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Consumption behavior in digital wearables in online environments such as the Metaverse

Abstract

Over the past decade, the developments of the internet and digitalization have significantly impacted different markets and industries. The emergence of online webshops, virtual assistants, and 3D fitting rooms has drastically changed the shopping experiences for consumers. Furthermore, these developments have resulted in new, digital commodities that merely exist online in the digital realm. An example of this are digital wearables. This study focuses on the demand of individuals for digital fashion, or rather known as digital wearables. In particular, this study focuses on the demand of individuals that are active in the Metaverse, a digital space where people can meet and socialize with each other online. A wide range of literature has focused on the demand for fashion within different sectors of the industry, such as luxury fashion and fast fashion. Nevertheless, this newly emerged commodity that only exists online has not been studied in depth before. However, commodities such as non-functional items in online video games have been studied in more depth before and seem to carry similar functionalities and values to digital wearables, as both exist in the virtual realm. This exploratory research tries to gain new insights into the key factors that cause demand for digital wearables and looks if there are similarities between demand factors within related industries. For this research, a quantitative research method was chosen in the form of an online survey distributed via various online channels connected to Metaverse users. A descriptive analysis and correlation tests of the result have been used to come to certain conclusions. Results of the research show strong factors for the demand that lay mainly in social motivations.

Key words: Digital fashion; virtual fashion; fashion industry; digitalization; Metaverse; demand; purchase behavior;

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Writing this Master thesis has been a journey that has given me new valuable insights into what I believe might be part of a new reality that we are heading to as a humanity. The ever-increasing digitalization of our lives has caused the physical and digital realms to merge more and more. I cannot deny that I am an active user of various platforms, such as social media and have been so for a big part of my life. To get as many insights as possible, I have indulged myself in the Metaverse platform Decentraland and tried to buy a digital wearable. Surprisingly, understanding this Metaverse and purchasing a digital wearable was incredibly difficult for me and required many steps that I was unfamiliar with. Unfortunately, I lost €25 during this process, which is now stuck in the Metaverse. Nonetheless, I have had a great time writing this Master thesis. Finally, I would like to acknowledge my supervisor Pr. Isidoro Mazza for his expert assistance and guidance during my research. I have been truly inspired, and I am grateful for our exciting discussions.

Tim van der Velden, June 2023

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1. Introduction

Studies of demand have researched and analyzed at length customer purchasing behavior concerning different goods and services. Those studies investigated factors that influence customer demand and examined how changes in these factors can affect demand. In the case of the cultural industries, a substantial amount of literature aimed to understand customer behavior and preferences for productions such as visual and performing arts. Compared to other industries, the cultural industries are likely to deal with experience goods. These goods can only be evaluated after the moment of purchase because customers lack access to the full information on the price and quality of the commodity (Nelson, 1994). This phenomenon also applies to items from cultural industries such as the fashion industry. The quality of a sweater can, for example, only be evaluate after it has been worn for a certain amount of time. The fashion industry is often characterized by constant change, creativity, and innovation. It is thus considered one of the most creative industries (Lavanga, 2018). Like other cultural industries, the fashion industry is transforming digitally. As a result of these developments, fewer brick-and-mortar store concepts have come to the market. A report by Moran (2020) affirms that 40% of Gen Z and millennials prefer to shop online, compared with 36% at brick-and-mortar stores.

Digital transformation is not only visible in the distribution of fashion but also in its production. Digital tools such as designing software, 3D modelling, and augmented reality make it possible to revolutionize the way in which fashion is designed and produced. Virtual assistants and digital fitting rooms are new innovative digital ways brands use to boost their customers' shopping experience. Furthermore, the digital transformation introduced the birth of a new commodity, virtual fashion or rather known as digital wearables. To prevent confusion throughout this research, the terms digital fashion and digital wearables can be used interchangeably and refer to the same thing. Digital wearables only exist virtually in the online realm. Customers "wear" these fashion items through augmented reality, digitally altered photos, or personal avatars in digital spaces such as the Metaverse. This phenomenon is not something that we have not seen before. In games like Fortnite, players purchase custom outfits, or *"skins,"* to customize their avatars. The industry of digital outfits for avatars within online games is estimated to be worth a multibillion-dollar market (Santos, 2021). So, what causes the demand for this new commodity of virtual fashion?

1.1 Research question

Because of the growing popularity of digital wearables, this paper addresses the following research question: *What are the main factors that impact the demand for digital wearables used in games or virtual reality environments such as the Metaverse?* To be able to answer this, the research looks into demographic characteristics of customers, price, general interest in fashion, availability, social media, online communities, spending habits, and budgeting priorities. The research of this paper relies on a quantitative analysis based on the data gathered through a survey. This study explores the key factors that cause the demand for buying behaviour of virtual fashion. To be able to answer this research question, the following sub-questions are answered:

- *Is there a correlation between a general interest in fashion and digital fashion?*
- *Can digital fashion be a complementary good for physical fashion?*
- *Can digital fashion be a substitute for physical fashion?*
- *Does the activity in a digital space such as the Metaverse have an influence on demand for digital fashion?*

1.2 Academic relevance & managerial relevance

The study of the demand for digital wearables will touch upon a range of disciplines such as business, marketing, technological developments, and the implications for society as a whole. Digital wearables represent a rapidly growing market that happens in the digital sphere. Understanding the factors influencing the demand for digital wearables can help businesses and policymakers make informed decisions about product development, marketing, and regulation. Furthermore, the demand for digital wearables can be influenced by various factors such as individual, social, cultural, and even technological factors. Considering these factors can provide useful insight into how technology is adopted and used in different contexts, and can help to design interventions that promote behavior change.

As this study explores the demand for digital fashion, it might provide valuable insights for marketing managers of (digital) fashion houses by providing an analysis and portrayal of this new customer profile based on the results found in this research. Understanding the demand for digital wearables can help managers develop and improve products that align with consumer preferences and needs. Furthermore, knowledge of the demand for digital wearables enables managers to effectively identify market segments and

target specific customer groups. By understanding consumer preferences and motivations, managers can tailor their marketing strategies and positioning to attract and retain customers in this new emerging market.

1.3 Structure of the thesis

In order to answer the questions mentioned above, the structure of this research is as follows; firstly, the theoretical framework is discussed in chapter two and exists divided into five sub-sections. Section 2.1 looks into the fashion industry in general and gives a brief overview of the developments within this industry. Section 2.2 looks into the developments of innovation and digitalization within the fashion industry. Developments in e-commerce, online shopping, and product development will be discussed. Section 2.3 looks into the concept of the Metaverse and its current developments. This section will also briefly touch upon the concept of network effects and its implications within the Metaverse. Section 2.4 looks into general studies of demand and the demand within the fashion industry. This section briefly overviews several factors that can influence demand and how demand can be developed for commodities. Section 2.5 discussed the demand for fashion based on three different industries and customer profiles; the luxury fashion industry, the fast-fashion industry, and the non-functional items within the gaming industry. After discussing the theoretical framework, the methodology used for this research is explained in chapter 3. This chapter discusses the research design, generation of variables, data collection, and procedure. Chapter 4 will display the results found in this research and is divided into four sections. Section 4.1 gives insights into the respondents' profiles. Section 4.2 discussed the results found on the demand of respondents for fashion. Section 4.3 discusses the results found on respondents' demand for digital fashion. Moreover, section 4.4 gives a correlation test and analysis between certain variables of demand. Secondly, the methodology, research design, and data collection used for this research will be discussed. Following chapter 4, chapter 5 will discuss the results and is divided into two sections. The first section looks into the contribution and theoretical comparison. The second section discusses the limitations of this study. The final chapter 6 concludes the thesis with some final comments.

2. Theoretical framework

This section presents a brief review of the relevant theoretical issues concerning the topic under investigation. The insights that are highlighted here constitute the conceptual framework to develop the questionnaire discussed in detail in the next section. Firstly, a general overview of the fashion industry will be discussed. Secondly, a brief overview of the developments of innovation and digitalization in the fashion industry is given. Thirdly, the concept of the Metaverse will be explained, which plays a significant role in the distribution and consumption of digital wearables. Fourthly, the demand for (physical) fashion is discussed. Lastly, the demand for three specific fashion industry categories will be examined: the luxury industry, the fast fashion industry, and the demand for non-functional wearables in the gaming industry. The third industry is not directly considered part of the fashion industry but can be linked to the developments of digital wearables, which will be discussed later. The core concepts of the theoretical framework are clustered as follows:

Table 1: *overview core theoretical concepts (own elaboration)*

Topic		**Concepts**
2.1	The Fashion Industry	Haute couture, luxury fashion, fast fashion, slow fashion, unsustainable practices, greenwashing
2.2	Innovation and Digitalization in the Fashion Industry	Digitalization, innovation, globalization, e-commerce, fashion 4.0, virtual fashion, virtual reality (VR)
2.3	The Metaverse	Metaverse, virtual worlds, avatars, social network, interoperability
2.4	Demand in the Fashion Industry	Demand, taste, rational addiction, consumption capital, herd-behavior
2.5	Demand in Digital Fashion Based on Three Customer Profiles	Conspicuous consumption, brand-consciousness, self-expression, multisensory appeal

2.1 The Fashion Industry

Fashion is a complex and diverse industry that involves the design, production, marketing, and sales of clothing. It can be seen in the realm of the pure and applied arts, and at the same time, we can observe its presence in the field of entertainment and amusement (Blumer, 1969). Multiple activities, such as the production of fibers, the manufacturing and shipping of garments, and the consumption of fashion come together in the fashion industry. Several studies have suggested that the fashion industry is shaped by a combination of social, cultural, and economic factors. For example, Blumer (1969) describes fashion as a social phenomenon. He discusses how fashion can enable people to adapt to changing social conditions in an orderly and unified manner. Within the fashion industry, we can distinguish three different segments: haute couture, luxury fashion, and fast fashion. Haute couture refers to exclusive and expensive designs created by top fashion houses. Luxury fashion refers to high-end brands that offer premium quality and craftsmanship. On the other end of the spectrum, fast fashion regards the fast-paced, mass-produced, and trend-focused approach to the design, production, and selling of clothing and other fashion items. The fast fashion businesses are often blamed for stimulating a *'throw-away culture'*, devaluing the garments worth (Cooper, 2005).

From an economic perspective, we can observe a two-sided polarization in the fashion industry: companies that operate in the mass market, selling low-cost products that are easily available, and companies that provide exclusive and expensive products to an elitist market segment (Brun et al., 2008). However, because of the need for expansion of luxury brands to stimulate growth, global distribution led to the concept of luxury for the masses (Silverstein et al., 2003). As a result, this polarization may not be that evident anymore nowadays. These developments, especially concerning fast fashion, have pointed out that the fashion industry can be considered responsible for reinforcing damaging consumption practices by promoting overconsumption and waste (Buchel et al., 2022). The economic, social, and environmental consequences of the unsustainable practices and mode of production have been increasingly difficult to overlook (Brydges, 2018). Because of the rising concern about environmentally unfriendly practices, more and more emerging fashion designers have started to implement sustainable practices in their business when it comes to the production of garments. Movements such as *"slow fashion"* that focus on sustainability, social responsibility, and transparency have come into existence. Related movements include up-cycling, smart textiles, and ethical fashion consumption (Brydges, 2018). However, smaller businesses and emerging fashion designers that try to innovate their practices could have a difficult time

since they have to compete in a market with established, bigger firms (Janssens & Lavanga, 2018).

Despite the multiple efforts to make the industry more sustainable, fast fashion, overproduction, and overconsumption still dominate the landscape of the industry (Peters et al., 2021). Unfortunately, many fashion brands only make minimal sustainability efforts and do not directly incorporate sustainability practices into their business (Buchel et al., 2022). A common issue within the fashion industry is the practice of so-called "greenwashing", where brands disseminate false or incomplete information to present themselves as environmentally friendly (Furlow, 2010). In addition to misleading consumers, these practices can also cause firms dedicated to their environmental objectives to lose their competitive advantages. Due to the abuse and misuse of the term "green," the market can become oversaturated to the point where consumers cannot distinguish between environmentally friendly products and those that are not (Furlow, 2010). However, the development of online platforms and apps such as EnviroMedia, Good On You, and Greenwash.com try to shed light on the greenwashing practices of fashion brands and bring this to the public.

