LUISS

Department of Business and Management

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THE BLOCKCHAIN IMPACT ON CUSTOMERS' WILLINGNESS TO PURCHASE IN THE FASHION INDUSTRY

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ACADEMIC YEAR 2022/2023

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1. Introduction

The fashion industry has a great impact on the world economy, indeed, in 2023, the fashion sector is expected to generate US$1,01 trillion in revenue and by 2027 it is anticipated that revenue would rise at a 9.84% compound annual growth rate (CAGR 2023–2027), with a market size of US$1.48 trillion. (Statista, 2023)

Due to the magnitude of this industry and of the still small shrewdness adopted toward sustainability by companies, the environment results significantly impacted by the fashion industry (Jacometti, 2019). Industry-related issues include greenhouse emissions, water use, and plastic waste. Specifically, daily environmental and social harm is caused by the fashion industry's excessive use of natural resources and the chemicals used to create fibres and dyes (Pal, R.; Gander, 2018). Furthermore, due to the energy consumed during manufacturing and transportation of the millions of clothes purchased each year internationally, which combined create a complicated supply chain, the apparel sector contributes significantly to the world's carbon emissions. Moreover, production facilities are frequently relocated to find cheaper labour, and this practice is typically associated with problems relating to limited or non-existent workers' rights (Nayak, R.; Akbari, 2019).

If there is no significant change in the way the sector operates, it is predicted that the manufacturing and retail of clothing will emit 1.6 gigatons of carbon dioxide equivalents by 2030 (Smith P., 2022).

Given the environmental damage it causes, the fashion industry has been forced to implement several reforms towards more sustainable business models (Adamkiewicz, J., Kochanska, E., Adamkiewicz, I., & Łukasik, 2022). Although changes in fashion brands' models to achieve sustainability need to occur quickly due to the current challenges, several fashion industry brands turn to greenwashing techniques and solutions to relieve this pressure.

According to BeckerOlsen and Potucek, "Greenwashing refers to the practice of falsely promoting an organization's environmental efforts or spending more resources to promote environmentally sound practices" (Becker-Olsen K & Potucek S., 2013). In order to appear more environmentally friendly than it actually is, greenwashing relies on promoting one or a small number of sustainable practises while hiding all others that are not.

When it comes to the fashion industry, examples of the greenwashing narrative include making claims about being more sustainable while only making a small improvement to the collections of fashion brands, downcycling materials rather than emphasising fiber-to-fiber recycling and promoting take-back programmes that encourage guilt-free consumption. (Generation climate europe, 2021). Ecolabeling or certification of the fashion sector is another typical strategy used in greenwashing, they are effective methods for winning over customers (Zaidi SMMR, Yifei L, Bhutto MY, Ali R, 2019).

The necessity of achieving customers' trust and needs is required for fashion's brands, indeed consumers are significant players in the achieving of environmental sustainability and their demand greatly propels fashion firms' output (Neumann, H.L., Martinez, L.M. and Martinez, 2021).

In the last years, environmental awareness campaigns played a key role, indeed, they have raised people's interest in buying products that have been manufactured from recyclable materials or with a low environmental impact. Since, consumers are becoming more aware of sustainable development (Centobelli, P., Cerchione, R., & Esposito, 2020) and this has an impact on their purchasing decisions (Koo, C., & Chung, 2014). Therefore, acquiring a product from a firm that adopt sustainable practises and produce green products has a positive effect on customer satisfaction and emotional well-being and consequently on their willingness to purchase from this company (D'Angelo, V., Cappa, F., & Peruffo, 2022).

The need of a sustainable development it is also supported by all the member countries of the United Nations Organization (UN) that have determined 17 Sustainable Development Goals (SDGs) (Chan, S., Weitz, N., Persson, Å., & Trimmer, 2018). Among which, the 12th has the objective to guarantee sustainable models of production and consumption, with the aim of making resources and energy efficient and promoting sustainable infrastructure, however, this goal envisages a change on the part of the companies to achieve the objectives the 2030 Agenda. The implementation of the 2030 Agenda is monitored annually by the High Level Political Forum (HLPF), it gives a high-level summary of the meeting's main concerns and the EU's progress in implementing the SDGs, with an emphasis on the SDGs that will be further examined at the Forum (Parlament, 2022). However, this document does not provide an advancement of the individual players that must contribute to the achievement of the SDGs, but only gives a macro picture of the situation in each individual country, companies are therefore not directly controlled in the achievement of the SDGs.

Corporate Sustainability (CS) and Corporate Social Responsibility (CSR) have also a relevant role in sustainable development, CS paradigm is based on the Brundtland Report (Word Commission on Environment and Development, 1987). In which was enhanced the necessity of a sustainable development that respect three key aspects: social fairness, economic progress, and environmental conservation. CSR instead, was defined in 2011 by the European Commission as "The integration of social and environmental concerns into their operations on a voluntary basis by companies" (Commission of the European Community, 2001). There is a substantial difference between CSR and CS. Indeed, CSR is primarily concerned with considerations of stakeholder benefit and equity, whereas, CS adopts a more comprehensive strategy, considering the social effects of business along with the economy and environment. However, both support sustainable business development (Montiel, 2008).

To meet the necessity of a sustainable development, companies are therefore helping to reduce their environmental and social impact by adopting environmentally sustainable attitudes. With the aim of highlighting these efforts, they are increasingly publishing freely accessible CSR reports to inform stakeholders of their social and environmental initiatives and tactics. On their corporate websites, about 60% of the top 200 worldwide firms claimed to have CSR reports. Consumers, governments, non-governmental organisations (NGOs), investors, and other interested parties are increasingly using these reports. By contrasting the reports from different companies and industries, consumers, governments, and NGOs can determine how involved companies are with and how committed they are to environmental and social issues (Tate, W. L., Ellram, L. M., & Kirchoff, 2010).

CSR reports are not the only manner to evaluate companies' sustainable development. ESG ratings, which ESG stands for the acronymous Environmental, Social and Governance are a widely used scoring framework through which companies, country and industry's performance is assessed and analyzed in a structured manner to obtain a combined ESG score and consequently to understand its effort in these three main ESG factors (Clementino, E., & Perkins, 2021). These valuations on ESG criteria are provided by entities known as sustainability rating agencies (referred as SRAs or rating agencies) (Busch, T., Bauer, R., & Orlitzky, 2016; Drempetic, S., Klein, C., & Zwergel, 2019). The main goal of the ratings they generate is to give stakeholders information on numerous environmental, social, and governance (ESG) variables. SRAs are increasingly using these measures to assess how vulnerable businesses are to the transition to neoliberal governance models that place an emphasis on accountability, transparency, and market discipline (Christophers, 2017).

Despite the imposition of United Nations Organization SDGs achievement, firms voluntarily provide CSR reports and are assessed on the basis of ESG ratings by sustainable

rating agencies, consumers continue to have a lack of confidence in companies' sustainable attitudes (Amin, S., & Tarun, 2021).

Following these directions, some companies, as instance the brand Zara (Segran, 2019), just moved to a different business model by using recycled materials to produce some items and inserting the percentage of recycled materials of product on the label (Callery, P. J., & Perkins, 2021). Though, the main issue is that consumers clearly have no way of verifying whether the information disclosed are true or not, thus increasing the lack of consumer confidence in the information provided by companies. The advent of new technologies, such as blockchain, with its ability to offer asset tracking and create encrypted data, could confirm the effective sustainability of a company and consequently increase consumers trust and their willingness to purchase (McKinsey, 2023).

The blockchain technology could provide a solution to the need for companies to have sustainable development and for customers to verify the effective sustainability of products. Indeed, it could be defined as a "Distributed ledger systems based on peer-to-peer web-based systems" (Cappa, F., Pinelli, M., 2020). Therefore, due to this distributed ledger a trusted central entity is not needed, since transactions on a blockchain are verified and recorded by consensus among users in the peer-to-peer network. Once a transaction is confirmed, it becomes permanent, secure, verifiable, and irreversible on the blockchain (Chen, Y., 2018). Specifically, blockchain is composed of data sets that are made up of a series of data packages called blocks, each of which contains several transactions. Every new block adds to the blockchain, which serves as a comprehensive record of all transactions. By applying cryptographic techniques, the network can validate blocks. Each block also includes the transactions, a timestamp, the hash value of the block before it (the "parent") and a nonce, a random integer used to confirm the hash. Through the "genesis block," this idea guarantees the reliability of the entire blockchain. Since changes to a block in the chain would immediately affect the corresponding hash value,

each hash value is unique and can be used to successfully detect fraud. In fact, a block can be inserted into the chain if the majority of nodes in the network concur via a consensus process that both the transactions in a block and the block itself are valid (Nofer, M., Gomber, P., Hinz, O., & Schiereck, 2017).

