

European Master in Business Studies



Sustainability and Blockchain: Defining *Product Provenance* and Its Implications for the Fashion Industry

– EMBS13 Master's Thesis Exposé –

Submitted by Emanuele Amoroso

Supervisor: Prof. Ralf Wagner

Kassel, Germany

30/09/2020



Abstract

Lack of transparency – due to long, complicated, and geographically stretched supply chains – and greenwashing – sustainability as a mere marketing strategy without any positive impact on people and the planet – are typical of fashion companies, while consumers are more aware than ever of environmental and social issues and demand sustainable products and reliable information about them. To address these concerns, digital technologies are brought into play. Notwithstanding blockchain – a disruptive digital technology – applicability and validity are not yet clearly understood, it emerges as one of the best solutions to resolve issues of sustainability reporting and accountability, and to increase transparency across the supply chain by making provenance knowledge – information about an item’s origin, manufacturing, modifications, and chain of custody – available.

The aim of this thesis is to explain blockchain potential for implementation in clothing companies, and to investigate consumers perception of blockchain benefits concerning its application to sustainable fashion items and how such perceived advantages impact their purchase behaviour.

Drawing on signaling theory, the researchers conduct an online customer survey to show that blockchain technology applied to sustainable products provides transparency cues that can positively influence consumer behaviour outcomes, in particular the shopping journey of young European people who are more tech-savvy and “greener” compared to older consumers and different nationalities. An innovative framework is built to take account of the “blockchain component”, and the selected elements of the proposed theoretical model are verified by means of structural equation modeling (SEM).

After combining blockchain applications in fashion businesses with consumer green purchase behaviour, this study contributes to research on blockchain beyond cryptocurrencies by exploring its use within the fashion industry, by introducing consumers’ perspective on the benefits of this technology, and by investigating, for the first time, its impact on the consumer decision journey in the purchase of sustainable clothes. The findings provide practitioners insights about blockchain implementation as a tool to effectively prove sustainability, which can be integrated in marketing strategies in order to improve customer trust and buying intention.

Keywords: Blockchain; Sustainability; Supply chain; Product provenance; Transparency; Sustainable fashion; Consumer green purchasing behavior.

Table of contents

<i>Abstract.....</i>	<i>2</i>
<i>Introduction</i>	<i>4</i>
Fashion and Sustainability	4
Transparency and Digital Technologies: Blockchain’s Potential.....	5
Literature Review Table	7
Problem Statement and Relevance of the Study	10
<i>Proposed Conceptual Framework</i>	<i>12</i>
Theoretical Grounding	12
Information Economics Theory and Signaling Theory	13
Hypotheses Development	14
Defining Sustainable Fashion	14
Perceived Benefits of Blockchain Implementation in Fashion Supply Chain	15
Unified Theory of Acceptance and Use of Technology for Blockchain Benefits	16
Perceived Risks towards the Purchase of Sustainable Clothing	17
Brand Trust when Combining Fashion and Blockchain	18
Confidence in Green Products when Combining Fashion and Blockchain	20
Theories of Attitude-Behaviour: Theory of Reasoned Action and Theory of Planned Behaviour	21
Consumer Attitude and Purchase Intention towards Sustainable Clothing with Blockchain	22
Research Model	24
<i>Methodology</i>	<i>24</i>
<i>Provisional Thesis Chapters Overview</i>	<i>31</i>
<i>Schedule</i>	<i>32</i>
<i>References</i>	<i>33</i>

Introduction

Technology and sustainability are the key to the future World development, yet there is still a long way to go, and it is difficult to distinguish true efforts in the sustainable direction from unsubstantiated claims to deceive consumers into believing that a company commits to focus on social and environmental concerns.

García-Torres and Rey-Garcia (2020) identify circular economy, digitalization, transparency and traceability as the factors making fashion industry competitive, sustainable and prosperous in future. McKinsey & Co. and *The Business of Fashion* (Amed et al., 2020) also report sustainability, digitisation and innovation as top priorities for the industry, representing the biggest challenges and opportunities.

Fashion and Sustainability

The fashion industry has been criticized for being one of the most polluting on the planet, with very resource-intensive processes, and sometimes associated with working conditions and human rights violations (UNECE, 2018). Fast fashion – which combines three key business elements: (1) quick response to consumers demand, and (2) inexpensive, (3) trendy clothing – is exacerbating risks at the expense of sustainable development (Caro and Martínez-de-Albéniz, 2015). García-Torres and Rey-Garcia (2020) report that criticism was heightened by the collapse of Rana Plaza in 2013 – a building in Dhaka, Bangladesh, that housed garment factories manufacturing apparel for famous Western fashion brands. The accident happened because the structure did not meet standards required by building and construction, and health and safety at work regulations, killing more than one thousand people and injuring more than two thousand. The scholars explain that globalization and delocalization – that is, moving production in developing countries with lower wages and lax labour and environmental legislations – are typical of clothing industry. Consequently, textile supply chains are long, complex and fragmented on account of abundant subcontracting practices and actors dealing with plentiful sources (animal, plant, and synthetic fibres) and operations (fashion design process, raw material extraction and processing, fabric manufacture, garment assembly, and distribution and sales) across many countries with the goal to lower operational costs (Ali and Haseeb, 2019; Bullón Pérez et al., 2020; García-Torres and Rey-Garcia, 2020; Kumar et al., 2017).

Tragic events, like Rana Plaza collapse, and activist movements, like Extinction Rebellion and Greta Thunberg's Fridays for Future, are awaking consumers to the impact of fashion on the environment and society (Amed et al., 2020; García-Torres and Rey-Garcia, 2020). Human rights, climate crisis and ecological emergency have therefore become the focus of attention.

Although in 2019 sustainability was placed, for the first time, among the determinants of fashion purchase decision, and nine out of ten shoppers born between 1996 and 2019 (a.k.a. Gen-Z) believe that companies should be responsible for addressing environmental and social issues and prefer brands aligned with their purpose and values for sustainability (Amed et al., 2019; Lehmann et al., 2019), consumer's stated willingness to pay for green products is seldom

translated into actual sustainable purchases (Amed et al., 2020). Lack of clear information about the meaning of sustainability, and of tools for the consumer to identify sustainable brands and products broadens this gap (Amed et al., 2020).

When purchasing a sustainable product, communication-based barriers related to the lack of information or insufficient information identifying sustainable clothing can cause the consumer to delay or abandon the purchase, or to buy an unsustainable one because distinguishing conventional from green products is difficult (Koszewska, 2016). Even though in some situations the most environmentally friendly option is no purchase at all (Horne, 2009), it is important to encourage market uptake of green goods. Koszewska (2016) clarifies that barriers arise from the complexity of information or overabundance of data indicating fair trade, organic cotton, vegan, country of origin, and so on; the ambiguity of information or lack of specific and definitive information; and low-credible information sources, poor company reputation and/or unverified information on clothing labels. Furthermore, lack of time and expertise to seek more sustainable options represent another (consumer-based) barrier to sustainable shopping. The author concludes saying that these obstacles generate perceived risks which affect the intention to buy sustainable clothing. Goryagin and Wagner (2018) too observe that a superabundance of human, environmental and animal welfare labels confuses rather than orients the buyer in the choice of consumer goods, especially food and fashion items. As a result of their study, they have found that consumers report a need for reliable information. In addition, consumers do not put their trust in fashion companies because greenwashing is a common practice, for which sustainability becomes a mere marketing strategy without any positive impact on people and the planet (Amed et al., 2020).

Transparency and Digital Technologies: Blockchain's Potential

While fashion players are under pressure to address increasing consumer concern regarding sustainability so as to secure their future (Amed et al., 2020), digitization comes into play. The implications of Industry 4.0 technologies – such as 3D printer, internet of things, artificial intelligence, robotics, and blockchain – are business model innovation, customer experience enhancement, logistics process improvement and more agile supply chains, and greater digital connectivity, among others (García-Torres and Rey-Garcia, 2020). The authors claim that connectivity facilitates production monitoring, enables traceability and transparency along complex fashion supply chains and thus improves social, environmental and economic sustainability. They continue to explain that in an attempt to create transparency and a good reputation, firms have started disclosing supply chain information or adopting eco-labels. However, the former is often static information which does not necessarily ensure that sustainability promises are fulfilled for all billions of garments produced worldwide every year, while the latter does only transfer responsibility to (not always) independent, qualified certifiers, without an answer to the questions of how and where products are made at each stage in the supply chain. Ultimately, García-Torres and Rey-Garcia use the UN Global Compact definition of traceability – “the ability to identify and trace the history, distribution, location and application of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labour (including health and safety), the environment and

anti-corruption” – to highlight that it can reduce social and environmental risks and enhance competitiveness within the fashion industry, by optimizing material and information streams flow. Traceability would allow consumers to discern window dressing or green washing, and to substantiate fashion brands sustainability claims. Furthermore, by making production processes more transparent, traceability would help fashion players to spot the most reliable suppliers in terms of efficiency and effectiveness and, therefore, avoid unknown and disastrous outsourcing.

Blockchain technology can provide the digital infrastructure necessary to trace origin, certify authenticity, track custody, and verify integrity of products (Montecchi et al., 2019). Every transaction concerning the product's lifecycle is chronologically entered into the blockchain decentralized ledger and cannot be altered, nor can it be hidden or difficult for consumers to access anymore (Montecchi et al., 2019). Nevertheless, it is important to point out that blockchain cannot serve as a source of a correct information because if the initial data input is (intentionally or unintentionally) mistaken, then all further transactions are also unreliable; for this reason, blockchain is also called trustless trust facility (Goryagin and Wagner, 2018). However, it is certain that all entries and modifications of products are consistent as they are decentralized and irreversibly recorded, leading to high-level information security and reduced amount of resources spent on product monitoring, control, investigations, etc. (Goryagin and Wagner, 2018). Furthermore, given that all supply chain partners have to verify and agree on every transaction related to a product, without relying on intermediaries, and that they often use smart contracts, namely a system of self-executing contracts trusted by all signatories, blockchain can serve as a source of truth even though it does not always ensure correct, trustworthy information (Goryagin and Wagner, 2018; Montecchi et al., 2019). In this way, this new technology can substitute current ways to present sustainable information (third-party accreditations, online reviews, etc.) with digital identities attached to physical products and enriched with features like immutability, integrity and consistency, which increase reliability and consumer trust in the data contained therein (Goryagin and Wagner, 2018; Montecchi et al., 2019).

There are various different criteria for categorising blockchain technologies, and two of the principal ones distinguish public from private blockchains, and open from closed blockchains (Bullón Pérez et al., 2020). The authors explain that anyone can take part in a public blockchain since there are no particular nodes (participants) that control the whole network; while, in contrast, there are conditions peculiar to a private blockchain that restrict who can join in and the role members have. The second criterion concerns who has permission to access and read the data in a blockchain. If it is open, everybody is able to access the information, whereas only the participating actors can do it if the blockchain is closed. Using both notions, private and open blockchains would be the most suitable combination for application in the supply chain context, as only parties involved in all the activities to get the product to the customer can write into the blockchain, but any other person can read the information.

