OuiShare Academy is a global project with a very ambitious goal: to make the economy more collaborative, with impacts and potentials understandable and accessible to all:

"OuiShare is a global community empowering citizens, public institutions and companies to build a society based on openness, collaboration and sharing, (...) OuiShare Fest is an international event that gathers entrepreneurs and social innovators, non-profit and business leaders, grassroots activists and public officials."

Already in 2011, Time Magazine pointed to Collaborative Economy as one of the 10 ideas that will change the world (Walsh, 2011).

"These kinds of phenomena are going to continue to spread in the years ahead, and as hundreds of millions of people shift large part of their economic activity to the sharing economy, they will change the course of economic history (Rifkin,2014)."

In 2016 the European Commission launched "The future of the EU collaborative economy - Using scenarios to explore future implications for employment". It recognizes the potential of the collaborative economy in creating new sources of income and benefits for consumers through new models of businesses for the temporary use of goods and services, such as lodging, car sharing, bicycles, televisions, lawnmowers, drills, among others.

For Manzini and Vezzoli (2008), shared uses are ways of optimizing the useful life of the products because they reduce the need for new products, resulting in less environmental impact. Tukker (2004) complements, in saying that this reduces the amount of products discarded, being able to reduce in 50% the environmental impact, when compared with the individual use.

The collaborative economy opens the way for new, more sustainable business models. For the Europe Network Circular (S.D.p.9), Collaborative Economy "refers to optimizing the use (or even production) of a product or service through the use of sharing. Among other things, collaborative economics questions the effectiveness of needs and the indispensability of satisfying them through the use of material resources. "It is based on the hierarchy of multi-R's: Re-thinking, Re-drawing, Re-reduce, Reuse, Redistribute, Repair, with a view to sharing and preserving the social, economic and environmental dimensions.

Collaborative economics is comprehensive and adaptive in several areas. It includes: Collaborative Consumption; Collaborative Production; Open Knowledge, Collaborative Financing, Open Government and Horizontal Organizations, Exchange of Value Systems - Stokes et. al. (2014).

This article aims to present new business models that fit the collaborative consumption. Botsman and Rogers (2011) divide collaborative consumption into three systems: Product Service Systems (SSP), Redistribution Markets, and Collaborative Lifestyles.

4.2 Literature Review

4.2.1 Collaborative Consumption, Product Services Systems (SSP)

The Products and Services System (PSS) allows sharing the products of a company. Users pay for the use of the product without needing to have it.

Businesses with the shared wardrobe concept Fashion Library are increasingly earning followers in several countries. In English is called Fashion Library, in Spain uses the name Ropateca, in Brazil it is named Modateca, Roupateca. These business models are expanding to the whole of Brazil. In Portugal, to date, there is no record of a business model with these characteristics.

These new business models work through a signature system similar to Netflix and allow customers to pay a monthly service fee. There are companies that offer various plans so that one can access a fixed number of garments on loan basis at any time. These models are an attractive offer for users who want frequent changes of clothes.

Brief operating history

In Germany, in Hamburg, Kleiderei members acquire a monthly ticket of 14 euros. They are entitled to one coordinate per month. The clothing should then be returned clean after seven days. The store's motto is: "lend it to a friend." Members can try out new styles and wear quality clothes with low prices.

In Amsterdam, the Netherlands, one of the most well-known, Fashion Library, is the Lena store, in which members make a signature worth € 19.95 a month. And they have at their disposal high quality clothes, vintage, famous brands and ecological brands. The slogan is "Collect moments, not things." The clothes should be returned clean. The store receives donations of clothes in good condition.

In Copenhagen, the Resecon fashion library opened in 2012, has about 200 members who can change their own dresses, with a stock of around 300 pieces. The members pay a fee, for six

months. When they become members they bring clothes to contribute to the stock of the library.

In Helsinki, Finland, the fashion library was founded in 2011; account for 750 pieces most of them from Finnish fashion designers and has about 100 members. The fashion library of Helsinki offers three types of associations, ranging from 160 to 460 euros, for a period of six months, Pedersen, et. al., (2015)

In Barcelona, Spain, Ropateca, with the same concept, has 400 pieces of different clothes and accessories. It has vintage and contemporary styles, for party-wear and casual wear for all seasons. Customers are associated and pay a value of 15 euros. They can carry three pieces of clothing per month. In this case, they must also deliver clothes clean. However, they have the option of paying 20 euros and do not need to return them clean. Another alternative is to pay 5 euros and rent one piece per week.

In Italy, Milan and Brescia, the company EGO, Ahoroupa Ecológico Organizzato, also follows the concept of shared fashion, Vezzoli (2010). The EGO offers 365 different outfits per year with eight styles, ranging from classic to casual, romantic, diva, dandy, sporty, ethnic and technical. There are two collections per year: one fall / winter and one spring / summer, each one with 120 pieces. Registered customers go to EGO once a week and are entitled to a look for each day of the week. The monthly amount is 86 euros per month plus 89 euros annual subscription. Customers do not need to wash or even ironing to return them.

In New York, United States, Gwynnie Bee offers a signature clothing service for the day-to-day in the 'plus size' female segment. It offers customers more than 4,000 styles and various subscription plans. Members can keep items for as long as they want, then just send them back to get other items of interest. The brand was founded in 2011 and decided to invest in this niche market due to the fact that 75% of the US adult female population have size 44 - or above - and that 67% of the total population wears size 48 or above. The hygiene of the clothes is made by the brand itself.

Rent the Runway Unlimited Company charges a monthly membership fee. The membership renews automatically and is charged on the same date every month, and the member can cancel at his own discretion. Members have more than 350 high-end designer items for \$ 139 a month, and they can rent three designer dresses, blouses, skirts or accessories at a time, and keep them for as long as they like. RTR College Rep Program is a specific program for students. The hygiene of the clothes is made by the brand itself.

YCloset, founded in 2015, is a Chinese clothing-sharing platform where users pay a monthly subscription fee to rent clothing and accessories. YCloset charges a monthly membership fee of 499 yuan, which allows users to rent unlimited clothing and accessories through their mobile application. According to YCloset CEO Liu Mengyuan, the clothing-sharing business will become

commonplace on e-commerce platforms in the future due to the low value of membership and the huge variety of styles offered by the brand. YCloset also partnered with the luxury brand of Kenzo and Acne Studios. The Laundromat service chain also is a strategic partner.

4.2.2 Collaborative Lifestyles

Collaborative lifestyles refer to business models with shared systems of leisure, work and learning spaces. People with common interests seek to divide and exchange tangible and intangible assets.

In, São Paulo, Brazil, the House of All is an example of a modular business model with a wide range of products and services within the collaborative lifestyle. Modes: Bubbles Lab - House of Bubbles is a space for sharing fashion, design, innovation and technology. It works as an experimental system, prior to purchase. There is also the House of Work, which is an office equipped with the following modalities: House of Learning and House food, for the chefs, where they rent the facilities per day; Cotattooing Space is a framework for the tattoo artist to create and carry out their work. House of Gaming is a gaming station. House of All members can also enjoy Hot Tub and Bar.

The House of Bubbles follows the same concept of clothing library, which they preferred to call "Roupateca". The space has more than 100 clothes and accessories. There are Brazilian brands such as Animale, Cris Barros, Le Lis Blanc, Osklen and Reinaldo Lourenço, and international brands such as Cristian Dior, Comptoir des Cotonniers and Zadig & Voltaire. It works by subscription, in the amount of 100, 200 or 300 reais (approximately, 23, 46 and 67 euros); customers can withdraw from one to six pieces at a time and these must be returned cleaned within 10 days. The space also has a self-service laundry.

In 2017 the House of Bubbles started a system of parts concession and remuneration. When a lease part is rented, the owner receives a value. The values are set according to the part value. The clothes can be picked up in São Paulo and delivered to House of Bubbles in Rio de Janeiro. The Brand also intends to operate with an online booking system and members can receive the clothes at home for little additional value. Mini-Bubbles LAB is a collection for babies and children with self-service laundry. Business is expanding. There are already Houses in Rio de Janeiro, Belo Horizonte and the owner of this brand intends to open new units in Curitiba and Ribeirão Preto and, in the future, in France, Germany, United States and South Korea.

4.2.3 Redistribution markets, p2p platform

In the redistribution markets, second-hand goods of unused private property are redistributed through online platforms, social networks or physical stores. In this case, there is possession of the goods that can be permanent or temporary. The transaction can be financial or direct exchange of product. According to FEM (2017) the resale market for second-hand products

online has been growing more than four times faster than the traditional second-hand store market (35% a year versus 8% a year).

4.2.4 Child Segment

Mybabystock, located in Mahón, Balearic Islands, Spain is an online child care platform for families concerned with financial and environmental sustainability. It is based on the model of reuse and redistribution of clothes and accessories for children, as well as rent of articles such as baby strollers, cribs, safety seats, appliances (sterilizers, bottle warmers, kitchen robots). Among the brands offered are Baby Comfort, Bebedue, Buggypod, Casual Play, Chicco, Firstwheels, Fuli & C, Jané, Micralite, OK, Baby and Quinny. Mybabystock connects the source and demand, guaranteeing the quality of the products. In this case study the child segment was highlighted because it is one of the sectors with the highest activity to be explored within the collaborative consumption. The market opportunity can begin with redistribution through selling the rental of maternity clothing and maternity kit unfolding in all phases of the child's growth.

4.3 Final considerations

The innovation of new sustainable business models presents many possibilities for exploration. The redistribution market has great potential because it has low risk and presents good rewards for investors. It intensifies the use of fashion products without the need to produce new products. "The starting point for a sustainability innovation is to try to decouple the success of a business from the relentless expansion of material consumption by seeking to minimize resource depletion, pollution and associated effects such as climate change" (Fletcher and Grose 2011, p.100). There are many success models of redistribution. Ebay, Amazon, Gumtree and Craigslist are all examples, especially for P2P transactions that connects consumer to consumer, being able to sell or buy, rent or exchange. Collaborative consumption on P2P platforms works with reputation mechanisms that can build trust among users. To sell a product it may be charged a membership fee to the platform; if the product is sold, a fee will be charged on the final value. These platforms that have no physical inventory and in which users own their clothing have great potential for scalability with exponential growth. They can be implemented anywhere in the world, at reduced cost for deployment. The great investment is made in technology, insurance and partnership with companies providing services such as washing, arrangements, delivery and others.

OLX and Custo Justo are P2P platforms that act as classified ads online. These connect seller and user, without charge. They do not offer evaluation system and are not responsible for fraud. The PSS model per signature system, although the client has the possibility to cancel whenever he wants, generates user loyalty and develops a lasting relationship based on loyalty.

Companies can also exploit innovation through eco-efficient systems. Rent the Runway Unlimited is an example of using non-toxic product hygiene, delivery and return reusable packaging, protective clothing plastic cover. All are returned for recycling.

There are many possibilities to be explored in the collaborative lifestyle with hotels in tourist locations, such as ski resorts and national parks, among others, that can offer sports clothing and other equipment.

Regardless of the business model, collaborative consumption can represent a significant change in behaviors to increase the usage time and lifespan of the fashion product. It is worth mentioning that the business models presented in this article all value the quality of the products.

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5. Circular and Collaborative Economies as a Propulsion of Environmental Sustainability in the New Fashion Business Models

The objective of this work is to explore convergence and divergence between business models of circular and collaborative economies in fashion industry and the benefits to sustainable development.

The methodological approach is exploratory through bibliographic review and case study of two business models. The first, Rent the Runway, makes use of the Services and Products System (PSS), being a circular model using eco-efficient services with the potential to replicate and to compete with the 'fast-fashion' industry. The case study was done using data from Rent the Runway website. The second, Wardrobe, a P2P platform whose study was conducted with personal information with the company co-founder Germanno Teles. Wardrobe business models have a high potential for scalability, as they can be replicated anywhere, have no physical inventory, as users own their clothes.

Thus, circular economy is considered to be holistic and adaptive, representing an evolution of the linear economy through the perception and need of a new sustainable strategy in response to the environmental degradation caused by the traditional linear economy. Collaborative economy can be considered an environmentally sustainable socio-economic system, built through the use of digital networks to connect and share goods and products, as well as human, financial and physical capital.

5.1 Introduction

The concept of sustainable development ensued from the ECO-92 conference. By 2015, all countries have committed to reduce emissions in defence of climate and salvation of the planet [1]. The promise was to limit the global average temperature increase up to 2 °C (Paris Climate Change Agreement). The main objectives of COP22 2016, and COP23 2017, were to follow the application of the Paris Agreement - the period of this agreement will go until 2030 [2]. All countries will have to act to achieve the objectives, being vital to transform the current model of production and consumption: Make it sustainable.

Thus, this paper aims to analyse the points of convergence and divergence between business models of circular and collaborative economies in the fashion industry and the benefits to

sustainable development. In this context, textile and apparel industry is a major sector in the global economy, providing jobs to more than 300 million people worldwide [3], but it is considered the second most polluting sector in the world following oil.

The textile and clothing production system not only depletes and degrades natural resources, but also uses dangerous substances affecting workers and consumers health. The textile industry relies mainly on non-renewable resources, such as oil to produce synthetic fibres, fertilizers and chemical products, like insecticides, herbicides and fungicides in the cultivation of cotton, for example.

The actual production and distribution model operates in a linear fashion, accumulating raw materials and end products that could be reused; according to [3], page 3, "large amounts of non-renewable resources are extracted to produce clothes that are often used for a short time, after which they are mostly sent to landfill or incinerated. More than USD 500 billion of value is lost every year due to underutilisation clothing and the lack of recycling. Furthermore, this take-make-dispose model has numerous negative environmental and societal impacts".

As Ellen MacArthur Foundation (EMF) reported in 2017 [3], the gas emitted by the textile production system worldwide is around 1.2 billion tons per year. These and other problems were further aggravated by the 2000s, when fast fashion chains came up, with a fast pace of production and consumption, allowing manufacturing fashion products with shorter life cycles.

The fast fashion industrial production is governed by financial results: increase production and generate higher profits. Consequently, in addition to ecological harms, social problems due to exploitation of cheap labour and poor working conditions in underdeveloped countries also rise. The fast fashion chain has generated easy access to low price fashion products [4]. Thus, clothes became disposable, increasing textile waste. According to [5], "discard economy contributes significantly to climate change." This model has negative impacts, which inevitably leads to potential environmental catastrophe increase.

According to the aforesaid and identified info gaps in the scope of sustainable growth, the present exploratory work contributes to the improvement of knowledge on convergence and divergence between circular and collaborative economy models, and to foster the analysis and benefits identification for sustainable development. Following [6], there is a lack of studies that analyse the wide range of activities and business models in the collaborative economy.

5.2 Literature Review

5.2.1 Circular Economy

The Circular Economy is pragmatic, grounded and contextualized in the planet current reality. Its purpose is to preserve natural resources, optimize the ones available to us and guarantee those essential for the future.

In 2012, the report “Towards circular economy: economic and business rationality for an accelerated transition” published by the EMF [7], and also, the European Commission published the “Manifesto for a Resource-Efficient Europe”, which addresses the need for Europe to move to a circular, regenerative economy. In 2015, the European Commission launched the “circular economy package”. According to the Circular Europe Network, the concept of circular economy refers not only to recycling, but is part of the basic tripod of the 3Rs: Reduce, Reuse, Recycle, and enabling to reach the hierarchy of multi-R: Rethink, Redesign, Repair, Remaking, and Redistribute, Recover [8].

The circular economy goes beyond the waste problem: assumes a closed cycle management of all natural and energy resources, where inputs are reduced in production, use and reuse. It proposes environment, nature, society and economy integration.

EMF presented in 2017 [3], the report “A New Textiles Economy: Redesigning Fashion's Future” showing a vision for a new long term integrated system, based on the principles of circular economy. The goal is to transform the textile and apparel economy into an opportunity that integrates better economic, social and ecological outcomes. This is a great ambition. It requires a broad change:

- 1) Raw material obtaining, with reduction of natural resources, as water, use of renewable inputs, avoids toxic substances.
- 2) Textile production, disposal of synthetic fibres derived from plastic and toxic detergents, dyes and bleaches; fabrics and fibres which retain their quality during use and which may be reusable.
- 3) Creation of fashion design with an Eco-design approach, to avoid environmental impacts associated with clothing during its life cycle, zero waste, multifunction, modular, and customization design [9-10]. Upcycling allows to create new clothes with those to be discarded and waste raw materials, such as patchwork, fabric leftovers. Upcycling is also a market opportunity to increase the circularity of clothing. Restrict the use of blended fabrics to an ease end of the line recycling.
- 4) Clothing manufacturing sector should make use of innovative technologies.
- 5) Distribution by means of bioethanol, biodiesel, electric, hybrid low environmental impact transportations. Use of less environmental impact packaging. New point-of-sale models such as “fitting showrooms” store tester or the pop up brand can be presented in partnership with other physical outlets, the products are exposed for a short period and follow another itinerary to make the brand known and the consumer purchasing products through e-commerce [9].
- 6) Firstly, when wearing clothes, consumers should be aware of the production system, use of natural resources and labour exploitation: “Ask the companies who does my clothes? (Fashion

Revolution, 2018 [11]), "rethinking their consumption habits and asking themselves why they have so much clothing in the closet and at the same time have nothing to wear, why always the need to buy something new? Investing in the style consulting service may be a good option, since many clothes are discarded due to lack of knowledge of the body biotype. The staff helps to choose clothes that better dress each body type, make repairs and transformations of clothes, choose collaborative consumption, redistribute through online platforms to sell, exchange, lend and rent, do it yourself, and buy quality products with durability.

7) For the disposal, the solution still is the redistribution through new business models, since 95% of discarded clothes have good wear conditions. Keep the products collected in the country, as when sending them to underdeveloped ones will cause difficulty to improve local economies. Recycling is an end-of-pipe option, turning these products into by-products. Currently, with excess production and consumption of fashion products and wear reduction, often the garments are still discarded with the label.

The circular economy encompasses the collaborative economy also called shared economy, through the access of goods and services that allow the increase of wearing clothes by the collaborative consumption.

5.2.2 Collaborative Economy

The collaborative economy has exponential growing "the relevance of the phenomenon is linked with sustainable consumption that encourages resources efficiency, waste reduction, better development and surplus reuse of products due to overproduction and overconsumption" [12].

According to [8], page 22, the collaborative economy covers several areas: "collaborative production (easing the design and production of goods through bricolage, fablabs and marketspaces), collaborative consumption (networks for exchange, rental, loans, donation or interchange of goods and services) and collaborative development". In 2001, Rifkin published the "The Age of Access" book, in which he presented future transitions from economic activities based on access to goods and services through shared use or collaborative production [*apud* 13]. The term collaborative consumption was consecrated in [13]. Collaborative consumption involves trading, lending, negotiating, leasing, donating and exchanging from person to person (P2P). In [13] the collaborative consumption is divided into three systems: Product Services System (SSP), Redistribution Markets, and Collaborative Lifestyles. Lisa Gansky, is also driving the collaborative economy with her work called "Mesh" [5]. This is a term that refers to the interconnectivity of people through the digital technology used to provide access to goods and services. For [14], collaborative economy is a way of doing business; it is an exchange of social value that allows access rather than possession. The collaborative economy is formed by decentralized P2P networks that make use of idle assets and create new markets. One move

that is driving the collaborative economy is OuisShare, which began in 2011 and has expanded. "OuisShare is a global community empowering citizens, public institutions and companies to build society based on openness, collaboration and sharing" [15].