Given its ability to create encrypted data, ensuring reliability and transparency, the blockchain technology is adopted in many sectors: banking, financial services, and insurance (BFSI), government and public sector, healthcare and life sciences, retail and e-commerce, automotive, media & entertainment, and other industries (Wang, K., & Safavi, 2016).

Today, data is what drives the retail sector. The retailers' objectives will be efficiently accomplished with the aid of blockchain technology. The blockchain has a lot to offer the retail industry, indeed it helps to enhance current company operations, which will foster business expansion. As a matter of fact, blockchain can be used to verify a product's authenticity, in this way buyers can browse the product records and prevent counterfeiting, boosting their trust in the quality of the goods (Chakrabarti, A., & Chaudhuri, 2017).

According to this, the blockchain, used within fashion companies, could create a transparent and encrypted data system, providing the consumers with certain and unchangeable information, avoiding the greenwashing phenomenon. By putting a QR code based on blockchain technology on the clothes' labels on sale, everyone could track all the materials used to produce that garment (Nygaard, A., & Silkoset, 2022). In this way, the customer will be able to make informed choices without information asymmetries (Sunny, J., Undralla, N., & Pillai, 2020). A proof of the relevance of this topic can be seen in the fact that some large fashion companies such as H&M are already implementing blockchain technology, in this case offered by the start-up TextileGenesis to track their garments and increase the sustainability of the company (H&M Group, 2022).

Nevertheless, the impact of blockchain in the fashion industry to enhance sustainability and consequently customers' willingness to purchase has not been studied in depth despite the huge benefits it could bring. Indeed, although the commitment on the part of the UN and companies, there is no way to verify the actual commitment on the part of firms, with the risk that greenwashing is uncontrolled. Blockchain could therefore increase consumers' trust in companies, consequently raising their willingness to purchase. Thus, the topic could be of significant interest not only to scholars but also to managers and policymakers.

On the other side, unfortunately, there is a resistance by managers to use the blockchain within the supply chain given intra-organizational, inter-organization and system related barriers (Van Hoek, 2019), furthermore, the blockchain is not widely known by most consumers. Probably, if the purpose and the benefits of its implementation were explained to customers, using verbal nudging, studies would have had a different result. Indeed, nudging could guide consumers towards improved decision-making process without forbidding any potential options, to improve both personal and social behaviour (Kahneman, D., & Frederick, 2002; Stanovich, 1999). Moreover, if effectively the company will have a high return in terms of customers' willingness to purchase, the resistance to the implementation will be overcome.

According to this, the main research question is the following:

"Does the usage of blockchain benefit customers' willingness to purchase in the fashion industry? And is this effect positively affected by a proper explanation of blockchain technology?".

Therefore, the aim of the study is to analyse if the implementation of blockchain technology in the fashion industry, with the purpose of providing transparent and reliable information regarding the sustainability and the environmental impact of the products, could be a driving factor in customers' willingness to purchase.

The research is organized as follows: in Section 2, are reported the theoretical framework and the hypotheses of the study; in Section 3, are specified the methodology and the statistical analysis conducted; and in Section 4, are examined the results of the analysis. Therefore, in section 4 are discussed and commented the analysis's results. Finally in section 6, are reported the conclusions of the study and potential future research areas are highlighted.

2. Theoretical framework

According to product pricing, the fashion industry is classified in four segments: luxury, which includes high end and accessible luxury brands, premium, mass-market, value and bargain (Amed, I., Berg, A., Brantberg, L., Hedrich, S., Leon, J. and Young, 2017). The expression "fast fashion" is used interchangeably when referring to mass-market companies that, due to this phenomenon, are much more polluting than companies in other segments of the fashion industry (Smith P., 2022). Indeed, it has historically been claimed that fast fashion cannot be sustainable by its own nature, sometimes referred to as "trash couture," when its conformity with sustainable development is discussed. Fast response systems serve as the foundation of fast fashion firms' business models (Joy, A., Sherry, J.F., Venkatesh, A., Wang, J. and Chan, 2012).

Fast fashion industry is distinguished by items that are accessible by the general public. Its business plan, which attempts to draw buyers into shops as much as possible with the goal of increasing the purchase frequency (Turker, D.; Altuntas, 2014), has led to a rise in the amount of items with shorter lifespans, accompanied by the depreciation of sale prices (Claxton, S.; Kent, 2020). Fast fashion is widely used as the favoured business model, which has created a throwaway culture where clothing is swiftly purchased, used, and discarded. These clothing products have an extremely short lead time often only one month and are frequently replaced to maintain up with the rapidly shifting fashions.

The growing complexity and the more frequently use of fast fashion business model (Schaltegger, S.; Beckmann, M.; Hansen, 2013) has profound effects on the reasons and the ways that decisions from both customers' and companies' side are taken.

The motivation for which customers buy green products can be led by the "Self-determination theory" (D'Angelo, V., Cappa, F., & Peruffo, 2023; Deci, E. L., & Ryan, 2000; Ryan, R. M., & Deci, 2000) according to which consumers that support a social objective, in

this case reducing environmental impact, feel satisfied. Indeed, could be defined as "active, growth-oriented organisms who are naturally inclined toward integration of their psychic elements into a unified sense of self and integration of themselves into larger social structures" (Deci, E. L., & Ryan, 2000). Therefore, purchasing green goods contributes to individuals' psychological development and stability, generating pleasure and self-satisfaction (Koo, C., & Chung, 2014; Ryan, R. M., & Deci, 2000), which consequently positively impacts their willingness to purchase green products.

Indeed, according to a PwC study, the 63% of customers look for sustainable products, the 34% actively look for environmentally – friendly items, the 45% avoid the use of plastic whenever possible and the 41% favour products with less plastic (strategy& - Part of the PwC network, 2021). Moreover, a study conducted by McKinsey in 2020, demonstrated that a startling 75% of millennial and 66% of overall respondents based their buying decisions on the perceived sustainability of a product (McKinsey, 2020).

There are considerable factors that may have an impact on a customer's decision - making process to purchase green products, the main ones are the consumption values (Bei, L.T. and Simpson, 1995), environmental consciousness (Rana, J., & Paul, 2017) and green trust (Schlosser, A.E., White, T.B. and Lloyd, 2006). Therefore, to understand customers' decision-making process about the decision to buy green and environmentally sustainable products requires an understanding of the "Theory of customer consumption behaviour" developed by Sheth in 1991 (Sheth, J. N., Newman, B. I., & Gross, 1991).

The theory explains why people choose to purchase or not a specific product, why they select one type of good over another, and why they choose one company over the others. It emphasises on consumption values.

It is predicated on three basic assumptions:

1. Several consumption values influence customer choice.

2. In any given circumstance including a decision, the consumption values contribute differently.

3. The variables for consumption are independent.

According to this theory, customer decision is influenced by five values (Sheth, J. N., Newman, B. I., & Gross, 1991).

They are valuable in terms of function, social interaction, feeling, condition and knowledge. Any or all of the five consumption values may have an impact on a decision.

Functional Value

The perceived usefulness derived from an alternative's ability to execute in a functional, economical, or physical manner is characterised as the functional value of an alternative. By having important functional, economical, or physical features, an alternative might gain functional value (Sheth, J. N., Newman, B. I., & Gross, 1991).

From a sustainable development perspective, functional features, including quality and price, are crucial factors that may affect customers' decisions to select and purchase eco-friendly products instead of a non-green one. Nowadays, customers throughout the world are appreciating green items and are even willing to pay more for sustainable products as they become more value-conscious (Tsay, 2009).

Thus, environmentally conscious and ethical buyers favour goods that are manufactured with natural materials, are organic in origin, and are not tested on animals (Norazah, 2013). Moreover, it has been asserted that reasonable prices and higher standards may considerably enhance customers' perceptions of the value of sustainable services and good and consequently increase their purchase intention (D'Souza, C., Taghian, M., Lamb, P. and Peretiatko, 2007).

Social value

It could be defined as the perceived utility gained by an alternative's affiliation with one or more particular social groupings. Through these affiliations with stereotypical demographic, socioeconomic, and cultural-ethnic groups, an alternative might gain social significance (Sheth, J. N., Newman, B. I., & Gross, 1991).

According to the research, the perception of social responsibility might affect people's attitude towards the environment and their ability to engage in sustainable consumerism (Straughan, R.D. and Roberts, 1999).