Notwithstanding blockchain applicability and validity are not yet clearly understood, it emerges as the best solution to resolve issues of sustainability reporting and accountability, and to increase transparency across the supply chain, by making provenance knowledge –

information about an artefact's origin, manufacturing, modifications, and chain of custody – available (García-Torres and Rey-Garcia, 2020; Montecchi et al., 2019).

Literature Review Table

A list of relevant papers is provided in this section. They are related to blockchain technology, its applications beyond cryptocurrencies, the fashion industry, and sustainable consumption, and have served as a useful basis for defining and developing the problem statement and the purpose of the study as well as the research questions and model, which will all be presented in the next paragraphs.

Title	Author(s)	Published	Key concepts
It's real, trust me! Establishing supply chain provenance using blockchain	Matteo Montecchi, Kirk Plangger, & Michael Etter	2019 Journal: <i>Business Horizons</i> , 62(3), 283-293	Blockchain; Supply chain; <u>Product provenance</u> ; Consumers' perceived risks; Framework: Blockchain capabilities – Provenance knowledge – Risks
Exploring the implications of blockchain technology for brand–consumer relationships: A future research agenda	Achilleas Boukis	2019 Journal: <i>Journal of Product & Brand Management</i> , 29(3), 307-320	Strategic brand management; Blockchain; <u>Blockchain impact on consumer-brand relationship</u> ; Brand transparency; Consumer trust
The impact of the blockchain on the supply chain: A theory-based research framework and a call for action	Horst Treiblmaier	2018 Journal: <i>Supply Chain Management</i> , 23(6), 545-559	Blockchain; Supply chain management; <u>Blockchain for supply chain-related implications and research questions derived from economic theories</u> <u>Principal agent theory</u> , <u>Transaction cost analysis</u> , <u>Resource-based view</u> , <u>Network theory</u>
Trusting in trustless trust: Blockchain information storage in product communication	Konstantin Goryagin & Ralf Wagner	2018 Conference: <i>Strategica 2018. Challenging the status quo in management and</i>	Blockchain; Smart contracts; <u>Trustless trust facility</u> ; Empirical results on consumers' awareness of and trust in blockchain technology

		<i>economics</i> (pp. 718-729). Tritonic Press	
How blockchain technologies impact your business model	Vida J. Morkunas, Jeannette Paschen, & Edward Boon	2019 Journal: <i>Business Horizons</i> , 62(3), 295-306	<u>Explanation of blockchain technology</u> ; Blockchain beyond bitcoin; Public and private blockchains; Business model innovation; Business model canvas (Osterwalder and Pigneur); Real-life examples
Beyond Bitcoin: What blockchain and distributed ledger technologies mean for firms	Alex Hughes, Andrew Park, Jan Kietzmann, & Chris Archer-Brown	2019 Journal: <i>Business Horizons</i> , 62(3), 273-281	Explanation of blockchain; Smart contracts; Cryptocurrencies; Blockchain benefits; Non-cryptocurrency use cases; <u>Blockchain technical, societal and regulatory barriers</u>
Sostenibilidad para la competitividad de la industria de la moda española: Hacia una moda circular, digitalizada, trazable y colaborativa	Sofía García-Torres & Marta Rey-García	2020 Journal: <i>Información Comercial Española (ICE), Revista de Economía</i> , 912, 87-100	Sustainable development; Fashion industry; Business model innovation; Circular economy; Digitalization; <u>Traceability</u>
Understanding consumer behavior in the sustainable clothing market: model development and verification	Malgorzata Koszewska	2016 Book: <i>Green Fashion. Environmental Footprints and Eco-design of Products and Processes</i> (pp. 43-94). Springer	Consumer behaviour; Fashion industry; Sustainable consumption; Holistic model: production of and consumer behaviour towards sustainable clothing; Structural equation modeling; Barriers to sustainable apparel consumption; Innovations in the textile industry; Perceived risks; Theory of planned behaviour; <u>Conceptual framework: Attitudes, intentions, purchase, eco-labels</u>

Sustainable consumption and third-party certification labels: Consumers' perceptions and reactions	Simon Brach, Ginafranco Walsh, & Deirdre Shaw	2018 Journal: <i>European Management Journal</i> , 36(2), 254-265	Consumer behaviour; Sustainable products; Third-party certified labels; Perceived risks; Green purchase attitude-intention gap; Credence qualities; Signaling theory; <u>Experimental studies: Conventional product vs. Sustainable product vs. Sustainable product with label – Credibility of third-party certified label – Perceived risk – Purchase intention</u>
Predicting green product consumption using theory of planned behavior and reasoned action	Justin Paul, Ashwin Modi, & Jayesh Patel	2016 Journal: <i>Journal of retailing and consumer services</i> , 29, 123-134	Consumer behavior; Green products; Theory of planned behavior; Theory of reasoned action; <u>Framework: Theory of planned behavior incorporating environmental concern</u> ; Establishing validity of measurement model through confirmatory factor analysis; Structural equation modeling
Theory of planned behavior approach to understand the green purchasing behavior in the EU: A cross-cultural study	Genovaitė Liobikienė, Justina Mandravickaitė, & Jurga Bernatoniienė	2016 Journal: <i>Ecological Economics</i> , 125, 38-46	Consumer behavior; Green purchase; Sustainable consumption; <u>Determinants of green purchase behavior in EU countries</u> ; Theory of planned behavior; Hofstede's cultural dimensions influence on green purchase behavior; Cross-cultural study
Green thinking but thoughtless buying? An empirical extension of the value-attitude-behaviour hierarchy in sustainable clothing	Kathleen Jacobs, Lars Petersen, Jacob Hörisch, & Dirk Battenfeld	2018 Journal: <i>Journal of Cleaner Production</i> , 203, 1155-1169	Consumer behavior; Sustainable consumption; Fashion industry; Attitude-behavior gap; Structural equation modeling; <u>Framework: Value-attitude-behavior hierarchy plus Enablers of (online and catalogue shopping affinity and preference for durability) and Barriers to (fashion consciousness</u>

			and price sensitivity) sustainable clothing purchase behavior; Empirical data
--	--	--	--

Problem Statement and Relevance of the Study

Satoshi Nakamoto is the pseudonym of the inventor(s) of an electronic cash system called Bitcoin, which allows online payments to be executed directly between parties (Morkunas et al., 2018). As there do not exist centralized financial intermediaries in a peer-to-peer network, the implementation of cryptocurrencies requires innovative systems that record and secure all transactions, hence a “chain of blocks” (Nakamoto, 2008, p. 7) or distributed ledger – a decentralised database in which information is entered in a real-time, chronologically ordered, irreversible and encrypted manner, authenticated by a network of computers, and made available to all participants (Hughes et al., 2019; Morkunas et al., 2018). Figure 1 below visually shows the steps of a blockchain transaction and presents some benefits and applications of this technology.

So far, blockchain ability to revolutionize finance has been in the spotlight, but its impact can go far beyond financial services (Morkunas et al., 2018). Although there are some literatures about the adoption of blockchain in the context of supply chain – e.g., Hughes et al. (2019), Montecchi et al. (2019), and Morkunas et al. (2018) use illustrative examples of cases in real estate, food, drugs, diamonds, and fashion industries –, at present applications outside cryptocurrency domains are infrequent (Angelis and Ribeiro da Silva, 2019; Ghose, 2018; Halaburda, 2018; Montecchi et al., 2019; Morkunas et al., 2019). Therefore, there is very little discussion about non-financial corporations, and the business community is frustrated with if and how blockchain should be developed in order to create or maintain competitive advantage (Hughes et al., 2019; Morkunas et al., 2018; Treiblmaier, 2018).

Lastly, but most importantly for the purpose of our paper, also research that explores by what means firms can integrate digital transformation technologies in their marketing strategies and how such technological advancements change the consumer decision journey, is limited (Boukis, 2019; Gielens and Steenkamp, 2019). In consequence, new instruments useful for signaling imperceptible attributes of sustainable products – such as blockchain which can be used to define provenance knowledge – need to be investigated with respect to their impact on consumers’ perceptions and purchase behaviours (Brach et al., 2018).

This thesis is structured into two sections: the first one will review and bring together information and knowledge of blockchain adoption in the fashion supply chain, including marketing; while the second one will focus on the role of blockchain perception in consumer behaviour, and the development and explanation of the proposed theoretical framework, structural equation model, and quantitative study. Thus, by combining blockchain applications in fashion businesses with consumer green purchase behaviour, the following fundamental research questions arise:

- ◆ To what extent do consumers understand/perceive benefits of blockchain technology with regard to sustainable apparel?
- ◆ What are the main variables that perceived benefits of blockchain directly or indirectly influence?
- ◆ By supporting sustainable fashion firms' efforts to increase transparency and consumer trust, does blockchain technology really alter consumer behavioural outcomes towards sustainable clothing positively?

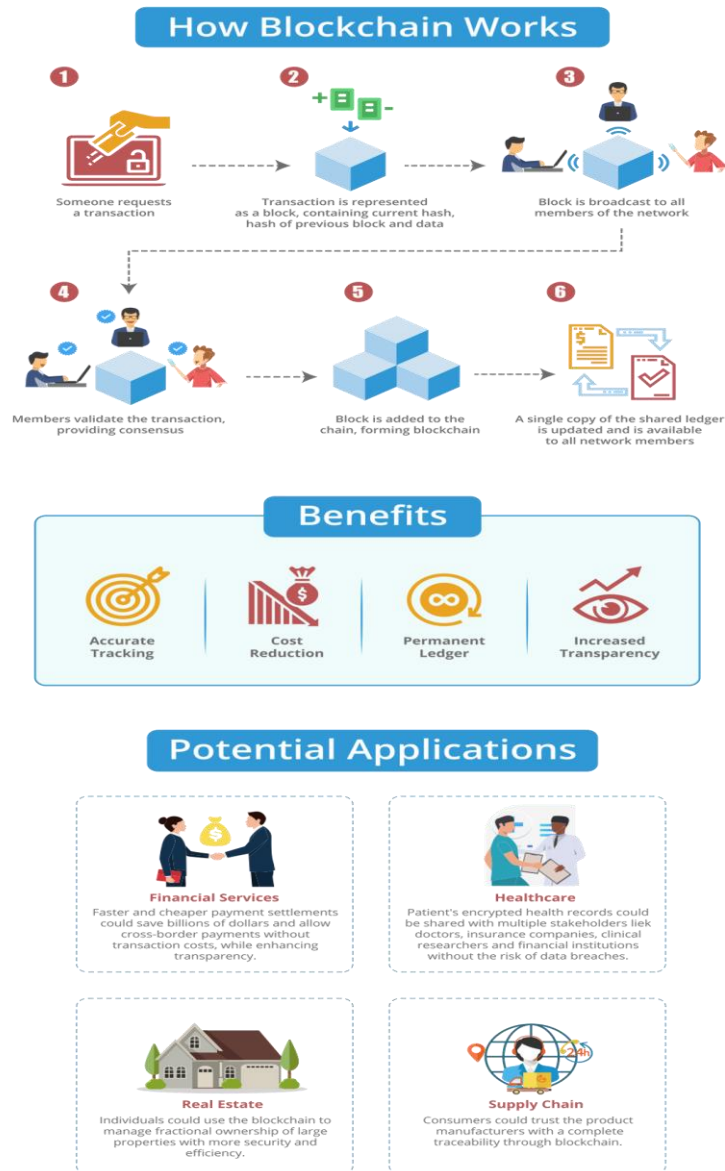
This study makes contributions to research in the field of blockchain technology, since it:

- Examines in more depth blockchain non-financial implementation in fashion supply chain;
- Tackles the perception of blockchain technology from a consumer perspective;
- Is – to the author's knowledge – the first-ever research on how technological advancements, in this case blockchain, can change the consumer decision journey in the purchase of sustainable clothing by indicating assurance for potential attributes – i.e., process-related qualities of a product that demonstrate it is produced in accordance with specific environmental, social, and economic standards, but that are difficult to verify (Zhang et al., 2016).

