Is co-creation still an innovative innovation strategy across generations?

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Abstract

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Co-creation, the process of involving customers in the innovation process, has gained popularity in recent years as a way for companies to tap into customer knowledge, skills, and insights and to create value for both the company and their customers. Co-creation as an innovation strategy has already been used for many years. However, the extent to which co-creation is still perceived as an innovative innovation strategy among younger generations has not been researched. This paper aims to review the literature on co-creation and innovation to answer the question: Is co-creation still perceived as an innovative innovation strategy? A systematic review of the literature was conducted, and the results suggest that co-creation is still perceived as an innovative innovation strategy. In order to test the differences in perceptions between generations, a survey was conducted to test these possible differences. Our study found that younger generations have still higher perceptions of innovation ability, perceive higher trust in companies and their products, and have higher quality perceptions of products which result from a co-creation strategy. The study also found that the level of digital literacy of consumers has a partial influence on these perceptions. Further research is needed to more fully understand the factors that influence the perceived innovativeness of co-creation and to identify best practices for implementing co-creation as an innovation strategy.

Keywords: Co-creation across generations, digital literacy

Sumário

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A co-criação, o processo de envolvimento dos clientes no processo de inovação, ganhou popularidade nos últimos anos como forma de as empresas explorarem os conhecimentos, competências e insights dos clientes e criarem valor tanto para a empresa como para os seus clientes. A co-criação como estratégia de inovação já tem sido utilizada há muitos anos. Contudo, a medida em que a co-criação ainda é vista como uma estratégia de inovação inovadora entre as gerações mais jovens não tem sido investigada. Este artigo visa rever a literatura sobre co-criação e inovação para responder à questão: A co-criação ainda é percebida como uma estratégia inovadora de inovação? Foi realizada uma revisão sistemática da literatura, e os resultados sugerem que a co-criação ainda é percebida como uma estratégia de inovação inovadora. A fim de testar as diferenças de percepção entre gerações, foi realizado um inquérito para testar estas possíveis diferenças. O nosso estudo descobriu que as gerações mais jovens ainda têm percepções mais elevadas da capacidade de inovação, percebem uma maior confiança nas empresas e nos seus produtos, e têm percepções de maior qualidade dos produtos que resultam de uma estratégia de co-criação. O estudo descobriu também que o nível de literacia digital dos consumidores tem uma influência sobre estas percepções. É necessária mais investigação para compreender melhor os factores que influenciam a percepção de inovação da co-criação e para identificar as melhores práticas de implementação da co-criação como uma estratégia de inovação.

Palavras-chave: Co-criação através de gerações, alfabetização digital

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Glossary

α	Cronbach's index of reliability
ANOVA	Analysis of Variance
H	Hypothesis
M	Sample Mean
p	p-value
SD	Standard Deviation
Gen X	Generation X
Gen Z	Generation Z

1. Introduction

1.1 Background and Industry research

Since the early 2000s, co-creation has gained popularity as a new innovative model for new product development. In this open innovation strategy, consumers take part in the new product development processes through interactions with firms (Galvagno & Dalli, 2014). Through co-creation, consumers are interacting at the same level as internal R&D professionals to develop new products and services. By maintaining a close focus on the needs of its customers, companies are able to create all different kinds of products with unique value propositions (Ramaswamy, 2009). The complex engagement between various stakeholders improves business innovation and provides companies a strategic advantage. At the same, customers can state their opinions and ideas, which will then be used for the development of new products or to adjust already existing products to customers' needs and wants (Mandolfo, Chen, & Noci, 2020; Moghadamzadeh, Ebrahimi, Radfard, Salamzadeh, & Khajeheian, 2020).