Moreover, consumers' perceptions of social pressure have an impact on how they accept products and make decisions (Ajzen, 1991). Actually, customers' buying intentions are influenced by several factors, not just social pressure. Researchers discovered numerous variables that may affect consumers' decision-making, including social pressure, peer influence, and reference groups' viewpoints (Pickett-Baker, J. and Ozaki, n.d.).

Conditional value

In a situation of buying decision-making choice customers consider the perceived utility that an alternative product has as a result of the particular setting or circumstances that the decision-maker is faced with. When there are previous physical or social circumstances that increase an alternative's functional or social value, that alternative gains conditional value (Sheth, J. N., Newman, B. I., & Gross, 1991).

The assessment of contextual factors that influence green consumption determines the conditional value for green products. Situational factors are the conditions that surround people and influence how they react to stimuli to meet their needs.

Therefore, environmental attitude and awareness about development sustainable issues enhance the trade-off and the evaluation criteria between two or more products.

Changes in consumer situational variables affect consumer behavioural variables and consequently their purchase intention (Saxena, R., & Khandelwal, 2010).

Emotional Value

The perceived usefulness obtained from an alternative's ability to generate emotions is what is referred to as the emotional value of an alternative. An alternative gains emotional value when it is connected to certain feelings, or when such emotions are sparked or maintained (Sheth, J. N., Newman, B. I., & Gross, 1991).

Emotional reactions are commonly linked to products and services. Their constructs, in contrast to other measurements, have both utilitarian and hedonistic elements (Sweeney, J., Soutar, 2001). The attractiveness of a product or service is an amalgam of intellectual and emotional considerations and that emotions have an impact in every buying decision illustrates the significance of this combination (MacKay, 1999).

Looking at the green products perspective, Bei and Simpson discovered that the majority of respondents (89.1%) typically felt that buying recycled products they are helping to save the environment (Bei, L.T. and Simpson, 1995).

Nowadays customers are worried about their consumption effects on society and the environment. Studies have found a number of consumer attitudes and behaviours that support sustainable consumption, including picking compact packages, supporting healthy eating, and purchasing organic food (Cawley, 2004).

Epistemic Value

The perceived utility derived from an alternative's ability to stimulate interest, offer novelty, and/or sate a need for information is characterised as the epistemic value of an

alternative. A substitute gains epistemic worth through curiosity, novelty, and knowledge (Sheth, J. N., Newman, B. I., & Gross, 1991).

Consumer product knowledge is crucial for predicting new product acceptance in a buying decision-making situation (Laroche, M., Bergeron, J., Barbaro-Forleo, 2001). When customers come across a new green product, they decide whether or not to purchase it based on a combination of their familiarity with the known product category and newly acquired product knowledge (Lai, 1991).

Nowadays consumers, thanks also to the commitment shown by the UN and the European Union, are much better informed about the importance of companies' role in achieving the world's sustainable development and built an environmental consciousness. It is defined as "a person's desire to protect and conserve the environment" (De Silva, M., Wang, P., & Kuah, 2021). A high level of environmental consciousness is generally viewed as a requirement for implementing effective environmental protection measures (Tsarenko, Y., Ferraro, C., Sands, S., & McLeod, 2013), since environmentally conscious people will be engaged in environmentally friendly activities, such as buying green products (Rana, J., & Paul, 2017).

Consumption values and environmental consciousness are not the only components that influence customer behaviour and purchase intention, also customer trust plays a key role (Lee, J., Park, D.H. and Han, 2011). Consequently, it is possible to argue that customers' trust in the goods or services they purchase may have a great impact on their attitude and intent (Harris, L.C. and Goode, 2010).

According to scholars, customer trust is one of the key factors influencing customers buying decision-making process (Schlosser, A.E., White, T.B. and Lloyd, 2006). Chen was the first to provide a definition of "green trust" in a study from 2010 and came to the conclusion that customers' purchase intentions and behaviours are influenced by green trust. Owing to

excessive overstatement and ambiguity, lack of transparency and the missed possibility of confirming what companies affirm, many customers do not trust the effective greenness of firms' products (Amin, S., & Tarun, 2021).

The lack of consumer confidence it is even highlighted in a study conducted by the biotech company Genomatica in 2021 using an online survey given to 2,000 people and reported by McKinsey (McKinsey, 2023). The results show that the 88% responded that they do not automatically believe companies that claim to be sustainable, the 51% claimed that the fashion business was rife with greenwashing and produce huge gas emissions. Moreover, half of the surveyed 50% are in favour the usage of sustainability label to aid in the identification of sustainable solutions.

Therefore, despite the achievement objective of SDGs imposed by the UN, the increasing number of CSR report and the companies' evaluation through the ESG ratings the due to customers' lack of trust, there is a need for new communication techniques on sustainability (McKinsey, 2023).

Companies need to also be more upfront about their progress and failings. Indeed, to avoid losing customers' trust, brands have find a trustworthy and effective approach to communicate their sustainability path (McKinsey, 2023).

In addition to ESG rating, to help brands and customers, external third certification programmes and impact evaluation methods have arisen, however, they have also generated discussion. One of the most widely used rating systems for fashion, the Higg Index, was criticized in 2022 for a several reasons, the main critics moved concern the authenticity and quality of the data it offers and the possibility that major manufacturers could manipulate it. In June 2022, Norway's consumer authority forbade the mention of the Higg Index in marketing materials after finding that the index's consumer-facing efforts may be deceptive (Shendrunk

A., 2022; Tabuchi H., 2022). Common frameworks are clearly needed. In 2022, the International Sustainable Standard Board released the initial draught of the baseline. If extensively used, the reporting method might make possible for investors and customers to compare companies across sectors. However, it may not be detailed enough to draw attention to the unique difficulties facing the fashion sector (IFRS, 2022; Kent S., 2021).

More traceability along the supply chain would be possible thanks to digital and technological tools, in this way it will be easier to acquire information about all manufacturing phases in order to strict data standards to monitor sustainability criteria (McKinsey, 2023).

Some companies just moved in this direction, for instance Swedish fashion company Asket is tracking its whole supply chain and collecting information to explain to consumers the provenance, the sustainable effects, and cost of each garment (Asket, 2022). Moreover, also the H&M fast fashion group started a partnership with TextileGenesis a start-up that is providing it the blockchain technology (H&M Group, 2022). Even the luxury brands have started their path for tracking products during the supply chain, indeed LVMH, Prada Group, Cartier, Richemont, Otb Group and Mercedes - Benz have founded the Aura Blockchain Consortium that will offer them the blockchain technology to create a "product passport" thanks to which everyone could see the environmental impact of a specific product and its journey from the origins to the shop's shelves. In this way customers will have the possibility to verify the effectively use of low environmental impact materials and their costs, where the garment was produced and if it was manufactured without the exploitation of labour power (Cupellaro F., 2022).

Some quantitative studies about the blockchain implementation along the supply chain have been conducted in the food sector by questionnaire, in one of which consumers expressed

their positive feedback to the implementation of blockchain within this sector (Rainero, C., & Modarelli, 2021).

In a subsequent study (Remme, A. M. R., Stange, S. M., Fagerstrøm, A., & Lasrado, 2022) was developed a survey that showed that the use of blockchain within the fashion industry has less impact than high product rating and low price on decisions to purchase a product, price is therefore still a driving factor in consumer decisions. This study, however, aimed to analyse which factors have the greatest impact on consumers' purchase intention; it did not analyse consumers' purchase intention in the event of blockchain implementation.

My arguments and the theoretical framework suggest a positive relationship between green purchase intention, consumption values, the satisfying feeling of contributing to a social aim, green consciousness and green trust. Green trust in this plays a key role, for if environmental consciousness leads to the development of consumer values that lead to the purchase of sustainable products, the lack of green trust would lead customers not to purchase that specific product. Nowadays, fashion brands need a common framework to demonstrate their truthful commitment to sustainable development and to increase customers' trust. Thanks to the cryptographic technology offered by blockchain, consumers would be able to check for themselves the effective eco-sustainability of the product they are going to buy and consequently have more incentive to purchase it. Therefore, the first aim of this research is to test the following hypothesis:

H1: *Blockchain implementation increases the customers' willingness to purchase within the fashion industry.*

The main limitation is that blockchain technology and functionality are not known in detail by many people. The lack of this information will affect customers' decision-making process, and consequently their purchase intention (Prasad, R. K., & Jha, 2014).

In order to improve consumer decision making process and increase customers' purchase intention, nudging could have a relevant role. Indeed, nudging could be defined as a framework for driving people toward a better decision-making process without outlawing any possible choice, with the scope of enhancing personal and social behaviour.