Practical contributions also help close gaps in current research by giving business community insights into the validity of blockchain integration in marketing strategies. If buyers perceive the capabilities of this digital technology as positive, managers allocating resources to sustainable products should consider blockchain development within their organizations: if attached to goods, blockchain could be used as proof of sustainability and therefore increase consumer trust and purchase intention. Furthermore, as this technology could be beneficial to firms and have an effect on shoppers, the findings of this study are likely to be useful for policy makers seeking a more effective checker tool to prove product sustainability claims so as to protect consumers against greenwashing and promote a wider use of sustainable apparel.

Ultimately, the aim of this thesis is to explain blockchain potential for implementation in clothing companies, and to investigate consumers perception of blockchain benefits concerning its application to sustainable fashion items, and how such perceived advantages impact their purchase behaviour.

Figure 1: The steps of a blockchain transaction (Takyar, n.d.)



Proposed Conceptual Framework

Theoretical Grounding

Inspired by several researches that explore how marketing tools, such as eco-labels, Corporate Social Responsibility, and greenwashing, affect consumers' trust and consumption of green products (e.g., Brach et al., 2018; Braga Junior et al., 2019; Chen et al., 2020; Koszewska, 2016; Nguyen and Le, 2020; Song et al., 2019; Steffen and Doppler, 2019), the author of this dissertation builds a conceptual framework that presents, for the first time, blockchain technology perceived capabilities and the effect they have on selected variables –

brand trust, perceived risks, and confidence in green products – that can ultimately modify consumer attitude and buying intention when purchasing sustainable clothing.

The theoretical foundation of this study is grounded in information economics and signaling theories, including the concepts of asymmetric and imperfect information, in an attempt to demonstrate the effectiveness of blockchain as a market signal influencing consumer behaviour; in the Unified Theory of Acceptance and Use of Technology (UTAUT), in an experiment to determine blockchain perceived benefits; in cognitive orientation theories, that is the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB), which describe buyer attitude and intention; and in other definitions found in relevant papers to support the process of putting together the new parts “brand trust”, “perceived risks”, and “confidence in green products”, and completing the assembly of the novel research framework.

Information Economics Theory and Signaling Theory

Brach et al. (2018) – based on Darby and Karni, 1973; Nelson, 1970, 1974 – explain that information economics theory establishes three types of product quality: search, experience, and credence. Consumers can verify search qualities related to a product or service prior to purchase (e.g., price), can assess experience qualities only through purchase and consumption (e.g., functionality of a warm winter jacket), but cannot evaluate credence qualities neither before nor after buying because of lack of skill (e.g., pullover in an organic cotton fabric or made from recycled materials). The authors claim that difficulties to evaluate contents and processes are notable in sustainable markets, in which generally consumers do not have the ability to confirm the declaration of, for instance, fair-trade or ecological products. Therefore, they point out that barriers, such as lack of expertise, information asymmetry, and risk of greenwashing strategies, limit intention of purchasing sustainably.

Because companies know more and better than buyers and the latter cannot readily judge the quality of experience and credence products, there is a need for firms to find a way to notify consumers of product qualities based on truth or reason and that is able to be accepted (Erdem and Swait, 1998). Considering the imperfect and asymmetrical informational structure of the market, marketing signals can be used to make inferences about true characteristics, quality, and value of a product. Indeed, the use of signaling techniques is very common in marketing for the reason that higher prices, packaging, advertising, umbrella branding, and other marketing mix elements and activities can give insights into the unobservable, drive positive consumer perceptions of product attributes, and increase confidence in brand claims (Erdem and Swait, 1998; Herbig and Milewicz, 1996).

In marketplaces for ethical shopping, many firms attach additional features to their products, especially eco-labels, so as to enable buyers to classify an item as sustainable, and to increase trustworthiness (Noblet and Teisl, 2015; Thøgersen, 2002; Thøgersen et al., 2012). Third-party certified labels function as signals that can simplify consumers’ decision-making by decreasing perceived risks and information costs (Brach et al., 2018; Erdem and Swait, 1998; Thøgersen et al., 2010; Thøgersen et al., 2012).

To alleviate uncertainty, blockchain technology can be another powerful signal, hence the purpose of this study to investigate the potential effect of its perceived benefits on reducing

knowledge gaps and scepticism about sustainable fashion items, and on encouraging green purchase.

If information imperfection and asymmetry exist, the information provided by a company will create value if and only if it is credible (Erdem and Swait, 1998). Eco-labelling schemes are too numerous, sometimes self-declared, and not always clear and understandable, and therefore the information they convey can be overwhelming and undependable for customers (Horne, 2009). In contrast, blockchain traceability schemes which allow to monitor details about time and place of manufacturing, origin and quality of raw materials, firms and workforce involved, etc. (Bullón Pérez et al., 2020) could more effectively signal that promised offerings will not differ from actual products since discrepancies, which may erode brand credibility, would be more easily recognizable (Erdem and Swait, 1998).

Hypotheses Development

Defining Sustainable Fashion

The general meaning of sustainability is the quality of being able to meet the needs of the present generations without compromising the possibility and the capability of the future ones to meet their needs (Brundtland Commission, 1987). In the recent past, sustainability has been discovered to be a crucial product attribute in the formation of consumer product choice (de Boer et al., 2006). Behind sustainable products there are green companies which can be defined as businesses that think that people and the planet are as important as profit, and, exactly for this reason, combine economic, environmental and social aspects, aiming at not only making money but also improving human lives and the natural environment (Vermeir and Verbeke, 2008).

Cervellon et al. (2010) argue that fashion and sustainability have long been considered to be opposing concepts: the former being characterized by seasonal production of different styles and therefore short product lifecycle, whereas the latter rejecting consumerism in favor of efficient and careful use of natural resources, durability and reuse of products.

The conflict between going in and out of style and being long-lasting is enhanced by two contrary movements: fast fashion characterised by reproducing catwalks trends in a very short time span, rapid production, low-cost materials and labour in developing countries, short lead time, numerous fashion seasons, and overconsumption of cheap and low-quality clothing worn only a handful of times before they are discarded and end up in a landfill; and slow fashion associated with slower production schedule, minimum exploitation of natural and human resources, craftsmanship, local production, and purchasing enduring quality over quantity (Koszewska, 2016; Henninger et al., 2016).

Sustainable fashion – also called eco-friendly, green, or ethical fashion – is a part of the slow fashion approach, and it first emerged in the 1960s (Carey and Cervellon, 2014; Jung and Jin, 2014). The concept of sustainable fashion takes into account the social, natural and economic price paid in clothing manufacturing (Morgan, 2015); this is why it breaks down existing boundaries between organisations and their stakeholders and promotes employee empowerment, good working conditions, and fair wages, and sets new goals for the fashion

industry, such as lowering carbon footprint and reducing environmental destruction, introducing upcycling and recycling processes, and using renewable and organic resources (Clark, 2008; Johnston, 2012).

Whilst the eco-fashion industry has not yet established clear boundaries, definitions and regulations, the following description is perhaps one of the more complete explanations containing various distinct notions of sustainable clothing grouped under the umbrella term “ethical fashion”:

“Ethical clothing refers to clothing that takes into consideration the impact of production and trade on the environment and on the people behind the clothes we wear. Eco clothing refers to all clothing that has been manufactured using environmentally friendly processes. It includes organic textiles and sustainable materials such as hemp and non-textiles such as bamboo or recycled plastic bottles. It also includes recycled products (clothes made from recycled clothing including vintage, textile and other materials and can also be termed re-used) and is not necessarily made from organic fibres. Organic clothing means clothes that have been made with a minimum use of chemicals and with minimum damage to the environment and fairtrade is intended to achieve better prices, decent working conditions, local sustainability and fair terms for farmers and workers in the developing world.” (Mintel, 2009).

Perceived Benefits of Blockchain Implementation in Fashion Supply Chain

The length, fragmentation and geographic dispersion of the clothing supply chain hinder traceability during the time that transparency is becoming increasingly important in both supply chain and marketing disciplines as consumers insist on more data about origin, components, lifecycle, and quality of marketed clothes (Bullón Pérez et al., 2020; Pigni et al., 2007).

Agrawal and Pal (2019) classify and validate the information sets companies in the clothing industry should gather and make available to any interested individual – specifically, they are product origin and composition, manufacturer and supplier details, and quality, process, and socio-environmental information.

Blockchain can function as a registry of activities performed by any natural or legal person that participates in the chain of designing, producing, distributing, marketing, and selling garments, where each node tracks and provides information about each stage of the textile supply chain (Nan et al., 2017). This technology is thus capable of providing provenance knowledge and, as a consequence, assuring consumers of the reliability of sustainable products.

Provenance knowledge derives from supply chain transparency in terms of where and how products have been made, stored, and delivered to a buyer (Kim and Laskowski, 2018). Such information can add to consumers’ understanding of a product both pre- and post-purchase, likely improving evaluation of credence qualities or transforming credence attributes into search ones, and modifying trust, perceived risks, and purchasing decisions (Kim and Laskowski, 2018; Montecchi et al., 2019).

For example, Bullón Pérez et al. (2020) propose a distributed ledger in which each supply chain contributor records origin, characteristics, and suppliers of raw materials and fibers (first block in the blockchain), fabric manufacture (second block), garment assembly

operations (transformation of the fabric into clothing, quality inspection, packaging, etc.) (third block), and distribution and sales (transportation, wholesalers, and retailers) transactions (fourth block). In this way, the scheme allows to authenticate the final product, tracks it along the entire logistics chain, and ensure its quality and safety.

Therefore, blockchain benefits for consumers can be transparent and reliable information concerning the textile supply chain, and origin, authenticity, quality, and sustainability assurances in relation to the item of clothing they are buying.