In 2016 the European Commission (EU) launched "The future of the EU collaborative economy - Using scenarios to explore future effects for employment." It recognizes the potential of collaborative economy to create new sources of income and benefits for users through new business models for the temporary use of goods and services, such as housing and sharing [16]. Also, in 2011, Time Magazine was pointed the Collaborative Economy as one of 10 ideas that will change the world. According to [13], collaborative economy has become more popular since the global financial crisis of 2008; the recession and unemployment drove consumers to use platforms for sharing goods and services. With increased use of smartphones with mobile internet access, this resulted in an explosion of software applications, (apps). The main users, drivers and influencers of the collaborative economy are the "Millennials", born from 1982, as they dominate digital tools. The motivations refer to the economic advantages and interpersonal benefits of social interaction, trust relationship through the reputation generated by user assessment.

The distinction of collaborative economy is that it involves the use of internet technologies to connect groups of people in order to make better use of goods, services, skills, create collaborative companies and projects.

5.3 Case Study: Circular and Collaborative Business Models - Rent the Runway (SSP) and Wardrobe (P2P)

According to [17], "Companies may have different reasons to review their business models. Some can exploit value-added occasions by switching to circular design, providing more durable and efficient products, retrieving end-of-life ones, etc. For others, the business model may be the start of new service opportunities that foster greater circularity of products". This was the case of Rent the Runway, founded in 2008, a traditional like business model of rental of party dresses and luxury accessories that, by market perception, started to offer a new service: clothes for the day to day, named Rent the Runway Unlimited, charging a monthly membership fee. This type of offer is characteristic of collaborative economy business models. The unlimited membership automatically renews and is charged on the same date every month, enabling the member to cancel at any time. Members have more than 350 high-end items for US\$159 a month, can rent three dresses, blouses, skirts or accessories at a time, keeping them as long as they like, and have personalized style consulting. The RTR College Rep Program is specific for students.

Clothes are dry-cleaned with non-toxic products. Shipping packages are used by the brand as reused ecological clothing bags. The return of the clothes is free. Members have insurance covering most of the setbacks. Customers also can download the application on the phone as the brand makes use of social networks Instagram, Facebook, Twitter, and Pinterest. There are currently five Chicago, NYC Flagship, San Francisco, Topanga and Washington DC stores [18].

Wardrobe is an app designed to meet the party sector whereby users can make quickly, securely, easily, intuitively and wisely low cost business without initial infrastructure investment. Those interested should photograph the clothes that will be shared, register in the mobile application, post the clothes, giving a brief description and value of them. Wardrobe provides for the possibility of partnerships with outsourced services (delivery, laundry, repairs, etc.) and can also be used by fashion design students, serving as a showcase for the work of future stylists.

The Wardrobe makes use of "Mach" tool, which helps with clothes' sizes. To know if the clothes "fit well" height, bust, waist and hip measures are enough. The Wardrobe Technological Differential is an application version with cognitive intelligence and ability to understand and know the behaviour of users, so that the Wardrobe can suggest clothes in accordance to individual tastes [19]. Culminates with the creation of a Big Data capable of collecting, analysing, interpreting the current data of the platform by the users. Thus, using Artificial Intelligence, one can develop an individual personal style, guiding users in their choices, according to their habits and needs.

Finally, results are analysed, presenting more prominent intended information so that, interpretations, conclusions, limitations and expectations regarding the subject matter of study are developed.

5.4 Discussion and Final Considerations

Rent the Runway is a circular business model with the potential to compete with the fast-fashion business model. It makes use of the Service and Products System (PSS) through the dematerialization of products: it offers a wide variety of quality and design clothing models and eco-efficient services. If it is to be expanded to other countries, it will bring environmental benefits, increase products life cycle, extend the life of materials and minimize the use of natural resources. The financial gain is centralized and strictly follows existing regulations, as taxes, insurance, licensing, etc.

Wardrobe is a P2P platform to reallocate party clothing, keeping in circulation products previously idle or stocked. It operates in a collaborative way, allowing users to monetize clothes without being discarded. It is recommended for special occasions needing durable products that

remain with quality for long time. It offers the possibility of partnerships with outsourced services (delivery, laundry, repairs, etc.).

As the Wardrobe does not have physical inventory, users being their clothing owners, gives it a high potential for scalability, since the business model can be replicated anywhere on the planet. To increase the use of fast-fashion products and to intercept early disposal is the collaborative consumption of exchange platforms and loans.

Circular economy is thus holistic and adaptive, representing a sustainable solution to the environmental degradation caused by the traditional linear economy. Although the circular economy encompasses the collaborative one, it is perceived that both are independent lines of research, with many points of convergence that complement each other. They accelerate the transition to sustainable development through new business models that increase the use of fashion products. But, at a long period, rethinking the entire value chain is needed: clothes will have to be designed to last.

Collaborative economy can be considered as a socio-economical sustainable system built on a digital network connecting and sharing goods and products, and human, financial and physical capital. It originated naturally and consumers became prosumers, creating their own businesses, often for the financial need, opportunity to optimize goods and services, share knowledge, always through an online platform. In the collaborative economy, the economic and financial result is distributed among those involved. In 2016, the EU recognizes the collaborative economy potential [16]. However, collaborative business models, while having all the positive aspects discussed above, are still far from being in line with current regulations.

As study limitations, it should be noted that cases associated to circular and collaborative economies were analysed and that the observations in the adopted methodology are always partial and are not exhaustive in a single study. Other variables can be considered in case analysis, and can be improved and broadened to allow for more detailed information. As proposal for future research, a case-study with more cases and its comparison with the present study is suggested. This can also be complemented by descriptive statistical analysis on the impact on sustainable development.

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6. Fashion Revolution as Promoter of Social Innovation and Sustainability in Fashion

The manuscript titled “Fashion Revolution as Promoter of Social Innovation and Sustainability in Fashion” reference no.RPI-20-02, is accepted for publishing in issue 1/2020 of Leather and Footwear Journal. (See Appendix B)

Fashion Revolution is a global collaborative movement that seeks to increase transparency across industry's production chain and counteract misunderstanding. The movement calls university students around the world to become ambassadors and to become activist designers. Also, students, teachers, businesses, professionals and the community to discuss consumption, sustainable development of fashion and getting millions of people demanding fashion transparency, through brand questioning: #whomademyclothes.

This article aims a fashion week revolution, promoting knowledge as social innovation for sustainability when launching a concept as a business value proposition.

Authors present a CANVAS and Pestle business model to support future implementation of this conceptual idea. [1] [2] [3]

One concludes that design of product-service systems, allied to fashion revolution movement, helps foster social innovation, stimulates circularity, induces behavioural consumption changes, promotes dematerialization of energy consumption, redistribution of idle products, available resources management with social and environmental benefits, through online platform and app.

6.1 Introduction

The fashion industry is considered the second most polluting in the world. The textile and clothing system operates in a linear fashion: large amounts of non-renewable resources are extracted to produce clothing that is used for a short time and is subsequently dumped into landfills, incinerated or sent to underdeveloped countries. These problems worsened even further from the 2000s, when fast fashion chains emerged, and production and consumption increased, thereby increasing social and environmental problems [2].

The international activist movement Fashion Revolution [3] was created following the collapse of a garment industry in Dhaka, Bangladesh, on April 24, 2013, in which 1,138 people died and more than 2,500 were injured. Such a tragedy touched a group of people in the UK who decided to found the collaborative Fashion Revolution movement, Carry Somers was the founder and

director of global operations. In 2014 in the first edition, the movement was organized in several countries of the world and grew every year.

Fashion Revolution aims to make the production chain more transparent to the eyes of consumers and with that, ensure that a tragedy like the one that happened Rana Plaza never happens again. According to the organizers the simple question "Who made my clothes?" contributes greatly to a change in this process.

Bringing the protagonists of the industry to the fore, Fashion Revolution aims to change the narrative around clothing, inspiring positive and permanent changes in the fashion industry.

The death of 1,138 people on one terrible day cannot be forgotten. It is imperative to demand changes that prevent such new accidents, wherever they may be. On April 24 of every year, Fashion Revolution mobilizes the entire fashion chain to question the true cost of fashion and show to the world that changes are possible in the industry segment [3].

The lack of knowledge of the consumers about the production system, the use of natural resources and the exploitation of the labour contributes to the economy of the discard and to the global warming and social degradation. [4]

Fashion Revolution, headquartered in the United Kingdom, is a community-based company comprised of nine people in global coordination, from various fields such as politics, communication, branding and education. They work closely with the Global Advisory Committee to plan and implement the Fashion Revolution campaign each year. [3]

Members are responsible for organizing and managing the primary groups and overseeing Fashion Revolution globally. They work on communication, policy and strategy and fundraising for events.

The Global Fashion Revolution coordination is also responsible for the governance of the movement in each country, through regional coordinators. Currently, there are over one hundred countries that are part of the Fashion Revolution movement.

Fashion Revolution country coordinators (CCs), as is the case of Salomé Areias in Portugal, work voluntarily assuming the responsibilities of organizing the Fashion Revolution event in their respective countries. Its main tasks are: facilitating and distributing Fashion Revolution campaign materials; define communication policy and strategy, in accordance with global guidelines; compile and present annual reports on its impact and evaluate the progress of Fashion Revolution in the country. [3]

6.2 Educational Academic Fashion Revolution

The Fashion Revolution movement invites university students to become Fashion Revolution ambassadors at their universities, organizing events and achievements there. Between March 29 and April 1, 2017, the first edition of the event was held at the University of Beira Interior, the first Portuguese university to join the movement. The ambassador and organizers of the event Fashion Revolution Week at the University of Beira Interior, (See Appendix 1st Edition D1 to D5 , 2st Edition E to E2 and 3rd Edition F of FRUBI), had the collaboration and participation of the course directors, professors and graduation, master's and doctorate students in Fashion Design. [5]

The objective was to raise awareness among consumers, designers, industry, artisans about the true cost of fashion, both social, environmental and economic; create relationships with universities, fashion design courses, companies and encourage production, consumption and circular distribution. Besides, question who made my clothes? [5]

With this, it is expected to sensitize the participants of the event, both regarding social and environmental issues of the fashion industry, in the expectation that they will adhere to the slow fashion, the circular fashion and the change of attitude towards clothing. The first edition was attended by national or international brands that spoke about sustainability in fashion. Brand Natural Cotton Color [6], spoke of the coloured cotton of Paraíba, Brand Away to Mars [7], talked about the creation process open to all. Lala Deheinzelin [8] UNO consultant spoke on 4D: New and savings to activate the transition. Thomas Echkschmidt [9] talked about Conscious Capitalism, among other important speakers. See Conference PROCEEDINGS at [/www.fashionrevolutionubi.com/proceedings-2017](http://www.fashionrevolutionubi.com/proceedings-2017). [5]

In the edition of Fashion Revolution at the University of Beira Interior (FRUBI) in 2018, we believed that in order to achieve sustainability in fashion we need to promote a new way of life through social innovation that involves teachers, students, companies, professionals and the local community in the process to accelerate the transition of the circular economy. Thus, the FRUBI of 2018 is divided into three large panels: [5]

Inner Wellness - Where the sustainable lifestyle is portrayed, from healthy eating habits - avoiding the eating disorders driven by the fashion industry, to the separation and recycling of the garbage generated in the day-to-day; Exterior Wellness - Panel based on aesthetics, beauty care and styling, interconnecting internationally renowned cosmetic brands and regional products thought of female empowerment;

Circular Fashion - After the analysis of consumption and identity established in previous days, the last day focuses on finding established brands in the market that work for a more circular, dynamic, creative and above all transparent fashion industry. [5]

In addition, a competition was held to raise awareness of the academic and general community for the development of sustainable fashion, driven by innovation, design and creativity, to stimulate the creative and enterprising capacity of the competitors, as well as, to spread to the community the guidelines of the development of sustainable fashion products. One of the parts of the coordinator must comply with the guidelines of one of the following sustainability concepts:

The concept of upcycling is simple: it consists of creating new parts from the reuse of other pieces of clothing or leftovers, extending the product life cycle; Zero Waste: The "zero waste" design process offers a cleaner production alternative, aimed at minimizing waste already in the design and modelling phases, providing a new approach to product development, making production cleaner and reducing its environmental impacts, aiming at the sustainable concept of slow fashion; Modular/Multifunctional Clothing: Modular, multifunctional or convertible clothing consists of dresses and blouses with straps that can be configured in various ways or depending on the modelling, transforming the piece into a skirt, scarf, cape, bag, blouse and dress. The event ended with the presentation of a parade with about 400 people. [5]

The Fashion Revolution Week event at the University of Beira Interior - Bachelor, Master's degree in Fashion Design is a pioneering and unique opportunity to explore, in the interaction between students and community, the many issues of the fashion industry such as: workers' rights, transparency in the production chain, global citizenship, sustainable development and ethical business practices. [5]

Together people will question: why a fashion revolution? Who makes our clothes? Where are they made? What is the salary and working conditions? What are the environmental consequences?

From 2015, to 2018 the great differential of this Movement is the direct interaction with the educational sector of the fashion area, offering material resources to support the participation of the students and the community.

The major challenge of sustainable development is social innovation, which requires a well-informed, participatory and collaborative society that better integrates technical-scientific knowledge for environmental, social and economic sustainability. [10]

By connecting design mode courses, these movements also stimulate principals, faculty, and students to rethink the practice of design, designing activism as a tool that can drive transformation throughout the fashion system.

The fashion industry is a global industry with enormous social and environmental impact. The university has a key role in raising awareness of its Fashion Design students and future fashion industry designer. Fashion is not just glamor. It is life and work. Giving students the awareness

and the need to reflect on all this with a view to a new model of creating and producing clothes, this being our contribution to sustainability.

Table 6.1: Sustainable Fashion organizations (In this table are shown only a few of them).

Sustainable Fashion Centre	Clean Clothes Campaign	Ellen MacArthur Foundation [11]	Fairtrade Foundation	Textile Exchange
Sustainable Fashion Centre is a research institute committed to exploring ways to use fashion to drive change through research and collaboration between education and industry.	The Clean Clothes Campaign is a global alliance dedicated to improving working conditions and empowering workers in the global clothing and sportswear industries.	The Environmental Justice Foundation is working to secure a world where habitats and natural environments can sustain and be sustained by the communities that depend on them for their basic needs and livelihoods.	The Fairtrade Foundation's mission is to connect farmers and disadvantaged workers with consumers, promote fairer trade conditions and empower farmers and workers to fight poverty.	Textile Exchange is a global non-profit organization that works to promote the transformation of the industry into sustainable fibres, integrity and responsible standards and supply networks.

Source: For more information visit <https://www.fashionrevolution.org/key-organizations> and key-organizations at site <https://www.fashionrevolution.org>[3]

It is growing both by consumers and the brands that have come to answer the questioning about the origin of their productions. A differential of this Movement is the direct interaction with the educational sector, offering material resources to support student participation.

To transform the world, Fashion Revolution believes in the power to work in collaboration with other activist movements.

The way fashion revolution is working and uniting collaborative thinking for the transformation of the garment industry is in the social issues faced by the environmental workers.

For Manzini [10] cultural activists, grassroots organizations and design activities are converging on a variety of initiatives whose purpose is not to provide immediate solutions to problems, but to arouse interest in these scenarios and to show, in general and in a paradoxical or provocative way that exist different ways of looking at them and solving them. Social innovation in design may be one of them because of the natural need or desire to design supported by digital tools and new social networks. This is the case of the fashion revolution platform with guidelines,

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blog and materials available for downloads. And it works collaboratively in more than 100 countries. The country coordinators always give support on the site during Fashion Revolution week. The movement encourages, do it yourself, upcycling, swap market production, and conscious consumption of fashionable product with value together for all.

Figure 6.1: PESTLE analysis.

FACTORS	ATUAL (consolidated)	FUTURE (emergent)	INSIGHTS LIST
POLITICAL Regulations Regional Regimes and Taxation Government Grants Financing & Fundings	Universities internal policies; Design/platform maintenance fees; Municipal, State Incentives Incubators / Investors Crowdfound;	Prevent or hinder the implementation of the model; High competition, great app offer, strong competitive differential;	Possibility to use other infrastructures, including digital (app); Partners, take the project to startups fairs;
ECONOMIC Cost of labor Economic scenario Demand for raw materials	Maintenance of the platform; Increasing need and awareness of people in saving;	Make updates on the platform / service users; People will look for other ways to save money;	Outsourced or personal encountered or partnered with students with any advantage offered; Use economics as a marketing call to win over people who are not yet into the collaborative lifestyle;
SOCIAL Changes in expectations Specific pressure and interest groups Cultural changes Role of media Social responsibility	Circular Economy and collaborative support groups; Fashion Revolution Movement pressing fast fashion companies and raising the awareness of the population (alternative media) about the economic, social and environmental impacts; International Learning Network of networks on Sustainability (LENS);	Universities adhere to a teaching with more application of the circular and collaborative economy; Fashion Revolution Movement in expansion which will impact more and more the consumption habits of people; International Learning Network of networks on Sustainability;	Actions with students of fashion design to encourage the application of circular economy in projects; To count on the support / partnership of the Fashion Revolution Movement and other pressure groups to actions, publicize and maintain the system; Massive presence in social media; LENS;
TECHNOLOGIC New technologies Effects of internet P2P platforms Need for infrastructures Availability to adopt innovations	Impact of the internet on the organization of people; Strong positioning of facilitating applications / platforms; Existing faculty infrastructure; Young audience at university (Millenius) with ease of adopting novelties;	Collaborative economy on the rise which will redefine people's lifestyles; Need to adapt existing infrastructure and a lot of bureaucracy to be feasible to implement;	Use the internet to publicize the system; Create an online platform p2p; Use online platforms to reach more people and avoid the need for physical and bureaucratic infrastructure; Strategies to initially reach young people who are more willing to adopt novelties;
LEGAL Guidelines Variation in laws by country, state or region	PERSU 2020 (Strategic Plan for Urban Waste);		
ENVIRONMENTAL Carbon footprint Emission reduction Waste Disposal Regulations Social pressure for social responsibility	Agendas for compliance with municipal and regional goals; Stronger pressure groups;	Agendas delayed; Increasing and higher visibility charges;	Seek support for companies and agencies that have a late compliance agenda; Maximize use and delay the disposal of parts in nature; Conscious designers.

Source: Adapted from Sampaio 2017[12]

According to Fuad-Luke [13] Design activists make their "moves" create a critical mass. This can significantly impact the transformation of the clothing industry and our consumption habits.

Fashion Revolution is seen as a promoter of the social innovation of Fashion library P2P UBI, is in the process of development together with the Informatics Department of UBI.

Manzini [10] states that design for social innovation is service design (to design and develop solution ideas that take into account the quality of the interactions involved) and strategic design (to promote and support partnerships between the different actors involved). It also produces significant social innovations, that is, solutions based on new social forms and new economic models.