Research focusing in the growing trend on innovation models, namely co-creation revealed that organizations, which performed co-creation with customers and employees have performed better in the market with more creative solutions and approaches for longer periods of time (Radjou, Prabhu, Kaipa, & Ahuja, 2010). Due to continuous interaction with firms, third parties, consumers, suppliers and other relevant stakeholders became part of the new product development process and are therefore included in the company's innovation strategy. In 2006 the global sports apparel giant Nike, introduced the Nike+ platform to promote consumer engagement. Nike was able to collaborate with millions of soccer fans worldwide thanks to the recently developed platform. Through platform involvement, Nike+ fostered networking and consumer empowerment, also allowed customers to stay connected with the company (Ramaswamy, 2008). Customers communicate with the company by providing suggestions and insights that are utilized to create new goods or enhance existing ones. This, in turn, helped the company to gain a competitive advantage through addressing real market needs according to their consumers by continuously interacting with its customers through engagement platforms, especially those centred on customer experiences.

Digital development enhanced the possibilities of co-creation as an innovation strategy. Web 2.0, which is characterized by virtual platforms where consumers and brands interact and generate value, power is redistributed from brands to customers as consumers take an active role in the creation of new products and services from brands (Grönroos & Voima, 2013;

Iglesias & Bonet, 2012; Singh & Sonnenburg, 2012; Vallaster & Wallpach, 2013). Content sharing, information dissemination, and relationship development are all made possible by using virtual platforms for marketing activities (Chang, Yu, & Lu, 2015; Cheung & Lee, 2010; Kim & Ko, 2012). To formulate it another way, co-creation benefits from the use of social media. When brands and consumers join forces, both create value by sharing useful information and learn from both sides (Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004, 2016). When consumers give different characteristics to a brand, it can lead to perceptions about how the brand can be influenced. Co-creation emerges when members agree to take part in a co-creation community (Ind, Iglesias, & Schultz, 2013), the driving forces for consumers' participation in co-creation (Füller, 2010), and the resources which are needed to execute the strategy (Gummesson & Mele, 2010).

Co-creation has emerged as a prominent concept in the digital age, particularly with the rise of Web 2.0 technologies that have enabled greater collaboration and participation online (Bughin, Chui, & Manyika, 2010). These technologies have facilitated the creation of virtual communities and platforms that allow companies to engage with customers in new and innovative ways, leading to the co-creation of value for both parties (Vargo & Lusch, 2004). Co-creation has the potential to improve the quality and relevance of products and services, as well as to build stronger relationships between companies and their customers (Prahalad & Ramaswamy, 2004). As such, it has become an important strategy for firms looking to stay competitive in the digital economy (Evans & Reid, 2011).

The rise of digital technologies was met with the emergence of new generations more accustomed to and expectant of firm collaboration and online participation. For example, the younger generations, Millennials and Generation Z, are often referred to as "digital natives" because they have grown up with access to technology and the internet from a young age (Prensky, 2001). These generations tend to be more open to and adept at using digital platforms for co-creation, and companies are increasingly seeking to engage with them in this way (Evans & Reid, 2011). The rise of digital technologies, particularly Web 2.0 platforms, has enabled greater collaboration and participation online, leading to the emergence of co-creation as a popular business strategy. For Millennials and Generation Z, co-creation may seem like a natural and expected way of doing things, as they have grown up in a digital environment that has facilitated this approach. Thus, younger generations may consider the process of co-creation as the natural way of idea generation for innovation, while older generations value the involvement of consumers as external sources in business processes as a new innovative method. For generations born after the millennium, perceived benefits of co-created new

products, such as lower costs, better adaptation, greater speed of service, higher levels of convenience or greater brand differentiation, learning, social integration, personal integration, and hedonism (Nambisan & Baron, 2009; Nuttavuthisit, 2010; Roberts, Hughes, & Kertbo, 2014), became common within this generation. In addition, younger generations are often more interested in and expectant of personalized and relevant products and services, and co-creation allows for the creation of such products and services by actively involving customers in the creation process (Prahalad & Ramaswamy, 2004).