We understand that this technology plays a key role in enabling brands to provide verified information about the end product, in making possible for consumers to identify actual product value, and finally in forging greater trust in all the links of a fashion supply chain.

Unified Theory of Acceptance and Use of Technology for Blockchain Benefits

The Unified Theory of Acceptance and Use of Technology (UTAUT) captures elements of eight previous models that define intention and usage of technology, and, in this manner, establishes four direct determinants of user acceptance and usage behaviour (performance expectancy, effort expectancy, social influence, and facilitating conditions) and four key moderators (gender, age, experience, and voluntariness of use) (Venkatesh et al., 2003).

The UTAUT's inventors describe performance expectancy as "the degree to which an individual believes that using the system will help him or her to attain goals in job performance" (p. 447) and identify it as the strongest predictor of intention. For the purpose of this thesis, the author will adjust and use the aforementioned variable and its root constructs to study to what extent consumers believe that blockchain technology will benefit them in purchasing sustainable clothes.

Venkatesh et al. (2003) elaborate performance expectancy by embracing perceived usefulness (from Davis' Technology Acceptance Model, 1989), extrinsic motivation (from Davis et al.' Motivational Model, 1992), job-fit (from Thompson et al.' Model of PC Utilization, 1991), relative advantage (from Moore and Benbasat's Innovation Diffusion Theory, 1991), and outcome expectations (from Compeau and Higgins' Social Cognitive Theory, 1995b). To what degree a person expects that employing a specific technology would enhance his or her job performance is the definition of perceived usefulness (Davis, 1989). Extrinsic motivation concerns user willingness to adopt a new technology "because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself (implementing the technology), such as improved job performance, pay, or promotions" (Davis et al., 1992, p. 1112). Job-fit is defined as the ways the capabilities of a particular information system improve an individual's job performance (Thompson et al., 1991). The degree to which an innovation is perceived as being better than its precursors represents a relative advantage (Moore and Bendasat, 1991). Lastly, outcome expectations relate to consequences of the technology usage behaviour, and they can be job- or performance-related and/or personal, concerning individual goals (Compeau and Higgins, 1995b).

If the job to be performed is considered to be the purchase of sustainable clothing, the items of the research papers mentioned above could be revalidated and extended to the context of green buyer behaviour. Details will be found in the methodology section.

Perceived Risks towards the Purchase of Sustainable Clothing

Because of lack of information and/or knowledge to evaluate socio-ecological attributes and of credence qualities great in number, sustainable products make consumer decisional process more complex, and, thus, perceived risks – i.e., expectations of losses, as defined by Stone and Grønhaug (1993) – associated with green purchase are higher compared to a conventional product (Brach et al., 2018). To be more accurate, perceived risks are described as “any action of a customer that will provide consequences which he cannot anticipate with anything approximating certainty, and some of which at least are likely to be unpleasant” (Bauer, 1967, p. 24).

Brach et al. (2018) draw attention to financial, performance, and time risks (Stone and Grønhaug, 1993) when having a sustainable product as a subject matter. The first type concerns the fear of losing money by purchasing the wrong, not truly sustainable item. This risk may be intensified by the fact that green products are generally more expensive than conventional ones. The second type regards the expected performance of the product and has a direct effect on the perception of product quality. The last one pertains the loss of time likely necessary to make a good and correct decision. We complete this classification with two other categories: psychological risks, which appear when a purchase decision threatens the consumer’s self-image or has a negative impact on his peace of mind (Featherman and Pavlou, 2003; Jacoby & Kaplan, 1972; Mitchell, 1999); and social risks, which originate from negative judgments of others due to the purchase of a product and can damage the consumer’s status within a social group (Featherman and Pavlou, 2003; Montecchi et al., 2019).

Several studies prove that these risks can influence customers’ purchase decisions and attitudes (e.g., Featherman and Pavlou, 2003; Kim et al., 2008; Mitchell, 1999; Montecchi et al., 2019; Sweeney et al., 1999). They explain that scarce information about a product’s characteristics intensify customers’ perceived risk of negative outcomes as a result of buying and utilizing that product. Moreover, information asymmetry may encourage the seller to act dishonestly as it is difficult for the buyer to identify actual product value before purchasing (Mishra et al., 1998). The buyer would possibly be reluctant to purchase a product because of distrust of the seller (Gregg and Walczak, 2008). And, further, if the customer is suspicious of the brand and perceives high risks towards a product, s/he is unwilling to trust the product as well (Mitchell, 1999).

In summary, previous research argues that perceived risks negatively affect consumer purchase decisions and behaviours, brand trust, and product confidence. Decreasing customer perceived risk about greenness of products is helpful to reduce customer skepticism and to enhance green trust and green purchase intentions (Chen and Chang, 2012).

Companies can offer additional information to remove inefficiencies caused by information asymmetry and to reduce risk perception, and they can reassure customers of their sustainable practices by replacing more traditional transparency interventions, such as

certifications and peer reviews, with blockchain technology (Jacoby & Kaplan, 1972; Montecchi et al., 2019).

In this study we investigate blockchain implementation in sustainable clothing and so hypothesise that (1) perceived benefits of blockchain technology lower perceived risks towards the purchase of sustainable clothing, (2) perceived risks diminish trust in a fashion brand that incorporates blockchain technology into its sustainable clothing, (3) perceived risks diminish confidence in green fashion products that incorporate blockchain technology, (4) perceived risks have a negative impact on consumer attitude towards the purchase of sustainable clothing that incorporates blockchain technology, and (5) perceived risks have a negative impact on consumer purchase intention towards sustainable clothing that incorporates blockchain.

H1: Perceived benefits of blockchain reduce perceived risks.

H2: Perceived risks decrease brand trust.

H3: Perceived risks decrease confidence in green products.

H4: Perceived risks have a negative effect on consumer attitude.

H5: Perceived risks have a negative effect on consumer purchase intention.

Indicators containing various types of risk have been derived from the investigations of Featherman and Pavlou (2003), Jacoby & Kaplan (1972), and Stone and Grønhaug (1993), and have been used to measure the construct “perceived risks” generally, as shown in the methodology section.

Brand Trust when Combining Fashion and Blockchain

Brand trust is built on consumers’ willingness to rely on the ability of a brand to deliver its promises (Chaudhuri and Holbrook, 2001). The more consumers trust the brand, the greater the so-called brand equity – the added value a brand gives a product – is; for this reason, increasing trust has been one of the most desired outcomes of branding efforts (Veloutsou, 2015).

Trustworthiness is the quality of being trustworthy or, more simply, able to be trusted. Such quality indicates the extent to which an organization will be trusted, and it has three dimensions: competence, integrity, and benevolence (Mayer et al., 1995; Schoorman et al., 2007). The scholars explain that the set of skills and abilities that enables one party in a relationship to have influence within a specific area of interest delineates competence; those principles and values of the trustee that the trustor considers good describe integrity; and the trustee’s sincere concern for the trustor’s well-being defines benevolence.

Market signals can improve consumer perception of a brand’s attribute levels and confidence in the brand’s claims, since, if firms send clear signals of competence and

credibility (Sichtmann, 2007), consumers will very probably believe in their ability and willingness to offer the promised products (Erdem and Swait, 1998). Lee et al. (2011) found that trust is a fundamental determinant of long-term consumer behaviour and, also, other researchers (e.g., Harris and Goode, 2010; Schlosser et al., 2006) claim that consumer purchase intention is affected by customer trust. Furthermore, when companies exaggerate the sustainability claims of their products, buyers may become reluctant to trust them (Kalafatis and Pollard, 1999). Such misbehaviour shows the connection between a brand, its products, and consumer trust.

Boukis (2019) asserts that blockchain adoption can strengthen and, also, restore consumers' trust in a business. According to him, it can happen in three ways: by enhancing supply chain transparency; by detecting and reducing counterfeit products; and by increasing brand trust in online marketplaces. However, it is needed to clarify why and when consumers trust the information in a blockchain for it to advance as a useful technology for both buyers and sellers (Goryagin and Wagner, 2018).

Seeing trust in brand sustainability claims as the belief that the information provided is reliable and can be used as the basis for purchase decision (Zhang et al., 2016), this research is the first empirical one investigating the relationship blockchain-trust from a consumer perspective and will focus on blockchain capability to enhance brand transparency, considering that marketing is changing and nowadays sharing as much information as possible and giving consumers the capability to trace the history of apparel are paramount to nurture a successful brand image and, consequently, trust (Agrawal and Pal, 2019).

Hence, this study proposes that (6) perceived benefits of blockchain increase trust in a fashion brand that sells sustainable clothing tracked with this technology, (7) trust in a sustainable fashion brand that uses blockchain enhances confidence in the green products this brand sells, (8) trust in a sustainable fashion brand that uses blockchain has a positive impact on consumer attitude towards the purchase of sustainable clothing that incorporates this technology, and (9) trust in a sustainable fashion brand that uses blockchain has a positive impact on consumer purchase intention towards sustainable clothing that incorporates this technology.

H6: Perceived benefits of blockchain increase brand trust.

H7: Brand trust enhances confidence in green products.

H8: Brand trust has a positive effect on consumer attitude.

H9: Brand trust has a positive effect on consumer purchase intention.

Questionnaire items and scales have been found in Erdem and Swait (1998), Veloutsou (2015), and Sichtmann (2007). Veloutsou's indicators have turned out to be the most adequate and, therefore, have been adapted to the needs of this research as presented in the methodology section.

Confidence in Green Products when Combining Fashion and Blockchain

While brand trust reveals consumer's intention of accepting vulnerability with the positive expectation that the counterpart is honest and capable (Rousseau et al., 1998), confidence in green products indicates the level of willingness to depend on one object, believing in its credibility, benevolence, and ability about sustainable performance (Chen, 2010).

Confidence in green products is defined as a degree of trust in the characteristics of a sustainable product, based on the expectation of its reliability and performance (Chen, 2010; Chen and Chang, 2012). The variable has been introduced in the model since the sustainable garment, not the brand, is the ultimate object of the purchase and the subject of frequent misleading environmental and social claims that make the consumer hesitate (Kaufman, 2014). Furthermore, according to the findings of a research study carried out by Liobikienė et al. in 2016, confidence in green products is a significant determinant of the green purchase behaviour in the EU.

Shoppers who do not trust company logos, labels, special seals, and other types of claims are not willing to put their money where their mouth is, it means their attitudes towards green purchasing, regardless of being positive or negative, will not result in behavioural intention to buy sustainable products, unless they also have some rational factors to base their decision on (Verbeke and Viaene, 1999). In other words, in addition to sustainability orientation, consumers also need to have a reasonable degree of certainty about the information they receive and the knowledge of ethical goods they develop if the market share of sustainable products is to grow (Vermeir and Verbeke, 2008). Indeed, a typology of trust proposed in literature is called cognitive-based trust, and it is a basic type of trust founded on information availability and logical reasoning that is built only if the good intentions and ability of the counterpart are proved by reliable facts (Mayer et al., 1995; Zhang et al., 2016).