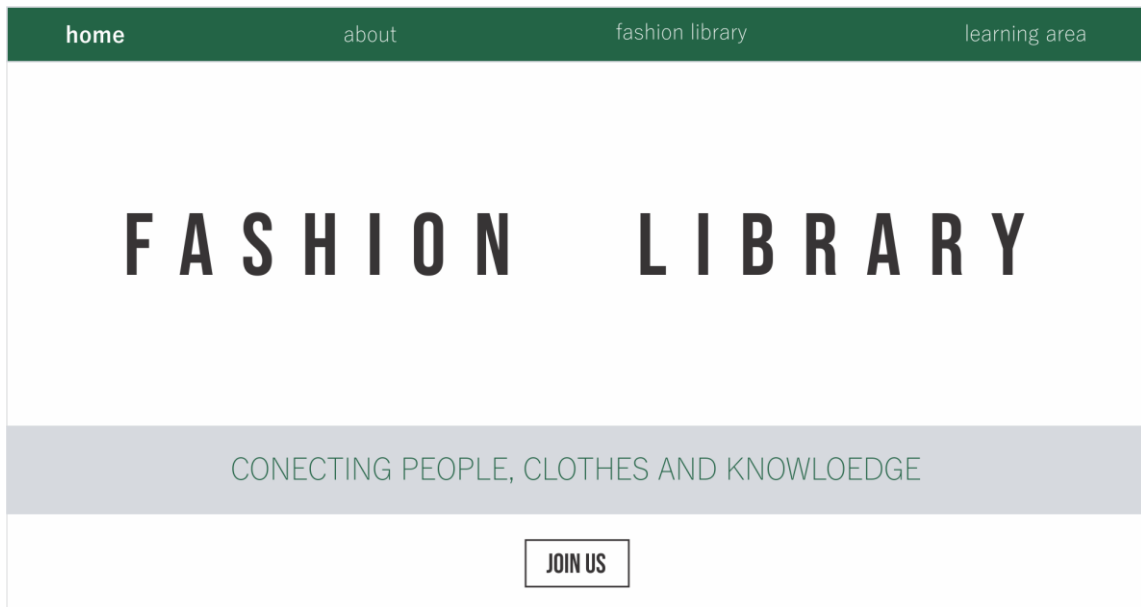
Social design deals with all types of social change geared to sustainability: changes that can reduce its environmental impact, regenerate common goods and strengthen the social community.

Figure 6.2: The Business Model Canvas



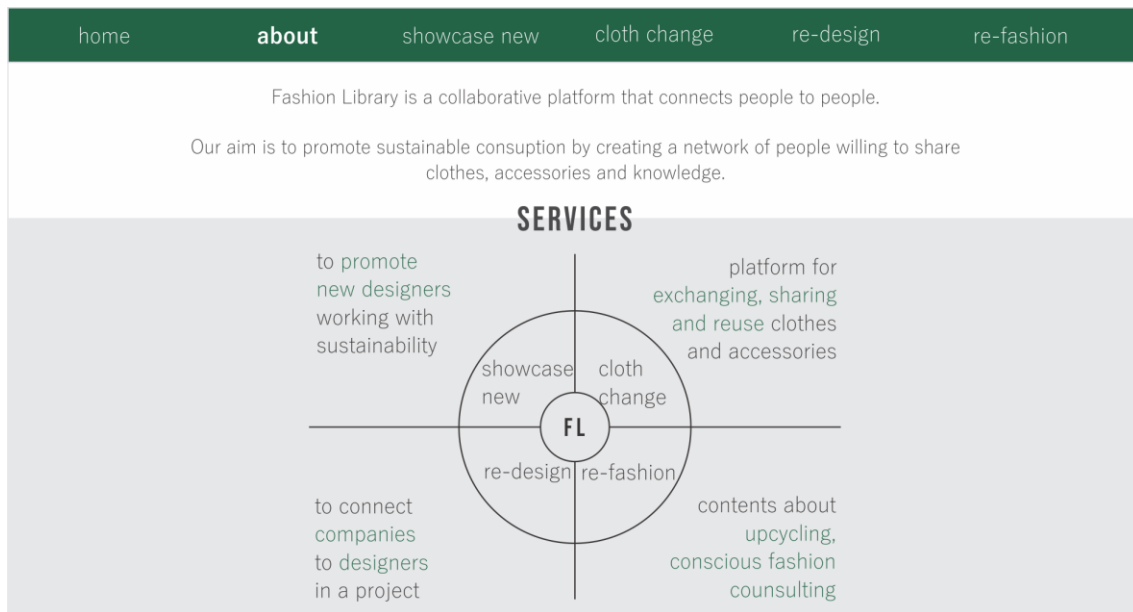
Source: adapted from Sampaio [12]

Figure 6.3: Landing Page “home”



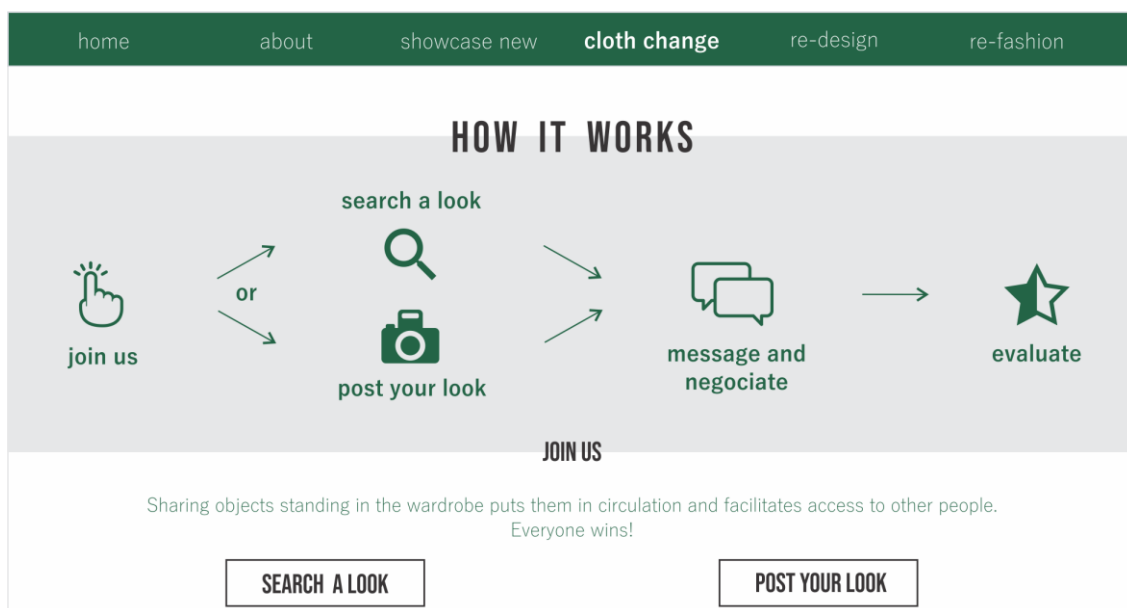
Source: Adapted from Solange et all [14]

Figure 6.4: Landing page “about”



Source: Adapted from Solange et all [14]

Figure 6.5: Landing page “cloth change”



Source: Adapted from thenuardrobe [2018] [15]

6.3 Final considerations

Initially, the perceived obstacles were the behaviour of Portuguese consumers, who are not accustomed to access business models that replace the property. There is a lack of awareness and mobilization of citizens and economic agents.

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Its implementation is proposed in Covilhã, Portugal, with the provision of eco-efficient, collaborative and sustainable services in fashion products, which can be replicated in its entirety, or by parts, in other places and contexts, adopting, for this, modularity as an adaptive resource. Adoption of the system will depend heavily on the culture to which it is embedded.

It will be an online P2P platform to connect source and demand promoting access to clothing, without the need to buy, will thus help change the perception of disposable article apparel to a reusable product. The cleaning will be done by the home user who lends the clothes. "Increasing the number of times clothes are worn may be the most powerful way to capture value, reduce resource pressure and reduce negative impacts". [13]

Accelerating sustainable development requires a paradigm shift in terms of the productive process in order to migrate from a linear to a circular economy: it is about changing habits, the mentalities and methods rooted in society.

According to 2030 agenda the future of research and innovation for the Circular Economy in Portugal depends on a collective approach, along with the collaborative economy, involving the Academy in the first place, with multidisciplinary models of interaction in civil society. [16]

This project has as target audience the generation Millennials, also known as generation or the "generation Uber" or "Airbnb" that use the collaborative economy.

Rifkin [17] has published a book called "The Age of Access," in which presented the future transitions of economic activities based on access to goods and services through the shared use. The shared consumption will cause a real revolution of behaviours for the sake of sustainability, pointing to the replacement of products for services. The shared practices are ways of optimizing the lifetime of the products, reducing the need for new products, leading to less environmental impact. This is to say that it reduces the amount of discarded products which can reduce up to 50% the environmental impact as compared with the single use.

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7. Exponential System Strategy for Sustainability in Fashion Design

This paper aims to discuss the importance of exponential system design in promoting social innovation and influencing collaborative lifestyles, presenting the growth of a business model "Exponential System Design for Sustainability in Fashion Design". The developing product-service system (PSS) business model integrates the lines and contributions of the exponential design for sustainability, based on the 6Ds of exponential organizations: digitization, dissimulation, disruption, dematerialization, demonetization and democratization. The proposed implementation is in the city of Covilhã, Portugal, with the provision of a facilitating platform with collaborative services for fashion. This can be replicated in other places and contexts, in whole or in part, adopting, for this, the modularity. How this movement can be called? One can call it Exponential Organization precisely because it represents the most appropriate structure to cope with the accelerated, nonlinear, Internet-based pace in contemporary life and in future. It is concluded that the exponential design system is an approach capable of leading to radical innovation and to the creation of value in the development of business for Sustainability.

7.1 Introduction

The problems of sustainability in fashion are exponential causing the unsustainability of natural resources. The textile and clothing industry, throughout its production chains, is the second most polluting in the world. First is the oil - raw material for synthetic fibres, polyester, nylon, acrylic, and others. Clothes with these materials when washed discharge micro particles that are released in water, reaching the ocean and ingested by contaminated fish throughout the food chain. It takes up 200 or more years to decompose it in nature. Textile industry also contaminates the environment with fertilizers, pesticides and chemicals to harvest fibres and in dyeing and finishing industrial processes. Besides pesticides, cotton crop growth also uses yearly around 93 billion cubic meters of water, contributing to water scarcity in some regions. Textile and clothing system operates in a fully linear way: large amounts of non-renewable resources are extracted to produce clothing that is used for only a short period of time. Afterwards, materials are dumped in landfills or incinerated, contributing to global warming [1].

All of these problems were further aggravated by the 2000s, with fast fashion chains, having a fast pace of production and consumption [2], often with sales up to 70%, stimulating consumerism. The great growth of fast fashion chains, divulge fashion with affordable prices,

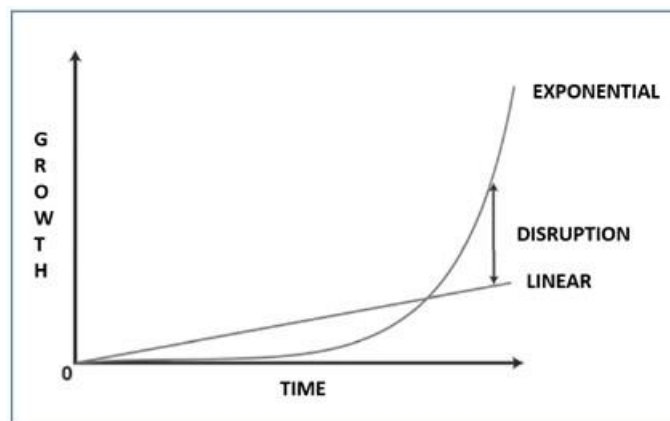
but with low quality raw materials. Consumers no longer repair their clothes, as discarding and buying others is cheaper. The lack of consumer knowledge about the production system, use of natural resources and the exploitation of labour, greatly contributes to the success of fast fashion chains. According to [3], "the economics of discarding contributes significantly to climate change".

In 2015 the European Commission launched the "Circular Economy Package". The concept of circular economy [4] refers to recycling and to the basic tripod of the 3Rs (Reduce, Reuse, Recycle) and can reach the multi-R hierarchy (Rethink, Redesign, Repair, Remanufacture, Redistribute, Recover). To change from a linear to a fully circular system requires time, the first step would be to create new fibres that do not contaminate the soil and the entire food chain. The second is to use circular economy methodology to design free collections of disposable raw materials and components. Third, use the methodology of upcycling and recycling to create new collections and use fibres that are biological and biodegradable [1].

7.2 New Business Models

According to Agenda 2030, the future of Research and Innovation for Circular Economy in Portugal should focus on a collective approach, together with the collaborative economy, involving firstly the Academy, with multidisciplinary projects of interaction with civil society. The success of the Circular Economy depends on social innovation, a well-informed, participatory and collaborative society that better integrates technical-scientific knowledge [5]. Collaborative economics is seen as an emerging technological and economic phenomenon that develops exponentially, through information and communication technologies. These generate collaborative web communities and create the social sharing of goods and services through peer-to-peer platforms [6]. No large physical facilities are required, Exponential Organizations are built on information technologies, which dematerialize what was previously physical in nature and transfer it to the digital world on demand (Figure 1).

Figure 7.1 - Linear vs. Exponential



Source: Adapted author [14]

Exponential organizations whose impact is disproportionately large, is typically ten times higher than traditional companies. This happens because of the embracing of new technologies, for example Airbnb, Uber and others. Airbnb was created from a need for and lack of money to pay rent.

A page was created on a social media platform, in order to offer accommodation on an air mattress with breakfast included, thus for the name. We can observe that exponential companies are created from a simple idea with a scalable potential through the usage of social media, thus forming [6] the concept of the 6 D's used in exponential methodology: digitization, dissimulation, disruption, dematerialization, demonetization and democratization. Ismail et al [7]. First, any technology becomes digitalized, second it enters a period of uncontrolled growth, becoming disruptive, the third "D". The fourth, technology is dematerialized, and no longer is need to charge GPZ, video, camera, or flashlight. All these apps are available on a smartphone. The fifth, demonetization happens, the services are demonetized. The sixth democratizes, access is available to everyone. Although an exponential company makes use of technology, the focus is on a daring purpose called the massive transforming purpose. If we analyse the situation, one can see many points of convergence of exponential companies with companies that are part of the collaborative economy, since the main examples are the same Airbnb, Uber, Netflix.

The Mass Transformer Purpose indicates what the companies intend to do in order to be innovative. Make the most of the user-to-user (P2P) relationship that generates community relationship and becomes a crowd engaged system in value for companies in the form of algorithms. To automate and understand how the community thinks, information-based assets, interfaces, processes for standardization and abundant information management methodology are used. Currently there exist empty spaces, fashion products, clothing and accessories among others in excess, that are discarded to the environment contributing to global warming, Martin Selgman, cited by [7], one of the greatest experts in psychology, quoted. Research shows that the Y generation - those born between 1984 and 2002 - is showing a tendency to search for meaning and purpose in their lives. Throughout the world, they are becoming increasingly aspirational and as such will be drawn as customers, supporters, investors, collaborators, and exponential business creators with the Purpose of Mass Transformation. They put their principles into practice and become scalable.

The social relationships are getting more and more digital. People need to be prepared for the internet of things [8].

This work, which is in the process of development, proposes a new exponential business model that intends to change the perception that clothing is disposable becoming a durable product instead. It allows the user to live new experiences and break paradigms. "Increasing the number

of times clothes are worn may be the most powerful way to capture value, reduce resource pressure and reduce negative impacts" [1].

The key issue for changing a culture of the disposable is education. For this, social innovation, through active intervention within universities, should support the transition to the incorporation of the principles of circular economy in its teaching. This project has the potential to prepare users to live experiences and transform their mentalities, as well as to change them into transforming agents of a society of thinking and acting in a circular way [5].

Product Service Systems (PSS) contributed methodologically with its tools for creating the business model that integrates the approaches and contributions of design to sustainability in fashion [9]. A proposal for the implementation of an establishment, in Covilhã, Portugal, providing eco-efficient, collaborative and sustainable services in fashion products, which could be replicable in its entirety, or in parts, in other places and contexts, the modularity becoming as an adaptive resource.

Digital technology has the potential to contribute to sustainability by digitizing services for the purpose of dematerializing clothing and allowing temporary access to them. Figures 7.2, 7.3 and 7.4 are only a temporary representation, as the website is being developed together with the Informatics Department of the University of Beira Interior.

Figure 7.2 - Fashion Library representation home land page

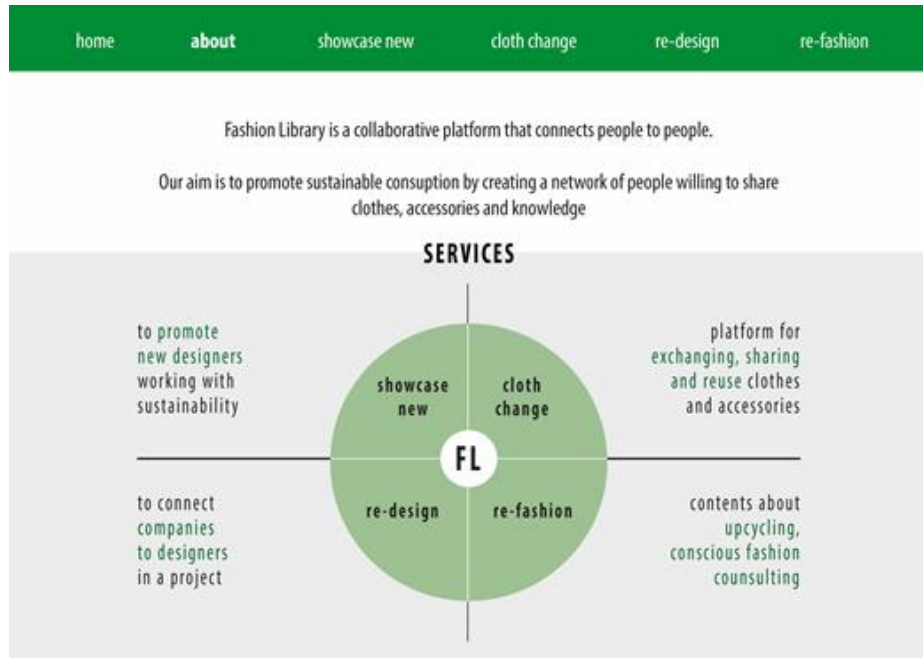


The online platform is a tool to connect source and demand: an experience of sharing and access to clothing, without the need to buy them (Figure 7.2).

This business model would help change the perception of clothing, from disposable article to a reused product, with increased usage time. The user can contribute to the improvement of the

platform through the experience, either in co-design or in the co-creation of systemic solutions for platform improvement and management.