2.2 Innovation and Digitalization in the Fashion Industry

The innovation of the internet and ongoing developments of digitalization have brought many changes to the production, consumption, and distribution of cultural goods. For example, video games often use the internet to link individuals to one another and generate shared experiences (Handke & Towse, 2016). Although there is a vast and varied body of work, it remains unclear what characteristics and phenomena distinguish industries as cultural. We follow the interpretation that cultural industries are often recognized as an industry that produces experience goods with considerable creative elements (Peltoniemi, 2015). Innovation in live performances and cultural services would, generally, not lead to productivity increases as it would in technology-intensive industries (Moody et al., 1967). For example, a classical piece cannot be played in a more ''efficient'' way. This phenomenon is often recognized as Baumol's Cost Disease. Within the creative industries, innovation tends to be more open-ended and experimental. Unfortunately, the introduction of innovative techniques or performance conventions often fails to come into existence because of the high costs involved. However, the fashion industry is, in this regard, different since production processes can be optimized as a result of innovations. Furthermore, digital innovations have made it possible to change the whole design process within this industry. Nonetheless, there

are plenty of examples of innovation and taste shifts that were successful in other creative industries (Caves, 2000). Essentially, digitization has transformed cultural goods and services that were once rival and excludable to some degree into public goods for Internet users (Handke & Towse, 2016).

Like other cultural industries, the fashion industry is being affected by developments in digitalization. It is considered one of the most innovative creative industries and is a field where luxury and high prices coexist with low prices and scalability. Oversupply of (new) products and high demand uncertainty dominate within this industry (Brydges, 2018; Lavanga, 2018). Fashion companies have been at the forefront of mass production dynamics, transforming and adapting to the impacts of technological innovation and globalization. With fashion's merging of physical and digital dimensions, a *"cyber-physical system"* was created that transformed the traditional logic that governed this industry before digital technology. (Bertola & Teunissen, 2018). The concept of brick-and-mortar stores has largely been replaced by digitalization and omnichannel retail, which is fast-paced and reflects Millennials and Generation Z's shopping habits (Berridge, 2018). Online business activities continue to grow as e-commerce has emerged as a strong economic force over the past years (Crewe, 2013). The success of e-commerce stores such as Otrium, Farfetch, and Zalando supports this, and these online stores continue to grow and even outrun traditional retail models. The COVID-19 pandemic has stimulated online buying behavior as well. A report from Drapers Bespoke (2020) found that 30% of Gen Zers and 36% of Millennial consumers are expected to purchase less at physical stores than before the pandemic. Surprisingly, the use of fashion apps by Gen Z and Millennials has fallen from 70% to 65% between 2019 and 2020. Various fashion brands have used digital transformation to implement virtual assistants and digital fitting rooms in online web shops. Digitalization is also transforming the design and production of fashion in the value chain. Nowadays, garments can be designed with different digital tools such as augmented reality, 3D modelling, and CAD software. An article by Gray (1998) already mentions these developments in virtual fashion, 3D modelling, and the developments of virtual reality (VR) in fashion. These innovations have helped to make the designing process of fashion easier, faster, and more efficient. Digital mannequins are able to adopt pose after pose and will show off garments to their best effect. Digital 3D models can thus be displayed before the garments are manufactured. As a result, digital mannequins can model new designs in virtual fashion shows for far less money and are more controllable to boot (Gray, 1998).

Nowadays, the fashion product itself has transformed into a product existing merely in the digital realm. Designers are utilizing 3D technology to enable digital prototyping, sampling, and digital-only collections. Entirely virtual, digital-only collections that never take on a physical form are becoming a reality in the current market (Särmäkari, 2021). This development is often referred to as *fashion 4.0* and is characterized by the fusion of smart technologies that blur the boundaries between the digital and the physical. It is a revolutionary paradigm for its technological and organizational development that operates in the cyber-physical area and develops towards the production of smart products, automation, optimization, flexibility, and customer-driven processes (Bertola & Teunissen, 2018). New fashion houses that mainly focus on digital fashion, such as The Fabricant and Auroboros, have come into existence. These and other existing fashion houses only focus on the production of digital wearables or so-called virtual fashion. However, well-established brands such as Balenciaga and Dolce&Gabbana have recently experimented with setting foot into the realm of digital wearables as well. Online platforms such as DressX offer digital wearables from various well-known mainstream brands such as Adidas and Tommy Hilfiger, which can be purchased directly as NFT. With the dematerialization of fashion products, new ways of communication have arisen, enabling real-time distribution of products online (Santos et al., 2020). As a result, digital wearables can function in a purely virtual setting. The term "digital fashion" is used by the media and practitioners to refer to a processual tool for developing and visualizing virtual products, a marketing or educational tool for creating online stores and virtual museums, and an end product that is exclusively digital. 3D files can be used in a variety of platforms to store data regarding garments and materials (Särmäkari, 2021).

Digital fashion items can be purchased at digital marketplaces such as *DressX, XR Couture,* and *The Dematerialised.* Often, these items are bought in the form of an NFT and can be worn in digital spaces such as a Metaverse. Metaverses are interfaces that are used to carry out any type of human-computer interaction. This new paradigm is based on technologies such as augmented reality, virtual world, and lifelogging (De La Fuente Prieto et al., 2022)

2.3 The Metaverse

The majority of digital wearables are likely to be worn inside online (social) platforms such as the Metaverse. In this section, the definition of the Metaverse is explained to give more context to the reader. Metaverses are virtual worlds or spaces where people can interact with each other and digital objects in a fully immersive environment. It is considered to be the next generation of the internet and has been gaining increasing attention from both academic and industry perspectives. One of the earliest references to the Metaverse can be traced back to science fiction author Neal Stephenson's 1992 novel "Snow Crash," in which he describes a virtual reality shared space known as the "Metaverse." Within this virtual realm, individuals would engage with each other using avatars within a three-dimensional space that mirrors the physical world. Various efforts have been made to define the Metaverse since its emergence. Lee et al. (2021, p. 1) attempted to describe the Metaverse with several concepts such as "lifelogging," "collective space in virtuality," "embodied/spatial Internet," "a mirror world," or "an omniverse: a venue of simulation and collaboration". Park and Kim (2022) created a taxonomy of 48 definitions of the Metaverse based on the work of various researchers. The aim was to demonstrate the absence of a standard definition for the term. Some of the definitions included in the taxonomy were a virtual world that enables users to have control over the digital environment by creating desired objects (Papagiannidis & Bourlakis, 2010). Others referred to an immersive three-dimensional network of spaces where individuals can interact with one another and the virtual environment without physical limitations, using real-world metaphors (Owens et al., 2011). Kim (2021, p.142) suggests that due to the numerous definitions, the Metaverse can be briefly described as an "interoperated persistent network of shared virtual environments where people can interact synchronously through their avatars with other agents and objects".

Despite the diversity of interpretations, there are common characteristics that connect the majority of definitions of the Metaverse. Firstly, the element of engaging with other users in a three-dimensional environment seems to be a key point. Secondly, the concept of being fully engaged in a hybrid world, created through the convergence of physical and digital dimensions, known as a "phygital" world, is mentioned frequently (Gaggioli, 2017). Thirdly, the interaction between individuals is done through virtual representations in the form of avatars. Lastly, the concept of interconnectivity between virtual environments is often referred to as "interoperability" (Sparkes, 2021). Within the Metaverse, several technologies such as augmented reality (AR), virtual reality (VR) and mixed reality (MR) are used to immerse the user into the digital space. Hardware tools such as VR headsets or AR glasses

can be used to enable these technologies (Lee et al., 2021). However, it is worth mentioning that the Metaverse can be accessed not only through AR/VR hardware but also via 2D devices like laptops and smartphones. This is evident from the fact that three-dimensional virtual environments like Decentraland or Sandbox can be experienced through such devices. Another essential element of the Metaverse is blockchain technology. This technology is defined as "a ledger that stores the transactions to facilitate digital asset tracking and securing in a commercial network" and is believed to have the ability to increase safety, decentralization, and transparency in the Metaverse (Huynh-The et al., 2023). Cryptocurrencies are often used to buy and trade items that are available on the different marketplaces in different Metaverses.

As the interaction between individuals plays such an important role in the Metaverse, the effect of network externalities is most likely to occur in Metaverses as well. The connectivity within networks relates to network industries, social networks, and lastly, communication networks such as the internet and smartphones (Xiong et al., 2018). These networks exhibit a type of network externality, which refers to a shift in the advantage or value that a consumer derives from a product or service as the number of other consumers utilizing the same product or service rises or falls (Liebowitz & Margolis, 1988). Examples of this are platforms such as Facebook, Instagram, and Tiktok, but can also be seen in Metaverses. Logically, the more people that make use of the Metaverse, the more valuable it becomes. The synchronization values enable users of the same product to communicate with each other, conveying the essence of network effects (Liebowitz & Margolis, 1988).

2.4 Demand in the Fashion Industry

A great deal of research has been done in marketing and e-commerce regarding what motivates purchasing. Even though different models exist, there is a consensus that a purchase decision only occurs if it provides value to the customer. Value can be an abstract concept, but ultimately it is a concept that reflects the personal, societal, or economic significance placed on something. Multiple factors can influence the demand for a particular product, such as price, population, price of substitutes, expectations, tastes etc. When the demand for a particular commodity increase, consumers want a greater quantity at the same price or are willing to pay a higher price for the same quantity (Cowen & Tabarrok, 2015). Per industry, the factors that influence demand may differ significantly.

There are certain characteristics in fashion and trends generate demand, like seasonality, business, and product. Studies in economics have shown different decision-making models that are based on the idea of rational consumers who maximize their utility subject to their constraints (Ateca-Amestoy, 2008). However, the assumption that consumers make rational purchase decisions to maximize their utility is not always accurate in reality. Different economic models have been used to study individuals' demand and purchasing behavior. Cultural goods such as fashion differ from other goods because demand for them may return, whereas other goods will often be forced out of the market if substitutes arrive (Kretschmer et al., 1999). For example, typewriters have been replaced by modern commodities such as computers, laptops, and tablets. Furthermore, most cultural goods are experience goods. The quality of these goods can only be evaluated after the moment of purchase (Nelson, 1994). For example, the quality of a musical performance can only be measured after the moment the customer has bought the ticket and visited the concert. As a result, asymmetric information between seller and consumer comes into existence. Sellers often signal quality through various mediums to consumers to diminish forms of asymmetric information (Kirmani & Rao, 2000). Companies use different strategies to signal quality. Common strategies are branding, price, product design, packaging, and advertisement through various (digital) platforms. However, it is common for cultural products to lack a clear-cut description, which makes signaling more challenging. While digital fashion might be considered a cultural good as well, it has to be treated somewhat differently since quality cannot be measured because there is no direct quality differentiation between these digital commodities. Digital wearables should thus not be considered as an experience good, compared to, for example, physical fashion. Therefore, demand based on quality would not apply to these commodities and is thus excluded from this research.

The demand for a product or service can also be affected by the demand for related products or services. This phenomenon is often referred to as demand interdependence. Other factors such as group pressure, trends, culture, and herd behavior can also influence consumer demand. Each individual possesses unique information that can be used for their own benefit in the decision-making process (Hayek, 2009). The personal taste of an individual can also have a strong influence on demand. The growing taste of an individual towards a particular commodity or service is often referred to as ‘rational addiction’. The more an individual consumes a particular good or service, the more addicted he/she becomes (Stigler & Becker, 1977). In addition, economists and sociologists acknowledge that past consumption strongly influences current consumption (Garboua & Montmarquette, 1996). When a consumer

acquires experience with a particular commodity or service, they are building up ‘consumption capital’, which may assist them in making decisions in the future. A person’s taste is formed throughout his or her lifetime and can significantly impact the demand for different cultural activities or commodities (McCain, 2003).

2.5 Demand in Digital fashion Based on Three Customer Profiles

Digital fashion is a relatively new concept. As a result, there has not been much research on the demand for this particular commodity. For analyzing the demand for digital fashion, this research uses literature that focuses on customers' demands in three different industries related to digital fashion; the luxury fashion industry, the fast fashion industry, and the gaming industry. Based on the literature that discusses customers' demands within these specific industries, customer variables are generated and used within the research to explore the demand for digital fashion. The study compares if there is a correlation between the general interest in fashion and the interest in digital fashion.

In the fashion industry, luxury fashion brands often set trends and styles that are later copied by fast fashion brands. As a result, the success of luxury brands can drive demand for similar styles from fast fashion brands and vice versa. A luxury brand has distinct characteristics that help them differentiate from other types of goods in today’s market, driving consumers’ demand for luxury goods more than for any other type of product (Okonkwo, 2016). Demand for luxury fashion has grown over the last decade and is estimated to reach €382.6 billion as an industry by 2025 (Statista, 2021). Purchasing luxury fashion products can be seen as a form of conspicuous consumption as people may consume luxury goods for what they symbolize or to show wealth and achieve a higher social status (Veblen, 1899). This form of symbolization can also be seen in digital fashion items since these items do not function in the physical sphere. In addition to being an indicator of status and wealth, luxury products can be costly, which enhances their value. However, newcomers such as Generation X and Generation Y consumers have been increasingly spending more on the luxury market. As a result, luxury fashion is no longer about wealthy older consumers and saving until you can purchase luxury fashion items (Shea, 2013; Stein & Sanburn, 2013).