Vermeir and Verbeke (2008) state that the lower the availability of information is and/or the greater the complexity and inconsistency of available information are, the lower the confidence level buyers may have regarding products to select. Individuals who feel more confident about the true content and claim of a product are more inclined to make decisions without considering other people's behaviour and opinion as a source of information; whereas, those with a weaker belief that the product "keeps its promises" tend to acquire and process information by observing the behaviour and opinion of the others (Jager, 2000).

A waterproof system of identification, traceability and control can deliver more transparent and reliable information so as to fulfil the request for rational support (Verbeke and Viaene, 1999) and make consumers more confident of the true characteristics of sustainable products and able to gather and process information independently. In this regard, blockchain's potential for creating a digital history of items' journey and making information about the materials, processes and people behind products accessible via the items' smart labels at point of sale is being proven to be useful.

To sum up, this technology can deliver new green knowledge which has influence on confidence in ethical goods which, in turn, significantly determines the consumer purchase intentions (Chen and Chang, 2012; Vermeir and Verbeke, 2008).

Therefore, this study hypothesises that (10) perceived benefits of blockchain improve confidence in green fashion products that incorporate this technology, (11) confidence in green fashion products that incorporate blockchain positively affect consumer attitude towards the purchase of such products, and (12) confidence in green fashion products that incorporate blockchain positively affect consumer purchase intention towards such products.

H10: Perceived benefits of blockchain increase confidence in green products.

H11: Confidence in green products has a positive effect on consumer attitude.

H12: Confidence in green products has a positive effect on consumer purchase intention.

Items for measuring this variable have been adapted from Liobikienė et al. (2016) and Vermeir and Verbeke (2008) and are presented in the methodology paragraph.

Theories of Attitude-Behaviour: Theory of Reasoned Action and Theory of Planned Behaviour

Although simplified representations of reality containing several assumptions and limitations, consumer behaviour models are essential to understanding interactions between consumers and the market (Kiezel, 2010, as cited in Koszewska, 2016). The majority of models created to study green purchase behaviour make reference to the cognitive orientation which includes the classic and well-known Ajzen and Fishbein's theory of reasoned action (1980) and Ajzen's theory of planned behaviour (1985) (Koszewska, 2016).

The theory of reasoned action establishes a causal sequence, underlying consumer decision making, that connects attitude, subjective norm, behavioural intention, and behaviour, and subsequently was extended by another variable, perceived behavioural control, in the theory of planned behaviour (Shaw et al., 2007). Ajzen (1985), who postulates that attitude towards the behaviour, subjective norm, and perceived behavioural control are the determinants of intention, explains that attitude refers to the degree to which a person has a favourable or unfavourable assessment of a given behaviour, subjective norms concern the perceived social pressure to perform or not to perform the behaviour, and perceived behavioural control indicates whether the consumer has possibility and the means to act in a certain manner or whether the behaviour is difficult or impossible. According to his theory, intention in turn is the immediate antecedent of behaviour, and the stronger the intention to engage in a particular behaviour, the more likely its performance. This theoretical framework has shown to be accurate in conceptualising, measuring, and empirically verifying the elements of consumer behaviour models (Montano et al., 1997).

The two theories have been frequently modified and widely adopted also for clarifying consumer behaviour towards ethical fashion (Koszewska, 2016) (e.g., adopted by Brosdahl and Carpenter, 2010; Halepete et al., 2009b; Han and Chung, 2014; Kang et al., 2013; and Shaw et al., 2007). Ajzen (1991) states that "the theory of planned behaviour is, in principle, open to the inclusion of additional predictors if it can be shown that they capture a significant

proportion of the variance in intention or behaviour after the theory's current variables have been taken into account" (p. 199). In the domain of consumer behaviour towards sustainable clothing, model modifications have proposed the addition of environmental concern, awareness, and knowledge of ecological and social issues related to clothing production (e.g., Brosdahl and Carpenter, 2010; Kang et al., 2013; Lee et al., 2012), perceived consumer effectiveness, that is one's belief in her/his own ability to improve society and the environment through responsible fashion consumption (e.g., Kang et al., 2013), and perceived risks (e.g., Han and Chung, 2014; Kang and Kim, 2013), among others.

Consumer Attitude and Purchase Intention towards Sustainable Clothing with Blockchain

In this dissertation we make changes to the above-mentioned theories of attitude-behaviour and test a new model in the context of sustainable clothing with blockchain technology. We use "perceived risks" and, because of this, remove "subjective norms", and we do not measure "perceived behavioural control" and "behaviour" since blockchain adoption is not yet widespread in fashion industry. Therefore, in addition to perceived benefits of blockchain technology, perceived risks, brand trust, and confidence in green products as defined in the previous paragraphs, our research model derives consumer attitude and behaviour from the theory of reasoned action/planned behaviour and utilises them to evaluate buyer inclination towards the purchase of a sustainable garment that is tracked with blockchain technology.

Koszewska (2016) recalls Ajzen's theory of planned behaviour and describes attitudes, which are determined by self-beliefs about the anticipated outcomes of a certain behaviour, as the principal factor influencing each intention. The more positive attitude one holds towards a behaviour, the stronger his/her intention is to show it (Ajzen, 1985). This relationship has proven true also in research studies on consumer behaviour towards sustainable clothing (e.g., Halepete et al., 2009b; Hyllegard et al., 2012; Kang et al., 2013; Koszewska, 2016; Shaw et al., 2007), meaning that a behaviour pattern towards eco-fashion is significantly influenced by the attitude towards such behaviour. In other words, an attitude to buying sustainable clothing that is full of hope and confidence positively impacts purchase intention. In the theoretical model we design, the attitude should act as an intermediary variable to explain the factors of perceived risks, brand trust, and confidence in green products that forms the intention to buy a sustainable garment with blockchain. This digital technology increases transparency and therefore can strengthen those beliefs people have about the expected outcomes of sustainable fashion consumption. By providing consumers verified information about product provenance and attributes, blockchain can reassure them that their actions truly give the desired result of green purchasing, that is the purchase of environmentally friendly and socially responsible garments and avoidance of products that harm human communities and the environment (Chan, 2001).

In the theory of reasoned action as well as in the theory of planned behaviour, intention is an indicator of consumers' willingness to show some behaviour, and consumer behaviour and intention are generally consistent except that special situations occur (Koszewska, 2016).

Common purchase intention develops into green purchase intention when consumer motivation for environment protection and for ecological and social improvement appears (Nguyen and Le, 2020). Green purchase intention captures intrinsic motivation from attitude, internal or individual factors such as brand trust and consumer confidence in the product, and external or situational elements such as risk, price, product attributes, and environmental and social messages (Joshi and Rahman, 2015; Nguyen and Le, 2020). As distributed ledger technology has not yet been widely adopted for supply chain and marketing management and there exist very few items of clothing that are tracked with blockchain, actual behaviour is difficult to measure; for this reason, intention is the most appropriate dependent variable in order to understand whether blockchain technology can serve as a factor that facilitates sustainable clothing shopping (being useful to consumers), supports sustainable clothing sales (useful for companies), and builds trust (beneficial to both).

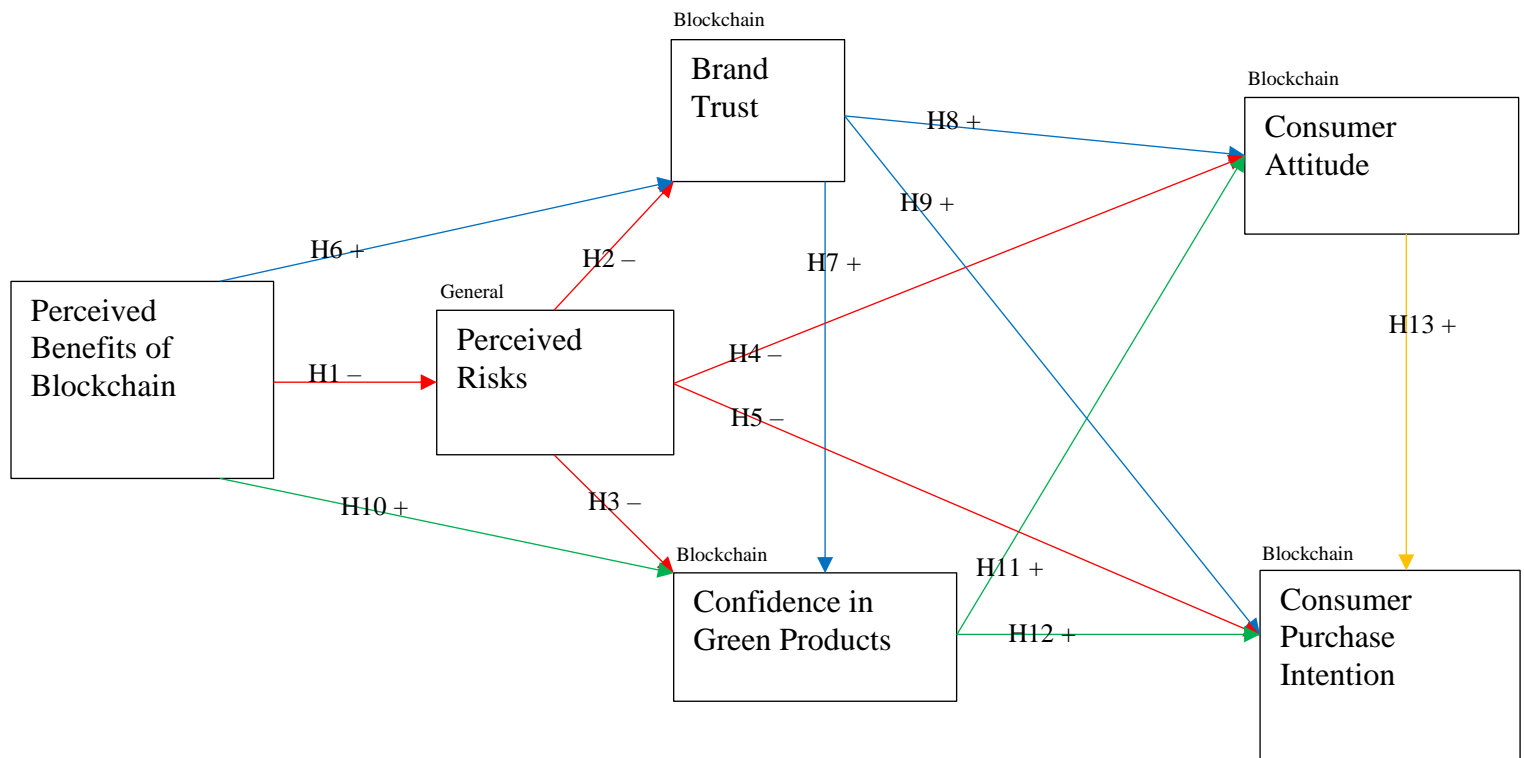
Hence, seeing that attitude is identified as the most important factor influencing the intention of consumer product selection (Nguyen and Le, 2020), and empirical evidence demonstrates that positive attitudes have a positive and significant impact on consumer intention to purchase green products (Atkinson and Rosenthal, 2014; Thøgersen et al., 2010), we hypothesise that (13) a favourable attitude towards buying a sustainable article of clothing tracked with blockchain technology positively affects shopper purchasing intention.