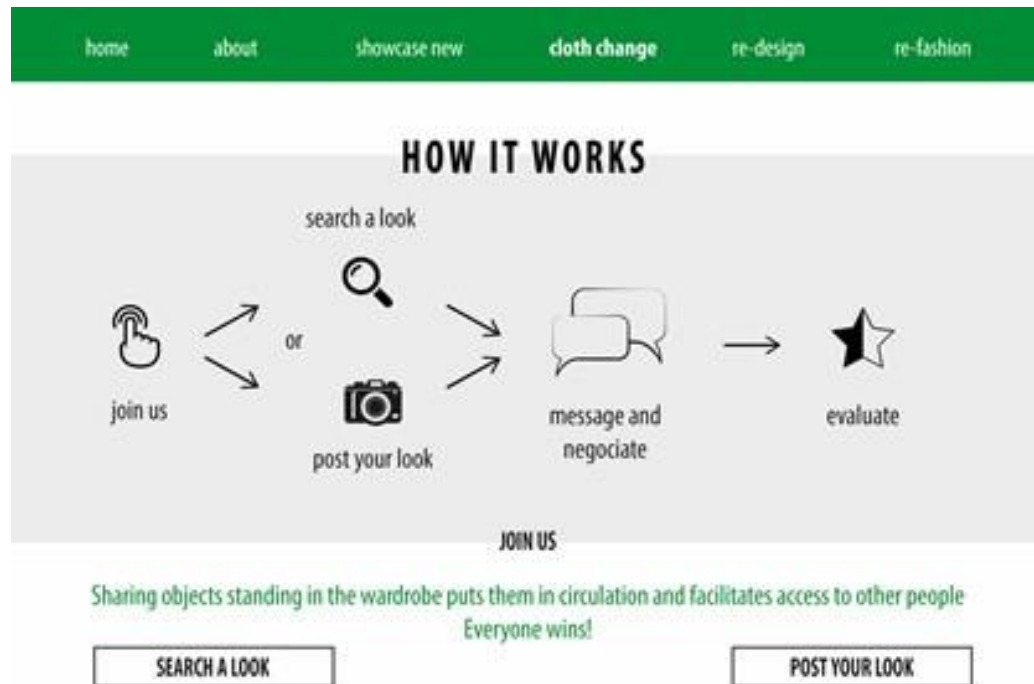
Figure 7.3 -Fashion Library representation



Source: author [10]

Systems, products and services design contributes towards sustainability. Optimizing, distributing and redistributing products through online platform and apps encourages the dematerialization of products through sustainable management of available resources. It stimulates the circularity through a new business model, inducing changes in consumer behaviour with socio-environmental benefits (Figure 7.3).

Figure 7.4 -Fashion Library representation how it works



Source: author [10]

The Informatics Department will collaborate in the creation of a digital platform that will work in P2P form. Networking, collaboration, co-design and co-development of solutions have to fit all authors of the value chain.

7.3 Conclusion

The challenges imposed are the students joining the platform, both at the user and at technical and scientific training level, both of which are fundamental for society to contribute to national goals, seizing solutions. The students earn because they associate their name with creating innovative solutions to the world's biggest problems, which are scalable, sustainable, and systematic.

For the success of the enterprise, it is important the active support of the Department of Textile Science and Technology of the University of Beira Interior with students, society, government agencies and European networks for sustainable development, (see Figure 4 - land page how it works), explains how the process works.

The implementation of this project, "Exponential System Design for Sustainability in Fashion Design," will be a disruptive innovation at the level of mentalities. This project will contribute to the creation of a matrix that positions Exponential Organization, Design, Circular Economy and Collaborative Economy on the landscape of socioeconomic value creation, this is transformational.

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**Creative Collaborative Circular Economics,
Exponential System Design for Sustainability in Fashion Design**

8. Theoretical Essay on the Networked Collaborative Consumption

The present theoretical essay aims to make an outlook with various approaches related to collaborative economics. Also features several collaborative consumption platforms.

Discusses the sharing of goods and services through online and offline networks. Finally, highlights five important points of collaborative economics.

8.1 Introduction

The 20th century is enshrined as the century of excess consumption. The result of this practice generated exhaustion and unsustainability of natural resources in the development processes. To ensure life of the human being on Earth, we must reduce the extraction and waste of natural resources, as well as the generation of waste. Only in this way we can ensure the sustainability of the planet.

The concept of sustainable development was established in 1987 by the World Commission on Environment and Development of the United Nations with the publication of the report "Our Common Future", through the so-called Brundtland Commission that defined it as: "a development that aims to meet the needs of the present without compromising the ability of future generations to meet their own needs "[1]. The term sustainable development is well-preserved in the international meeting on the Environment, convened by the United Nations (Eco-92), held in Rio de Janeiro, Brazil, in 1992 and constituting a strategic step for the survival of life on the planet. The conference endorses the fundamental concept of sustainable development, which combines economic progress and material use without compromising the needs of future generations.

Sustainable development is a global challenge that requires local initiatives with a view to reduce the effects of environmental impacts. New economic opportunities should be able to promote a transformation of the finite resources of the planet, in order to house the next generation. The starting point for an innovation towards sustainability is trying to dissociate the business success of the relentless expansion of material consumption, seeking to minimize the depletion of resources, the pollution and the associated effects, such as climate change [2]. Sustainability requires an urgent overhaul of the current patterns of production and consumption to achieve social equity, economic efficiency and environmental preservation.

8.2 Literature Review and Discusses the concepts

8.2.1 Sharing

“Today’s smart choice: Don’t own. Share” Walsh [3]

The sharing of common assets is touted as a way for this change. It overcomes outdated as the excess consumption behaviours, which consecrated with the slogan "consume is to exist" and points to a new way of consuming and to be. Important part of this is sharing collaborative economics. In this the new established saying [4] is: "what's mine is yours". Consumption based on access to and use where we share what already exists rather than producing more. Rifkin has published a book called "The Age of Access," in which presented the future transitions of economic activities based on access to goods and services through the shared use [5]. The shared consumption will cause a real revolution of behaviours for the sake of sustainability, pointing to the replacement of products for services [6]. The shared practices are ways of optimizing the lifetime of the products, reducing the need for new products, leading to lower environmental impact [7]. This is to say that it reduces the amount of discarded products which can reduce up to 50% the environmental impact as compared with the single use [8]. In 2011, Time magazine noted the Collaborative Economy as one of the 10 ideas that will change the world [3]. Collaborative Economy is also part of the incentive for Circular Economy, which aims to find a new economic paradigm that integrates environmental concerns and opens the path to new, more sustainable business models. The Collaborative Economy refers to the optimization of the use (or even production) of a product or service through the use of sharing. Among other aspects, the Collaborative Economy questions the urgency of the needs and the requirement to satisfy them through the use of material resources. Collaborative Economy is based on five "R"s: Re-thinking, Re-designing, Re-educate, Reduce and Reuse, in order to share and preserve the social, economic and environmental dimensions [6].

In 2016, the European Commission has launched "The future of the EU collaborative economy – Using scenarios to explore future implications for employment", which recognizes the potential of Collaborative Economy in creating new sources of income, offering benefits for consumers through new business, for temporary use of goods and services, such as accommodation, sharing of cars, bicycles, televisions, lawnmowers, drills, appliances, clothes among others [9]. Companies are moving towards providing services with their products rather than selling them, and business models based on online platforms, once called “collaborative economy”, are becoming mainstream [10].

The term "Mesh Business", created by Gansky [11] is based on features: (1) the offer can be shared, within a value chain, community or market, including products, services and raw materials; (2) the Web and mobile data networks are used to track products and users, customers and information about goods; (3) offers, ads and recommendations are passed on

through word-of-mouth and extends through network services partners. The Mesh Business and Collaborative Economy are different terms, however, very similar. Both are formed through the use of social and personal networks, communication technologies and the use of applications on mobile devices.

8.2.2 Collaborative Economy

Collaborative Economy, anyway, can be seen as a technological and economic emergent phenomenon, that develops through information and communication technologies. These generate collaborative communities on the web and create the social sharing of goods and services. It is a question of business models through decentralized networks with peer-to-peer platforms or direct contact between people. In some cases, they create their own rules and standards for new business models through the use of idle assets [12]. Collaborative consumption is divided into three systems: Product Service Systems (PSS), Redistribution Markets and Collaborative Lifestyles [4].

8.2.3 Product Service Systems

Product Service Systems allow that products owned by a company are shared by enterprises (car sharing, solar power, automatic laundry) or that privately owned products are shared among interested people, i.e., a product of individual property, often with limited usage, is replaced by a shared service that optimizes its usefulness. Users pay for using it without the need to own it, counting with the following benefits: no need to pay the full value of the product, nor its maintenance, repair and secure costs.

8.2.4 Redistribution Markets

There are Redistribution Markets with the possession of goods and not only the access, such as in product service systems: goods of private property without use are redistributed via online social networks and physical stores. There are cases where redistribution is based entirely on free trade (e.g., Freecycle, Kashless and Around Again). Others, where the goods are sold in exchange for points (e.g. Barterquest and UISwap) or money (e.g., e-Bay, Flippid), or in which markets are a mixture of it (ex: SCoodle and Craigslist). There are even online companies that make exchanges of goods such as makeup, accessories, clothing, books, toys, etc., for similar products (e.g. Thred-up, Makeup Alley; Swapstyle, Toyswap, 'N' Dig Swap) or for goods of the same value (SwapTree, SwapSimple). Exchanges are usually carried out by unknown persons while there are cases where people who know each other (e.g. Share Some Sugar, Neighbor Goods). Regardless of the type of return, the redistribution market encourages the re-use and re-sale of stranded products, keeping them in circulation.

8.2.5 Collaborative Lifestyles

The Collaborative Lifestyles refer to the shared workspace systems (Coworking Space Citizen, Hub Culture), goods (Neighborrow), tasks, time and messages (DaveZillion, Ithaca HOURS), gardens (Urban Gardenshare, Landshare), skills (Brooklyn Skillshare), food (Neighborhood Fruit), parking spaces (ParkatMyHouse) and housing (Airbnb, CouchSufing, Roomorama). People with common interests that seek to divide and share intangibles such as time, space, skills and money. These various sharing modes are reporting to a new field of Economy: Collaborative Economy.

The OuisShare divides the collaborative economy in six blocks, namely:

1. Collaborative consumption is most known currently. Is based on the use of the Internet and peer-to-peer networks to reinvent the sharing through rental, exchange or trading of goods and services.

2. Collaborative production is made possible by the democratization of digital production tools. Is related with the Maker movement and Peer production, also do-it-yourself (DIY), as well as the use of free software for manufacturing. Other forms are the sharing of creative spaces (FabLabs, HackerSpaces, MakerSpaces) and the exchange of knowledge and open information between manufacturers.

3. The open and collaborative knowledge comes to the democratization of information or data that can be freely used, reused and redistributed without the legal, technological or social constraints. It is the basis for creating collaborative and sustainable societies through the opening of science, technology, education, culture, economy and transparency of Governments. (Ex: Open knowledge, OuisShare Academy, Stanford, MIT, Harvard, Open Badge, and Local Motors). Open licenses (e.g. Creative Commons, Copyleft, Arduino, and Open Source Ecology).

4. Collaborative funding. Currently, many credit banking, investment, cash, bank transfer, both national and international, are also a part of this new economy. (PayPal, Kanotox, TransferWise and others.) The Transferwise has more than 20 intentional coins and allows to transfer money with a charge of 0.5% in comparison with the usual 4.5% tax of banks. There are also services offered by specialized start-ups in which collaboration and empowerment through digital tools allow people to manage financial operations. The “crowdfunding” is a form of cooperation among many people whose goal is to collect a sum of money, or other non-monetary resources, which support the development of a music, handicrafts, sport, food, science and other initiatives. There are other forms of collective financing: the crowdfunding rewards (KickStarter, Indiegogo, Ulule and Goteo) that are known to international level, and the

crowdfunding based on donations (Microdonanes.net, Migranodearena.org, WorldCoo and Teaming) and loans and investments (Funding Circle Lending Club).

5. Open Government and horizontal organizations refer to the concept of “partner” or “state” that accompanies, facilitates, discloses, and spreads out data. Governments and administrations are also open to popular contribution in participatory budgets to the co-creation of solutions or the integration of citizens as a source of information. It is important to stress that in this process of transformation of cities in collaborative cities, the role of public administration is to monitor and facilitate the development of citizen initiatives. Examples of collaborative cities are Amsterdam, Portland and Seoul, both at the level of district and town, by supporting the creation of informative web sites.

6. Exchange of value systems (Complementary and alternative currencies, banks, etc.). Complementary currencies are used, along with the currency of each country, to boost the local economy and generate employment. Alternative currencies produce synergies with communities who choose to reinvent its own currency. They create more social and environmentally friendly alternatives, the traditional currency being not necessary. An example is the Bank of time (BdT) in which the currency is generally the time [13].

8.3 Conclusion

Historically, the share of products always existed. This happened through networks of trust between family members, neighbours and friends, with the purpose to supply the needs of a product, without having to own it. The structure of the traditional sharing, however, was broken due to the growth of large cities. People took one of the other unknown, thus breaking the network of interaction and trust.

In the 21st century, thanks to the internet and the technological and digital evolution, social networks have emerged imitating human social life. The "online world" grows exponentially and allows to expand social networks to anywhere on the planet, linking both individuals as organizations. The links that are created using the Web end up strengthening outside of the net. In Collaborative Economy, there are five important points worth highlighting: (1) the social, in which the demand for goods and services increases along with concerns related to improve sustainability in the community; (2) the economical, focused on the continuity of the life-cycle of stranded products; (3) the technology, made possible by social networks thanks to devices and mobile platforms, as well as ease of payment systems; (4) the service of collaborative consumption that consists in the mechanism of reputation and the ability to generate trust among strangers across platforms and users; (5) the co-creation related to collective intelligence as key element for collaborative innovation processes.

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9. Fashion Library UBI-Platform P2P

This article has the objective to present the case of study and development of a business model applied to the creation of a Fashion Library platform P2P.

9.1 Introduction

The sustainable business model (SBM) presents an innovative approach to consider embedded sustainability into business purpose and processes and serve as a key driver to competitive advantage. It is important in driving and implementing collaborative creative economy and social innovation for sustainability and can help embed sustainability into business purposes and processes. Sustainable business model considers a wide range of stakeholder interests, standing out environment and society/community.

9.2 Literature Review and Discusses the concepts

9.2.1 Sustainable Development

The concept of sustainable development has been used since 1987 by the United Nations World Commission on Environment and Development with the publication of the report "Our Common Future" through the Brundtland Commission which defined it as "a development aimed at meet the needs of the present without compromising the ability of future generations to meet their own needs "[1].

The term sustainable development was established at the International Meeting on the Environment, convened by the United Nations at Eco-92, held in Rio de Janeiro, Brazil, 1992, constituting a strategic step towards the survival of life on the planet [2].

Both conferences endorsed the fundamental concept of sustainable development, which combines economic and material progress without compromising the needs of future generations.

COP21 [3], the Climate Conference held in Paris in 2015, prioritized the global commitment to avoid global warming, keeping the temperature at a maximum of 1.5 ° C above those observed before the industrial era. Thus, sustainable development is a global challenge, with local initiatives aimed at reducing the effects of environmental impacts resulting from new economic opportunities capable of promoting a transformation in the use of the finite resources of the planet.

According to [4], "the starting point for an innovation towards sustainability is to try to decouple the success of a business from the relentless expansion of material consumption, seeking to minimize resource depletion, pollution and associated effects, such as climate change [4].

Sustainable development requires an urgent reformulation of current patterns of production and consumption to achieve social, economic and environmental equity.

The project is based on the methodology of the circular economy with a focus on collaborative creative economy.

9.2.2 Circular Economy

The concept of circular economy was created by the Ellen MacArthur Foundation, founded in 2010 [5]. In 2012, the Foundation published the report "Towards circular economy: economic and business rationality for an accelerated transition". In the same year, the European Commission published the "Manifesto for an efficient Europe in the use of resources", which addresses the need for their countries to move to a regenerative circular economy [5]. As early as 2015, it launched the "circular economy package".

According to the Circular Europe Network, [6] "the concept of circular economy refers not only to recycling, but also to 3Rs (Reduce, Reuse, Recycle) and goes beyond the waste problem; that is, circular economy implies closed-cycle management. This means that all natural resources, energy, materials must be reduced in production and that their use and reuse is optimized".

The circular economy aims to move to a new economic paradigm that integrates environmental concerns and opens the way to new and more sustainable business models, with or without financial intermediation.

9.2.3 Collaborative Economy

The collaborative economy has exponential growing "the relevance of the phenomenon is linked with sustainable consumption that encourages resources efficiency, waste reduction, better development and surplus reuse of products due to over production and overconsumption" [7]

The collaborative economy covers several areas: "collaborative production (easing the design and production of goods through bricolage, fablabs and marketspaces), collaborative consumption (networks for exchange, rental, loans, donation or inter-change of goods and services) and collaborative development" [6]

In 2000, Rifkin published the "The Age of Access" book, in which he presented future transitions from economic activities based on access to goods and services through shared use or collaborative production [8]. The term collaborative consumption was consecrated by Botsman

and Rogers in the book "What's mine is yours", published in 2010 [9]. Collaborative consumption involves trading, lending, negotiating, leasing, donating and exchanging from person to person (P2P). Accordingly to the authors above mentioned they divided collaborative consumption into three systems: Product Services System (SSP), Redistribution Markets, and Collaborative Lifestyles. Another author, who is also driving the collaborative economy, is Gansky [10] with her work called "Mesh." This is a term that refers to the interconnectivity of people through the digital technology used to provide access to goods and services. For Stokes and colleagues [11], collaborative economy is a way of doing business; it is an exchange of social value that allows access rather than possession. The collaborative economy is formed by decentralized P2P networks that make use of idle assets and create new markets.

In 2016 the European Commission launched "The future of the EU collaborative economy - Using scenarios to explore future effects for employment." It recognizes the potential of collaborative economy to create new sources of income and benefits for users through new business models for the temporary use of goods and services, such as housing and sharing [12].

The collaborative economy has become more popular since the global financial crisis of 2008; the recession and unemployment drove consumers to use platforms for sharing goods and services. With increased use of smartphones with mobile internet access, this resulted in an explosion of software applications, (apps). The main users, drivers and influencers of the collaborative economy are the "Millennials", born from 1982, as they dominate digital tools. The motivations refer to the economic advantages and interpersonal benefits of social interaction, trust relationship through the reputation generated by user assessment.

The distinction of collaborative economy is that it involves the use of internet technologies to connect groups of people in order to make better use of goods, services, skills, create collaborative companies and projects.

9.2.4 Collaborative Consumption, Pss Model

The Service and Products System (PSS) [1] allows products of a company to be shared, and thus users pay for the use of the product without the need to own it.

Businesses with the concept of shared wardrobe or fashion libraries are increasingly earning followers in several countries. In English is called Fashion Library, in Spain uses the name Ropateca, in Brazil is used Modateca or Roupateca. In Portugal, to date, there is no record of a business model with these characteristics. These new business models work through a subscription system, similar to Netflix and allow customers to pay a monthly service fee. There are companies that offer various plans so that one can access a fixed number of garments on

loan at any time. These models are an attractive offer for users who want frequent changes of clothes.

These organizations are emerging in a number of different places such as Amsterdam, the Netherlands, one of the most well-known Fashion Library: the Lena store [13], where members sign up for €19.95 monthly. And they have at their disposal high quality clothes, vintage ones, famous and ecological brands. The slogan is "Collect moments, not things." The clothes should be returned clean. The store receives donations of clothes in good condition.