Previous research has examined consumers’ consumption behavior from personality, brand consciousness, and self-motivation perspectives. Outcomes have shown that consumers prefer certain products or brands that match their self-image (Sirgy, 1982). Consumption decisions and product selection are thus strongly influenced by consumers’ self-concepts.

Products and brands are chosen by consumers intentionally to express their self-image to the public and to enhance their self-esteem by experiencing positive reflections of themselves in the public sphere (Sirgy, 1982). Furthermore, Heffetz (2011) found that there is a higher income elasticity of demand for items that are more visible. However, it is unclear what motivates individuals to consume visible consumer goods in order to signal their status. In addition to spending significantly more on fashion items (conspicuous consumption) and grooming products, individuals who strive more for status also care more about what others think about these items, the more visible they are (Heffetz, 2011). Signaling one's self-image largely rests on symbolic values that commodities and services can have (Belk, 1988). This applies not only to luxury items but also to fast fashion brands. The critical difference between fast fashion and luxury fashion goods is that luxury fashion goods are symbolic consumption goods which are associated with high quality, exclusiveness, high price, and social visibility. On the contrary, fast fashion items are often cheap, of a much lower quality, and the opposite of exclusive. Digital wearables, in comparison to both fast fashion and luxury fashion, cannot be distinguished by quality simply because they only exist in the digital sphere. Lastly, luxury fashion items can function as a product that stimulates the confidence and self-esteem of the consumer. These psychological benefits essentially differentiate luxury fashion items from non-luxury counterfeits (Vigneron & Johnson, 2004).

We can attribute the phenomena of fast fashion to the sociocultural changes in the lifestyle of consumers and their always up-to-date knowledge of the latest fashion trends. This consumer feels the need to see the reality around him/her in an affordable, dynamic manner (Cachon & Swinney, 2011). As a result of these needs of consumers, fast-fashion brands such as H&M and Zara have emerged to anticipate the everchanging fashion trends that determine consumers' demands. This movement has resulted in fashion houses that constantly refresh their product range resulting in trendy, fashionable products that are affordable to most people in society (Cachon & Swinney, 2011). The fast fashion model lacks ties to the personality of a particular stylist or location; it is a product of today's global consumer culture (Gabrielli et al., 2013). In this sense demand of consumers for fast-fashion items could be somewhat similar to digital fashion since digital wearables collections can be updated fast, in a dynamic manner, and are not tight to a particular location and are thus a product of global consumer culture as well. In a study by Gabrielli et al. (2013), consumers' demand and purchase intentions for fast fashion were researched. They found that consumers would associate the positive sides of fast fashion with freedom, fun, saving, speed, and personalization. The negative sides of fast fashion were considered the poor quality and

short-term life cycle of the garments. The result of the research showed that purchasing fast-fashion items represent a compromise between what consumers would like to be able to buy often and the amount of money they are able to spend on it (Gabrielle et al., 2013). As a result, fast-fashion consumption would result in the joy of changing clothes daily or the ease of occasionally wearing something different. However, because of the negative impact fast fashion has on the environment, the purchase behavior of individuals is changing, especially among individuals who are mindful of environmental concerns. Conscious consumers alter their purchasing decisions in line with their values by changing their consumption patterns to reflect their personal values (Solovjova et al., 2022). The growing awareness of the unsustainable practices of fast-fashion houses could potentially negatively impact the demand for these products. However, Blas Riesgo et al. (2022) found that consumers who held positive attitudes towards sustainable fashion were found to have an attitude-behavior gap. This implies that although these consumers express concerns about unsustainable practices, they do not translate their attitudes into actions by, for example, actively adopting sustainable fashion consumption.

Until now, fashion in the physical realm has been discussed. When we look at digital wearables, we can argue that outfits or so-called *"skins"* that are used on avatars in, for example, video games carry similar values. Furthermore, there are possibly similar incentives for buying these items and digital wearables. Therefore, it is interesting for the purpose of this research to also look into the demand for these digital outfits, rather known as non-functional virtual items. The online gaming industry has surpassed the Hollywood movies industry in revenue. In recent years, the highest growth has been seen in online free-to-play games (Marder et al., 2019). Free-to-play games can be accessed and played without payment by users. However, these games generate most of their revenue by selling these so-called virtual items. These virtual items can be divided into two categories: functional and non-functional. Functional items would give the user in-game advantages such as power/strength, defense, speed etc. Non-functional items, on the other hand, do not offer in-game advantages and can be seen as a purely aesthetic addition to the game (Marder et al., 2019). The non-functionality of these digital items makes it ambiguous to understand what value consumers see in these virtual items. These non-functional digital items in video games seem to be similar to digital fashion or digital wearables used in digital spaces such as the Metaverse. Both items do not seem to have a direct functionality, and the quality of these items cannot be measured since there is no differentiation in quality. Previous research has pointed out that the consumption of non-functional virtual items is largely hedonically motivated. This type of

motivation refers to individuals that mainly seek pleasure experiences that provide immediate gratification or positive emotions. The concept of hedonic consumption describes the multisensory, emotional, and fantasy-related elements that surround the consumer's experience with a product (Guo & Barnes, 2009; Turel et al., 2010). Virtual items would increase enjoyment through increased multisensory appeal in online games (Turel et al., 2010). Furthermore, these items would function as a form of self-expression for players, allowing them to express their ideal selves through online characters in the form of avatars (Lehdonvirta, 2005, 2009). Lastly, products or services that hold symbolic meaning are important to a consumer's social relationships and externalized identity (Belk, 1988; Solomon, 1983). This might also be translated into non-functional virtual items in the digital sphere.

3. Data and Methodology

3.1 Research design

Selecting the most suitable research design is crucial to ensure accurate information gathering and minimize errors when examining the intended relationships in this study (Malholtra & Birks, 2007). For this research, a quantitative research method was used. To be able to collect data, this study used an online survey method which individuals completed by themselves. Quantitative research has been defined differently by numerous researchers. Cohen et al. (2007) provide a definition for quantitative research, which involves the use of empirical methods and empirical statements. He distinguishes empirical statements as descriptive statements that describe what *"is"* present in the real world rather than what *"ought"* to be present. These empirical statements would be typically expressed in numerical terms. Creswell (1994) has provided a concise definition of quantitative research, which involves gathering numerical data to elucidate phenomena and using mathematically-based techniques, particularly statistics, to analyze the data. This seems somewhat limiting but luckily is not. We can collect many types of data that are not naturally quantitative by designing research instruments that are specifically aimed at converting these phenomena into quantitative data. This enables us to analyze the data statistically (Sukamolson, 2007). Three distinguishing characteristics of survey research were distinguished by Kraemer (1991). Firstly, survey research is used to describe specific aspects of a population quantitatively. This often involves examining the relationships between variables. Secondly, the data collected by surveys come from people and are therefore subjective. As a final point,

survey research involves using a population sample from which the findings can be generalized. For this research, a survey was created using the online survey software Qualtrics. The survey was distributed through two Metaverse platforms, Meta Horizon and Decentraland. Next to these online environments, the survey was also shared and distributed in private Metaverse communities that are active on different social media channels, including Facebook and Discord. Qualtrics automatically recorded and stored the responses that were received. The data collection took place over a two-week duration from Monday 24th of April, to Monday 8th of May. The target group for this study was anyone active in the Metaverse who makes use of and has purchased digital wearables.

3.1.1 Variables

Various variables of demand that were discussed within the theoretical framework within the three different industries are extrapolated. These variables relate to factors that cause individuals' demand and buying behavior within these industries. The following customer profiles are generated from these factors: the consumer showing conspicuous consumption (luxury fashion), the consumer interested in trendy fashion (fast fashion), and the consumer having hedonistic motivations (avatar outfit consumption in online video games). These variables were used to generate the questions used in the survey that explored the demand and motivations of individuals for purchasing digital wearables and were matched to different industries (see Table 2). These variables do not mean that the findings will be mutually exclusive since consumer demand can be a variation of these variables. Questions 2 and 19 examined factors of demand based on self-expression, trendiness, personalization, social motivations, and hedonic motivations. Questions 5, 16, 20, and 23 examined factors of demand based on brand consciousness, conspicuous consumption, and exclusiveness. Question 12 examined the multiple factors mentioned in customer profiles 1, 2, and 3 and evaluated how respondents would rank them. Questions 14 and 15 examined factors of demand based on multi-sensory appeal and hedonistic motivations.

Table 2: *Variables of demand based on three customer profiles*

	Industry	Variables of demand
Customer profile I	Luxury fashion industry	- Conspicuous consumption - Brand consciousness - Self expression - (Social) visibility - Exclusiveness - Confidence & self-esteem
Customer profile II	Fast fashion industry	- Trendiness - Price / affordability - Personalization - Broad variety - Global fashion trends
Customer profile III	Gaming industry	- Multi sensory appeal - Self expression - Character dedication - Own personal needs - Hedonically - Socially

3.2 Data collection

3.2.1 Sample

The majority of digital wearables are often used within different Metaverses. Therefore, this research's sample group consists of anybody active in the Metaverse worldwide. Because of the exploratory nature of this research, there is no specific focus on a particular age group, gender, or other demographic background.

3.2.2 Survey design

In order to explore the dominant factors that cause the demand for digital fashion, a survey was created in Qualtrics, an online survey software. Typically, a survey consists of a set of structured questions administered to a sample of the population for the purpose of research (Malhotra et al., 2012).

Firstly, the survey started with a short introduction which explained the description and purpose of the research. Furthermore, the introduction gave a short overview of the survey and an approximation of the duration. The basic structure of the survey was divided into three main blocks: demand in (physical) fashion, demand in digital fashion, and demographics. The first block contained questions about the motivations for buying physical fashion items. The second block contained questions about the motivations for buying digital items. The last block, demographics, contained questions that focused on age, country of residence, employment status, highest degree obtained, and annual income level. The survey was estimated to take approximately 5-10 minutes to complete. The survey included various questions, such as demographic questions, constructs that evaluate different aspects of personality and buying behavior, and questions that evaluate digital presence. The demographic categorization questions were presented in multiple-choice or open-ended formats to ensure that the respondent fell within the desired specifications. Existing scales from previous studies on demand were adopted to measure variables related to demand: conspicuous consumption, brand consciousness, self-expression, uniqueness, personalization, price/affordability, investment, social motivations, and hedonic motivations.

3.4 Procedure

The data in this research was collected via various social media groups/communities that specifically focused on the Metaverse and digital/NFT fashion. To be able to distribute the survey in these specific groups, I have joined several private groups on various platforms such as Facebook, Discord, and Decentraland. After joining these groups, I asked the admins of each group for permission to share my survey within the community. The survey was shared through an anonymous digital link which led members to the survey page where they could start filling in the survey. Each question of the survey was required to be filled completely in order to finish the survey and hand in the results. The distribution and data collection took place from Thursday, the 11th of May, until Thursday, the 25th of May (including the weekend days as the data collection happened online). After receiving the

responses in Qualtrics, the data was transferred to the digital software statistics program SPSS, where the data was analyzed and interpreted. A descriptive analysis of the results and a correlation test were done to provide insights for discussion. In total, 535 responses were received, from which 120 were not filled in by a 100% and 44 were finished within less than 1 minute. Survey responses with a lower answer time than 4 minutes could lower data quality (Kayyal, 2021; Leiner, 2019). To keep the data quality as high as possible, responses with a lower response time than 4 minutes were removed, leaving a total of 371 qualified responses for analysis.