From a theoretical point of view, nudging principle is based on a dual system framework (Kahneman, D., & Frederick, 2002; Stanovich, 1999).

These are two different cognitive systems, System 1 and System 2 and form the basis for people's capacity for evaluation, decision-making, and thinking. The two systems work in totally different manner, System 1 processes are rule-based, methodical, agile, and fast, while System 2 processes are heuristic-based, spontaneous, biased, associative, and automated (Evans, J. S. B. T., & Stanovich, 2013; Kahneman, 2011). According to nudge researchers (Sunstein, 2016, 2015; Thaler, R. H., & Sunstein, 2008), System 1 type processes are frequently activated as the basis for people's poor lifestyle decisions. As a result, reorienting aspects of the choice settings on which preconceptions and biases are invoked is a feasible strategy to target System 1 process and produce positive behavioural change. Typically, this is done surreptitiously without the decision maker's knowledge and depends on a differentiation among implicit and explicit processes, in which implicit processing takes place automatically while explicit processing is intentional and supported by consciousness (Evans, J. S. B. T., & Over, 1996; Stanovich, K. E., & West, 2000).

To affect individuals' behaviour are necessary some tiny alterations of their decision context, which is defined as choice architecture. The change of this, would change people's choice and their consequent behaviour. Therefore, the choice architecture describes how choices are shown, framed, and organised (Münscher, R., Vetter, M., Scheuerle, 2015).

Thus, in order to generate a positive behavioural change, nudging acts on the choice architecture by influencing the people's cognitive system 1. Nudge is defined as "any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any option or significantly changing their economic incentives" (Thaler, R. H., & Sunstein, 2008).

According to scholars there are four distinct forms of nudging: using social norms, changing default policies, altering the physical environment, and simplifying and framing information. The latter one, simplification and framing of information alludes to how much information is accessible and how it is shown to the individual. Indeed, consumer decision-making is significantly influenced by simplification, while framing affects people's attitudes and values (Lehner, M., Mont, O., & Heiskanen, 2016).

For this research, is necessary to go deeper into the simplification and framing of information, indeed giving people accurate information make easier for them to evaluate their potential behavioural possibilities cognitively, which could consequently lead to a more positive attitude towards adopting better behaviour (Cappa, F., Rosso, F., Giustiniano, L., & Porfiri, 2020).

Previous studies demonstrated the impact of simplification and framing of information, Roozen, Raedts and Meijburg conducted a study in which two H&M Group's T-shirts were displayed to consumers.

The only element that distinguished the two items was the material. There was one T-shirt made of ordinary cotton, while the other was a sustainable fashion T-shirt from the "Conscious collection", an eco-friendly fashion product (Roozen, I., Raedts, M., & Meijburg, 2021). In order to conduct the experiment, participants were divided in two groups, to one of them more information was provided in text form, and also organised and presented in a way that is

compatible with human information and decision-making processes (Lehner, M., Mont, O., & Heiskanen, 2016). Therefore, to half of the participants was explained that one of the two t-shirt was an eco-friendly product and the benefits that they will bring to the environment if they will buy it, while, to the others it was not explained. This type of nudging is defined aa "verbal nudge" and the individuals influenced by the verbal nudge condition opted for the sustainable T-shirt several times more frequently than the other group (Roozen, I., Raedts, M., & Meijburg, 2021).

The importance of simplification and framing of information was investigated also by (Cappa, F., Rosso, F., Giustiniano, L., & Porfiri, 2020), who reached to the conclusion that when feedback are offered to people in order to increase their personal and societal benefits, also their interest in participating in citizen science project and awareness in environmentally related issues increased.

It has therefore been studied that the missing in-depth knowledge of a topic or a lack of information about it can contribute negatively to the consumer's decision-making process. Consequently, if knowledge of a tool and the environmental impact of its adoption were properly explained to people, their interest and attitude towards its implementation would increase. This concept can thus also be applied to blockchain. Indeed, blockchain and its functionality are still little known to the majority of the population. Although it can provide many benefits by tracking the path taken by a product from the moment it is produced until it is displayed in a shop or arrives at the consumer's home. Moreover, thanks to this technology, consumers will be able to have a lot of information regarding the environmental impact of the product they are buying and understand how much it is contributing to the sustainable development of the world. Hence, nudging could contribute to overcoming this problem by increasing knowledge of blockchain technology and the benefits it would bring within the

fashion industry. Previous studies and the above reasoning, therefore, led to the following hypothesis:

H2: *If the blockchain is explained in detail to customers concerning possible sustainable benefits and its reliability, the effect on customers' willingness to purchase in the fashion industry is enhanced.*

3. Research Methods

In order to test the two hypothesis (H1) and (H2) was evaluated respectively the impact of blockchain mentioning and implementation and blockchain implementation and proper explanation on customers' willingness to purchase. To do that, were proposed to measure this impact through two independent variables named properly: "blockchain mentioning and implementation" and "blockchain implementation and proper explanation" (verbal nudging).

The data collection was based on a survey via Qualtrics, it was distributed in the Italian language, to fit the Italian population better, and to reach all ages and educational levels. Since everyone buys fashion products, the representative sample was selected through the simple random sampling method. The survey registered 245 responses that respect the rule of thumb to have at least 10 observations per variable (Austin, P. C. & Steyerberg E. W., 2015; Franco, S., Caroli M. G., Cappa F., & Del Chiappa G., 2020). The general information collected (gender, age and educational level) were considered as control variables.

To measure the impact of "blockchain mentioning and implementation" and "blockchain implementation and proper explanation" (independent variables) on "customers' willingness to purchase" (dependent variable) were employed three 1-7 Likert scale questions that refer to a hypothetical product (a pair of blue jeans) with the same visual characteristics but with a different environmental impact. Indeed, the first pair sold at 24.00 € have been produced with extreme attention to environmental and social sustainability, while the second pair sold at 20.00 € did not have these characteristics. Most probably, if the same price were set for both pairs of blue jeans, all participants would have been more willing to buy the eco-friendly product, which is why different prices were chosen. Meanwhile, low-considered prices were chosen for the pair of blue jeans to avoid the "high price" barrier influencing the participants' choices. The eco-friendly product was chosen to have 4.00 € price difference, which is 20% more than the non-

sustainable product, since in a previous study it was shown that the 67% of consumers are willing to pay 5-20% more for a product that is considered eco-friendly (Observatory of the School of Management of the Milan Polytechnic, 2022). The aim and the differences of these questions are explained in *Table 1*.

Table 1: Description of the Likert scale questions asked in the survey. Each of these have its unique identifier.

Identifier	*Question explanation*
Non-blockchain mentioning	This question aims at grading how willing the respondent would be to purchase a product that was manufactured with an extreme attention to environmental and social sustainability, despite not being able to verify the information provided by the company.
Blockchain mentioning and implementation	This question aims at grading how willing the respondent would be to purchase a product manufactured with extreme attention to environmental and social sustainability, and it is controlled by blockchain technology.
Blockchain implementation and proper explanation (verbal nudging)	This question aims at grading how much the detailed, simplified and framed information regarding blockchain technology, could increase the respondent's will to purchase a product for which extreme attention to

	environmental and social sustainability was paid.

To the participants, the questions in *Table 1*, were shown on different pages of the questionnaire, so that the viewing of subsequent questions would not influence their answer in the question they were currently reading. Moreover, these questions could appear very similar, which is why it was decided to highlight specific words in the survey that would make their difference more obvious. The words that have been highlighted will also be reported in bold in this paper.

The survey was divided into five blocks. In the first block, there was an introduction in which the participants were explained the aim of the research and they were informed about the completion time and the anonymousness of responses. The general information (control variables) was asked in a multiple question choice with the possibility to select only one option and relate to gender, age (which has been divided into ranges) and level of education. In blocks 2, 3 and 4, the hypothetical products were described following the purpose specified in *Table 1*. Participants could answer these questions by selecting a mark from 1 – 7 (Likert scale) thanks to the "cursor" provided by Qualtrics. The respondents were also provided with a "qualitative scale" that corresponded to the 1 – 7 Likert scale. Finally, in block 5, there was a brief conclusion to the survey.

The text that was shown and the answers available to the survey participants are reported below following the block layout.

Block 1 – Introduction and general information

Dear respondent,

thank you for participating in this research. The objective of this study is to analyse the impact of blockchain on customers' willingness to buy in the fashion industry. All answers will be anonymised in order to respect your privacy.

Questions will consist of a short text. Please take the time to read it carefully. When answering the questions, please consider that there are no right or wrong answers, as we are only interested in your opinions.