H13: Consumer attitude is directly related to consumer purchase intention.

Indicators derived from Paul et al. (2016) and Kang et al. (2013) have been adjusted to be compatible with our theoretical model. Paul et al. provide us the measuring instrument for consumer attitude, while Kang et al. the instrument for purchase intention. Both are shown in the methodology section.

Following from this discussion, a theoretical model representing the above-noted relationships is summarised in the figure in the next paragraph. The antecedents of the research framework are perceived benefits of blockchain, perceived risks, brand trust, confidence in green products, and consumer attitude. The last four variables are also mediators. Instead, consumer purchase intention is the consequent variable of the model.

Research Model



Methodology

Having a clear aim of investigating blockchain application in fashion supply chain and its impact on consumer purchase behavior, the study wants to employ a quantitative approach and gather data about customers by conducting an online survey.

Consumers' awareness of environmental and social issues, and their expectations about the role that companies should play in relation to sustainability challenges, are especially noticeable in certain demographic segments – the current generation of youth – and geographic markets – Western countries are currently leading the way into the demand for sustainable products (Amed et al., 2019; Lehmann et al., 2019). For this reason, this study will attempt to collect data about 385 consumers, in particular Centennials (another name for Gen-Z) from Germany, France, Italy, and Spain – the largest EU countries for population size (populationpyramid.net) and value of the apparel market (statista.com).

Raosoft (raosoft.com), an online calculator software, has been utilized to determine the sample size with a confidence level of 95%, a margin of error of 5%, and a population size estimated to be around 13,5 million people, which is the number of German, French, Italian, and Spanish inhabitants aged 20-24 (populationpyramid.net). The population size does not need to be very precise since, based on the instructions on Raosoft webpage, the sample size does not change much for population larger than 20,000; however, the selected unit of measurement (13,5 million) is high enough to obtain an accurate sample size for this survey, representing the young generation in Europe. Furthermore, the representativeness of the

generated sample can be reinforced by the phenomenon of cultural convergence in the EU due to globalization, for which a general system of values, stereotypes of social behaviour, Western lifestyle patterns, and the like create a common European cultural space (Melnikas, 2014).

Participants will be introduced to or familiarized with the concept of blockchain technology through a short explanation and an example like the partnership between fashion designer Martine Jarlgaard and Provenance, a platform for transparency, aimed at offering customers a fully traceable garment thanks to blockchain development. Then they will have to fill the sections of the questionnaire according to the variables of the research model. At the end of the data collection process, there will be a lucky draw and one of the respondents will receive either a t-shirt EcoAlf or Patagonia, or a voucher to spend for a pair of shoes Veja – three well-liked sustainable fashion brands have been selected for the draw.

The online questionnaire will be developed by using Sphinx software, both the introduction and the questions will be translated into multiple languages, i.e., English, French, Italian, and Spanish, and the questionnaire link will be spread internationally through social media, networks of acquaintances, and fashion fan pages, and it will also be forwarded to fashion schools' students if possible. The advantages of a self-administered electronic survey are low cost, saving of time, respondents' convenience and anonymity, and great accessibility which allows to reach all target geographic areas.

The items and scales for measuring the constructs have been chosen from previous studies. The indicators adapted to the proposed theoretical framework are as follows:

Item		Source	Scale
Perceived Benefits of Blockchain (PBBC)			
PBBC1	Using blockchain technology would increase fashion supply chain transparency.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC2	Using blockchain technology would make it easier to identify a sustainable article of clothing.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC3	Using blockchain technology would make it easier to understand the attributes of a sustainable article of clothing.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC4	Using blockchain technology in the purchase of a sustainable article of clothing	Venkatesh et al., 2003 (Base on Perceived usefulness)	5-point Likert scale: Strongly agree/disagree

	would enable me to have <u>secure</u> information about the history of the sustainable garment.	Davis, 1989)	
PBBC5	Using blockchain technology in the purchase of a sustainable article of clothing would enable me to have <u>trustworthy</u> information about the history of the sustainable garment.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC6	Using blockchain technology in the purchase of a sustainable article of clothing would enable me to have <u>reliable</u> information about the history of the sustainable garment.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC7	Using blockchain technology would improve <u>origin</u> assurance of a sustainable article of clothing.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC8	Using blockchain technology would improve <u>authenticity</u> assurance of a sustainable article of clothing.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC9	Using blockchain technology would improve <u>quality</u> assurance of a sustainable article of clothing.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
PBBC10	Using blockchain technology would improve <u>sustainability</u> assurance of a sustainable article of clothing.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree

PBBC11	Use of blockchain technology can decrease the time needed for the purchase of a sustainable article of clothing.	Venkatesh et al., 2003 (Base on Job-fit Thompson et al., 1991)	5-point Likert scale: Strongly agree/disagree
PBBC12	I would find blockchain technology useful in the purchase of sustainable clothing.	Venkatesh et al., 2003 (Base on Perceived usefulness Davis, 1989)	5-point Likert scale: Strongly agree/disagree
Perceived Risks (PR)			
PR1	My purchasing a sustainable article of clothing would be a bad way to spend my money.	Stone and Grønhaug, 1993	5-point Likert scale: Strongly agree/disagree
PR2	Buying a sustainable article of clothing subjects me to potential fraud (fake sustainable product).	Featherman and Pavlou, 2003; Jacoby and Kaplan, 1972	5-point Likert scale: Strongly agree/disagree
PR3	If I bought a sustainable article of clothing, I would be concerned that I would really not get my money's worth from this product (which is typically more expensive than a conventional one).	Stone and Grønhaug, 1993	5-point Likert scale: Strongly agree/disagree
PR4	The thought of purchasing a sustainable article of clothing causes me to be concerned for how really dependable and reliable that product will be.	Stone and Grønhaug, 1993	5-point Likert scale: Strongly agree/disagree
PR5	If I were to purchase a sustainable article of clothing, I become concerned that the product will not provide the level of attributes	Stone and Grønhaug, 1993	5-point Likert scale: Strongly agree/disagree

	(quality and sustainability) that I would be expecting.		
PR6	The purchase of a sustainable article of clothing will not fit in well with my self-image or self-concept.	Featherman and Pavlou, 2003; Jacoby and Kaplan, 1972	5-point Likert scale: Strongly agree/disagree
PR7	The purchase of a <u>fake</u> sustainable article of clothing would lead to a psychological loss for me because it would not fit in well with my self-image or self-concept.	Featherman and Pavlou, 2003; Jacoby and Kaplan, 1972	5-point Likert scale: Strongly agree/disagree
PR8	What are the chances that purchasing a sustainable article of clothing will negatively affect the way others think of me?	Featherman and Pavlou, 2003; Jacoby and Kaplan, 1972	5-point Likert scale: Very likely/unlikely
PR9	What are the chances that purchasing a <u>fake</u> sustainable article of clothing will negatively affect the way others think of me?	Featherman and Pavlou, 2003; Jacoby and Kaplan, 1972	5-point Likert scale: Very likely/unlikely
PR10	My purchasing of a sustainable article of clothing would lead me to a loss of convenience because I would have to waste a lot of time looking for and choosing a sustainable product rather than a conventional one.	Featherman and Pavlou, 2003; Jacoby and Kaplan, 1972	5-point Likert scale: Strongly agree/disagree
PR11	Overall, the thought of buying a sustainable article of clothing causes me to be concerned with experiencing some kind of loss if I went ahead with the purchase.	Stone and Grønhaug, 1993	5-point Likert scale: Strongly agree/disagree

Brand Trust (BT)		
BT1	A sustainable fashion brand that uses blockchain is sincere about its products.	Veloutsou, 2015
		5-point Likert scale: Strongly agree/disagree
BT2	Promises made by this brand are reliable.	Veloutsou, 2015
		5-point Likert scale: Strongly agree/disagree
BT3	This brand's communications do not make false claims.	Veloutsou, 2015
		5-point Likert scale: Strongly agree/disagree
BT4	This brand is credible.	Veloutsou, 2015
		5-point Likert scale: Strongly agree/disagree
BT5	I feel safe when I buy this brand.	Veloutsou, 2015
		5-point Likert scale: Strongly agree/disagree
BT6	I have a complete faith in the integrity of this brand.	Veloutsou, 2015
		5-point Likert scale: Strongly agree/disagree
BT7	This brand is genuinely committed to sustainability.	Veloutsou, 2015
		5-point Likert scale: Strongly agree/disagree
Confidence in Green Products (CGP)		
Considering that the brand has incorporated blockchain into its sustainable clothing...		
CGP1	How confident are you that sustainable clothing is produced respecting <u>environmental welfare</u> ?	Vermeir and Verbeke, 2008
		5-point Likert scale: Completely confident/Not confident at all

CGP2	How confident are you that sustainable clothing is produced respecting <u>animal welfare</u> ?	Vermeir and Verbeke, 2008	5-point Likert scale: Completely confident/Not confident at all
CGP3	How confident are you that sustainable clothing is produced respecting <u>human rights</u> ?	Vermeir and Verbeke, 2008	5-point Likert scale: Completely confident/Not confident at all
CGP4	How much do you trust clothing producers' claims about the sustainable performance of their own products?	Liobikienė et al., 2016	5-point Likert scale: Completely confident/Not confident at all
CGP5	How confident are you that when you buy a sustainable article of clothing indicated as, for example, organic cotton or fair trade, it will cause less damage to the environment and society than other products?	Liobikienė et al., 2016	5-point Likert scale: Completely confident/Not confident at all
CGP6	How confident are you that sustainable clothing is a better choice for you?	Vermeir and Verbeke, 2008	5-point Likert scale: Completely confident/Not confident at all
Consumer Attitude (CA)			
CA1	I like the idea of purchasing a sustainable garment that incorporates blockchain.	Paul et al., 2016 (Based on Taylor and Todd, 1995; Chan, 2001; and Mostafa, 2006, 2009)	5-point Likert scale: Strongly agree/disagree
CA2	Purchasing a sustainable garment that incorporates blockchain is a good idea.	Paul et al., 2016 (Based on Taylor and Todd, 1995; Chan, 2001; and Mostafa, 2006, 2009)	5-point Likert scale: Strongly agree/disagree

CA3	I have a favourable attitude towards purchasing a sustainable garment that incorporates blockchain.	Paul et al., 2016 (Based on Taylor and Todd, 1995; Chan, 2001; and Mostafa, 2006, 2009)	5-point Likert scale: Strongly agree/disagree
Consumer Purchase Intention (CPI)			
CPI1	If I see sustainable clothing that incorporates blockchain, I intend to purchase or considering purchasing a product.	Kang et al., 2013 (c.f., Ajzen and Fishbein, 1980; Shaw et al., 2000)	5-point Likert scale: Strongly agree/disagree
CPI2	If I see a sustainable fashion brand that uses blockchain, I intend to visit the store/Web site to purchase a product.	Kang et al., 2013 (c.f., Ajzen and Fishbein, 1980; Shaw et al., 2000)	5-point Likert scale: Strongly agree/disagree
CPI3	If I find a sustainable garment that fits my clothing needs, the possibility of my purchasing will increase if I then find it incorporates blockchain.	Kang et al., 2013 (c.f., Ajzen and Fishbein, 1980; Shaw et al., 2000)	5-point Likert scale: Strongly agree/disagree

A pre-test with a smaller sample will be conducted to ensure that the questions are relevant and comprehensible, and structural equation modeling will be used to test the theoretical model and to represent the relationships between the variables afterwards.