In New York, United States, Gwynnie Bee offers a signature clothing service for the day-to-day in the 'plus size' female segment. It offers customers more than 4,000 styles and various subscription plans. Members can keep items for as long as they want, then just send them back to get other items of interest. The brand was founded in 2011 decided to invest in this niche market due to the fact that 75% of the US adult female population have size 44 - or above - and that 67% of the total population wears size 48 or above. The cleaning of clothes is done by the brand itself [14].

Rent the Runway Unlimited Company charges a monthly membership fee. The membership renews automatically and is charged on the same date every month, and the member can cancel at his own discretion. Members have more than 350 high-end designer items for \$139 a month, and people can rent three designer dresses, blouses, skirts or accessories at a time, and keep them for as long as they like. RTR College Rep Program is a specific program for students. The cleanliness of clothes, as in the previous case, is done by the brand itself [15].

YCloset [16], founded in 2015, is a Chinese clothing-sharing platform where users pay a monthly subscription fee to rent clothing and accessories. YCloset charges a monthly membership fee of 499 yuan, which allows users to rent unlimited clothing and accessories through their mobile application. According to YCloset CEO Liu Mengyuan, the clothing-sharing business will become commonplace on e-commerce platforms in the future due to the low value of membership and the huge variety of styles offered by the brand. YCloset also partnered with the luxury brand of Kenzo and Acne Studios. The Laundromat service chain also is a strategic partner

9.2.5 Challenges in Portugal

Chic by Choice, a dressing platform for international designer dresses, once considered the best fashion start-up for technological start-ups, entered the Forbes ranking in 2018 on the Under 30 list. After a while news came out about bankruptcy of the store and sales with 80% [17].

Wardrobe is a P2P platform to reallocate party clothing, keeping in circulation products previously idle or stocked. It operates in a collaborative way, allowing users to monetize clothes without being discarded. It offers the possibility of partnerships with outsourced services (delivery, laundry, repairs, etc.). As the Wardrobe does not have physical inventory, users being

their clothing owners, gives it a high potential for scalability. Wardrobe is a platform created in Brazil is very successful [18]. CEO Germano Telles replicated the business model in Portugal, but with the rent was unsuccessful and had to switch to the sale option.

9.2.6 Obstacles to maintenance of the model in Portugal

Initially, it is essential to identify perceived barriers to Portuguese consumer behaviour, there is no awareness of business models that replace access ownership. There is a lack of awareness and mobilization of citizens and economic agents.

Accelerating sustainable development requires a paradigm shift in terms of the productive process in order to migrate from a linear economy to a circular economy. It is about changing habits, mentalities and methods rooted in society.

According to agenda 2030 [19], the future of Research and Innovation for the Circular Economy in Portugal depends on a collective approach, along with the collaborative economy, involving the Academy in the first place, with multidisciplinary models of interaction in civil society.

Figure 9.1: Exponential System Design for sustainability in Fashion Design



Source: Fernandes, S et al (2017)[20]

Figure 1 shows the preliminary system that is the focus of the study in question.

- Management Information: Big data
- Fashion Revolution UBI: social innovation
- Sustainable Fashion Design Research line
- Reuse: change of clothes or business through the platform.
- Memory Evolution and Preservation: A tab on the site available to be used as a virtual museum.
- Re-Fashion: Action of Upcycling with students and community.
- Conscious Dressing counselling with the community.

- Re-Design Action consulting, improvement and value added as company and artisan
- Supplies bibliography and available subjects on the themes.

9.3 Conclusion

It is the systematization of a business model (PSS) product service systems, integrating the approaches and contributions of design to sustainability in fashion.

It proposes its implementation in Covilhã, Portugal, with eco-efficient, collaborative and sustainable services in fashion products, which can be replicated in its entirety or by parts, in other places and contexts, adopting, for this, modularity as an adaptive resource.

Digital technology has the potential to contribute to sustainability by digitizing services for the purpose of dematerializing clothing and allowing temporary access to them. The platform will be developed with the support of Department of Informatics of UBI.

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10. Conclusion, limitations and Suggestions for Future Research

This last chapter presents the main conclusions obtained in the research carried out. The conclusions follow the sequential order of the thesis and finally, a series of proposals to be developed in the future are suggested, these being raised from the research process carried out up to this moment.

10.1 Research Conclusions

This investigation situates the role of the Designer in relation to the planet's sustainability challenges, evaluating the importance of the concepts and practices of Social Innovation and Circular Economy and Creative Collaborative Economy in this process. The development of this project was only possible with the collaboration of students, the community, teachers and responsables in all spheres that involve awareness issues for social innovation. The challenge will be to change the paradigm for a sustainable economy and consumption, through its reduction, reuse and recycling of products. Therefore, awareness is considered to be the most powerful tool for breaking past paradigms and behaviors and daring to embrace new challenges.

Thus, in the fields of construction and production, new business models are needed, induced by social innovation in the field of Fashion Design. This is exposed in the "Exponential System Project of Sustainability in Fashion Design", created and systematized by the author, and will be proposed to be carried out in Covilhã, Portugal. It will explore the opportunity to propose an innovative and integrated project, in response to the challenges imposed by regional, national and global public policies.

New sustainable business models offer many possibilities for exploration. The redistribution market has great potential, as it presents low risk and good rewards for investors. Intensifies the use of fashion products without the need to produce new products. Collaborative consumption on P2P platforms works with reputation mechanisms that can create trust among users. To sell a product, a user can charge a platform membership fee; if the product is sold, a fee will be charged on the final value.

The Rent the Runway is a circular business model with the potential to compete with the fast fashion business model. Uses the System of Products and Services (PSS) through the dematerialization of products: it offers a wide variety of models of quality clothing and

design and eco-efficient services. Financial gain is centralized and strictly follows existing regulations, such as taxes, insurance, licensing, etc.

Wardrobe is a P2P platform to relocate party clothes, keeping previously idle or stocked products in circulation. It operates collaboratively, allowing users to monetize clothes without being discarded. As Wardrobe does not have a physical inventory, users owning their clothing offer a high potential for scalability, as the business model can be replicated anywhere on the planet. Note that in Brazil it is very successful, but in Portugal the result are very different: different cultures, different behaviors in relation to the same process.

The circular economy is, therefore, holistic and adaptive, representing a sustainable solution to the environmental degradation caused by the traditional linear economy. Although the circular economy encompasses the collaborative economy, it is clear that both are independent lines of research, with many points of convergence that complement each other. But for a long time, it is necessary to rethink the entire value chain: clothes will have to be designed to last.

The collaborative economy can be considered as a sustainable socio-economic system, built on a digital network that connects and shares goods and products and human, financial and physical capital. In the collaborative economy, the economic and financial result is distributed among those involved. However, collaborative business models, despite having all the positive aspects discussed above, are still far from being in line with current government regulations.

With regard to the Fashion Library, some obstacles to Portuguese consumer behavior, which are not used to accessing business models that replace property, can be considered disappointing. There is a lack of awareness and mobilization of citizens and economic agents. Its implementation is proposed for Covilhã, Portugal, with the provision of eco-efficient, collaborative and sustainable services in fashion products, which can be replicated in full or, in parts, in other locations and contexts, adopting, for this, modularity as an adaptable resource. The adoption of the system will depend heavily on the culture in which it is inserted. It will be an online P2P platform to connect the source and the demand that promotes access to clothing, without the need to buy and, thus, will help to change the perception of disposable articles to reusable articles.

Sustainability, Social Innovation and Collaborative Economy in Fashion Design

To outline the main conclusions of the work developed throughout the investigation, it was taken as a reference point: sustainable concern, thus, a reference point for the main factors, the main objective of the investigation and the proposed theoretical model. The members of the World Conference (COP-15) are doing everything to fulfill the commitments made there to keep the earth's temperature increase at 1.5 C, until the end of this century. The other point of reference is the sustainable development process, as the fashion industry is considered one of the most polluting in the world, with the linear life cycle at an accelerated pace due to the ephemeral seasonality of fashion.

Thus, a reference point for the development of the conclusions is the knowledge of the two main methodologies: circular economy and collaborative creative economy. In parallel, the sustainable conceptual model is another point of reference, which mirrors the intended objective and contributes to achieving it.

In this segment, the empirical factor is contextualized: undergraduate and master students in Fashion Design at the University of Beira Interior develop collection projects and the clothes (coordinates) are kept in a closed warehouse, only eventually participating in some events. Thus, the following opportunities have been foreseen:

- Environmental aspect: Promote a better designation and destination for these clothes.
- Collaborative economy: Reuse through a new P2P business model.
- Social innovation: Sensitize and make society aware of new business models, contributing and increasing the importance of the designer in the way of thinking and seeking creative solutions to socio-environmental problems.

These are the reasons that led to this proposal to implement a new business model in Covilhã, Portugal. This thesis proposes the business model “**Exponential System Design for Sustainability in Fashion**” we call **Exponential** because it is **scalable and modular**, providing eco-efficient, collaborative and sustainable services in fashion products. It can be replicated in its entirety, or in parts, in other places and contexts, adopting, for this, modularity as an adaptive resource.

The circular economy methodology encourages Re-thinking, Re-designing, Re-educating, Reducing, Redistributing, Reusing, and, in addition, sharing and preserving the work of undergraduate and master students in Fashion Design at the University of

Beira Interior in a system design that allows us to progress in all ecological dimensions: human, social, economic, environmental and educational.

The purpose of this thesis is to contribute to the sensitization and awareness aiming to break the traditional paradigm of Portuguese culture, always pointed out as conservative in relation to the concepts of circular economy.

The message of collaborative consumption is that the current culture of ownership can be replaced by sharing and collaboration, but one still have to contribute to this transformation into a sustainable in reality, with the reduction of consumption and the reuse of fashion products.

Undergraduate and master students in Fashion Design at UBI develop collection projects, but the garments are stored in a closed warehouse, even participating in some events. We suggest bringing them abroad with the applicability of the concept of collaborative creative economy in the Fashion Library. This will bring the students' work to life, putting these closed jobs into service. The goal is to give them visibility so that it can become a common practice and for society to see the work of students up close.

It is understood that production and consumption are issues guided by cultural relationships and interaction and behavioral changes, with the use of products and services. System Design Products and Services (PSS) allow the generation of radical innovations and challenge new consumption habits, organizational structures and regulatory legislation.

This thesis is part of the design area, with special emphasis on the applicability of the multidisciplinary way of thinking, creativity, empathy and experimentation that is part of the design thinking methodology. This methodology has the consumer/customer as a starting point and center of attention. Design thinking has interpellations with social innovation, environmental sustainability, fashion design considering the entire life cycle of products, services and systems. Thus, the general objective of the thesis is to “systematize an integrative model with approaches and contributions from design to sustainability, aiming to raise the consciousness and awareness of fashion design students and local communities, about the production and conscious and sustainable consumption of fashion product.

Local production is more encouraged, as it requires the use and appreciation of material resources, proposes more transparent production systems between producers and consumers and reduces the speed of production of durable goods. This method also proposes the upcycling methodology, which means using previously used parts and

accessories, as well as waste, to create a new piece of clothing. Therefore, for this it must be taken into account that consumers must also participate in the process. More clearly, they should start thinking more accurately and review their needs with more concern, in order to buy their clothes with the aim of reducing compulsive consumption.

Here are some recommendations that can be addressed to consumers:

- 1) Buy quality and timeless clothing, customize, transform and repair.
- 2) Buy clothes that value personal body type. By doing this, the consumer really knows what his body's biotype is, taking also benefits from it.
- 3) Buy clothes that are in accordance with your personal style, knowing your own. This means that consumer would know how to match the clothes that are already in the wardrobe that best suit their style.
- 4) Purchase of versatile clothes that allow various combinations.
- 5) Acquire clothes in second hand stores, exchanging and lending clothes between friends or renting clothes in fashion libraries, which is also an upward trend in this regard.

According to the notes mentioned, a question that arises is: Are the “consumers” of Portuguese society culturally prepared to adopt the conscious consumption of fashion products?

This fact declares that, to make use of the concept of the circular economy to be adopted throughout the production, distribution and consumption of fashion products, social innovation must essentially play a fundamental role in inducing system change. In addition, social innovation has been gaining ground recently in government policies with two objectives: i) Reducing social inequalities and ii) Seeking solutions to the problems of climate change.

Therefore, currently, the social designer seeks to implement other, more innovative, creative, collaborative and sustainable solutions to problems not well perceived by society, but based on the pressing needs of society and the current world, with a focus on social innovation. Thus, effective responses to society and best practices are generated through behavioral changes. In this case, the designers really act as translators of the emerging wishes of the members of society, being a true cultural intermediary in the

processes of production and consumption. As an ideas and solutions manager, they promote new ways of thinking, creating, designing, consuming and acting in search of a better future for all.

The purpose of this investigation is to promote social innovation for the development of sustainable projects in Fashion Design, in order to disseminate conscious consumption. Thus, the intention here is to promote social activities with students and the community; encourage wear in a sustainable manner, acquiring knowledge about smart clothing, style consulting, body biotype and upcycling, new lifestyle and sustainable habits for the benefit of society and the environment. And, thus, it will be able to offer a model not only for collaborative actions, but also to promote interactions between the University, students, companies and society through the active, creative and conscious participation of all these agents, for the benefit of sustainability.

10.1.1. General Conclusions of the Investigation and Proposed Model Collaborative Consumption: Sustainable Business Model - Fashion Library

This work aims to develop a business model applied to the creation of a fashion library in the area of sustainability, within the scope of social innovation and collaborative creative economy. Therefore, this project can be called a sustainable business project. In fact, the sustainable business model (SBM) presents an innovative approach to consider sustainability incorporated into business objectives and processes and serves as a key factor for competitive advantage. It is important to drive and implement the collaborative creative economy and social innovation for sustainability and can help to incorporate sustainability into business objectives and processes. The sustainable business model considers a wide range of stakeholder interests, with an emphasis on the environment and society/community.

The project is based on the circular economy methodology, with a focus on collaborative creative economy. Through the research of the project, optimization and promotion of clothes created by undergraduate and master students in Fashion Design at the University of Beira Interior, Covilhã, Portugal.

The project aims to disseminate student fashion creations through a clothing website stored at UBI, with access through loans to the community. The fashion library will also promote recycling workshops with students and on smart clothing, style consulting and body biotype with the community. The fashion library will be a practical and replicable pilot model, with eco-efficient services. This article intends to define and situate the importance of the collaborative creative economy in the scope of sustainability through a literature review. To that end, the emergence of the concept of sustainable development preserved in the International Conference known as ECO-92, in which authorities from around the world signed an understanding of the limitation of the planet's natural resources in the search for a more and more intense and extended to a global population that had grown about six times in a century.

In fact, the concept of sustainable development has been used since 1987 by the United Nations World Commission on Environment and Development with the publication of a report. The term sustainable development was preserved in the International Meeting on the Environment, convened by the United Nations, in (Eco-92), held in Rio de Janeiro, Brazil, 1992, constituting a strategic step for the survival of life on the planet. The last Climate Conference, held in 2015 in Paris (COP21), ratified in China and in the United States on September 4 and 5, 2016 at the G-20 Meeting, held in Beijing, China.

Sustainable development is a global challenge, with local initiatives, with the objective of reducing the effects of environmental impacts resulting from new economic opportunities capable of promoting a change in the use of the planet's finite resources, to house the next generation. Thus, the circular economy seeks to find a new economic paradigm that integrates environmental concerns and paves the way for new, more sustainable business models, with or without financial intermediation. The collaborative economy also includes non-profit activities for public services and social innovation, such as social cohesion, common ownership and collective benefits. Responsibility and a sense of community, in terms of sharing and solidarity, are considered common values related to environmental sustainability.

Recently, new business models related to sustainability have emerged, such as the taking part of clothes, fashion libraries and clothing exchange fairs. The concept of shared wardrobe is increasingly gaining followers in several countries. It is called the Fashion Library in English, while in Spain the name Ropateca is used; in Brazil, Modateca or Roupateca are common names. In Portugal, for now, there is still no history. This supports the Exponential Systems Design business model for Sustainability in Fashion Design, being part of the empirical research, with local application in Covilhã, Portugal,

with the provision of collaborative and sustainable eco-efficient services in fashion products, which they can be reproduced entirely or partially, in other places and contexts, assuming modularity as an adaptive characteristic.

There will be effects through interconnections of systems that generate other systems, to be fed with radical innovations guided by the concept of sustainability. In fact, this approach will have a holistic approach to providing eco-efficient services and promoting student interaction with the community and with the product service system (PSS). We need to encourage students to use the circular methodology in new collections and encourage the community to adhere to new models of consumption of fashion products, without owning them. The promotion of social innovation plays a key role in helping students and the community to face new challenges in the circular economy. To this end, it has been organized since 2017 the Global Fashion Revolution Movement at UBI, with the objective of raising awareness and valuing actions aimed at conscious consumption. The Fashion Revolution yearly event at UBI, the first promoted at a University of Portugal, as part of the actions of the Fashion Library project, aims to bring together teachers, students, companies, professionals and the local community to discuss conscious consumption and sustainable development. In fact, it would be a continuous movement promoting collaborative actions between students and the community, comprising the thematic areas of sustainability, social innovation and creative collaborative economy, with the aim of promoting the collective awareness of the commitment to social well-being in its different environmental, cultural and economic aspects.

Collaborative Consumption: Sustainable Business Model - Fashion Library

In short, sustainable development requires an urgent review of current patterns of production and consumption in order to achieve greater social, economic and environmental equity through new business models.

It is important to drive and implement the collaborative creative economy and social innovation for sustainability and can help to incorporate sustainability into business objectives and processes. The sustainable business model considers a wide range of stakeholder interests, with an emphasis on the environment and society.

The project is based on the circular economy methodology, with a focus on collaborative creative economy.

This article aims to define and situate the importance of the collaborative creative economy in the scope of sustainability using a literature review. The article highlights some conceptual advances in the field of collaborative consumption in the fashion industry, capable of changing procedures and creating new mentalities through social innovation.

The article emphasizes the role of the circular economy essential to the process of sustainable feedback on the production and consumption of products. This means that all natural resources, energy and raw materials must be reduced in production and that their use and reuse must be optimized.

Thus, the circular economy seeks to find a new economic paradigm that integrates environmental concerns and covers the way for new, more sustainable business models, with or without financial intermediation.

Using scenarios to explore future implications for employment, which recognizes the potential of the collaborative economy in creating new sources of income, offering benefits to consumers through new businesses, through the temporary use of goods and services, such as accommodation and car sharing, bicycles, televisions, lawn mowers and hedges cutters, appliances, clothing, among others.

The collaborative economy also includes non-profit activities for public services and social innovation, such as social cohesion, common ownership and collective benefits. Responsibility and a sense of community, in terms of sharing and solidarity, are considered common values related to environmental sustainability.

Lately, new business models related to sustainability have emerged, such as the share of clothes, fashion libraries and clothing fairs. The concept of shared wardrobe is increasingly gaining followers in several countries.