4. Results

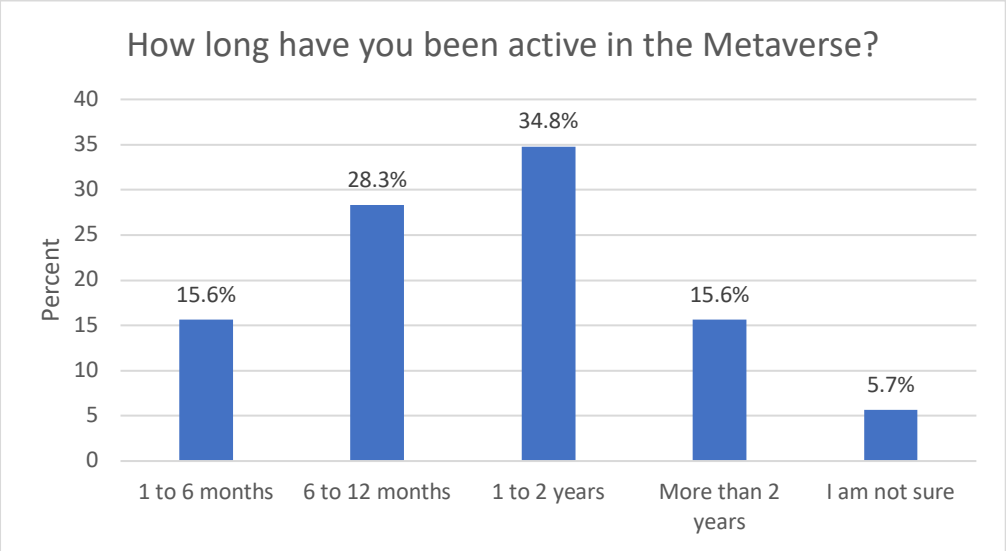
4.1 Respondent's profile

Table 1 shows an overview of the respondents that have filled in the survey. Among the respondents, 22.6% are male, 51.2% are females, 21.8% are non-binary/ third-gender, and 4.3% prefer not to say their gender. Interestingly, the number of respondents that identify as non-binary/ third-gender is almost the same as respondents that identify as male. The majority of respondents are females. This result may have different explanations. There might be a gender bias within the metaverse community, where more females actively participate compared to other genders. Furthermore, the topic of the research, which lies close to fashion, might unintentionally attract a more significant number of female respondents' duo to the survey's design and distribution channels. When we look at the age of the respondents, 3% of the respondents are under 18, 25.1% are between 18 and 25, 47.7% are between 26 and 35, 18.9% are between 36 and 50, and lastly 5.4% are above 50. Interestingly the majority of respondents are between 26 and 35 years old, which was unexpected since the Metaverse is a relatively new platform that uses new forms of technology and thus would be more likely to be used by a majority of individuals from a new/ younger generation. The majority of respondents are higher educated, with 40.7% of respondents having a Bachelor's degree, 15.9% a Master's degree, and 4% a PhD or higher. More than half of the respondents are currently employed, with 24.5% being employed full-time and 32.6% part-time. 11.3% of the respondents are students. The high number of employed respondents is reflected in the income levels recorded throughout the survey. The yearly income of the respondents is as follows: 18.3% earn below $10k, 34% earn between $11k and $50k, 31.8% earn between $51k and $100k, 13.7% earn between $101k and $150k, and 2.2% earn over $150k.

Table 3: *Profile of Respondents. N = 371*		
Variable	**Frequency**	**Percentage**
Age		
Under 18	11	3%
18 to 25	93	25.1%
26 to 35	177	47.7%
36 to 50	70	18.9%
Above 50	20	5.4%
Gender		
Male	84	22.6%
Female	190	51.2%
Non-binary / third-gender	81	21.8%
Prefer not to say	16	4.3%
Location		
North America/ Central America	42	11.3%
South America	54	14.6%
Europe	87	23.5%
Africa	49	13.2%
Asia	74	19.9%
Caribbean Islands	23	6.2%
Pacific Islands	16	4.3%
Oceania	12	3.2%
Other	6	1.6%
Prefer not to say	8	2.2%
Education		
Less than a high school diploma	41	11.1%
High school or equivalent	98	26.4%
Bachelor's Degree	151	40.7%
Master's Degree	59	15.9%
PhD or higher	15	4%
Other	4	1.1%
Prefer not to say	3	0.8%
Income		
Below $10k	68	18.3%
$11k - $50k	126	34%
$51k - $100k	118	31.8%
$101k - $150k	51	13.7%
Over $150k	8	2.2%
Employment status		
Employed full-time	91	24.5%
Employed part-time	121	32.6%
Seeking opportunities	90	24.3%
Student	42	11.3%
Retired	11	3%
Self-employed	16	4.3%

A final important aspect of the respondent's profile is their activity in the Metaverse. To be able to get a sense of their activity, I have asked how long respondents have been participating in the Metaverse. 15.6% have been active between 1 to 6 months, 28.3% between 6 to 12 months, 34,8% between 1 to 2 years, 15.6% more than two years, and 5.7% are not sure. The majority of respondents have thus been active between 1 to 2 years.

Table 4: *How long have you been active in the Metaverse*

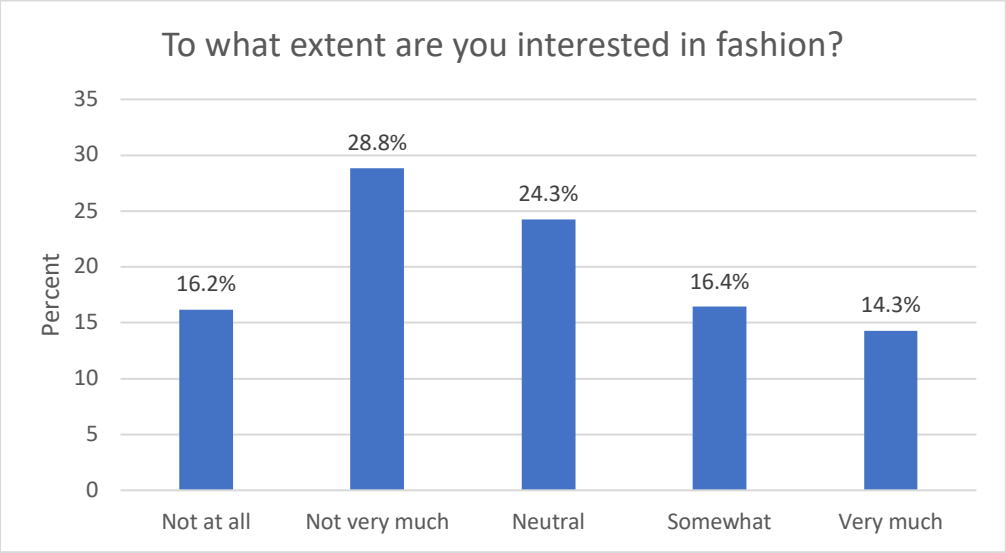


4.2 Respondents demand for fashion

The first part of the survey consisted of questions that investigated the demand for fashion of the respondents. These questions were used to investigate if there could be a correlation between a general interest in fashion and the demand for digital fashion. 28.8% of respondents are not very much interested in fashion, and 16.2% are not at all interested, as seen in table 4. 24.3% of respondents are neutrally interested, which leaves the majority of respondents not that much interested in fashion on average. The main motivation to go shopping for fashion is by a majority of 42.9% of respondents to express themselves with the items they buy. Buying fashion as a form of self-expression has been described in all three customer profiles and seems to be a crucial motivation for demand in this sample. Sirgy (1982) mentions that products and brands might be chosen to reflect and boost the consumer's personality or reflect personal values through symbolic meanings of commodities (Solovjova et al., 2022; Belk, 1988). 23.5% of the respondents said to mainly go shopping for socializing purposes with family and/or friends. The majority of respondents (35.6%) have purchased

bottoms (pants, jeans, shorts, etc.) in the past month. 20.2% has purchased tops (shirts, blouses, t-shirts etc.), 15.4% has purchased dresses, 12.9% has purchased footwear (shoes, boots, sneakers, heels, etc.), 8.4% has purchased outwear (jackets, coats, blazers, cardigans, etc.) 4.9% has purchased accessories (jewelry, hats, scarves, bags, etc.), and 2.7% has purchased other. When we look at the monthly spending on fashion items, the majority of respondents spend between 5% to 10% (32.6%) and 11% to 15% (32.1%). A small 3.5% of the respondents spend more than 20% of their monthly income on fashion. To be able to see how brand conscious the respondents are, I have asked how much extra money they are willing to spend if it was created by a well-known designer or brand. The majority of respondents (41%) are willing to pay up to 10% more, which shows that the respondents are at least somewhat brand conscious, which means they are sensitive to the brands of fashion items when they make a purchase decision. However, 24.8% of the respondents are not willing to pay an extra amount when a fashion item is created by a well-known designer or brand. A small 1.9% of respondents I willing to pay 50% more or above.

Table 5: *To what extent are you interested in fashion?*



4.3 Respondents demand for digital fashion

The second part of the survey consisted of questions that investigated the demand for digital fashion of the respondents. Similar questions, as in part 1, were used to be able to see if there was an overlap in responses and a correlation between general interest in fashion and digital fashion. To see whether the interest in fashion also influences the interest in digital fashion, I asked the respondents about their interest in both. For digital fashion, there is

significantly less interest than for physical fashion, with 25.3% not being interested at all, 31.1% not very much, 19.1% neutral, 12.9% somewhat, and 10.5% very much. Despite the lower interest in digital fashion, the majority of participants have purchased digital wearables before. 35% of the respondents sometimes buy digital wearables, 26.7% occasionally, 19.4% often, and 4.6% regularly. 14.3% have never bought digital wearables. This can be explained by the activity of earning/finding digital wearables in the Metaverse by doing certain "missions" or achievements. When we look at the participants' digital wardrobe, 20.8% have less than five items, 34.2% have between 5 to 10 items, 30.5% have between 11 to 20 items, 11.6% have between 21 to 30 items, and 3% have more than 30 items. The type of digital fashion items bought in the past month differ widely among respondents, with 11.1% purchasing tops (shirts, blouses, t-shirts, etc.), 19.9% purchasing bottoms (pants, jeans, shorts, skirts, etc.), 12.9% purchasing dresses, 19.4% purchasing footwear (shoes, boots, sneakers, heels, etc.) 20.5% purchasing outerwear (jackets, coats, blazers, cardigans, etc.) 10.8% purchasing accessories (jewelry, hats, scarves, sunglasses, bags, etc.), and 5.4% purchasing other kinds of digital wearables. A majority of 68.2% of participants have attended events in the Metaverse related to fashion (e.g. virtual fashion shows, digital pop-up shows), which is interesting since the general interest in digital fashion is relatively low. When we look at participants' monthly spending on digital wearables, we see an overlap in results with the spending on physical fashion items. The majority spend between 5% to 10% (25.9%) and 11% to 15% (32.6%). However, 14.6% spend between 16% to 20% and a small 5.7% spend more than 20% of their monthly income on digital wearables. The convergence of spending patterns between physical and digital clothes signifies evolving consumer attitudes towards virtual experiences, (online) self-expression, and the increasing integration of technology in our lives.

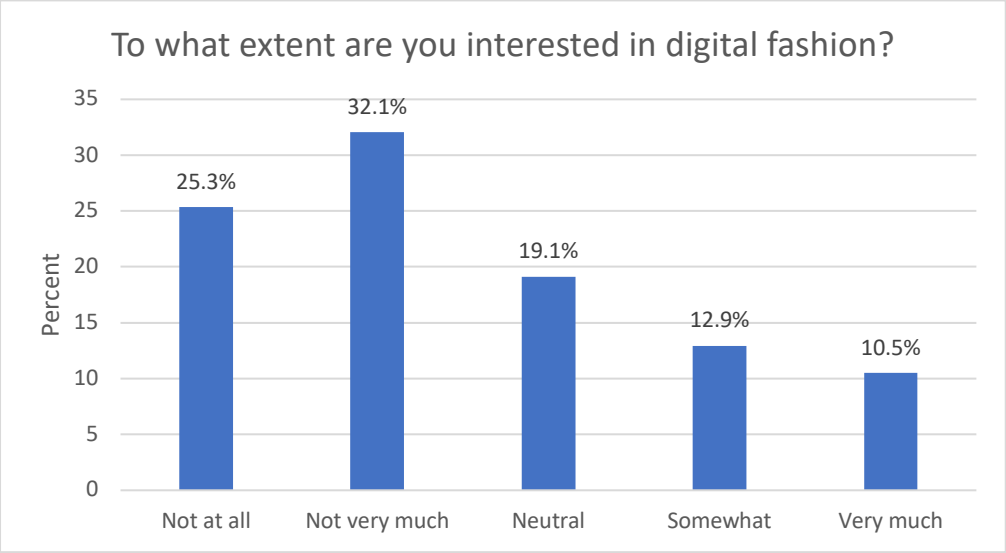
To look further into the motivation of demand for digital wearables, I have used variables of demand from the theoretical framework and the three customer profiles described earlier. In question 12, participants were asked to rank the factors to their personal preference when buying digital fashion items. Out of the results, the price would be considered the most crucial factor, with 88.9% of participants ranking this as number one. However, the majority of respondents answered in the pre-given ranking of the question, thus making the results of this particular question uncertain. The majority of participants do not see the purchasing of digital wearables as a form of investment, with 29.1% strongly disagreeing with the statement of question 13 and 28.6% disagreeing. However, 13.5% agree with the statement, and 6.2% strongly agree. Furthermore, with 20.5% of the respondents strongly disagreeing and 29.1%

disagreeing with the statement of question 14, the majority of respondents do not see the use of digital wearables significantly enhancing their personal experience in the Metaverse. 23.2% are neutral, 20.1% agree with the statement, and a small 7% strongly agree. The answers of participants on question 15, *to what extent do you agree with the following statement? I buy digital wearables to support the Metaverse I'm active in*, which are mostly equally divided, leaning slightly more towards disagreement with the statement. 19.1% strongly disagree with the statement, 19.9% disagree, 27.2% are neutral, 21.8% agree, and 11.9% strongly agree. When we look at the results of the statement of question 16, *it is important to me that digital fashion items are unique and one-of-a-kind*, we see that a slightly bigger percentage of respondents disagree with this statement. 18.9% strongly disagree with the statement, 20.5% disagree, 26.7% are neutral, 22.9% agree, and 11.1% strongly agree. However, compared to the previous questions, we see a bigger percentage agreeing. Respondents are willing to pay significantly more for a digital item when it is considered unique, with 3% willing to pay more than 50%, 16.4% up to 50% more, 44.7% up to 20% more, 22.1% up to 10% more, and 13.7% no extra amount. This is interesting since it would contradict the results of question 16, as uniqueness would not be considered as important, yet the majority is willing to pay more if an item is unique. When we look at the main motivation of participants to purchase digital items, 28.3% buys to express their personality and creativity, 38.5% buys to fit in with their friend group in the Metaverse, 21.3% buys to keep up with the latest fashion trends, 9.7% buys to have unique and exclusive items, and 2.2% have other reasons. Respondents are as well willing to pay significantly more for a digital item if it was created by a well-known designer or brand. 3.5% of respondents are willing to pay more than 50%, 9.4% up to 50% more, 32.3% up to 20% more, 34.8% up to 10%, and 19.9% no extra amount.