Provisional Thesis Chapters Overview

Introduction

Research background

Research problem, research questions, research aim and objectives, contributions and limitations

Proposed conceptual framework

Sustainability and Fashion Industry

Social and environmental issues

Eco-labels, greenwashing, and transparency

Consumer green purchase behaviour

Blockchain Technology

Brief history, types, and how it works

Blockchain and supply chain

Blockchain and marketing

Opportunities, barriers, advantages, and disadvantages

Provenance knowledge

Theoretical Framework

Theoretical grounding and explanation of the proposed conceptual framework

Research model and hypotheses development

Methodology

Research design

Collection of data

Data analysis

Structural equation model

Results

Discussion

Theoretical and managerial implications

Conclusions and Future Research Direction

Schedule

Exposé submission: End of September 2020

Literature review, finishing the theoretical part of the thesis: By end of November 2020

Instrument development: By middle of October 2020

Instrument pilot test: End of October-Beginning of November 2020

Data collection: November 2020

Data analysis: End of November-December 2020

Finishing phase: December 2020

Thesis submission: End of December 2020-Beginning of January 2020

References

- Agrawal, T. K., & Pal, R. (2019). Traceability in textile and clothing supply chains: Classifying implementation factors and information sets via Delphi study. *Sustainability*, 11(6), 1698 (article number: 1698). <https://doi.org/10.3390/su11061698>.
- Ajzen, I., (1985). From intentions to actions: A theory of planned behaviour. In Kuhl, J., & Beckman, J. (Eds.), *Action control: From cognition to behaviour* (pp. 11-39). Springer-Verlag.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, N. J., Prentice-Hall.
- Ali, A., & Haseeb, M. (2019). Radio frequency identification (RFID) technology as a strategic tool towards higher performance of supply chain operations in textile and apparel industry of Malaysia. *Uncertain Supply Chain Management*, 7(2), 215-226.
- Amed, I., Berg, A., Balchandani, A., Andersson, J., Hedrich, S., Young, R., Beltrami, M., Kim, D., & Rölken, F. (2019). *The state of fashion 2019: A year of awakening*. The Business of Fashion and McKinsey & Company. <https://www.mckinsey.com/TheStateOfFashion2019.pdf>
- Amed, I., Berg, A., Balchandani, A., Hedrich, S., Rölken, F., Young, R., & Poojara, S. (2020). *The state of fashion 2020: Navigating uncertainty*. The Business of Fashion and McKinsey & Company. <https://www.mckinsey.com/TheStateOfFashion2020.pdf>
- Angelis, J., & Ribeiro da Silva, E. (2019). Blockchain adoption: A value driver perspective. *Business Horizons*, 62(3), 307-314.
- Atkinson, L., & Rosenthal, S. (2014). Signaling the green sell: The influence of eco-label source, argument specificity, and product involvement on consumer trust. *Journal of Advertising*, 43(1), 33-45.
- Bauer, R. A. (1967). Consumer behaviour as risk taking. In Cox, D. F. (Eds.), *Risk taking and information handling in consumer behavior* (pp. 23-33). Harvard University Press.
- Boukis, A. (2019). Exploring the implications of blockchain technology for brand–consumer relationships: A future research agenda. *Journal of Product & Brand Management*, 29(3), 307-320.

- Bullón Pérez, J. J., Queiruga-Dios, A., Gayoso Martínez, V., & Martín del Rey, Á. (2020). Traceability of ready-to-wear clothing through blockchain technology. *Sustainability*, 12(18), 7491 (article number: 7491). <https://doi.org/10.3390/su12187491>.
- Brach, S., Walsh, G., & Shaw, D. (2018). Sustainable consumption and third-party certified labels: Consumers' perceptions and reactions. *European Management Journal*, 36(2), 254-265.
- Braga Junior, S., Martínez, M. P., Correa, C. M., Moura-Leite, R. C., & Da Silva, D. (2019). Greenwashing effect, attitudes, and beliefs in green consumption. *RAUSP Management Journal*, 54(2), 226-241.
- Brosdahl, D. J. C., & Carpenter, J. M. (2010). Consumer knowledge of the environmental impacts of textile and apparel production, concern for the environment, and environmentally friendly consumption behavior. *Journal of textile and apparel, technology and management*, 6(4), 1-9.
- Brundtland Commission (1987). *Report of the World Commission on Environment and Development: Our common future*. Oxford University Press.
- Carey, L., & Cervellon, M. C. (2014). Ethical fashion dimensions: Pictorial and auditory depictions through three cultural perspectives. *Journal of Fashion Marketing and Management*, 18(4), 483-506.
- Caro, F., & Martínez-de-Albéniz, V. (2015). Fast fashion: Business model overview and research opportunities. In Agrawal, N., & Smith, S. (Eds.), *Retail Supply Chain Management: Quantitative models and empirical studies* (pp. 237-264). Springer.
- Cervellon, M. C., Hjerth, H., Ricard, S., & Carey, L. (2010, January 21-23). *Green in fashion? An exploratory study of national differences in consumers concern for eco-fashion* [Paper presentation]. 9th International Conference Marketing Trends, Venice, Italy.
- Chan, R. Y. (2001). Determinants of Chinese consumers' green purchase behavior. *Psychology & marketing*, 18(4), 389-413.
- Chaudhuri, A., & Holbrook, M. B. (2001). The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. *Journal of Marketing*, 65(2), 81-93.
- Chen, Y. S. (2010). The drivers of green brand equity: Green brand image, green satisfaction, and green trust. *Journal of Business Ethics*, 93(2), 307-319.

- Chen, Y. S., & Chang, C. H. (2012). Enhance green purchase intentions. The roles of green perceived value, green perceived risk, and green trust. *Management Decision*, 50(3), 502-520.
- Chen, Y. S., Huang, A. F., Wang, T. Y., & Chen, Y. R. (2020). Greenwash and green purchase behaviour: The mediation of green brand image and green brand loyalty. *Total Quality Management & Business Excellence*, 31(1-2), 194-209.
- Clark, H. (2008). Slow fashion: An oxymoron or a promise for the future...?. *Fashion Theory: The Journal of Dress, Body & Culture*, 12(4), 427-446.
- Compeau, D. R., & Higgins, C. A. (1995b). Computer self-efficacy: Development of a measure and initial test. *Management Information System Quarterly*, 19(2), 189-211.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information System Quarterly*, 13(3), 319-339.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, 22(14), 1111-1132.
- de Boer, J., Helms, M., & Aiking, H. (2006). Protein consumption and sustainability: Diet diversity in EU-15. *Ecological Economics*, 59(3), 267-274.
- Erdem, T., & Swait, J. (1998). Brand equity as a signaling phenomenon. *Journal of Consumer Psychology*, 7(2), 131-157.
- Featherman, M. S., & Pavlou, P. A. (2003). Predicting e-services adoption: A perceived risk facets perspective. *International Journal of Human-Computer Studies*, 59(4), 451-474.
- García-Torres, S., & Rey-Garcia, M. (2020). Sostenibilidad para la competitividad de la industria de la moda española: Hacia una moda circular, digitalizada, trazable y colaborativa. *Información Comercial Española (ICE), Revista de Economía*, 912, 87-100.
- Ghose, A. (2018). What blockchain could mean for marketing. *Harvard Business Review*, 5, 2-5.
- Gielens, K., & Steenkamp, J. B. E. (2019). Branding in the era of digital (dis)intermediation. *International Journal of Research in Marketing*, 36(3), 367-384.
- Goryagin, K., & Wagner, R. (2018). Trusting in trustless trust: Blockchain information storage in product communication. In Brătianu, C., Zbucnea, A., & Vitelar, A. (Eds.),

- Strategica* 2018. *Challenging the status quo in management and economics* (pp. 718-729). Tritonic Press.
- Gregg, D. G., & Walczak, S. (2008). *Dressing your online auction business for success: An experiment comparing two e-Bay businesses*. *Management Information Systems Quarterly*, 32(3), 653-70.
- Halaburda, H. (2018). Blockchain revolution without the blockchain?. *Communications of the ACM*, 61(7), 27-29.
- Halepete, J., Littrell, M., & Park, J. (2009b). Personalization of fair-trade apparel: Consumer attitudes and intentions. *Clothing and Textiles Research Journal*, 27(2), 143-160.
- Han, T. I., & Chung, J. E. (2014). Korean consumers' motivations and perceived risks toward the purchase of organic cotton apparel. *Clothing and Textiles Research Journal*, 32(4), 235-250.
- Harris, L. C., & Goode, M. M. H. (2010). Online servicescapes, trust, and purchase intentions. *Journal of Services Marketing*, 24(3), 230-243.
- Henninger, C. E., Alevizou, P. J., & Oates, C. J. (2016). What is sustainable fashion?. *Journal of Fashion Marketing and Management*, 20(4), 400-416.
- Herbig, P., & Milewicz, J. (1996). Market signalling: a review. *Management Decision*, 34(1), 35-45.
- Horne, R. E. (2009). Limits to labels: The role of eco-labels in the assessment of product sustainability and routes to sustainable consumption. *International Journal of Consumer Studies*, 33(2), 175-182.
- Hyllegard, K. H., Yan, R. N., Ogle, J. P., & Lee, K. H. (2012). Socially responsible labeling: The impact of hang tags on consumers' attitudes and patronage intentions toward an apparel brand. *Clothing and Textiles Research Journal*, 30(1), 51-66.
- Hughes, A., Park, A., Kietzmann, J., & Archer-Brown, C. (2019). Beyond Bitcoin: What blockchain and distributed ledger technologies mean for firms. *Business Horizons*, 62(3), 273-281.
- Jacoby, J., & Kaplan, L. B. (1972). The components of perceived risk. In Venkatesan, M. (Eds.), *SV - Proceedings of the Third Annual Conference of the Association for Consumer Research* (pp. 382-393). Association for Consumer Research.
- Jacobs, K., Petersen, L., Hörisch, J., & Battenfeld, D. (2018). Green thinking but thoughtless buying? An empirical extension of the value-attitude-behaviour hierarchy in sustainable clothing. *Journal of Cleaner Production*, 203, 1155-1169.