Compilation time: 3/4 minutes

Question	*Answers*
1) Which is your gender?	▪ Male ▪ Female ▪ Non-binary or third gender ▪ I prefer not to answer
2) Which is your age?	▪ < 18 years old ▪ 18 – 35 years old ▪ 36 – 50 years old ▪ 51 – 60 years old ▪ More than 60 years old ▪ I prefer not to answer
3) Which is your educational level?	▪ Middle school diploma ▪ High school diploma ▪ Bachelor's degree

| | ▪ Master's degree |
| | ▪ PhD |

Block 2 – Product without blockchain mentioning and implementation

Identifier	*Question 4*	*Marks*
Non-blockchain mentioning	You are in a fashion shop and you are going to buy a pair of blue jeans that cost 24€, visually they have the same characteristics as another pair of blue jeans from a competitor company that sells them for 20€. Your friend recommended them to you because they are very comfortable and have a good fit. In addition, the company claims that the jeans sold for €24 have been produced with extreme care for environmental and social sustainability (carefully controlling the materials used, the emissions released into the atmosphere during production, and the working conditions of the people who produce them). Even if **you do not have the possibility to verify the information provided by the company with certainty**, but you like these jeans, how much would you be willing to purchase them compared to the pair of jeans of the competing company sold for €20, which have not been produced with a low environmental and social impact? (1 not at all, 2 very little, 3 little, 4 I am undecided, 5 quite a lot, 6 a lot, 7 very much)	1 – 7

Block 3 – Product with blockchain mentioning and implementation

Identifier	*Question 5*	*Marks*
Blockchain mentioning and implementation	The pair of blue jeans described in the previous question, sold at the price of 24€, **are also part of a new line of jeans controlled by the blockchain.** In this case, if you liked them, how much would you be willing to purchase them compared to the competitor's pair of jeans sold for 20€, which were not produced with a low environmental and social impact and **are not controlled by blockchain technology**? (1 not at all, 2 very little, 3 little, 4 I am undecided, 5 quite a lot, 6 a lot, 7 very much)	1 – 7

Block 4 – Product with blockchain implementation and explanation

Identifier	*Question 6*	*Marks*
Blockchain implementation and proper explanation (verbal nudging)	The pair of blue jeans described in the previous questions and sold at the price of 24€ are part of a new line of jeans controlled by the blockchain. **The blockchain** can be **defined** as a **shared and immutable computer ledger** to record transactions, **track assets and create trust** in people **by making information transparent**. **By implementing it** within a product line, **customers will be able to obtain clear and truthful information about the product they are buying**, namely: **the materials used and**	1 - 7

	where they come from, the environmental impact of the facilities where the product was made, **and the percentage of recycled materials** used in the production process. In this case, if you liked these jeans, how much would you be willing to purchase them compared to the competitor's jeans sold for €20, **which were not produced with a low environmental and social impact and are not controlled by blockchain technology?** (1 not at all, 2 very little, 3 little, 4 I am undecided, 5 quite a lot, 6 a lot, 7 very much)	

Block 5 - Conclusion

Thank you for participating in this research! Click on the blue arrow at the bottom right to register your answers.

In the results section, the sample will be described through standard descriptive statistics measure. Specifically, the sample will be analysed in terms of:

- Mean

- Median

- Mode

- Standard Deviation

- Variance

- Range

- Minimum

- Maximum

Then, to test the hypotheses and measure the blockchain impact on customers' willingness to purchase, the linear regression analysis will be adopted.

The relationship will be measured in the following equation:

$$Y = \alpha + aX + bZ + cW + dV + eM + \varepsilon$$

In which Y is consumers' willingness to purchase (corresponding to the sum of all observations included in Q4= Product without blockchain mentioning and implementation, Q5= Product without blockchain mentioning and implementation and Q6= Product with blockchain implementation and explanation), X and Z that are the independent dummy variables, called respectively: "blockchain mentioning and implementation" and "blockchain implementation and proper explanation". To which will be assigned "0 0" if there is no presence of either one of the two identifiers in the question, "0 1" if there is only "blockchain mentioning and implementation" or "1 0" if it is "blockchain implementation and proper explanation". W, V and M, are the control variables (gender, age and educational level) measured in Q1, Q2 and Q3).

Moreover, α is the equation's intercept and ε is the error term, whereas a, b, c, d, e are the variables' coefficients.

The linear regression will have a maximum acceptable significance level of 10%. The analysis will be conducted using both Excel and SPSS for descriptive statistics and SPSS for linear regression.

4. Results

In this section, through tables and graphs are shown the results of the analysis conducted. The survey was placed on Qualtrics (version updated 24 November 2021) and distributed via anonymous links between 6 and 17 March 2023. The link was shared on several social networks: LinkedIn, WhatsApp, Instagram and Facebook.

245 responses were collected, however, 67 were removed because they were incomplete, analysis was therefore conducted on a total of 178 responses. This number results sufficient to conduct the analysis as the study is composed of two independent variables and three control variables, therefore it respects the rule of thumb to have at least 10 observations per variable (Austin, P. C. & Steyerberg E. W., 2015; Franco, S., Caroli M. G., Cappa F., & Del Chiappa G., 2020). *Table 2* shows the descriptive statistics of the random sample analysed.

Gender is a binary variable equal to 1 for male and 2 for female, given that no answers were collected either for "Non-binary or third gender" or for "I prefer not to answer".

Age is a discrete variable equal to 1 for <18 years old, 2 for 18 - 35, 3 for 36 - 50, 4 for 51 - 60, 5 for >60 and 6 for "I prefer not to answer" for which no answers were collected.

Educational level is also a discrete variable, which corresponds to 1 for "Middle school diploma" (for which no responses were gathered), 2 for "High school diploma", 3 for "Bachelor's degree", 4 for "Master's degree" and 5 for "PhD". Furthermore, the last three variables "Non-blockchain mentioning", "Blockchain mentioning and implementation" and "Blockchain mentioning and proper explanation (verbal nudging)" are discrete as well, which follow a 1-7 Likert scale with qualitative descriptions equivalent to: 1 - Not at all, 2 - Very little, 3 - Little, 4 - I am undecided, 5 - Quite a lot, 6 - A lot and 7 - Very much.

**Table 2 – Descriptive statistics of the sample**

	Gender	Age	Educational level	Non-blockchain mentioning	Blockchain mentioning and implementation	Blockchain mentioning and proper explanation (verbal nudging)
Mean	1.61	2.63	3.06	2.84	4.54	6.20
Median	2.00	2.00	3.00	3.00	4.50	7.00
Mode	2	2	4	3	4	7
Standard deviation	0.490	1.078	0.900	1.423	1.079	1.203
Variance	0.240	1.161	0.810	2.024	1.165	1.447
Range	1	4	3	6	6	6
Minimum	1	1	2	1	1	1
Maximum	2	5	5	7	7	7

Table 3 – Gender frequency and percentage of the sample

	Frequency	Percentage
Male	70	39.3%
Female	108	60.7%
Non – binary or third gender	0	0.0%
I prefer not to answer	0	0.0%

Table 3 and *Figure 1* display the gender distribution of the sample. Respondents' gender average is equal to 1.61, indeed the 60.7% are females and the 39.3% are males, no one are "Non-binary or third gender" or preferred not to answer.