The actual price that respondents are willing to pay for digital items is also being looked at with question 21. 14.8% is willing to pay less than $1, 31.8% is willing to pay between $1 to $10, 35.3% is willing to pay between $11 to $30, 13.5% is willing to pay between 31$ to $50, and 4.6% is willing to pay more than $50. As the majority is mostly willing to pay a lower price, it reflects a similar behavior as with fast fashion, which could be the compromise between what consumers would like to be able to buy often and the amount of money they are able to spend (Gabriellie et al., 2013). The majority of respondents do not consider digital fashion as a replacement for physical fashion. Only 5.4% of participants strongly agree with the statement that digital fashion can be a replacement for physical fashion. 15.6% agree, 25.6% are neutral, 30.5% disagree, and 22.9% strongly disagree.

Lastly, to look more into the brand consciousness of the respondents, I have asked whether they would be interested in purchasing digital fashion items designed by their favorite fashion brand. 18.9% of respondents are not interested at all, 30.2% are not very much interested, 24% are neutral, 18.3% are somewhat interested, and 8.6% are very much interested. Overall, the results on questions regarding interest contradict the results of the question of willingness to pay. Thus, interest seems to be lower than willingness to pay.

Table 6: *To what extent are you interested in digital fashion?*



4.4 Correlation test

To make a deeper analysis of the results, a correlation test between some of the survey questions was performed. The main purpose of this analysis is to see whether an interest and demand for fashion is related to an interest and demand for digital fashion. Furthermore, this research has looked into whether activity in the Metaverse has an effect on the number of digital wearables somebody owns. The first correlation test is done between the results of questions 1 and 7. The second correlation test is done between questions 6 and 11. The final correlation test is done between questions 5 and 20. For all three correlation tests, the following hypothesis is stated:

> *H0: $\rho = 0$ ("the sample correlation coefficient is 0; there is no association")*
>
> *H1: $\rho \neq 0$ ("the sample correlation coefficient is not 0; a nonzero correlation could exist")*

The significance level determined for this correlation is $a = 0.05$. I have run a two-tailed Bivariate Pearson Correlation test analysis in the software program SPSS to be able to make an interpretation of the data. The sample correlation coefficients between the variables x and y are denoted r_{xy} and is computed as follows:

$$r_{xy} = \frac{cov(x, y)}{\sqrt{var(x)}.\sqrt{var(y)}}$$

Cov(x, y) is the sample covariance of x and y, var(x) is the sample variance of x, and var(y) is the sample variance of y.

H1: *There is a correlation between the extend people are interested in (physical) fashion and digital fashion.*

Correlations

		To what extend are you interested in digital fashion?	To what extend are you interested in fashion?
To what extend are you interested in digital fashion?	Pearson Correlation	1	.591**
	Sig. (2-tailed)		<.001
	N	371	371
To what extend are you interested in fashion?	Pearson Correlation	.591**	1
	Sig. (2-tailed)	<.001	
	N	371	371

**. Correlation is significant at the 0.01 level (2-tailed).

The level of significance is smaller than $a = 0.05$; therefore, the correlation coefficient is significant, and the null hypothesis is rejected. There is thus a statistically significant correlation between people that are interested in (physical) fashion and digital fashion. However, the correlation score $r = .591$ is considered a moderate degree of correlation.

H2: *There is a correlation between the time participants have been active in the Metaverse and the number of digital wearables they own.*

Correlations

		How long have you been active in the Metaverse?	How many virtual fashion items do you have in your digital wardrobe?
How long have you been active in the Metaverse?	Pearson Correlation	1	.251**
	Sig. (2-tailed)		<.001
	N	371	371
How many virtual fashion items do you have in your digital wardrobe?	Pearson Correlation	.251**	1
	Sig. (2-tailed)	<.001	
	N	371	371

**. Correlation is significant at the 0.01 level (2-tailed).

The level of significance is smaller than $a = 0.05$; therefore, the correlation coefficient is significant, and the null hypothesis is rejected. There is thus a statistically significant correlation between the amount of time participants have been active in the Metaverse and the number of virtual items they have in their digital wardrobe. However, the correlation score $r = .251$ is considered a low degree of correlation. Therefore, we can not conclude that the amount of time participants have been active in the Metaverse influences the number of virtual items they have.

H3: *There is a correlation between brand consciousness for physical fashion and digital fashion.*

Correlations

		How much extra money are you willing to spend on a fashion item if it is created by a well-known designer or brand?	How much extra money would you be willing to spend on a digital fashion item if it was created by a well-known designer or brand?
How much extra money are you willing to spend on a fashion item if it is created by a well-known designer or brand?	Pearson Correlation	1	.406**
	Sig. (2-tailed)		<.001
	N	371	371
How much extra money would you be willing to spend on a digital fashion item if it was created by a well-known designer or brand?	Pearson Correlation	.406**	1
	Sig. (2-tailed)	<.001	
	N	371	371

**. Correlation is significant at the 0.01 level (2-tailed).

The level of significance is smaller than $a = 0.05$; therefore, the correlation coefficient is significant, and the null hypothesis is rejected. There is thus a statistically significant correlation between the brand consciousness for physical fashion items and digital items. However, the correlation score $r = .406$ is considered a low degree of correlation. Therefore, we cannot conclude that brand consciousness for physical fashion is correlated with brand consciousness purchase behaviour for digital fashion items.

5. Discussion

5.1. Contribution and theoretical comparisons

The survey results have given some insights into the key factors that cause demand for digital wearables. Overall, the majority of respondents are not as much interested in fashion as in digital fashion. When we look at factors of demand for physical fashion, the majority of respondents see buying fashion as a form of self-expression. These results confirm the demand factors discussed earlier in all three industries. Fashion items can be intentionally selected and bought as a form of self-expression towards the public (Belk, 1988; Sirgy, 1982; Solomon, 1983). In the same way, non-functional virtual items in online video games could function as a form of self-expression for players (Lehdonvirta, 2005, 2009). This buying behavior is strongly connected to an individual's personal taste. Furthermore, forms of self-expression to the public through fashion relate to the social nature of fashion itself (Blumer, 1969). This is also reflected in 23.5% of respondents who indicated that their motivation to go shopping lies in socializing. Furthermore, interestingly 38.5% of respondents indicated purchasing digital wearables to fit in with their friend group. When we evaluate the brand consciousness of respondents, for both physical and digital fashion respondents are somewhat sensitive. However, the respondents indicate willingness to spend more, which can differ from actual spending in practice. Brand-conscious shopping behavior goes hand in hand with conspicuous consumption and is often seen in purchase behavior for luxury fashion products (Veblen, 1899). In contrast to other fashion items, luxury items are often distinguished by their high quality and price. It is thus interesting to see that respondents are to some degree brand conscious to digital wearables, while these items cannot be distinguished by quality. In fact, this would represent the purely symbolic function digital wearables could possibly carry. A contrasting result between digital wearables and non-functional items in games is that the majority of respondents in this research indicated

that digital wearables do not enhance their personal experience in the Metaverse. In contrast, non-functional items in games are known to increase enjoyment through increased multisensory appeal (Turel et al., 2010). The uniqueness of digital wearables does not seem to play a very important factor for the majority of respondents. This would be a strong contrast in demand behavior for luxury fashion items where uniqueness and visibility play a more important role (Heffetz, 2011). Overall, we can see some overlap and contrasts in factors of demand with the three customer profiles discussed earlier in the theoretical framework.

5.2 Limitations and future research

As Santos et al. (2020) pointed out, the dematerialization of fashion products results in new ways of communication that enable real-time distribution of products online. Since the phenomena of digital wearables are relatively new, the results found in this research are limited by several elements. First of all, the survey participations selection is not entirely random. This research intended to distribute the survey randomly over different Metaverse communities and channels. However, community users have helped distribute the survey, causing a snowball effect in the responses, thus removing the nature of random sampling. Secondly, this research focuses on the demand for a commodity that is relatively new on the market. There has not been much research done on the demand for digital wearables yet, causing the exploratory character of this research. The analysis and findings give new insights and identify potential relationships, but because of its exploratory nature, this research is limited, and results cannot be generalized. A third critical remark and limitation within this research is the sample group. To keep the scope of the research acceptable, the survey was only distributed to people active within the Metaverse since there is assumably a higher chance that these people have had previous experience with digital wearables. However, it is not excludable that digital wearables are also bought and used outside of the Metaverse. As a result, this research has not covered potential customer groups that are actively consuming digital wearables outside Metaverse platforms. Another significant limitation to consider is the limited information known about the dynamics of this particular market. Because digital wearables are such a new product, it is hard to look into the dynamics within the market that revolve around this commodity. It is at this point also challenging to look into essential demand factors such as past consumption patterns (Garboua & Montmarquette, 1996) and rational addiction (Stigler & Becker, 1977). Lastly, I am not an experienced user of either digital wearables or the Metaverse. I have tried to participate in the

Metaverse and make a purchase of a digital wearable to be able to deepen my knowledge on the subject. However, I had a difficult time understanding and using the online platforms where digital wearables could be purchased.

All respondents have indicated to have some experience with digital wearables, and a stunning 68.2% of respondents indicated to have participated in fashion-related events within the Metaverse. For future research, it would be interesting to look at how online platforms such as the Metaverse have an effect on triggering its users to be involved with buying or earning digital wearables. In relation to that, it would also be valuable to see in which other online environments digital wearables are used and what purpose they serve in each environment. Furthermore, future research could look into the societal effects that evolve from the increasing use of virtual spaces such as the Metaverse and the commodities such as digital wearables that are available within these environments. This could as well involve research on evolving policies around the digital marketplace where virtual items are found to be bought and sold. Lastly, as this research mainly looks into the consumer side of digital wearables, it would also be interesting to look at the producer side to get a better understanding of this commodity.

6. Conclusion

The rising involvement and developments of digitalization within the fashion industry have resulted in the dematerialization of the fashion items themselves, creating a new commodity online in the digital sphere. This has resulted in new ways of communication, enabling real-time distribution of products online (Santos et al., 2020). Digital wearables or digital fashion are not something we have not seen before. Non-functional items in video games that often appear in the form of fashion or so-called ‘’skins’’ do not offer any in-game advantages but have generated significant revenue in the gaming industry (Marder et al., 2019). This study aimed to investigate the different key factors that cause the demand for digital wearables. The main research question was thus as follows: *What are the main factors that impact the demand for virtual fashion used in games or virtual reality environments such as the Metaverse?* Different studies of demand have used several decision-making models based on the idea that an individual makes rational purchase decisions to maximize their utility (Ateca-Amestroy, 2008). However, the assumption that individuals make rational purchase decisions is not always accurate. To narrow the scope of this research, only the

demand for digital wearables of Metaverse users has been examined since these particular platforms offer users to buy and wear digital fashion for their avatars.

Since this commodity is relatively new on the market, this research relied on factors of demand found in previous studies of demand to related industries such as the luxury fashion industry, fast-fashion industry, and non-functional items within the online gaming industry. Furthermore, because of the exploratory nature of this research, results cannot be generalized. Firstly, this research has found that there might be a correlation between the general interest in fashion and the interest in digital wearables. This can be explained by the concepts of consuming capital and the development of taste (McCain, 2003). Secondly, this research has found some overlap and conflict with the factors of demand shown in previous studies of related industries. Especially the demand factors related to social activities in the forms of self-expression and personalization seem evident in demand for digital wearables in this research. Demand based on signaling wealth or status, as seen in the consumption behavior of luxury fashion (Veblen, 1899), does not seem to be evident for digital wearables. However, respondents within this research have shown to be brand conscious, even for digital wearables. This confirms the findings of Sirgy (1982), who argues that individuals prefer certain products and brands that match their personal self-image and thus seem to apply to these commodities in the digital realm as well. Lastly, this research has found significant results that show that users of the Metaverse have had significant experience with digital wearables. It would be interesting for future research to look into the role of these digital spaces in triggering its users to buy commodities such as digital wearables.