- Jager, W., Janssen, M. A., De Vries, H. J. M., De Greef, J., & Vlek, C. A. J. (2000). Behaviour in commons dilemmas: Homo economicus and homo psychologicus in an ecological-economic model. *Ecological Economics*, 35(3), 357-379.
- Johnston, A. (2012, July). *The first steps towards considerate design incorporating Cradle to Cradle principles*. London College of Fashion, University of the Arts London. <https://innovatingsustainablefashion.wordpress.com/cradle-to-cradle.pdf>
- Joshi, Y., & Rahman, Z. (2015). Factors affecting green purchase behaviour and future research directions. *International Strategic Management Review*, 3(1-2), 128-143.
- Jung, S., & Jin, B. (2014). A theoretical investigation of slow fashion: Sustainable future of the apparel industry. *International Journal of Consumer Studies*, 38(5), 510-519.
- Kalafatis, S. P., & Pollard, M. (1999). Green marketing and Ajzen's theory of planned behaviour: A cross-market examination. *Journal of Consumer Marketing*, 16(4-5), 441-460.
- Kamble, S., Gunasekaran, A., & Arha, H. (2019). Understanding the blockchain technology adoption in supply chains-Indian context. *International Journal of Production Research*, 57(7), 2009-2033.
- Kang, J., & Kim, S. H. (2013). What are consumers afraid of? Understanding perceived risk toward the consumption of environmentally sustainable apparel. *Family and Consumer Sciences Research Journal*, 41(3), 267-283.
- Kang, J., Liu, C., & Kim, S. H. (2013). Environmentally sustainable textile and apparel consumption: the role of consumer knowledge, perceived consumer effectiveness and perceived personal relevance. *International Journal of Consumer Studies*, 37(4), 442-452.
- Kaufman, N. (2014). Overcoming the barriers to the market performance of green consumer goods. *Resource and Energy Economics*, 36(2), 487-507.
- Kim, D. J., Ferrin, D. L., & Rao, H. R. (2008). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision Support Systems*, 44(2), 544-564.
- Kim, H. M., & Laskowski, M. (2018). Toward an ontology-driven blockchain design for supply-chain provenance. *Intelligent Systems in Accounting, Finance, and Management*, 25(1), 18-27.

- Koszewska M. (2016). Understanding Consumer Behavior in the Sustainable Clothing Market: Model Development and Verification. In Muthu, S., & Gardetti, M. (Eds.), *Green Fashion: Volume 1* (pp. 43-94). Springer.
- Kumar, V., Agrawal, T. K., Wang, L., & Chen, Y. (2017). Contribution of traceability towards attaining sustainability in the textile sector. *Textiles and Clothing Sustainability*, 3(1), 1-10.
- Lee, J., Park, D. H., & Han, I. (2011). The different effects of online consumer reviews on consumers' purchase intentions depending on trust in online shopping malls: An advertising perspective. *Internet Research*, 21(2), 187-206.
- Lee, N., Choi, Y. J., Youn, C., & Lee, Y. (2012). Does green fashion retailing make consumers more eco-friendly? The influence of green fashion products and campaigns on green consciousness and behavior. *Clothing and Textiles Research Journal*, 30(1), 67-82.
- Lehmann, M., Arici, G., Boger, S., Martínez-Pardo, C., Krueger, F., Schneider, M., Carrière-Pradal, B., & Schou, D. (2019). *Pulse of the fashion industry: 2019 update*. Global Fashion Agenda, Boston Consulting Group, and Sustainable Apparel Coalition. <http://media-publications.bcg.com/PulseOfTheFashionIndustry2019.pdf>
- Liobikienė, G., Mandravickaitė, J., & Bernatoniene, J. (2016). Theory of planned behavior approach to understand the green purchasing behavior in the EU: A cross-cultural study. *Ecological Economics*, 125, 38-46.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709-734.
- Melnikas, B. (2014). Enlargement of the European Union, integral cultural space and transition processes: Equal rights and the ecology of culture. *Procedia - Social and Behavioral Sciences*, 110, 251-258.
- Mintel Reports. (2009, February). *Ethical Clothing*. Mintel Group Limited. <https://reports.mintel.com>
- Mishra, D. P., Heide, J. B., & Cort, S. G. (1998). Information asymmetry and levels of agency relationships. *Journal of Marketing Research*, 35(3), 277-95.
- Mitchell, V. W. (1999). Consumer perceived risk: Conceptualisations and models. *European Journal of Marketing*, 33(1-2), 163-195.
- Montano, D. M., Kasprzyk, D., & Taplin, S. (1997). The theory of reasoned action and the theory of planned behaviour. In Glanz, K., Lewis, F. M., & Rimer, B. K. (Eds.), *Health*

- behavior and health education: Theory research and practice* (pp. 85-112). Jossey-Bass.
- Montecchi, M., Plangger, K., & Etter, M. (2019). It's real, trust me! Establishing supply chain provenance using blockchain. *Business Horizons*, 62(3), 283-293.
- Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192-222.
- Morgan, A. (Director). (2015). *The true cost* [Documentary film]. Untold Creative in association with Life is My Movie Entertainment.
- Morkunas, V. J., Paschen, J., & Boon, E. (2019). How blockchain technologies impact your business model. *Business Horizons*, 62(3), 295-306.
- Mostafa, M. M. (2006). Antecedents of Egyptian consumers' green purchase intentions: A hierarchical multivariate regression model. *Journal of International Consumer Marketing*, 19(2), 97-126.
- Mostafa, M. M. (2009). Shades of green: A psychographic segmentation of the green consumer in Kuwait using self-organizing maps. *Expert Systems with Applications*, 36(8), 11030-11038.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. <https://bitcoin.org/bitcoin.pdf>
- Nan, Y., Liu, Y., Shen, J., & Chai, Y. (2017), A study on MCIN model in intelligent clothing industry. *International Journal of Crowd Science*, 1(2), 133-145.
- Nguyen, H., & Le, H. (2020). The effect of agricultural product eco-labelling on green purchase intention. *Management Science Letters*, 10(12), 2813-2820.
- Noblet, C. L., & Teisl, M. F. (2015). Eco-labelling as sustainable consumption policy. In Reisch, L. A., & Thøgersen, J. (Eds.), *Handbook of research on sustainable consumption* (pp. 300-312). Edward Elgar Publishing.
- Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of retailing and consumer services*, 29, 123-134.
- Pigni, F., Crave, S., & Aurelio, R. (2007, October 4-8). *Traceability in the textile and clothing industry: issues and implications for RFID adoption* [Paper presentation]. 2nd Mediterranean Conference on Information Systems, Venice, Italy.

- Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, 23(3), 393-404.
- Schlosser, A. E., White, T. B., & Lloyd, S. M. (2006). Converting web site visitors into buyers: How web site investment increases consumer trusting beliefs and online purchase intentions. *Journal of Marketing*, 70(2), 133-148.
- Schoorman, F. D., Mayer, R. C., & Davis, J. H. (2007). An integrative model of organizational trust: Past, present, and future. *Academy of Management Review*, 32(2), 344-354.
- Shaw, D., Shiu, E., & Clarke, I. (2000). The contribution of ethical obligation and self-identity to the theory of planned behaviour: An exploration of ethical consumers. *Journal of marketing management*, 16(8), 879-894.
- Shaw, D., Shiu, E., Hassan, L., Bekin, C., & Hogg, G. (2007). Intending to be ethical: An examination of consumer choice in sweatshop avoidance. *Advances in Consumer Research*, 34, 31-38.
- Sichtmann, C. (2007). An analysis of antecedents and consequences of trust in a corporate brand. *European Journal of Marketing*, 41(9-10), 999-1015.
- Song, Y., Qin, Z., & Yuan, Q. (2019). The impact of eco-label on the young Chinese generation: The mediation role of environmental awareness and product attributes in green purchase. *Sustainability*, 11(4), 973 (article number: 973). <https://doi.org/10.3390/su11040973>.
- Steffen, A., & Doppler, S. (2019). Building consumer trust and satisfaction through sustainable business practices with organic supermarkets: The case of Alnatura. In John Byrom, J., & Medway, D. (Eds.), *Case Studies in Food Retailing and Distribution* (pp. 205-228). Woodhead Publishing.
- Stone, R. N., & Grønhaug, K. (1993). Perceived risk: Further considerations for the marketing discipline. *European Journal of marketing*, 27(3), 39-50.
- Sweeney, J. C., Soutar, G. N., & Johnson, L. W. (1999). The role of perceived risk in the quality-value relationship: A study in a retail environment. *Journal of Retailing*, 75(1), 77-105.
- Takyar, A. (n.d.). Blockchain development process – a complete guide for innovators. Retrieved October 21, 2020, from <https://www.leewayhertz.com/guide-to-blockchain-development-process>

- Taylor, S., & Todd, P. (1995). An integrated model of waste management behavior: A test of household recycling and composting intentions. *Environment and behavior*, 27(5), 603-630.
- Thøgersen, J. (2002). Promoting green consumer behavior with eco-labels. In Dietz, T., & Stern, P. (Eds.), *New tools for environmental protection: Education, information, and voluntary measures* (pp. 83-104). National Academy Press.
- Thøgersen, J., Haugaard, P., & Olesen, A. (2010). Consumer responses to ecolabels. *European Journal of Marketing*, 44(11-12), 1787-1810.
- Thøgersen, J., Jørgensen, A. K., & Sandager, S. (2012). Consumer decision making regarding a “green” everyday product. *Psychology & Marketing*, 29(4), 187-197.
- Thompson, R. L., Higgins, C. A., & Howell, J. M. (1991). Personal computing: Toward a conceptual model of utilization. *Management Information System Quarterly*, 15(1), 124-143.
- Treiblmaier, H. (2018). The impact of the blockchain on the supply chain: A theory-based research framework and a call for action. *Supply Chain Management*, 23(6), 545-559.
- United Nations Economic Commission for Europe (UNECE) (2018, March). *Fashion is an environmental and social emergency, but can also drive progress towards the Sustainable Development Goals*.
<https://www.unece.org/info/media/news/2018/FashionIsAnEnvironmentalAndSocialEmergency/doc.html>
- Veloutsou, C. (2015). Brand evaluation, satisfaction and trust as predictors of brand loyalty: The mediator-moderator effect of brand relationships. *Journal of Consumer Marketing*, 32(6), 405-421.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 27(3), 425-478.
- Verbeke, W., & Viaene, J. (1999). Consumer attitude to beef quality labels and associations with beef quality labels. *Journal of International Food and Agribusiness Marketing*, 10(3), 45-65.
- Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecological economics*, 64(3), 542-553.

Zhang, J., Liu, H., Sayogo, D. S., Picazo-Vela, S., & Luna-Reyes, L. (2016). Strengthening institutional-based trust for sustainable consumption: Lessons for smart disclosure. *Government Information Quarterly*, 33(3), 552-561.