This article presents the theoretical elements articulated to the new business models for sustainable development in the fashion industry, such as collaborative creative economy, circular economy, product service methodology (Product-Service System, PSS). Note that all these concepts and practices, especially the creative collaborative economy, are all quite recent, as is the sustainable development introduced in Rio 1992. The circular economy methodology, for example, was created in 2010. Therefore, it is in the fields of

construction that new business models induced by social innovation in the field of Fashion Design are demanded. This is exposed in the "project of an exponential system of sustainability in fashion design", created by the researcher, and which will be implemented in Covilhã, Portugal. It will allow exploring the opportunity to host an innovative and integrated project in response to the challenges imposed by regional, national and global public policies. Implanted through a collaborative practice between community, companies and consumers, it will give citizens the opportunity to enjoy the multidimensionality of sustainable development in its three dimensions: social promotion of quality of life and well-being; economic integration of the collaborative and solidary creative economy with active and conscious participation of all agents, which attracts and retains the population and improves the city's image; and environmental: promoting good environmental and eco-efficient practices.

Collaborative Economy: New Business Model Case Study

The innovation of new sustainable business models presents many possibilities for exploration. The redistribution market has great potential, as it presents low risk and presents good rewards for investors. Intensifies the use of fashion products without the need to produce new products. There are many successful models of redistribution like Ebay, Amazon, Gumtree and Craigslist as examples, especially for P2P transactions that connect consumer to consumer, being able to sell or buy, rent or exchange. Collaborative consumption on P2P platforms works with reputation mechanisms that can create trust among users. To sell a product, a platform membership fee may be charged; if the product is sold, a fee will be charged on the final value. Those platforms that do not have a physical inventory and where users have their clothes have great potential for scalability with exponential growth. They can be implemented anywhere in the world, at a reduced cost for deployment. The big investment is made in technology, insurance and partnership with companies that provide services such as washing, organization, delivery and others. OLX and *Custo Justo* are P2P platforms that function as online classified ads. They connect seller and user at no cost. They do not offer a rating system and are not responsible for fraud situations. The PSS model by subscription system, although the customer has the possibility to cancel whenever he wants, generates user loyalty and develops a lasting relationship based on loyalty. Companies can also exploit innovation through eco-efficient systems. Rent the Runway Unlimited is an example of the use of non-toxic products for hygiene, delivery and return of reusable packaging and protective clothing. All are returned for recycling. There are many possibilities to be explored in the collaborative lifestyle with hotels in tourist locations, such as ski resorts and national

parks, among others, that can offer sportswear and other equipment. Regardless of the business model, collaborative consumption can represent a significant change in behavior to increase the time of use and the useful life of the fashion product. It is worth mentioning that all the business models presented in this article value the quality of the products.

10.1.2 Conclusions of the Empirical Analysis of the Investigation

Circular and Collaborative Economies as a Driving Force for Environmental Sustainability in New Fashion Business Models

Circular and collaborative economies are and will be a good driver of environmental sustainability in new fashion business models.

Thus, the circular economy is considered holistic and adaptive, representing an evolution of the linear economy through the perception and need for a new sustainable strategy in response to the environmental degradation caused by the traditional linear economy. The collaborative economy can be considered an environmentally sustainable socio-economic system, built through the use of digital networks to connect and share goods and products, as well as human, financial and physical capital.

The objective of this work is to explore the convergence and divergence between business models of circular and collaborative economies in the fashion industry and the benefits for sustainable development.

The methodological approach is exploratory through a literature review and a case study of two business models. The first, Rent the Runway, uses PSS (Services and Products), being a circular model that uses eco-efficient services, with the potential to replicate and compete with the 'fast fashion' sector. The case study was carried out with data from the Rent the Runway website. The second, Wardrobe, a P2P platform whose study was conducted with personal information with the company's co-founder, Germanno Teles. The wardrobe business models have a high scalability potential, as they can be replicated anywhere, they do not have a physical inventory, as users own their clothes.

The fabric and clothing production system not only depletes and degrades natural resources, but also uses dangerous substances that affect the health of workers and consumers. The textile industry depends mainly on non-renewable resources, such as oil, to produce synthetic fibers, fertilizers and chemicals, such as insecticides, herbicides and fungicides in cotton cultivation, for example.

These and other problems were further aggravated in the 2000s, when fast fashion chains emerged, with an accelerated pace of production and consumption, allowing the

manufacture of fashion products with shorter life cycles. Fast fashion industrial production is governed by financial results: it increases production and generates greater profits. Consequently, in addition to ecological damage, social problems arising from the exploitation of cheap labor and poor working conditions in underdeveloped countries also increase.

According to the information gaps mentioned and identified in the context of sustainable growth, this exploratory work contributes to the improvement of knowledge about convergence and divergence between the models of circular and collaborative economy and to promote the analysis and identification of benefits for sustainable development.

The circular economy is pragmatic, grounded and contextualized in the current reality of the planet. Its objective is to preserve natural resources, optimize those available and guarantee the essentials for the future. The collaborative economy is formed by decentralized P2P networks that make use of idle assets and create new markets. The distinction between collaborative economics is that it involves the use of Internet technologies to connect groups of people in order to make better use of goods, services, skills, create collaborative companies and projects.

It is concluded that Rent the Runway is a circular business model with the potential to compete with the fast fashion business model. Uses the System of Products and Services (PSS) through the dematerialization of products: it offers a wide variety of models of quality clothing and design and eco-efficient services. If it is expanded to other countries, it will bring environmental benefits, increase the life cycle of products, extend the useful life of materials and minimize the use of natural resources. Financial gain is centralized and strictly follows existing regulations, such as taxes, insurance, licensing, etc.

Wardrobe is a P2P platform to relocate third party clothing, keeping previously idle or stocked products in circulation. It operates collaboratively, allowing users to monetize clothes without being discarded. It is recommended for special occasions that need durable products that remain with quality for a long time. It offers the possibility of partnerships with outsourced services (delivery, laundry, repairs, etc.). As the Wardrobe does not have a physical inventory, users who own their clothing offer a high potential for scalability, as the business model can be replicated anywhere on the planet.

Increasing the use of fast fashion products and intercepting early disposal is the collaborative consumption of foreign exchange and loan platforms. The circular economy is, therefore, holistic and adaptive, representing a sustainable solution to the environmental degradation caused by the traditional linear economy. Although the circular economy encompasses the collaborative one, it is clear that both are independent lines of research, with many points of convergence that complement each other. They accelerate the transition to sustainable development through new business models that increase the use of fashion products. But for a long time, it is necessary to rethink the entire value chain: clothes will have to be designed to last. The collaborative economy can be considered as a sustainable socioeconomic system built on a digital network that connects and shares goods and products, and human, financial and physical capital.

It originated naturally and consumers became prosumers, creating their own businesses, often due to the financial need, opportunity to optimize goods and services, share knowledge, always through an online platform. However, collaborative business models, despite having all the positive aspects discussed above, are still far from being in line with current regulations. As study limitations, it should be noted that the cases associated with circular and collaborative economies were analyzed and that the observations in the adopted methodology are always partial and are not exhaustive in a single study. Other variables can be considered in the case analysis and can be improved and expanded to allow more detailed information. As a proposal for future research, it is suggested a case study with more cases and its comparison with the present study. This can also be complemented by descriptive statistical analysis of the impact on sustainable development.

10.2 Projection and challenges

This project targets the Millennials generation, also known as the "Uber generation" or "Airbnb generation" that uses the collaborative economy. Shared consumption will cause a real behavior revolution in favor of sustainability, pointing to the substitution of products for services. Shared practices are ways to optimize product life, reducing the need for new products, leading to less environmental impact.

The challenges imposed are the students who join the platform, both as a user and as a level of technical and scientific training, which are fundamental for society to contribute to national goals, seeking solutions. Students benefit because they associate their name with creating innovative, scalable, sustainable and systematic solutions to the world's biggest problems.

For the project's success, it is important to count on the support of the Department of Science and Textile Technology of the University of Beira Interior with students, society, government agencies and European networks for sustainable development.

The implantation of this project, "Exponential System Design for Sustainability in Fashion Design", will be a disruptive innovation and involves changes in mentality. This project will contribute to the creation of a matrix that positions Exponential Organization, Design, Circular Economy and Collaborative Economy in the scenario of the creation of socioeconomic value, and it will be a transforming process.

In the 21st century, thanks to the Internet and technological and digital developments, social networks have emerged imitating human social life. The "online world" grows exponentially and allows expanding social networks to anywhere on the planet, linking individuals and organizations. Links created using the Web end up strengthening outside the network. In the Collaborative Economy, there are five important points that deserve to be highlighted: (1) the social, (2) the economic, (3) the technology, (4) the service of collaborative consumption; (5) and the co-creation related to collective intelligence.

Digital technology has the potential to contribute to sustainability by digitizing services with the aim of dematerializing clothes and allowing temporary access to them. The platform would be developed with the support of the UBI Informatics Department.

This work contributes to the future of the Circular Economy in Portugal and in the world. The academy should be an example to be followed as a sustainable business model with a collaborative approach, between departments for the resolution of projects that may be completed by students and presented to authorities, companies, civil society. Models of open innovation based on user experience, in the joint creation of systemic solutions for the preservation, recovery of an informed and participative society where the transition to a circular economy is based on an approach that integrates the best technical and scientific knowledge. This being the role of the university, a scientific, technological and innovation system with qualified human resources and adequate infrastructures.

Changing the way clothes are designed, sold and used can have great significance for nature. Increasing the useful life, reducing early disposal and capturing value through upcycling and reducing the pressure on natural resources and technical cycles along the value chain, are the essential objectives.

10.3 Limitations of the Study and Further Research

Since the beginning of this investigation, there was interest on the part of the Covilhã City Council to implement the project proposed in this thesis in the City of Covilhã, we had many meetings at UBI and the City Council, and even processed the documents-(See document and space Appendix G, G1 and G2) to make it feasible, reaching a stage having chosen a physical operational space. Throughout this investigation one went through several changes, first thinking about a practical project, a physical fashion library with cataloged clothes. However it would take a lot of time and bureaucratic implications that the Textile Department and the students' copyright entailed.

As the investigation matured, the virtualization solution for a P2P platform that reduces bureaucratic issues was established. Nevertheless, the department's support for the creation of the platform is important. The great advantage of this platform would be the interaction of students' work with the community.

The others interested in taking advantage of the project are UBI's Course of Cinema-departments Communication, Arts UBI, TeatrUBI-Theater Group and Asta. To wear clothes as costumes. Event promoters invite students to provide the coordinates for the parade or exhibitions. A Production agency showed interest for Costume Cinema production, TV Shows Productions and Advertising Commercial Productions and others. For this, the author has already been contacted several times.

As suggestions for teachers and designers, the circular economy platform, provides resources and tools⁴ for circular design, having specific material for fashion design.

When necessary it is possible to use resources from other departments to complete your projects.

This project is just the beginning of a field of investigation, which the author identified and hopes to continue to contribute to science, remembering that it is a very recent field and with many possibilities for connections to be explored. The researcher hopes that this project will be implemented in the future with the support of collaborators and sponsorships and especially if there is interest from the Textile Science and Technology Department of UBI. An adoption to be positive in terms of users is greatly expected.

⁴ <https://www.circulardesignguide.com> (2017,2018) The Circular Design Guide is a collaboration between the Ellen MacArthur Foundation and IDEO. [accessed in august, 2017]

As a future suggestion, it is proposed the application, expansion and enlargement of the themes with the involvement of other higher education institutions, such as the University of Minho and the Polytechnic Institute of Castelo Branco, with the adoption of Fashion Revolution aiming to increase the awareness of students, to recall the importance of discussing these issues. It is worth remembering that it is a collaborative platform in more than 100 countries and several fashion courses have already joined the worldwide movement. It has already been established by authors and government agencies that awareness is the key to changing social innovation.

In this line, it is suggested to deepen new business models with new categories, for example renting, for each type of customer a differentiated business model to better meet the needs of each one.

For example create a fashion library in hotels so that clients do not need to bring their own clothes.

Join the creation of a style consulting course and body biotype. For sustainable clothing is what already exists. In many cases the type of modeling does not favor body biotype or lack of knowledge of consumers own style. This leads to excessive clothing consumption.

It is worth remembering that Covilhã is a university city where a platform with second-hand household and electronic utilities can meet the needs of these students.

It is suggested to carry out studies regarding the social impacts resulting from behavioral transformation. It is also suggested to study and analyze the operation of the proposed business models, models that are economically viable and of a collaborative economic character.

When emphasizing the role of the designer, it is desired to be seen and perceive the design process in a completely different way until then. May the role be reinforced with the other collaborators throughout the chain, thus being able to solve the sustainability problem as a team. Now speaking in addition to the designer, business owners and producers, but also in government agencies, all of which need new practices and methodologies and innovative solutions for what already exists and for the creation of more efficient products. Even universities and schools need to update the way they lead their projects so that they are more effective and up to date to meet the demand for circularity in collaboration with the community.

This business model can be used in whole or in part, by any intervening agent and is free to adapt it.

APPENDIXES

**Creative Collaborative Circular Economics,
Exponential System Design for Sustainability in Fashion Design**

Appendix A. Images of the warehouse of fashion collections



Image 1. Depicts the warehouse where the fashion collections of the undergraduate and master's students in Fashion Design at the University of Beira Interior are kept in a closed warehouse. [Collaboration Photography: Vasco José Fernandes Silva]



Image 2. Depicts the warehouse where the fashion collections of the undergraduate and master's students in Fashion Design at the University of Beira Interior are kept in a closed warehouse in the overview. [Collaboration Photography: Vasco José Fernandes Silva]

Appendix B. Invitation - Elsevier Book Proposal Review

----- Forwarded message -----

From: Solange Fernandes <embaixadorafrobi@gmail.com>

Date: dom, 1 de jul de 2018 às 20:28

Subject: the proposal along with the reply proposal review questionnaire.

To: McCombs, Ken (ELS-NYC) <K.McCombs@elsevier.com>

Book Proposal Review: Sustainable Development Strategies: Engineering and Economics

McCombs, Ken (ELS-NYC) <K.McCombs@elsevier.com>

dom., 24 de jun.

de 2018 20:06

Dear Dr. Fernandes,

My name is Ken McCombs and I am the Senior Editor for Civil and Environmental Engineering at Elsevier Science and Technology books. I read your article: Circular and collaborative economies as a propulsion of environmental sustainability in the new fashion business models, which will publish in Lecture Notes in Electrical Engineering, Volume 505, 2019, Pages 925-932. I am writing to invite you to review the above mentioned proposal which was submitted by Professor Mousumi Roy, PhD (Economics) of the Department of Management Studies, National Institute of Technology Durgapur, India. The objective of the book is overcoming the various issues involved in forming an effective sustainable development strategy from the standpoint of a diversity of disciplines mainly engineering and economics.

The proposal is about 3 pages in length and should not take you long to read and digest. **I can offer you a \$150.00** review fee for your comments which I would like to have in house by July 1st. I will be happy to send you the book proposal and questionnaire upon your request. I hope that you can find the time to help.

Best regards,

Ken

Kenneth P. McCombs

Kenneth P. McCombs

Senior Acquisitions Editor

Science and Technology Books

Elsevier

50 Hampshire Street, 5th Floor

Cambridge, MA 02139 USA

Appendix C. Recognition by the scientific community:

C.1. Keynote Speaker Invitation: 8th Annual Conference of Analytix-2020, China

24/01/2020 Gmail - Fwd: Dr. Solange Fernandes, Would You Like to be Chair/Speaker in Analytix2020?

 Solange Fernandes <embaixadorafubi@gmail.com>

Fwd: Dr. Solange Fernandes, Would You Like to be Chair/Speaker in Analytix2020?
1 mensagem

Solange Fernandes <embaixadorafubi@gmail.com> 21 de janeiro de 2020 15:22
Para: Solange Fernandes <embaixadorafubi@gmail.com>

----- Forwarded message -----
De: **Melody** <Victor03@analyticaltech2019.com>
Date: ter., 7 de jan. de 2020 às 04:24
Subject: Dr. Solange Fernandes, Would You Like to be Chair/Speaker in Analytix2020?
To: Solange Fernandes <embaixadorafubi@gmail.com>

The 8th Annual Conference of AnalytiX-2020 China
Time: April 25-28, 2020
Place: Dalian, China

Dear Dr. Solange Fernandes,

Greetings and Happy New Year wish from the committee of AnalytiX-2020 (China). We hope that you are having a happy and safe holiday season and we want to give you a brief update regarding the upcoming event.

The 8th Annual Conference of AnalytiX-2020 (China) will be held during **April 25-28, 2020** in the beautiful city of **Dalian, China** with theme of Toward Original Innovations for Next Generation Technologies.

As we know your work in the field is a clear example of the leadership, we would like to highlight your effort at our conference and hope you could make a presentation as Speaker/Keynote/Chair regarding your latest research in the field on **your research**. **In order to express our sincerity, we can help to apply for some discount of registration fee or Package A (registration fee + hotel) from our organization committee.** If you are interested in attending, please send the **talk title** to me at your earliest convenience. As soon as we receive this information, we can then finalize the details of your presentation.

AnalytiX-2020 China is mainly focus on recent development and application of **bioanalytical technologies**. For more details, please check our website: <https://www.bitcongress.com/Analytix2020china/>

Dalian is a beautiful city with an excellent climate and unparalleled hospitality. It is the flagship city of the wealthiest region of China, leader in economy, art, design, industry and lifestyle, a must visit for travelers and an endless source of inspiration. April - Cherry Blossom Season, we cordially invite to join a Tech Tour to experience traditional Chinese culture, and to enjoy the delicious food of Dalian.

We look forward to your active support and participation for this influential event!!

Sincerely Yours,

<https://mail.google.com/mail/u/0?ik=a440ade1cb&view=pt&search=all&permthid=thread-f%3A1655042010138732501&simpl=msg-a%3Ar-11634276926923106> 1/2

C.2. Keynote Speaker Invitation: SES International Conference, University of Cambridge, United Kingdom

24/01/2020 Gmail - Keynote Speaker Invitation, SES Conference, University of Cambridge, United Kingdom

 Solange Fernandes <embaixadorafrobi@gmail.com>

Keynote Speaker Invitation, SES Conference, University of Cambridge, United Kingdom
1 mensagem

SES Conference <ses@ses-conference.com> 29 de julho de 2019 06:46
Responder a: ses@ses-conference.com

International Conference on:
Smart Energy Systems (SES2020)
Venue: [St Catharine's College, University of Cambridge, United Kingdom](#)
25-26 February 2020
<http://ses-conference.org>

Dear Colleague,

Based on your valuable experience and contributions on the field and on behalf of the SES2020 organizing committee, we sincerely invite you to submit your talk abstract (FYI: The duration of presentation at the conference will be about 25-40 Minutes.) and take part in our conference as keynote talk.

The International Conference on Smart Energy Systems (SES2020) aims to investigate innovative applications, Research Projects, Case Study, Letters, Investigation, Surveys, and last researches in the areas of **Energy and Systems**.

It is our pleasure to welcome you to the SES2020 conference, which will be **held from 25-26 February, 2020, in St Catharine's College, University of Cambridge, United Kingdom**. We are planning an outstanding scientific program led by world-renowned invited speakers.

**Creative Collaborative Circular Economics,
Exponential System Design for Sustainability in Fashion Design**

24/01/2020

Gmail - Keynote Speaker Invitation, SES Conference, University of Cambridge, United Kingdom

Keynote abstract submission is **OPEN until 12 August 2019**.