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Appendix

A. Survey

1. Introduction

Greetings! We are conducting a survey to study the demand for virtual fashion among individuals. With fashion we mean clothing, shoes, jewelry, and accessories (either digital or physical). With the rise of virtual worlds, such as the Metaverse, the demand for virtual fashion has been increasing, allowing individuals to express their unique style in new and exciting ways.

By participating in this survey, you can help us gain insight into preferences and attitudes towards virtual fashion among different demographics. The survey is divided in three sections and takes about 5 minutes to finish. The first section is about physical fashion, the second about digital fashion, and the third section are demographic questions. Your responses will be anonymous and no personal data is collected. The answers of the survey will be used only for the purpose of this study and will remain confidential.

Thank you for your participation in advancing our understanding of this emerging trend.

By signing below, I hereby give my consent to voluntarily participate in this study. I understand the purpose of this study and all the conditions listed above.

○ I agree to participate in this study

2. Demand in physical fashion

Q1 To what extent are you interested in fashion?

	Not at all (1)	Not very much (2)	Neutral (3)	Somewhat (4)	Very much (5)
Choose one answer (1)	○	○	○	○	○

Q2 What is your main motivation to go shopping for clothing/fashion items?

- ○ To socialize with my family/friends
- ○ To express myself with the items I buy
- ○ To replace old/ripped clothes
- ○ To be able to follow/wear the latest trends
- ○ Other (fill in) _____

Q3 What percentage of your monthly income do you typically spend on fashion each month?

- ○ Less than 5%
- ○ 5% to 10%
- ○ 11% to 15%
- ○ 16% to 20%
- ○ More than 20%

Q4 What kind of fashion items did you buy in the past month? (Multiple answers possible)

- ○ Tops (shirts, blouses, t-shirts, etc.)
- ○ Bottoms (pants, jeans, shorts, skirts, etc.)
- ○ Dresses
- ○ Footwear (shoes, boots, sneakers, heels, etc.)
- ○ Outwear (jackets, coats, blazer, cardigans, etc.)
- ○ Accessories (jewelry, hats, scarves, sunglasses, bags, belts, etc.)
- ○ Other (fill in) _____

Q5 How much extra money are you willing to spend on a fashion item if it is created by a well-known designer or brand?

- ○ No extra amount
- ○ Up to 10% more
- ○ Up to 20% more
- ○ Up to 50% more
- ○ Above 50% more

3. Demand in digital fashion

Q6 How long have you been active in the Metaverse?

- ○ 1 to 6 months
- ○ 6 to 12 months
- ○ 1 to 2 years
- ○ More than 2 years
- ○ I am not sure

Q7 To what extent are you interested in digital fashion?

	Not at all	Not very much	Neutral	Somewhat	Very much
Choose one answer	○	○	○	○	○

Q8 How often do you buy digital wearables?

- ○ Never
- ○ Occasionally
- ○ Sometimes
- ○ Often
- ○ Regularly

Q9 What percentage of your monthly income do you typically spend on digital fashion items each month?

- ○ Less than 5%
- ○ 5% to 10%
- ○ 11% to 15%
- ○ 16% to 20%
- ○ More than 20%

Q10 Did you ever attend events in the Metaverse (e.g. virtual fashion shows, digital pop-up shops) that feature digital fashion?

- ○ No
- ○ Yes
- ○ I am not sure

Q11 How many virtual fashion items do you have in your digital wardrobe?

- ○ Less than 5
- ○ 5 to 10
- ○ 11 to 20
- ○ 21 to 30
- ○ More than 30

Q12 Rank the following factors according to your personal preference when buying a digital fashion item.

_____ Price
_____ Design
_____ Uniqueness
_____ Brand reputation
_____ Fashion trend

Q13 To what extent do you agree with the following statement? *I buy digital wearables as an investment like NFT's*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Choose one answer	○	○	○	○	○

Q14 To what extent do you agree with the following statement? *The use of digital wearables significantly enhances my personal experience in the Metaverse.*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Choose one answer	○	○	○	○	○

Q15 To what extent do you agree with the following statement? *I buy digital wearables to support the Metaverse I am active in*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Choose one answer	○	○	○	○	○

Q16 To what extent do you agree with the following statement? *It is important to me that digital fashion items are unique and one-of-a-kind*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Choose one answer	○	○	○	○	○

Q17 What kind of digital fashion items did you buy in the past month? (Multiple answers possible)

- ○ Tops (shirts, blouses, t-shirts, etc.)
- ○ Bottoms (pants, jeans, shorts, skirts, etc.)
- ○ Dresses
- ○ Footwear (shoes, boots, sneakers, heels, etc.
- ○ Outerwear (jackets, coats, blazers, cardigans, etc.)
- ○ Accessories (jewelry, hats, scarves, sunglasses, bags, belts, etc.)
- ○ Other (fill in) _____

Q18 How much extra money are you willing to spend on a digital fashion item when it is considered unique?

- ○ No extra amount
- ○ Up to 10%
- ○ Up to 20% more
- ○ Up to 50% more
- ○ Above 50% more

Q19 What motivates you to buy digital fashion items?

- ○ To express my personality and creativity
- ○ To fit in with my friend group in the Metaverse
- ○ To keep up with the latest fashion trends
- ○ To have unique and exclusive items
- ○ Other (please specify) _____

Q20 How much extra money would you be willing to spend on a digital fashion item if it was created by a well-known designer or brand?

- ○ No extra amount
- ○ Up to 10% more
- ○ Up to 20% more
- ○ Up to 50% more
- ○ More than 50%

Q21 How much would you be willing to pay for a digital fashion item such as a virtual outfit or accessory that you can wear in the Metaverse?

- ○ Less than $1
- ○ $1 to $10
- ○ $11 to $30
- ○ $31 to $50
- ○ More than $50

Q22 To what extent do you agree with the following statement? *I consider digital fashion items as a replacement for physical fashion items*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Choose one answer	○	○	○	○	○

Q23 To what extent would you be interested in purchasing digital fashion items designed by your favorite fashion brand?

	Not at all	Not very much	Neutral	Somewhat	Very much
Choose one answer	○	○	○	○	○

4. Demographic questions

Q24 How old are you?

- ○ under 18
- ○ 18 to 25
- ○ 26 to 35
- ○ 36 to 50
- ○ Above 50

Q25 What is your gender?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

Q26 Where are you currently located?

- ○ North America/Central America
- ○ South America
- ○ Europe
- ○ Africa
- ○ Asia
- ○ Caribbean Islands
- ○ Pacific Islands
- ○ Oceania
- ○ Other (please specify)
- ○ Prefer not to say

Q27 What is the highest degree or level of education you have completed?

- ○ Less than a high school diploma
- ○ High school or equivalent
- ○ Bachelor's Degree
- ○ Master's Degree
- ○ PhD.D. or higher
- ○ Other (please specify)
- ○ Prefer not to say

Q28 What is your household income?

- ○ Below $10k
- ○ $11k - $50k
- ○ $51k - $100k
- ○ $101k - $150k
- ○ Over $150k

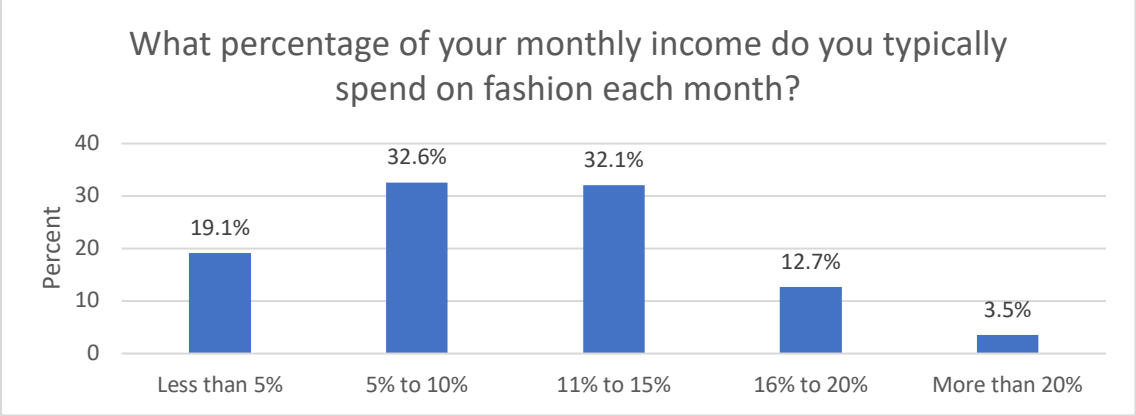
Q29 What is your current employment status?

- ○ Employed Full-Time (40+ hours a week)
- ○ Employed Part-Time (less than 40 hours a week)
- ○ Seeking opportunities
- ○ Student
- ○ Retired
- ○ Self-employed