Figure 1 – Gender distribution of the sample
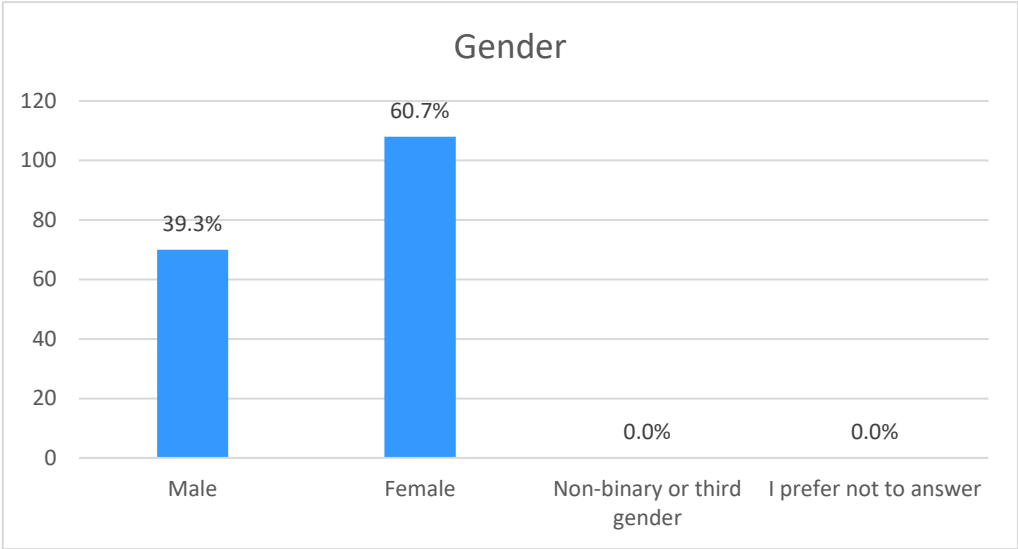
Table 4 – Age frequency and percentage of the sample

	Frequency	Percentage
<18	1	0.6%
18 – 35	125	70.2%
36 – 50	11	6.2%
51 – 60	21	11.8%
>60	20	11.2%
I prefer not to answer	0	0.0%

Table 4 and *Figure 2* show the age distribution of the respondents. Sample's age average is 2.63, more specifically, 0.6% of the participants are less than 18 years old, 70.2% are aged between 18 and 35, 6.2% are between 36 – 50, 11.8% are aged between 51 – 60 and the 11.2% are over than 60 years old. None of the respondents selected the option "I prefer not to answer".

Figure 2 – Age distribution of the sample
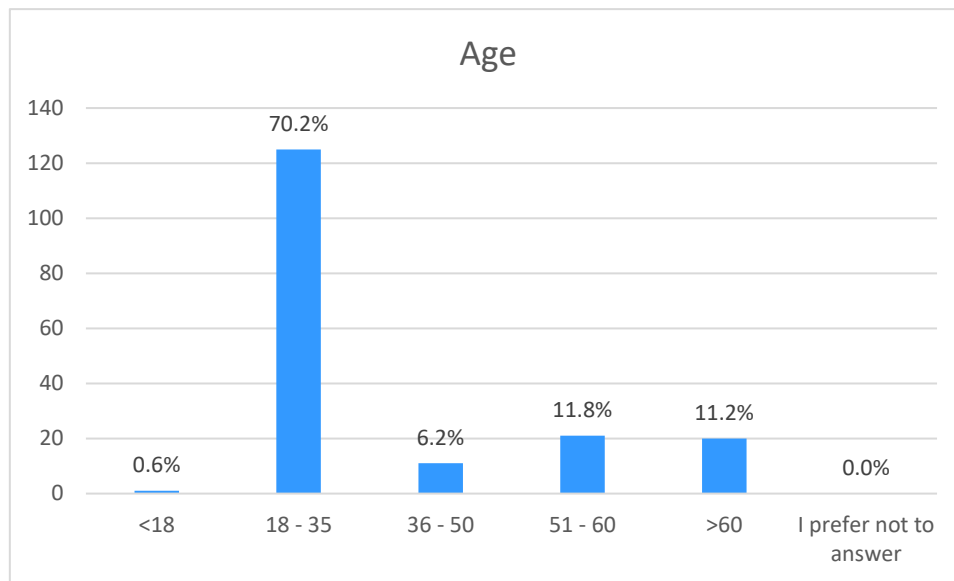
Table 5 – Educational level frequency and percentage of the sample

	Frequency	Percentage
Middle school diploma	0	0.0%
High school diploma	63	35.4%
Bachelor's degree	46	25.8%
Master's degree	65	36.5%
PhD	4	2.2%

Table 5 and *Figure 3* show the educational level distribution of the respondents. The majority of the sampled participants indicated "Master's degree" as their educational level, which was in fact selected by 36.5% of them. A data very close to the latter, is the number of respondents who indicated the "High school diploma", which are 35.4%. Furthermore, 25.4% of the sample

holds a "Bachelor's degree" and only 2.2% have a "PhD". No respondents indicated "Middle school diploma" as their educational level.

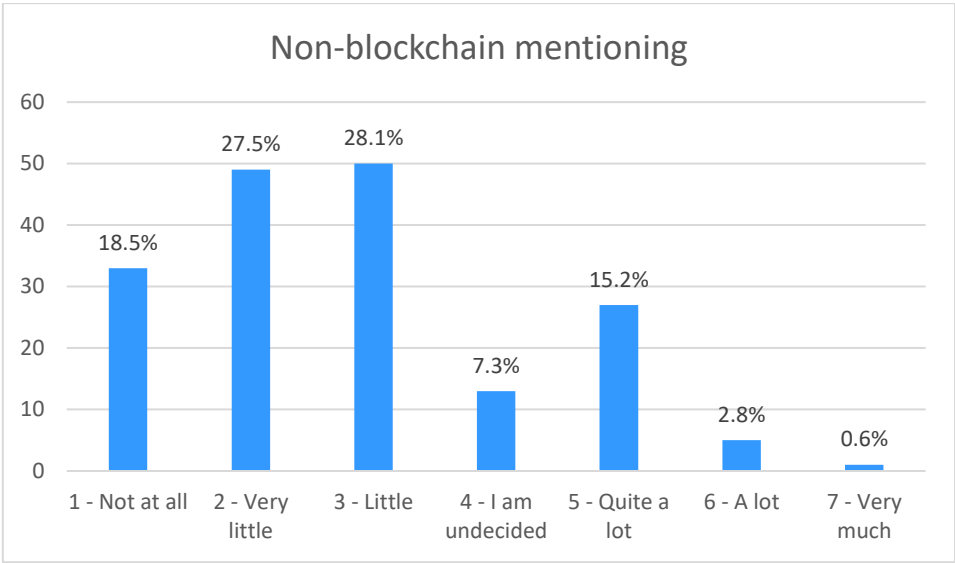**Figure 3 – Educational level distribution of the sample**
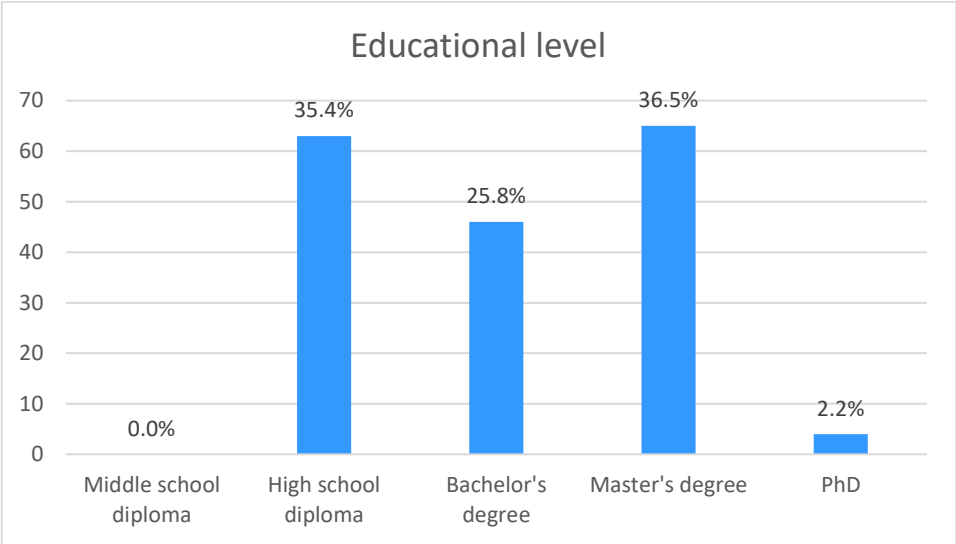
Table 6 – Non – blockchain mentioning frequency and percentage of the sample

	Frequency	Percentage
1 – Not at all	33	18.5%
2 – Very little	49	27.5%
3 – Little	50	28.1%
4 – I am undecided	13	7.3%
5 – Quite a lot	27	15.2%
6 – A lot	5	2.8%
7 – Very much	1	0.6%

Table 6 and *Figure 4* show the results of respondents' willingness to purchase the hypothetical product with a low environmental and social impact without blockchain being

mentioned within question 4. The majority of the respondents answered that they would be willing to buy "Very little" (27.5%) or "A little" (28.1%) a product that the company claims is sustainable at a price €4.00 higher than a non-sustainable product. 18.5% of the participants responded "Not at all", while 15.2% indicated "Quite a lot" as their answer. On the other hand, 7.3% of the respondents were undecided, while 2.8% indicated as an answer "A lot" and 0.6% "Very much".