To submit your keynote abstract, please read the [submission guidelines](#) and use the following submission link: [Online Submission System](#)

If you have problems with submitting your keynote abstract using the online submission system, you can submit it directly to the following emails:

Contact@ses-conference.org or
t.stewart.ses20@gmail.com

Publication of best selected papers in many journals

International Journal of Sustainable Aviation IJSA InderScience.
International Journal of Energy and Buildings Elsevier.
International Journal of Smart Cities MDPI.

Read More here: [Journals](#)

Accepted and **registered** papers of SES2020 will be published in **conference proceedings series with ISBN (978-1-912532-13-1)**. The proceedings will be submitted to be reviewed and indexed in Scopus and Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).

Keynote speaker can enjoy **15%-OFF** registration fee, on or before 30 August 2019, and the publication of the keynote abstract in the SES2020 conference proceedings. Also, we offer free registration for eventual submitted research paper. (free registration for the second paper)

For more information ([Why attend?](#), [Topics](#), [Committee](#), [Venue](#), [Socializing Events](#), and [...etc](#)), please visit our conference web site: <http://ses-conference.org>

Looking forward to hearing back from you and welcoming you in SES2020, Cambridge on 25-26 February 2020.

Best regards,

SES2020 Chair.

International Conference on Smart Energy Systems

Venue: St Catharine's College, University of Cambridge, United Kingdom

Email: contact@ses-conference.org or info@ses-conference.org

Web site: <https://ses-conference.org/speakers/>

C.3. Keynote Speaker Invitation: Waste Recycling Congress, Sydney

----- Forwarded message -----

De: **wasterecycling** <wasterecycling@expert-meetings.com>

Date: ter, 7 de mai de 2019 à 10:00

Subject: RE: Waste Recycling Congress Sydney Official

To: <embaixadorafrobi@gmail.com>

Dear Solange Fernandes,

Official Invitation Waste Recycling Congress,

*The purpose of this letter is to formally invite you, on behalf of the Operating Committee, to be the Keynote Speaker/ Speaker/ Delegate at the upcoming **Waste Recycling Congress 2019**.*

*This topical meeting provides a venue to discuss contemporary issues and advanced research in the field of **Recycling and Waste Management**.*

Official Language - English only

*We are offering **499 USD (Registration + 2 night's stay)** before early bird date.*

We look forward to your confirmed presence at the global event.

Thanks and Regards

Abby Rose

Program Coordinator

Waste Recycling Congress 2019

Mail ID: wasterecycling@expert-meetings.com

47 Church field Road, London, W3 6AY, UK.

Contact: | UK: 0-800-014-8923 | WhatsApp - +441234982406

C.4. Keynote Speaker Invitation: The 4th International Biotechnology Congress, Dubai, UAE

De: Ms. Sophie Yu <sandra08@plymer2019.com>

Date: dom., 19 de jan. de 2020 às 02:23

Subject: Interested in giving a talk at IBC Dubai event?

To: Solange Fernandes <embaixadorafrobi@gmail.com>

The 4th International Biotechnology Congress (IBC-2020)

Time: Nov. 9-11, 2020

Place: Dubai, UAE

Dear Dr. Solange Fernandes,

Greetings and Happy New Year wish from the committee of IBC-2020. We hope that you are having a happy and safe holiday season.

We are proud to announce that **the 4th International Biotechnology Congress (IBC-2020)** will be held during Nov. 9-11, 2020 in Dubai, UAE. On behalf of committee, we cordially welcome you to deliver a talk at **Circular and Collaborative Economies as a Propulsion of Environmental Sustainability in the New Fashion Business Models in Track 303: Biogas, Bioethanol and Biodiesel** on our conference. If you are interested in attending our event, please submit **preliminary speech title**. As soon as we receive this information, we can then finalize the details of your presentation.

IBC-2020 is a dedicated event where you will have the opportunity to learn about new developments in the field of Biotechnology, Gene and Life Sciences, and share aspects of your own work by submitting a poster or oral presentation. With the participation of outstanding international experts, we hope productive discussions would stimulate new creative ideas to translate new discoveries into better practice and application. IBC-2020 continues to expand with magnificent scientific and social programs to maximize your network in a free communication meeting environment. We create a great platform to researches, scientists, academicians and industry

experts to share experiences, discuss research findings and acquire the desired knowledge for practical exercise.

A rich selection of topics will be addressed during IBC-2020, which includes:

Track 1: Industrial Microbiology and New Enzymes & Biocatalysis

Track 2: Novel Biomaterials

Track 3: Biomass and Bioenergy

Track 4: Recent Advances in Bioanalytical Technologies

Track 5: Animal/Plant, Agricultural and Food Biotechnology

Track 6: Environmental Biotechnology

Track 7: Green Bioprocess and Biomanufacturing

For more information, please visit the conference website at: [IBC-2020](#)

Look forward to hear from you soon.

Sincerely yours,

Ms. Sophie Yu

Organizing Committee of IBC-2020

Tel: 0086-411-84799606

Fax: 0086-411-84799629

Email: sophie@mol-cell.com

C.5. Keynote Speaker Invitation: 6th International Conference on Fuzzy Systems and Data Mining (FSDM 2020) Xiamen, China

Exponential System Strategy for Sustainability in Fashion Design

fsdm@fsdmconf.org [por](#) [sendgrid.net](#)

qua., 15 de jan.

02:45 (há 9 dias)

Dear Solange Fernandes,

This is Senlin Yan, the conference secretary of the 6th International Conference on Fuzzy Systems and Data Mining (FSDM 2020)(Nov. 13-16, 2020, Xiamen, China). Impressed by your research Exponential System Strategy for Sustainability in Fashion Design

This paper aims to discuss the importance of exponential system design in promoting social innovation and influencing collaborative lifestyles, presenting the growth of a business model "Exponential System Design for Sustainability in Fashion Design". The developing product-service system (PSS) business model integrates the lines and contributions of the exponential design for sustainability, based on the 6Ds of exponential organizations: digitization, dissimulation, disruption, dematerialization, demonetization and democratization.

The proposed implementation is in the city of Covilhã, Portugal, with the provision of a facilitating platform with collaborative services for fashion. This can be replicated in other places and contexts, in whole or in part, adopting, for this, the modularity. How this movement can be called? One can call it Exponential Organization precisely because it represents the most appropriate structure to cope with the accelerated, nonlinear, Internet-based pace in contemporary life and in future. It is concluded that the exponential design system is an approach capable of leading to radical innovation and to the creation of value in the development of business for Sustainability.

I cordially invite you to share your new research findings.

Selected papers will be published in well-known journals with ISI impact factors

If you are not available for attendance to FSDM 2020, could you please help us review one or two papers? Active Reviewers are candidates for Technical Program Committee for FSDM 2021.

It is highly appreciated if you kindly forward this conference information to your colleagues or friends in this field.

cecnet@cecnetconf.org [por](mailto:cecnet@cecnetconf.org) sendgrid.net

sáb., 23 de mar.
de 2019 15:06

Dear Fernandes, Solange,

Greetings from the 9th International Conference on Electronics, Communications and Networks (Oct. 18-21, 2019, Kitakyushu City, Japan).

We have got to know that you have published paper with title "Circular and collaborative economies as a propulsion of environmental sustainability in the new fashion business models"

The objective of this work is to explore convergence and divergence between business models of circular and collaborative economies in fashion industry and the benefits to sustainable development. The methodological approach is exploratory through bibliographic review and case study of two business models. The first, Rent the Runway, makes use of the Services and Products System (PSS), being a circular model using eco-efficient services with the potential to replicate and to compete with the 'fast-fashion' industry. The case study was done using data from Rent the Runway website. The second, Wardrobe, a P2P platform whose study was conducted with personal information with the company co-founder Germanno Teles. Wardrobe business models have a high potential for scalability, as they can be replicated anywhere, have no physical inventory, as users own their clothes. Thus, circular economy is considered to be holistic and adaptive, representing an evolution of the linear economy through the perception and need of a new sustainable strategy in response to the environmental degradation caused by the traditional linear economy. Collaborative economy can be considered an environmentally sustainable socio-economic system, built through the use of digital networks to connect and share goods and products, as well as human, financial and physical capital. © 2019, Springer International Publishing AG, part of Springer Nature., it is quite inspiring, I sincerely invite you to present your newest research.

If you are not available for attendance, could you please help us review one or two papers?

Active Reviewers are candidates for Technical Program Committee next year.

It is highly appreciated if you kindly forward this conference information to your colleagues or friends in this field.

For more information, please contact

Joy Cai cecnet@cecnetconf.org

C.6. Keynote Speaker Invitation: The second Sustainable Solutions for Growth conference (SSG) 2019, Wroclaw (Poland).

Present and publish at 2nd SSG 2019 conference

Wojciech Budzianowski <wojciech4@budzianowski.eu>

qui., 1 de ago. de
2019 00:07

Dear colleague,

The second Sustainable Solutions for Growth conference (SSG) 2019 will be held on September 16-17, 2019 in Wroclaw (Poland). The conference brings together researchers, innovators, consultants and investors under common goal - creating, evaluating, implementing and benefiting from sustainable innovations. Conference themes include various aspects of innovation management, sustainable new products, processes, marketing and organisational methods. Two types of abstracts are invited (1) research and (2) sustainable solution. Research needs to comply with conference themes. Sustainable solutions need to give promise for future commercial applications. Abstracts will be published on Book of Abstracts, 4-page papers on Scopus/WOS indexed Proceedings while full papers will be facilitated for publication on leading journals and edited books. For example, Special Issue „Sustainable Solutions for Flexible Systems Management in Competitive Organizations” will be published by Global Journal of Flexible Systems Management (Springer). You may participate in-person or present virtually while retaining all publication privileges.

Owing to your eminence in the field I cordially invite you to communicate your research abstract or sustainable solution abstract to the SSG audience. We will be also happy to consider you as a member of the Scientific Advisory Board (SAB) if you register as a participant and reviewer.

Call for Abstracts can be downloaded and you may register at: <http://ssg.budzianowski.eu>

In case you might have any queries or requirements please do not hesitate to contact me by replying to this email.

I look forward to hearing from you soon.

Best regards,

Wojciech Budzianowski (Chair 2nd SSG 2019)

Upcoming conferences: 5th Renewable Energy Sources - Research and Business conference (July 6-7, 2020, Brussels, Belgium).

[Register](#) at 2nd Sustainable Solutions for Growth conference (September 16-17, 2019, Wroclaw, Poland).

If you do not wish to receive any email in future from conferences click [Unsubscribe](#). We concern for your privacy.

C.7. Keynote Speaker Invitation: International Conference on Textile Engineering-2019, Bangkok Thailand

International Conference on Textile Engineering-2019, Bangkok Thailand, October 21-22

Textile-Engg-2019 <textile-engg-2019@scientific-federation.net>

ter., 23 de jul. de

2019 09:13

Dear Dr. Solange Fernandes,

Good Day

The purpose of this letter is to solicit your gracious presence as a Speaker at the upcoming “**International Conference on Textile Engineering**” which will be held on October 21-22, 2019 Bangkok, Thailand.

The main **Theme** of the conference is “**A strategic innovation and research agenda for the textile engineering**”.

TextileEngg-2019 would lay a podium for the interaction between experts from across the world and aims in accelerating scientific discoveries.

For further information on the conference, please visit our website <https://scientificfederation.com/textile-engg-2019/>

The Invited Speakers can avail the registration at 699 USD only* and will be supported by 1-night of complimentary accommodation.

Benefits:

- Career Guidance Workshops to the Graduates, Doctorates and Post Doctoral Fellows
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With Best Wishes,

Mr. Rama Chandra Prasad

Textile Engineering Conference

Conference Secretary

Scientific Federation

Phone: +91-779-979-0002

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Appendix D. Publication (*forthcoming*)

Publication (*forthcoming*) 'Fashion Revolution as promoter of social innovation and sustainability in Fashion' in Edition 1/2020 of the 'Leather and Footwear Journal'

Appendix D and Appendix F refer to the topics of article number 6 "Fashion Revolution as Promoter of Social Innovation and Sustainability in Fashion"



Bucharest, 17.01.2020

To whom it may concern,

The manuscript titled "Fashion revolution as promoter of social innovation and sustainability in fashion", by authors Solange FERNANDEZ, Isabela Dias HONORIO, Alexandra CRUCHINHO, Maria Jose MADEIRA, Jose LUCAS, reference no. RPI-20-02, is accepted for publishing in issue 1/2020 of *Leather and Footwear Journal*.

Leather and Footwear Journal is indexed in the following international databases: Chemical Abstracts Service, CABI, Elsevier's COMPENDEX and SCOPUS, EBSCO, Crossref, CiteFactor, Research Bible, AcademicKeys, Environmental XPRT, MIAR, Electronic Journals Library, Cosmos Impact Factor, Science Library Index, Scilit, CNKI Scholar, DRJI, and Index Copernicus.

Sincerely,

Editor-in-chief,

Dana Gurău 

Appendix E. Fashion Revolution:

E.1. 1st Edition Fashion Revolution - 2017

E.1.1 Meeting of the 1st Edition Fashion Revolution UBI 2017



FASHION REVOLUTION UBI 2017

29 de Março – 1 de Abril

Universidade da Beira Interior

Covilhã

II Jornadas de Moda - ModUBI- Núcleo de Estudantes de Design de Moda

ATA DE REUNIÃO DA EQUIPA DE ORGANIZAÇÃO

O FASHION REVOLUTION UBI 2017, tem como Embaixadora do Movimento Solange Fernandes que aderiu ao movimento no âmbito do Doutoramento em Design de Moda UBI/Minho, que é na área da sustentabilidade com base na economia criativa colaborativa. Tendo como orientador o professor doutor José Lucas e coorientadora a professora doutora Alexandra Cruchinho. O objetivo é potencializar as ações de conscientização do consumo consciente do produto de moda com os estudantes e com a comunidade local.

O FASHION REVOLUTION UBI 2017 será realizado ajuntamento com II Jornadas de Moda “ModUBI- Núcleo de Estudantes de Design de Moda.” representado pela a presidente Iolanda Guimarães. As demais ações “O FASHION REVOLUTION UBI 2017” fazem parte das atividades oficiais do movimento, juntamente com as ações do Doutoramento da embaixadora. O qual seria muito importante o apoio “ModUBI” nas demais atividades.

No dia 27 de fevereiro de 2017, a equipa de organização do FASHION REVOLUTION UBI 2017, reuniram-se na sala de reuniões do Departamento de Ciência e Tecnologias Têxteis da Universidade da Beira Interior às 14:30, para definir as atividades do evento e responsabilidades cada integrante da equipa, sendo ela formada por:

Embaixadora do movimento Fashion Revolution UBI 2017: Solange Fernandes

Equipa de apoio da organização: Ana Gonçalo, Iolanda Guimarães, Cristiana Costa, Caroline Loss e Inês Paula.

Nesta reunião ficou definido:

1. O programa provisório do evento, conforme segue em anexo a esta ata;
2. A necessidade de inscrição prévia para a participação nos workshops;
3. Solange Fernandes fará o primeiro contacto com os seguintes palestrantes: Pé de Chumbo, Marita Moreno, Ana Abrunhosa, Paulo Vaz, Jomafil, Economia Circular, Gremanno Wardrobe, Coolabora, H&M, Graça Guedes, Miguel Gigante, Bruna e Patrícia, Utriplo, Loja de segunda mão, Sarah Trending, Rafaela Norogrande, Susana Azevedo, Denis Coelho, Liliana Ribeiro, Carla Morais, Cristina Broega e Wool.
4. Caroline Loss fará o primeiro contacto com os seguintes palestrantes: Sofia Rocha, Burel Factory e Maria José.
5. Cristiana Costa fará o primeiro contacto com os seguintes palestrantes: Away to Mars, A Montra, Riopele, Louropele, Sara Lamúrias e Ina Koelln.
6. Cristiana Costa fica responsável pelo envio dos e-mails de confirmação das datas e horário de todos os palestrantes confirmados. Bem como solicitar o envio do resumo da apresentação, breve CV e fotografia dos oradores.
7. Cristiana Costa fica responsável por solicitar junto a Câmara Municipal da Covilhã a permissão para utilizar espaços público, sendo eles o miradouro das Portas do Sol para a intervenção comunitária, Assembleia para o painel da Economia circular e o Teatro Municipal para a exibição do documentário *The True Cost*.
8. Caroline Loss contactará o Museu dos Lanifícios para o workshop de crochê.
9. Após as confirmações dos palestrantes, o MODUBI fica responsável por reservar o auditório das engenharias e ao CREA, além de reservar os almoços e hospedagens necessárias.
10. MODUBI contactará empresas para patrocinar os intervalos (coffee break).
11. MODUBI ficará responsável pela organização da festa de encerramento das II Jornadas de Moda UBI 2017, na Ex-libris, no dia 30 de Março de 2017 (quinta-feira).
12. MODUBI fica responsável pela criação e administração da página do facebook e Instagram do Fashion Revolution UBI 2017.
13. Cristiana Costa e MODUBI ficam responsáveis pela parte gráfica dos cartazes e credenciais do Fashion Revolution UBI 2017 & II Jornadas de Moda. Além de solicitar patrocínio da AAUBI para as fitas das credenciais e das Folhas Soltas para a impressão e plastificação.
14. MODUBI solicitará patrocínio para as bebidas consumidas durante o evento.
15. Ana Gonçalo e Cristiana Costa serão responsáveis pelas relações públicas dos eventos e contactos relacionados com o Fashion Revolution UBI 2017 & II Jornadas de Moda.
16. Caroline Loss fica responsável por organizar o Projeto Fashion Revolution Escola e Solange Fernandes por contactar as escolas.

**Creative Collaborative Circular Economics,
Exponential System Design for Sustainability in Fashion Design**

17. Caroline Loss e Cristina Costa ficam responsáveis por organizar o Projeto Fashion Revolution Empresa.
18. Solange Fernandes fica responsável por organizar o Projeto Fashion Revolution Teatro e dança.
19. MODUBI fica responsável por contactar o grupo de alunos de cinema para acompanharem as atividades ligadas Fashion Revolution UBI 2017 & II Jornadas de Moda.
20. Solange Fernandes ficará responsável pela organização da feira troca todos em parceria com a Coolabora.
21. MODUBI fica responsável por divulgar o evento Fashion Revolution UBI 2017 & II Jornadas de Moda com os outros núcleos da universidade.
22. Esta reunião foi realizada do conhecimento do orientador da embaixadora do evento, o professor doutor José Mendes Lucas.

Covilhã e UBI, 27 de fevereiro de 2017.