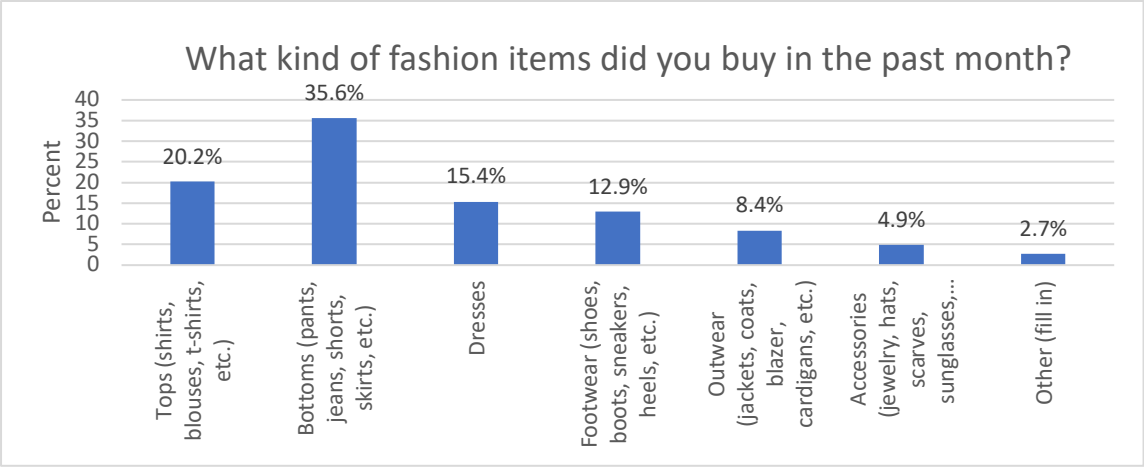
B. Survey output

Q2

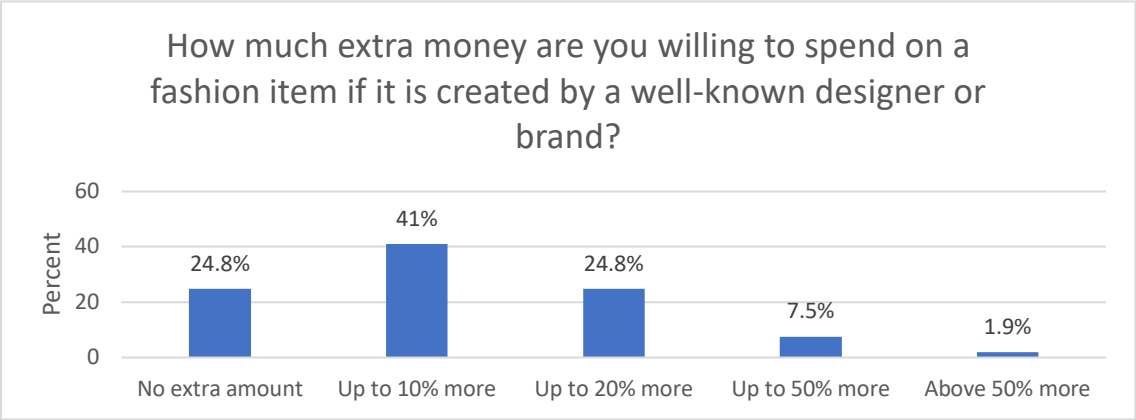
Q3



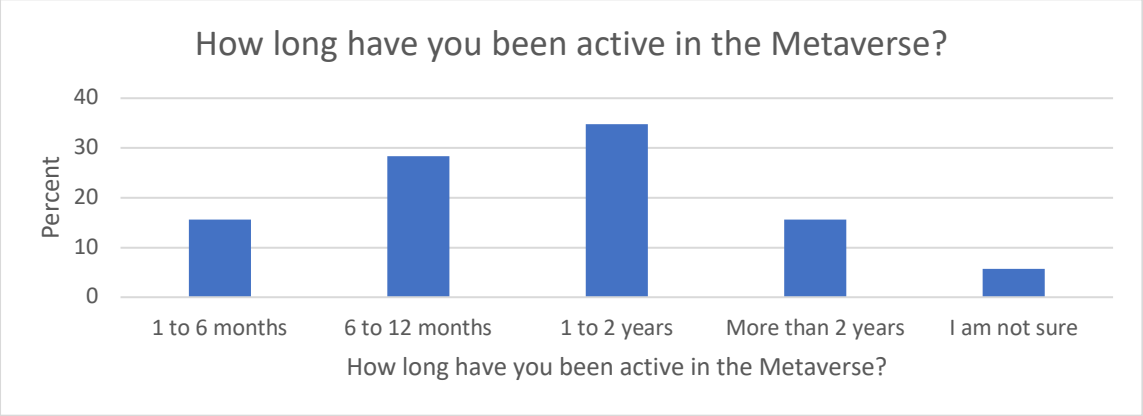
Q4



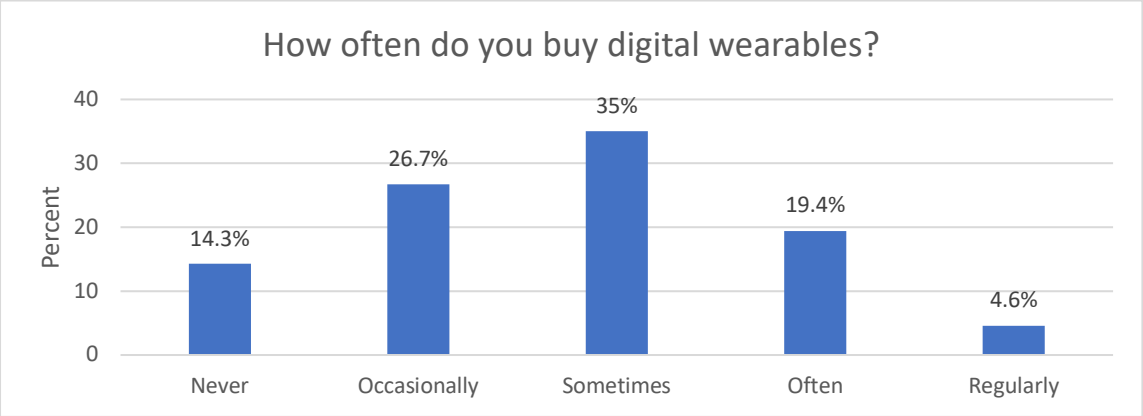
Q5


How much extra money are you willing to spend on a fashion item if it is created by a well-known designer or brand?
Percent
60
40
20
0
24.8%
41%
24.8%
7.5%
1.9%
No extra amount
Up to 10% more
Up to 20% more
Up to 50% more
Above 50% more

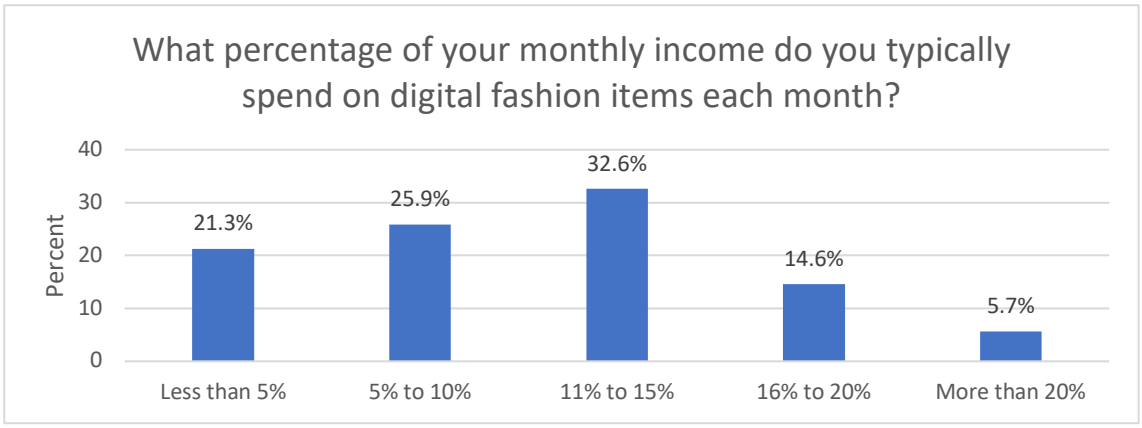
Q6


How long have you been active in the Metaverse?
Percent
40
30
20
10
0
1 to 6 months
6 to 12 months
1 to 2 years
More than 2 years
I am not sure
How long have you been active in the Metaverse?

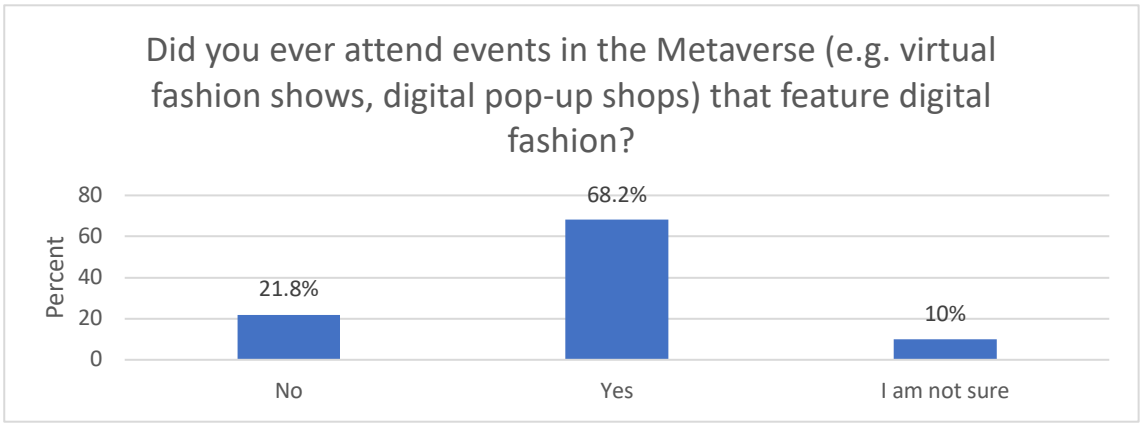
Q8


How often do you buy digital wearables?
Percent
40
30
20
10
0
14.3%
26.7%
35%
19.4%
4.6%
Never
Occasionally
Sometimes
Often
Regularly

Q9


What percentage of your monthly income do you typically spend on digital fashion items each month?
Percent
40
30
20
10
0
21.3%
25.9%
32.6%
14.6%
5.7%
Less than 5%
5% to 10%
11% to 15%
16% to 20%
More than 20%

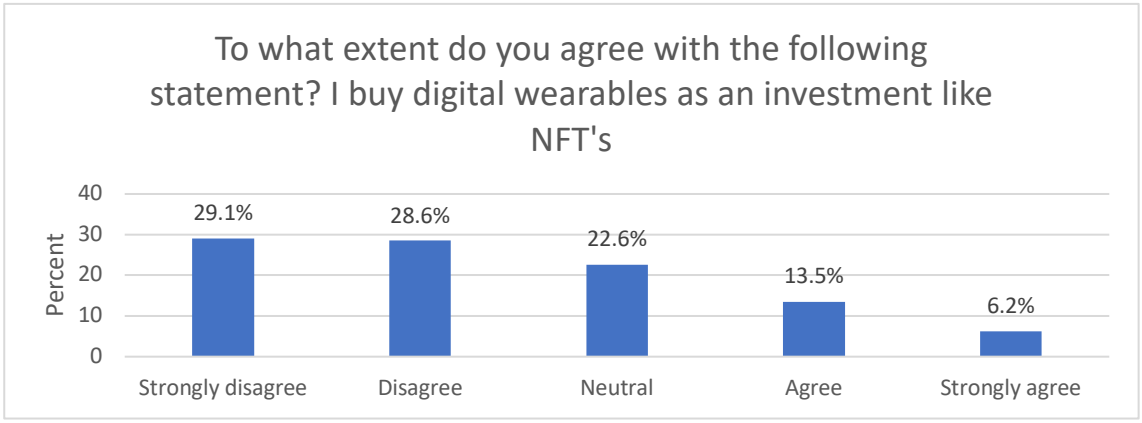
Q10


Did you ever attend events in the Metaverse (e.g. virtual fashion shows, digital pop-up shops) that feature digital fashion?
Percent
80
60
40
20
0
21.8%
68.2%
10%
No
Yes
I am not sure

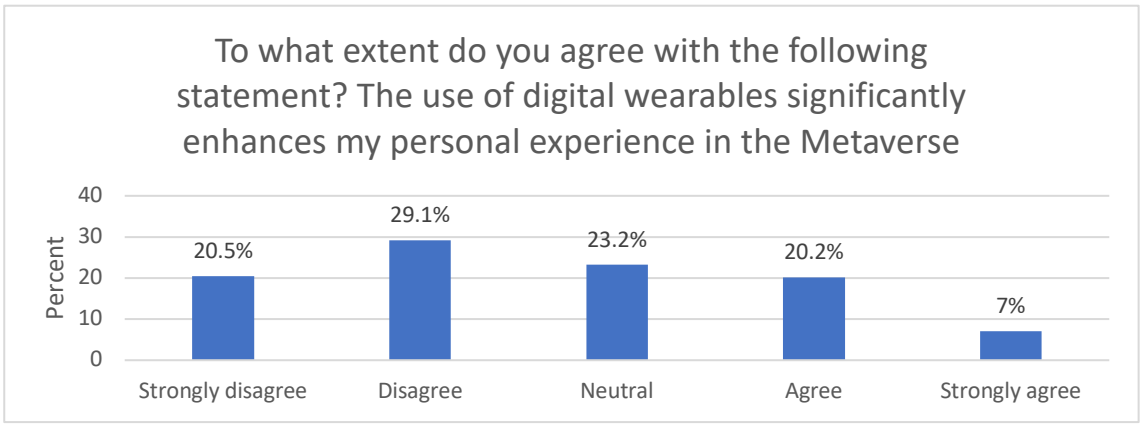
Q11


How many virtual fashion items do you have in your digital wardrobe?
Percent
40
30
20
10
0
20.8%
34.2%
30.5%
11.6%
3%
Less than 5
5 to 10
11 to 20
21 to 30
More than 30

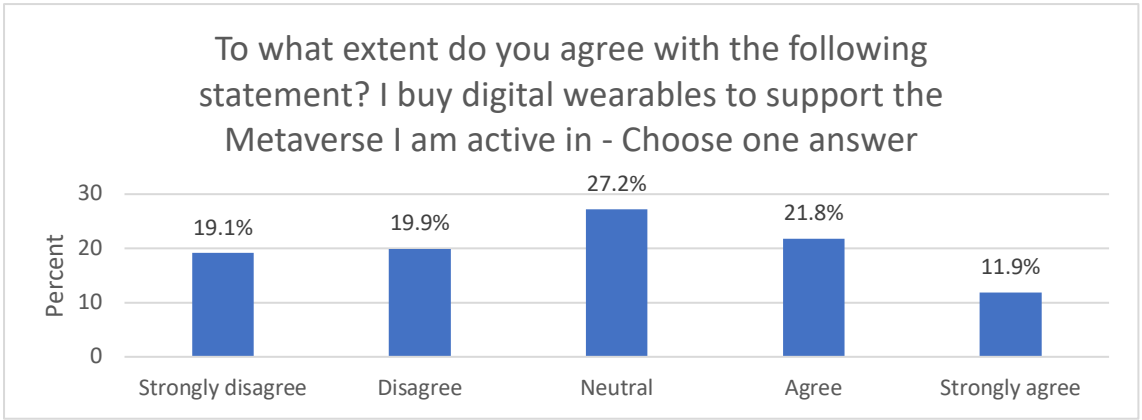
Q13


To what extent do you agree with the following statement? I buy digital wearables as an investment like NFT's
Percent
40
30
20
10
0
29.1%
28.6%
22.6%
13.5%
6.2%
Strongly disagree
Disagree
Neutral
Agree
Strongly agree