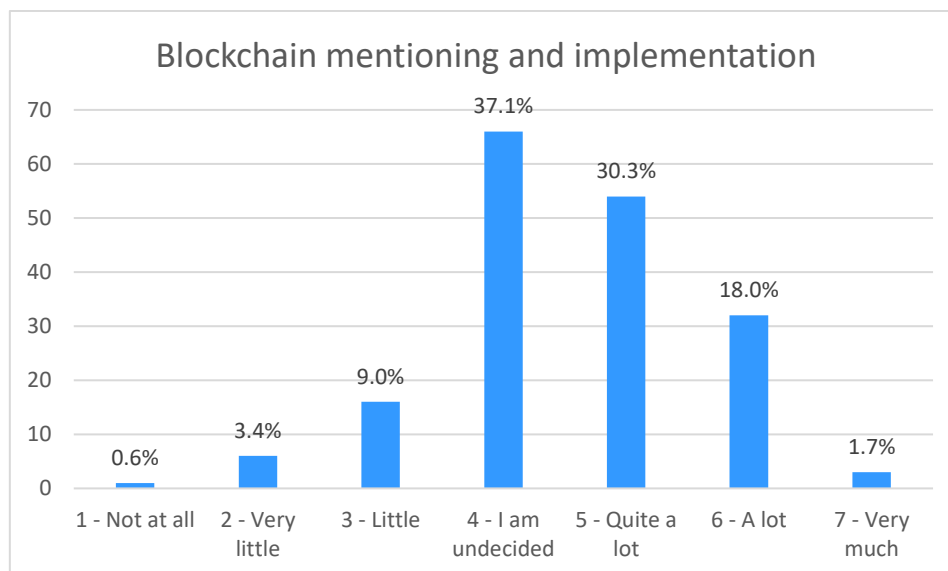**Figure 4 – Non – blockchain mentioning frequency distribution of the sample**

Table 7 – Blockchain mentioning and implementation frequency and percentage of the sample

	Frequency	Percentage
1 – Not at all	1	0.6%
2 – Very little	6	3.4%
3 – Little	16	9.0%
4 – I am undecided	66	37.1%

5 – Quite a lot	54	30.3%
6 – A lot	32	18.0%
7 – Very much	3	1.7%

Table 7 and *Figure 5* show the results of respondents' willingness to purchase the low environmental and social impact hypothetical product controlled by blockchain technology, described in question 5. In this case, whereas most people (37.1%) answered that they were undecided whether to buy at a price higher than EUR 4.00 a product that the company claims is sustainable rather than one that does not have a low environmental impact. Furthermore, 30.3% indicated as an answer "Quite a lot", 18.0% "A lot", 9.0%" "Little" and finally 3.4% "Very little", 1.7% "Very much" and 0.6% "Not at all".

Figure 5 – Blockchain mentioning and implementation distribution of the sample
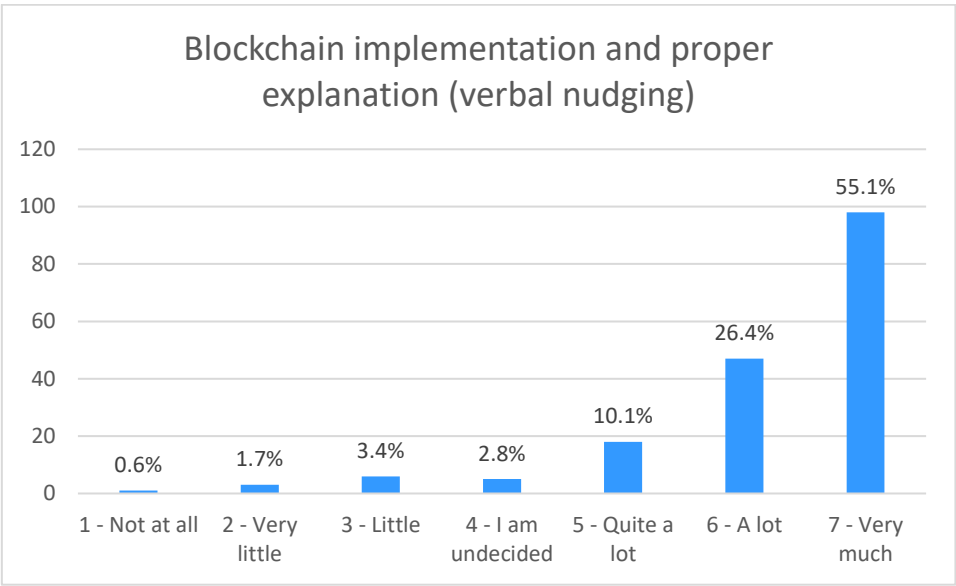
Table 8 – Blockchain mentioning and proper explanation (verbal nudging) frequency and percentage of the sample

	Frequency	Percentage
1 – Not at all	1	0.6%
2 – Very little	3	1.7%
3 – Little	6	3.4%
4 – I am undecided	5	2.8%
5 – Quite a lot	18	10.1%
6 – A lot	47	26.4%
7 – Very much	98	55.1%

Table 8 and *Figure 6* show the results of the respondents' willingness to purchase the low environmental and social impact hypothetical product controlled by blockchain technology. In the question 6 text, using verbal nudging, customers were also explained what blockchain technology is and its benefits. As the data show, the use of verbal nudging led 55.1% of people to say that they would buy the product proposed in the question text "Very much". Followed by 26.4% of the participants who answered "A lot", 10.1% who indicated "Quite a lot" as an option, 3.4% who replied "Little", 2.8% who were undecided, 1.7% who would buy it "Very little" and finally 0.6% who answered "Not at all".

Figure 6 – Blockchain mentioning and proper explanation (verbal nudging) distribution of the sample

As illustrated in the methods section of this research, a linear regression analysis was conducted to study the impact of "Blockchain mentioning implementation" and "Blockchain mentioning and proper explanation" on customers' willingness to purchase.

The dependent variable is represented by customers' willingness to purchase, and it was measured by a 1-7 Likert scale. Instead, the independent variables are "Blockchain mentioning implementation" and "Blockchain mentioning and proper explanation (verbal nudging)", they were constructed by assigning "0 0" to answers to question 4, since both variables are not present. "1 0" to question 5's answers, given that only "Blockchain mentioning and implementation" is observed and "0 1" to question 6's answers since only "Blockchain mentioning and proper explanation (verbal nudging)" is found. Finally, as a control variables were considered "Gender", "Age" and "Educational level".

The linear regression analysis was conducted on SPSS Statistics (version 26).

Table 9 – Results of the linear regression ("customers' willingness to purchase is the dependent variable", "Blockchain mentioning and implementation" and "Blockchain mentioning and proper explanation" are the independent variables)

R^2	0.561
p-value Fisher	<0.001[b]
F	135.173

	Coefficient	p-value	VIF	Number of observations
Costant	2.842	<0.001		
Gender	-0.139	0.209	1.024	534
Age	-0.126	0.012	1.015	534
Educational level	0.136	0.022	1.013	534
Blockchain mentioning and implementation	1.697	<0.001	1.333	534
Blockchain mentioning and proper explanation (verbal nudging)	3.335	<0.001	1.333	534

To perform the linear regression analysis, "Gender", "Age" and "Educational level" were considered as control variables, whereas "Blockchain mentioning and implementation" and "Blockchain mentioning and proper explanation" as independent variables. Finally, "Customers' willingness to purchase" was the dependent variable.

The total number of observations per variable in the linear regression is 534. Thus, by not viewing the questions concerning customers' willingness to buy on the same page of the survey, it was assumed that the respondents were not influenced by the subsequent questions, which, if they were on the same page, could have influenced their response to the question they were

currently answering. Therefore, all 178 respondents answered three times, resulting in a total of 534 observations

The results of the linear regression analysis show a fit of the model developed, indeed the F-test has a p-value of <0.001[b], which respect the significance level of 0.1 designed for the study. Moreover, the R – square shows that 56.1% of the dependent variable is explained by the independent variables selected for the analysis. Looking at the significance level of the independent variables, both have a significance equal to <0.001, that broadly complying the acceptable p-value of 0.1. Furthermore, these variables have a positive coefficient, therefore the "Blockchain mentioning and implementation" increases customers' willingness to purchase and the "Blockchain mentioning and proper explanation (verbal nudging)" enhances it. For what concern the control variables, "Gender" is not significant, while "Age" and "Educational level" are both significant since their p-value is lower than 0.1. Looking at their coefficient, it is possible to observe that "Age" has a negative coefficient, meaning that an increase in age reduces customers' willingness to buy, whereas, "Educational level" has a positive coefficient, hence a higher educational level increases customers' intention to purchase. Finally, it is possible to conclude that there is a multicollinearity absence, considering that all VIF values are in a range between 1 and 10 (Daoud J. I., 2017).