Professor doutor José Mendes Lucas

Solange Fernandes

Ana Gonçalo

Cristiana Costa

Iolanda Guimarães

Caroline Loss

Inês Paula

E.1.2 Poster of the 1st Edition Fashion Revolution UBI 2017



E.1.3 Programm of the 1st Edition Fashion Revolution UBI 2017 – 1st Day

29 Quarta

Auditório da Parada

9:30 — Sessão de abertura

Prof. Doutor Mário Raposo, Vice-Reitor da Universidade da Beira Interior
Prof. Doutor João Lanzinha, Vice-Presidente da Faculdade de Engenharia
Prof. Doutor Manuel dos Santos Silva, Coordenador da Unidade de Investigação FibEnTech
Prof. Doutor José Mendes Lucas, Diretor do Mestrado em Design de Moda
Eng. Hélio Fazendeiro, Adjunto do Presidente da Câmara Municipal da Covilhã
Solange Fernandes, Embaixadora Fashion Revolution UBI - Covilhã
Iolanda Guimarães, Presidente do Núcleo dos Estudantes de Design de Moda UBI

Rede sustentável

Auditório da Parada

Moderador: Lilitiana Simões Ribeiro

- 10:00 — Away to Mars - Cocriação: processo de criação aberto para todos
- 10:20 — A Montra / The Window - O poder das redes
- 10:40 — Marita Moreno- As pessoas que tornam possível um projeto
- 11:00 — Coffee Break
- 11:15 — Isabel Cantista - O retalho da sustentabilidade
- 11:35 — ONNO Models - Onno: Um projeto de colaboração artística
- 11:55 — Pé de Chumbo - Sustentabilidade no desenvolvimento da marca
- 12:15 — Rafaela Norogrande - Little Dress Project
- 12:35 — Sessão de Questões

Workshops Paralelos

- 14:30-18h — Produção fotográfica de moda
(Estúdio CREA)
- 14:30-18h — Cama de gato: do fio à trama
(Museu de Lanifícios)

#Ação 3 - O outro
lado da moda

Auditório Municipal da Covilhã

- 21-22:30h — Exibição do documentário "The true cost"

E.1.3 Programm of the 1st Edition Fashion Revolution UBI 2017 (cont.) – 2nd Day

30 Quinta

Do Fio a Pavio

Auditório da Parada

Moderador: Rui Miguel

- 9:30 — Brunho Cunha - Vintage for a cause - a moda como agente de mudança
- 9:50 — Alexandra Cruchinho - Sustentabilidade na Moda: Utilização do cobertor de papa
- 10:10 — Thomas Eckschmidt - Capitalismo consciente
- 10:50 — Coffee Break
- 11:05 — Twintex - Eco fashion e responsabilidade social
- 11:25 — Logik Wool - Fio de Fantasia Reciclado
- 11:45 — Burel Factory - O reinventar do valor do conhecimento regional
- 12:05 — Sessão de Questões

Inovação Social e Economia de Partilha

Auditório da Parada

Moderador: Hélio Fazendeiro

- 14:30 — Lala Deheinzelin - Fluxonomia 4D: Novas Economias para ativar a Transição
- 15:00 — Natural Cotton Color - A inovação aliada ao artesanato
- 15:20 — Lindsey Wuisan - Slow Fashion: Textiles in a Circular Economy
- 15:40 — BLC3 - Fashion Ecodesign
- 16:00 — Coffee Break
- 16:15 — Germanno Wardrobe - Wardrobe: Moda Compartilhada
- 16:35 — Coolabora - Economia solidária: a experiência da Coolabora
- 16:55 — Solange Fernandes - Inovação Social e Economia Criativa Colaborativa
- 17:15 — Sessão de Questões
- 18:00 — Visita ao New Hand Lab

Festa

Exlibris

- 00:00h — Festa de Encerramento II Jornadas de Moda

E.1.3 Programm of the 1st Edition Fashion Revolution UBI 2017 – Last Day

1

Sábado

#Ação 4
Intervenção
Comunitária

10:30h — PANO DE MURALHA
Tecelagem Comunitária
A Tentadora & Cinco Atelier
(Miradouro Portas do Sol)

14:30h — Feira Troca Tod@s
Coolabora
(Jardim Público)

E.2. 2nd Edition Fashion Revolution - 2018

E.2.1 Poster of the 2nd Edition Fashion Revolution UBI 2018



E.2.2 - Programm of the 2nd Edition Fashion Revolution UBI 2018

**FASHION
REVOLUTION**

FASHION REVOLUTION UBI COVILHÃ

07_05 LIFESTYLE DAY

AUDITÓRIO DAS SESSÕES SOLENES DA UNIVERSIDADE DA BEIRA INTERIOR

09:30 Sessão Solene de Abertura
10:00 Salomé Areias - Country Coordinator Fashion Revolution Portugal
10:20 Solange Fernandes - Circular Economy Club: Fashion Club in Covilhã
10:40 Cláudia Pires - Uma imagem vale mil emoções
11:00 Coffee Break
11:15 Patrícia Gabriel - Alimentação Saudável e Sustentável
11:35 Pura Natureza - Uma visão dos novos conceitos de sustentabilidade: biológico, granel e desperdício zero.
11:55 Cláudio Sampaio - LeNS: Learn Sustainability by Design for All
12:15 Antónia Silvestre - Diário de uma família sustentável
12:35 Sessão de Perguntas
12:50 Almoço (livre)
14:00 Workshop maquilhagem com Ricardo Pedro

A TENTADORA

21:00 Exibição do filme "The Next Black: A Film About the Future of Clothing"
+ Debate

08_05 BEAUTY & ACCESSORIES DAY

AUDITÓRIO DAS SESSÕES SOLENES DA UNIVERSIDADE DA BEIRA INTERIOR

10:00 DeAmor - A sustentabilidade no resgate da arte da saboaria artesanal natural
10:20 Organii - Organii o caminho da sustentabilidade
10:40 Germano Telles - Wardrobe
11:00 Coffee Break
11:15 DOME - Ethical Store
11:35 Antonio Mateus Handmade Story - A importância dos valores éticos nas marcas de moda
11:55 Revoadas - from Brazil
12:15 Sessão de Perguntas
12:30 Almoço (livre)
14:00 Workshop snacks saudáveis com Mónica Paixão
16:00 Workshop de cabelo com Isabel Curveira

09_05 FASHION DAY

AUDITÓRIO DAS SESSÕES SOLENES DA UNIVERSIDADE DA BEIRA INTERIOR

09:30 Ex-UBI's make your clothing - um debate com as marcas nacionais e sustentáveis:
Barn of Monkeys - David Pinto
Naz - Cristiana Costa
Severa - Marisa Inglês
Josefinas - Maria Inês
11:00 Coffee Break
11:15 Larissa Roviezzo - Ex-aluna ESMOD Berlim
11:35 Daniela Ponto Final
11:55 Marta Rebelo - Blog The Fabulista
12:05 Sessão de Perguntas
12:20 Almoço (livre)
14:00 Ações diversas: Atelier de upcycling e acessórios + fabrico da bandeira Fashion Revolution UBI
21:00 Exibição do filme "Riverblue" + Debate

FASHION REVOLUTION UBI COVILHÃ



E.2.3 Parade Poster of the 2nd Edition Fashion Revolution UBI 2018



E.3. 3rd Edition Fashion Revolution - 2019

E.3.1 Poster and Programm of the 3rd Edition Fashion Revolution UBI 2019



FASHION REVOLUTION

FASHION REVOLUTION – UBI

DIA 16 de Maio
Período 9:00 às 16 horas
Anfiteatro da Biblioteca Central
Sessão de Abertura UBI -Embaixadora UBI

9:30-10:30 Mesa Redonda - A MODA PRECISA REVER SEUS VALORES

Dr. Nuno Jerónimo — Sociólogo, Presidente do Departamento de Sociologia UBI

Celene Ferreira — Professora do curso de Jornalismo da UFT,
Doutoranda em Ciências da Comunicação na UBI

Emanuel Ramos — Modelo e Director na empresa N'JOY Models

Dra. Rafaela Norogrande — Designer de moda,
Professora do curso de Design de Moda da UBI

10:30-10:45 **Juliany Jorge** - Director da empresa Prommo

10:45-11:00 **Carla Costa** - MASTER OF ARTS (M.A) Amazing wool: Ancient Fribre, New Stremis

11:00-11:30 **Dr. Rudy Folkersma** - PhD. in Chemical Engineering and Chemistry,
University of Technology Eindhoven,
Professor of Sustainable Polymer Technology,
Circular Plastics, Sustainable Chemistry Technology.

14:00 – 14:30 **Paloma Garcia** - Regional Director of Operations na empresa Slow Fashion World
Slow Fashion World, CEO/Founder/Owner na empresa The Circular Project

14:30-15:00 **Carlo Vezzoli** - Plataforma LenS
Apresentação dos novos embaixadores do Fashion Revolution
Exposição dos coordenados do Fashion Revolution2018

16:00 – 17:00 **Exposição Fotográfica Paisagens Rurais: Interioridade**
Museu dos Lanifícios. Trabalho de Diana Geuera e Cláucia Denites, no âmbito do
mestrado em Estudos de Cultura na UBI.
Núcleo da Fábrica de Panos (Galeria).



Appendix F. Contact of Covilhã City Council

**Email enviado quinta-feira, 25 de maio, de 2017, às 10:56 para a
Câmara Municipal da Covilhã.**

Biblioteca de Moda da Covilhã

Projeto-UBI-CMC

Solange Fernandes

Universidade da Beira Interior, FibEnTech R&D, Unidade de Investigação Covilhã, Portugal, integrante do Grupo de Pesquisa Design, Sustentabilidade e Inovação do Departamento de Design da Universidade Estadual de Londrina, Paraná, Brasil.

embaixadorafrobi@gmail.com

Solange Fernandes, número de matrícula D1873, portadora do número de identificação fiscal 276687388, brasileira, nascida em 01/08/1981, residente na Quinta do Pinheiro Lt 25, 90 andar, esquerdo frente, CEP: 6200-552, Covilhã, doutoranda em Design de Moda na Universidade da Beira Interior, em associação com a Universidade do Minho.

Tem sua investigação de tese na área da sustentabilidade, no âmbito da inovação social e economia criativa colaborativa e solidária. Trata-se de um design de sistema exponencial para a sustentabilidade em design de moda, apoiado na metodologia da economia circular, com implementação de modelo de negócio local, em Covilhã, Portugal. Poderá ser replicável na sua totalidade ou por partes em outros lugares. Uma Biblioteca de Moda que integra mais seis projetos, com prestação de serviços ecoeficientes, colaborativos e sustentáveis, sendo:

Biblioteca de Moda: emprestará as roupas criadas pelos estudantes de Licenciatura e Mestrado e Design de Moda UBI.

Museu: preservará a memória e demonstrará a evolução dos trabalhos dos estudantes ao longo do tempo.

Loja Troca Roupas: (swap market) permanente.

Re-Moda: promoverá ações sociais entre os alunos e a comunidade, voltada à criação e consumo consciente de produto de moda e o vestir de forma criativa e sustentável.

O projeto R-Design prestará consultoria e assessoramento às empresas e artesãos para agregar valor aos produtos e elevar o seu potencial de mercado.

A Biblioteca de Moda da Covilhã, é um projeto público voltado para a comunidade. Os demais projetos são partes integrantes do sistema exponencial da biblioteca de Moda, que emprestará as roupas e acessórios criados pelos estudantes dos cursos de Licenciatura e Mestrado em Design de Moda da Universidade da Beira Interior, que estavam armazenadas sem visibilidade e uso.

A Biblioteca de Moda irá registrar, organizar, divulgar na Website, utilizar e promover a interação destes produtos com os trabalhos académicos com a sociedade. A sociedade atuará como consumidora final, podendo, assim, contribuir para melhorias futuras dos trabalhos dos discentes, através da gestão da informação pelo sistema informático. Todos os trabalhos dos estudantes serão fotografados e divulgados no site da Biblioteca.

Museu: funcionará em uma parte da Biblioteca de Moda no qual o coordenado conceito de cada coleção irá permanecer, podendo ser emprestado para eventos especiais. As novas coleções dos alunos ficarão expostas pelo período de um ano, para participação em desfiles e eventos de divulgação. A moda é uma representação cultural, criativa, em constante transformação e reinterpretação de época. É de grande importância para preservar a memória e narrar a evolução do que foi e é criado na universidade ao longo do tempo.

Re-Moda: A Biblioteca de Moda será um espaço físico com prestação de serviços ecoeficientes, pelo projeto Re-Moda. Com ele promover-se-ão ações sociais entre os estudantes de Design de Moda e a comunidade, voltadas para criação e consumo consciente de produto de moda e o vestir de forma criativa e sustentável.

Os estudantes serão sensibilizados a desenvolver produtos com base na metodologia circular. O foco principal será o upcycling e coodesign, de forma a permitir a interação com a comunidade no processo de criação. Exemplo: uma vez por mês, será promovida oficina na confecção da UBI onde a comunidade poderá levar roupas para ajustar e transformar. Considerando que a falta de conhecimento do biótipo corporal é um dos fatores que leva ao acúmulo de roupas no armário, também serão promovidos workshops sobre temas como: estilo pessoal, biótipo corporal, guarda-roupa inteligente e outros. Valorizar o estilo pessoal eleva a auto estima e reduz compras compulsivas. Guarda-roupa inteligente é utilizar o que se tem no armário e saber combinar as peças para montar vários looks diferentes.

O projeto R-Design irá prestar consultoria e assessoria às empresas e artesãos para agregar valor aos produtos e elevar o seu potencial de mercado.

O projeto a loja Troca Roupas (swap market) permanente: Projeto Sustentável, sem fins lucrativos, terá como objetivo criar um espaço com vistas à aumentar, o ciclo de vida produto de

moda. Isso significa a redução de gasto em toda a cadeia de valor começando da matéria prima até o descarte. A loja irá funcionar com roupas, acessórios e calçados que as pessoas levam para trocar por outros disponíveis

Colaboração de Departamento de Ciências e Tecnologia Têxteis da Universidade da Beira Interior.

Para a viabilização desses projetos, conta-se com a colaboração do Departamento de Ciências e Tecnologia Têxteis da Universidade da Beira Interior, para que os trabalhos (Coleção de Moda) dos estudantes de Licenciatura e Mestrado em Design de Moda possam vir a ser utilizados, assim como o acesso aos documentos com dados de informação dos trabalhos de cada universitário. Haverá ainda o incentivo do departamento na interação dos estudantes com as demais ações sociais com a comunidade.

Tal iniciativa resulta de uma nova cultura no Design de Moda, mais ampla, expressiva e interativa entre as áreas de criação, produção e comunidade. Isso irá enriquecer a produção científica criativa nas áreas envolvidas. Estimulará, enfim, a inovação social pautada na consciência sustentável, apoiando a transformação do comportamento do consumidor rumo à sustentabilidade

A Universidade da Beira Interior cumpre, com este projeto, sua responsabilidade social: “Fomentar a consciência coletiva de compromisso com o bem-estar social nas suas diferentes dimensões (social, ambiental, cultural e económico)”. Parte-se, pois, da Universidade como um agente estratégico de mudanças, cabendo-lhe a formação de novas gerações confiantes na sustentabilidade e seus princípios: construção democrática de sociedades mais justas, ecologicamente equilibradas e economicamente eficientes.

Há, entretanto, um ponto a observar. Caso algum aluno requeira direito autoral pelas peças de roupas utilizadas para este projeto, fica, desde já, acordado que cabe a responsabilidade pelo pleito ao Departamento de Ciências e Tecnologia Têxteis. Não será atribuída à aluna e doutoranda, Solange Fernandes, proponente do presente projeto, qualquer responsabilidade por esse tipo de demanda.

Apoio Câmara da Covilhã

Por se tratar de um projeto integrado às políticas públicas, a Câmara da Covilhã apoiará a implementação e o desenvolvimento. O Projeto Biblioteca de Moda faz parte da estratégia regional de revitalizar a história da Covilhã na área da moda. A Biblioteca de Moda da UBI reiterará este papel, avançando no campo da economia circular na construção de visões e cenários compartilhados.

As colaborações visam a articular inter-relações entre Covilhã e Conselho, Universidade, estudantes, empresas e sociedade com a participação ativa, criativa e consciente de todos estes agentes, em prol da sustentabilidade na Moda.

Creative Collaborative Circular Economics, Exponential System Design for Sustainability in Fashion Design

A promoção da inovação social acelera a melhoria das respostas aos desafios de implementação da economia circular essa iniciativa local que reforça os caminhos para um mundo melhor, avança o processo de sustentabilidade do Planeta a nível regional e Global.

Sendo de responsabilidade da Câmara Municipal da Covilhã:

Questões burocráticas e legalização,

Logotipo da Biblioteca e da Loja Troca Roupas,

Visual Merchandising: a loja será composta por montra, cabides, espelho, prateleira e decoração com material (upcycling).

Site da biblioteca de moda: fotografar, catalogar e gerir o sistema de informação,

Espaço e Manutenção,

Gastos: Água, luz, telefone, Internet,

Funcionário,

Televisão para passar vídeos dos desfiles na Biblioteca,

Horário de funcionamento,

Limpeza,

O projeto aporta benefícios para a CMC- Câmara Municipal da Covilhã, para a Cidade e Concelho. Assim, permitir explorar a oportunidade de sediar um projeto inovador e integrado, bem como dá resposta aos desafios colocados ao nível das atuais as políticas públicas de âmbito regional, nacional e global. Deste modo, o conceito global do projeto permite aos cidadãos, usufruir da multidimensionalidade de sustentabilidade que inclui três dimensões: Sociocultural - promoção da qualidade de vida e bem-estar; Económica: integração da economia criativa colaborativa e solidária com participação ativa, criativa e consciente de todos estes agentes, este facto atrair e retém população e melhora a imagem da cidade; e Ambiental: promoção de boas práticas ambientais e ecoeficientes.

Responsabilidade da Doutoranda

Solange Fernandes será responsável pela gestão e assessoramento em todas as fases de implantação e implementação do projeto:

Gestão informação:

Facebook: Tire uma foto e nos mostre como ficou o seu Look. Compartilhe!!

Registrar: Nome do designer e ano da criação

Conceito da Coleção: A definir

Etiqueta das roupas: Biblioteca de Moda.

Numeração: A definir

Organização da coleção: Por ano.

Emprestar: Prazo de entrega.

Seguro das roupas: A definir

Regra de limpeza das roupas:

Estudantes: voluntários

Cadastro dos Clientes: Nome, endereço e telefone.

Também é de responsabilidade da doutoranda a busca e gestão de fundos para serem destinados ao desenvolvimento científico e promoção e sustentabilidade da Biblioteca de Moda em Eventos, assim como às horas de trabalho em workshops.

Ao longo da experimentação prática este projeto poderá sofrer alterações para o melhoramento do mesmo.

Esse projeto conta com a orientação dos professores.

Orientador: Prof. Doutor José Lucas

Universidade da Beira Interior, FibEnTech R&D Unit, Covilhã, Portugal

jlucas@ubi.pt

Coorientação: Prof^a. Doutora Maria José Madeira

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Obs: Esse projeto tem todos os direitos autorais reservados à Doutoranda Solange Fernandes.

Espaço pertencente à Câmara Municipal da Covilhã (CMC) e sugerido por responsável da CMC para potencial localização da Fashion Library, visita efetuada a 24 de abril, de 2017.



G.1 - Espaço externo onde seria a Fashion Library visitado dia 26/04/2017
(Imagem fonte própria)



G.2 - Espaço interno onde seria a Fashion Library
(Imagem fonte própria)

**Creative Collaborative Circular Economics,
Exponential System Design for Sustainability in Fashion Design**