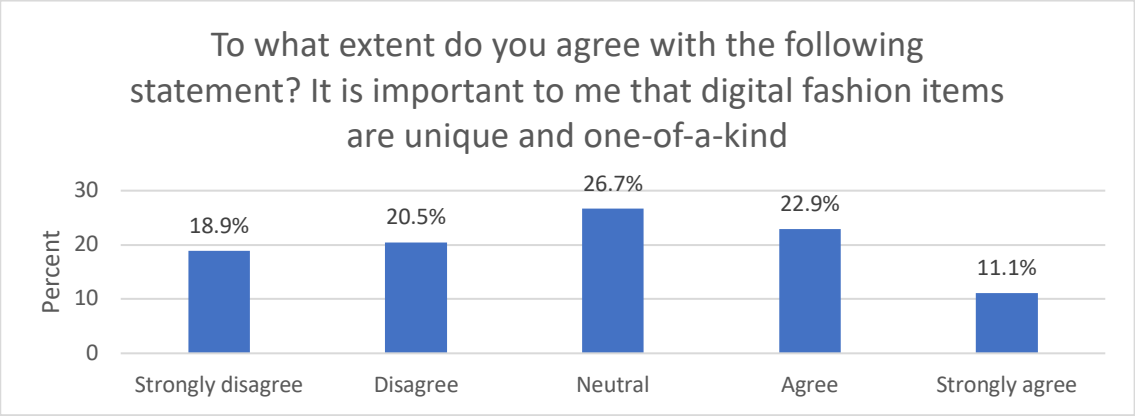
Q14


To what extent do you agree with the following statement? The use of digital wearables significantly enhances my personal experience in the Metaverse
Percent
40
30
20
10
0
20.5%
29.1%
23.2%
20.2%
7%
Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Q15


To what extent do you agree with the following statement? I buy digital wearables to support the Metaverse I am active in - Choose one answer
Percent
30
20
10
0
19.1%
19.9%
27.2%
21.8%
11.9%
Strongly disagree
Disagree
Neutral
Agree
Strongly agree

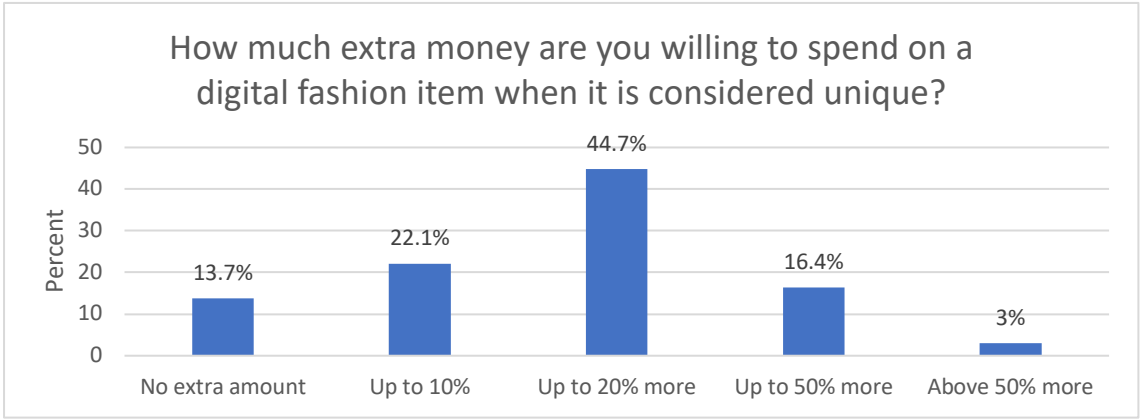
Q16


To what extent do you agree with the following statement? It is important to me that digital fashion items are unique and one-of-a-kind
Percent
30
20
10
0
18.9%
20.5%
26.7%
22.9%
11.1%
Strongly disagree
Disagree
Neutral
Agree
Strongly agree

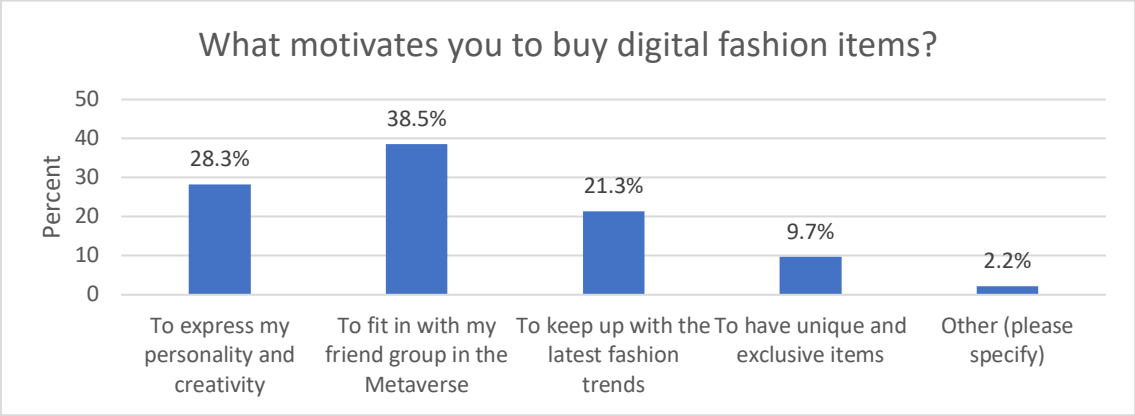
Q17


What kind of digital fashion items did you buy in the past month?
Percent
25
20
15
10
5
0
11.1%
19.9%
12.9%
19.4%
20.5%
10.8%
5.4%
Tops (shirts, blouses, t-shirts, etc.)
Bottoms (pants, jeans, shorts,...
Dresses
Footwear (shoes, boots, sneakers,...
Outerwear (jackets, coats, blazers,...
Accessories (jewelry, hats, scarves,...
Other (fill in)

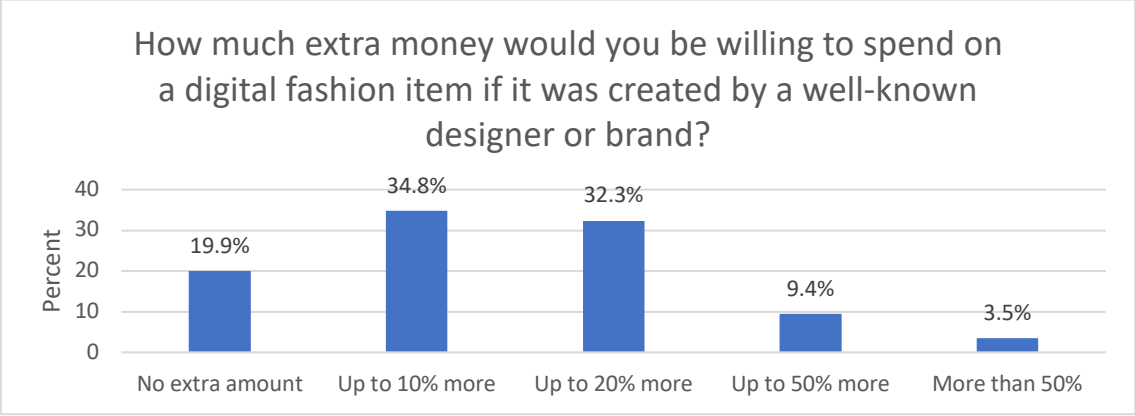
Q18


How much extra money are you willing to spend on a digital fashion item when it is considered unique?
Percent
50
40
30
20
10
0
13.7%
22.1%
44.7%
16.4%
3%
No extra amount
Up to 10%
Up to 20% more
Up to 50% more
Above 50% more

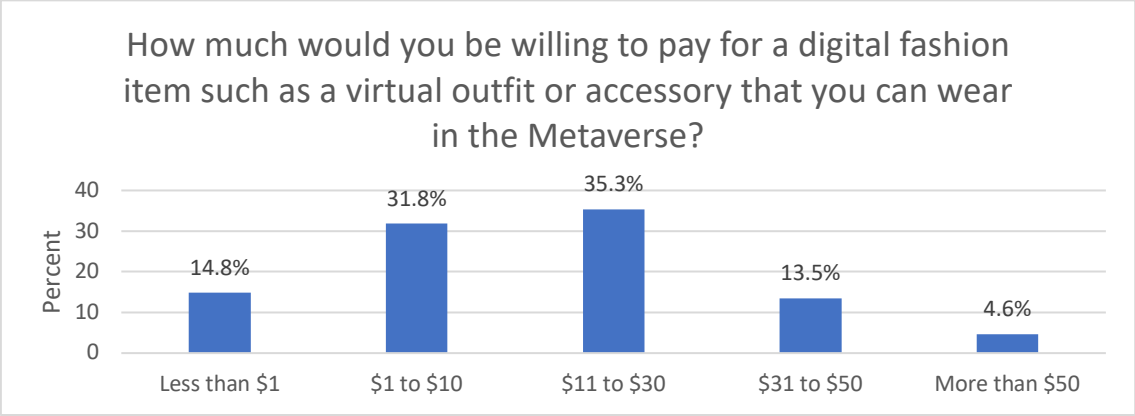
Q19


What motivates you to buy digital fashion items?
Percent
50
40
30
20
10
0
28.3%
38.5%
21.3%
9.7%
2.2%
To express my personality and creativity
To fit in with my friend group in the Metaverse
To keep up with the latest fashion trends
To have unique and exclusive items
Other (please specify)

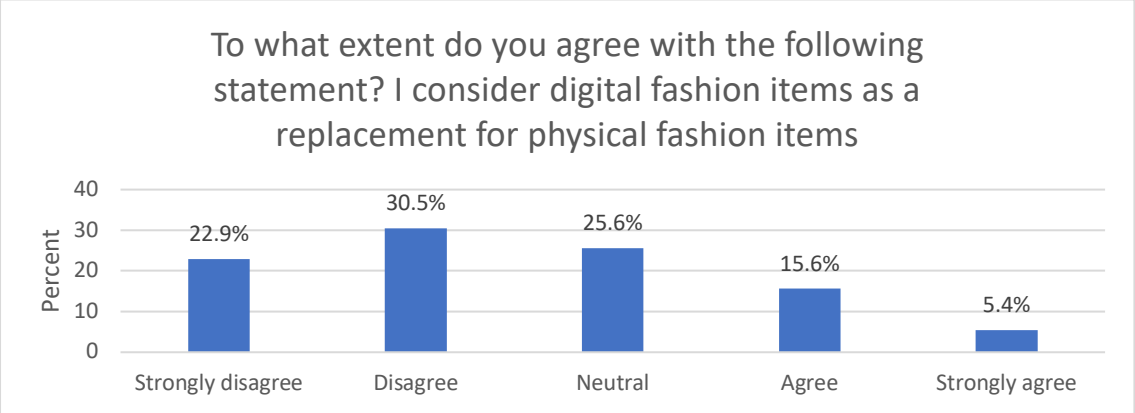
Q20


How much extra money would you be willing to spend on a digital fashion item if it was created by a well-known designer or brand?
Percent
40
30
20
10
0
19.9%
34.8%
32.3%
9.4%
3.5%
No extra amount
Up to 10% more
Up to 20% more
Up to 50% more
More than 50%

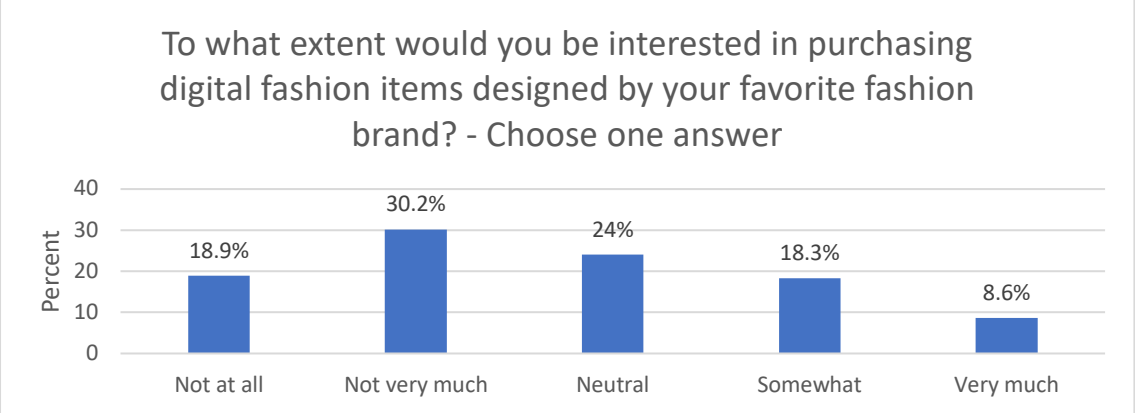
Q21


How much would you be willing to pay for a digital fashion item such as a virtual outfit or accessory that you can wear in the Metaverse?
Percent
40
30
20
10
0
14.8%
31.8%
35.3%
13.5%
4.6%
Less than $1
$1 to $10
$11 to $30
$31 to $50
More than $50

Q22


To what extent do you agree with the following statement? I consider digital fashion items as a replacement for physical fashion items
Percent
40
30
20
10
0
22.9%
30.5%
25.6%
15.6%
5.4%
Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Q23


To what extent would you be interested in purchasing digital fashion items designed by your favorite fashion brand? - Choose one answer
Percent
40
30
20
10
0
18.9%
30.2%
24%
18.3%
8.6%
Not at all
Not very much
Neutral
Somewhat
Very much