In the discussion and conclusions sections, will be evaluated the outcome of the research. Specifically, will be outlined the relevance for scholars, managers and policymakers and moreover, will be identified the limitations and future implications of the study.

5. Discussion

The aim of this research was to theoretically deepen and empirically investigate the impact of blockchain technology on customers' willingness to purchase in the fashion industry. To test the hypotheses, it was employed a survey, considering the absence of secondary data available to conduct the analysis. The results of the survey confirmed the hypotheses by showing that if blockchain was implemented within the fashion industry, consumers' willingness to purchase would increase and that the use of verbal nudging would emphasise their willingness to purchase. Indeed, the linear regression intercept shows that in the case of "Non-blockchain mentioning" customers are on average willing to purchase a sustainable product rather than one that is not eco-friendly 2,842, therefore slightly under half of the Likert scale 1-7. In the event of "Blockchain mentioning and implementation" the dependent variable "Customers' willingness to purchase" increases by 1,697 or 59.7%, verifying H1. Whereas, if there is "Blockchain implementation and proper explanation" the "Customers' willingness to purchase" increases by 3,335 or 117.34%, verifying H2.

The confirmation of the hypotheses also leads to support previous studies in other contexts (D'Angelo, V., Cappa, F., & Peruffo, 2023; Deci, E. L., & Ryan, 2000; Ryan, R. M., & Deci, 2000), indeed, based on the answers provided by the survey it is possible to hypothesise that many consumers identify with the "Self-determination theory" (Deci, E. L., & Ryan, 2000; Ryan, R. M., & Deci, 2000). Therefore, customers feel an improvement in their level of personal satisfaction, due to their contribution in pursuing a social objective, in the case of the study, a reduction in environmental impact by purchasing an eco-friendly product.

Furthermore, in agreement with the "Theory of customer consumption behaviour" (Sheth, J. N., Newman, B. I., & Gross, 1991), on the basis of the answers given by consumers, it can be understood that most of them attribute greater consumption value to green products rather than

those with a high environmental impact. Therefore, customers are more incentivised to buy them, even though they cost slightly more. Consumption values, as explored in the theoretical framework, can be: functional, social, conditional, emotional or epistemic (Sheth, J. N., Newman, B. I., & Gross, 1991).

However, it is necessary to clarify, as also highlighted by the results of the study, even though environmental awareness is now widely spread, there remains a greater tendency to purchase green products among young people and participants with a higher educational level, compared to older people and those with a lower educational level. The greater willingness to buy green products of the 18-35 age group compared to the others may be attributed to the fact that sustainability has been more widely studied and debated in recent years rather than in the previous (Centobelli, P., Cerchione, R., & Esposito, 2020; Chan, S., Weitz, N., Persson, Å., & Trimmer, 2018; Clementino, E., & Perkins, 2021; Commission of the European Community, 2001; Parlament, 2022; Word Commission on Environment and Development, 1987). As a consequence, the newer generations appear to have been educated to behave sustainably since childhood, given the worsening environmental situation.

Meanwhile, although the hypotheses turned out to be confirmed, since according to linear regression the customers' willingness to purchase increases, 37% of people turn out to be undecisive about whether to buy products controlled by the blockchain. This reveals people's limited knowledge about the blockchain, which is widely investigated by scholars (Chakrabarti, A., & Chaudhuri, 2017; Nofer, M., Gomber, P., Hinz, O., & Schiereck, 2017; Rainero, C., & Modarelli, 2021; Remme, A. M. R., Stange, S. M., Fagerstrøm, A., & Lasrado, 2022; Wang, K., & Safavi, 2016) but not by too many non-researchers.

5.1 Contributions

Firstly, the study contributed to furthering the issue of blockchain awareness and the appreciation of blockchain as a tool that can increase trust and transparency, as already studied in several research in other contexts (Chakrabarti, A., & Chaudhuri, 2017; Nofer, M., Gomber, P., Hinz, O., & Schiereck, 2017; Nygaard, A., & Silkoset, 2022; Sunny, J., Undralla, N., & Pillai, 2020).

Secondly, it pointed out a deficiency of customers trust in green products and in the fashion industry, as already highlighted by (Amin, S., & Tarun, 2021). Indeed, according to the study, 27.5% and 28.1% of consumers respectively answered that they would buy a green product not controlled by the blockchain "Very little" and "Little".

Thirdly, the study has therefore contributed to identify a dual role of blockchain's implementation in the fashion industry, firstly it would rise consumer trust and willingness to purchase and, secondly, it would lead to an increase in revenue for companies, as customers would not only be willing to increase their intention to buy but also to pay a slightly higher price, as also shown by (Observatory of the School of Management of the Milan Polytechnic, 2022). Therefore, the study also provides useful insights for managers on how best to exploit the use of blockchain in the fashion industry.

Moreover, the research highlighted the necessity of a direct control instrument over companies, blockchain could be of interest to policymakers who could use it to have direct control over firms, checking their environmental impact. Indeed, although, there is the enforcement of SDG attainment by the UN, companies voluntarily submission of CSR reports, and they are evaluated based on ESG ratings by sustainability rating organisations, there are no means to confirm the enterprises' genuine commitment, running the risk of unchecked greenwashing. In addition, the study emphasizes the importance blockchain knowledge by

policymakers as a tool to assess the effective financial performance of fashion industry's companies, as previously stressed by (Kumar, S., Kumar, B., Nagesh, Y., & Christian F., 2022) in other contexts.

Finally, it analysed the role of verbal nudging on consumers' willingness to purchase, contributing to other studies that have investigated it in other contexts (Cappa, F., Rosso, F., Giustiniano, L., & Porfiri, 2020; Lehner, M., Mont, O., & Heiskanen, 2016; Roozen, I., Raedts, M., & Meijburg, 2021), also highlighting its role in increasing companies' revenues and consequently the need for marketing campaigns in which the blockchain's functionalities will be explained, which would otherwise remain unknown and whose implementation would not have the desired effect on companies' revenues.

6. Conclusions

The study highlighted the blockchain impact on customers' willingness to purchase in the fashion industry. Indeed, although blockchain technology is widely studied and known by scholars, its effects on customers' willingness to buy are far from clear. Moreover, even though the fashion industry results to be one of the most economically and environmentally relevant, the research pointed out a lack of green trust on the part of consumers towards fashion industry's companies, underlining the need for a tool to increase consumer confidence in purchasing products from fashion companies. Indeed, the possibility of uncontrolled greenwashing exists although the UN's implementation of SDG achievement, firms' voluntary submission of CSR reports, and sustainability rating agencies' evaluation of their performance based on ESG ratings.

Due to its characteristics, blockchain technology could be used as a tool that increases transparency and consumer trust, making the customer purchasing process more transparent.

Therefore, the study focused on the analysis of the blockchain technology impact on customers' willingness to purchase, proving that if blockchain were implemented within fashion industry's companies, customers' willingness to purchase would increase. Finally, if verbal nudging were used, their willingness to purchase would increase even further.

6.2 Limitations and Future Research Directions

Although the results were found, the study is not exempt from limitations. Firstly, the research was conducted in the Italian language on a sample composed mainly of people in the 18-35 age group, reducing the variety of the sample both culturally and in terms of age. Thus, further studies could conduct the analysis on a sample more aged and culturally varied.

Secondly, fixed and low prices were used in the survey to describe the hypothetical purchasing situation in which the consumer finds himself. Consequently, future scholars could analyse the effects on willingness to buy in a purchasing situation in which prices could be higher and how variable prices could affect the willingness to pay.

Thirdly, customers were not asked any questions concerning their spending capacity or salary, which could instead be included as a control variable. However, in future studies, it could be included both or even only one of these control variables, to examine how customers' willingness to purchase would vary according to their economic availability.

Furthermore, only the effectiveness of verbal nudging was analysed, providing a proper explanation of the blockchain and its functionalities, without testing the effectiveness of other nudging techniques. Therefore, future research could focus on other nudging techniques' effectiveness, in addition to the verbal one already analysed in this study.

Additionally, the study is focused on the fashion industry and the survey is based on a purchasing situation of an item of clothing. Consequently, future studies could analyse the impact of the blockchain on customers' willingness to purchase in other sectors, describing a different purchase situation.

Finally, it would be of academic and managerial interest to analyse the phenomenon of blockchain insertion within companies by interviewing company managers and estimating the operational and marketing costs of its implementation. Future studies could therefore focus on this more qualitative aspect by interviewing various company managers, highlighting their views on the matter, or quantitative by estimating the costs of implementing blockchain within companies.

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