At the same time, innovation scholars investigated factors such as perceived quality (Liljedal, 2016), innovation ability (Gyrd-Jones & Kornum, 2013), and brand trust (Kamboj, Sarmah, Gupta, & Dwivedi, 2018) when co-creation was involved in the innovation strategy.

This dissertation investigates whether co-creation continues to generate positive behaviours toward products through positive perceptions of firm capabilities and product attributes to younger generations (van Dijk, Antonides, & Schillewaert, 2014). We will also investigate whether consumers digital literacy across generations is the driving factor towards perception of innovation ability that arise from a co-creation strategy.

1.2 Research aim and objectives

Co-creation has been a very popular and successful innovation strategy over the last two decades. This study is now aimed at showing whether co-creation still holds its own as an innovative strategy among the younger generations. The assumption is, that older generations valued the process of co-creation more compared to younger generations. With the comparison of different generations, this work should provide useful insight about the process of co-creation impacts them and how they perceive and value this process.
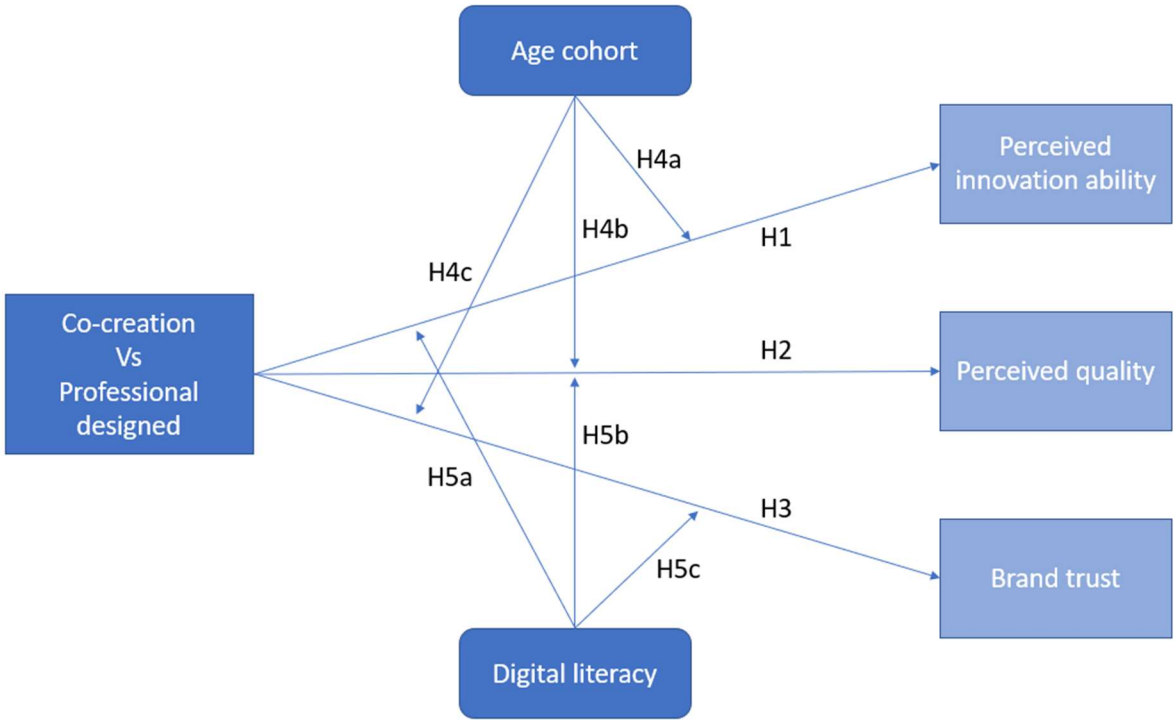
1.2.1 Conceptual Framework

Figure 1 - Conceptual Framework

2. Literature Review

2.1 Co-creation: definition

Research has shown that co-creation is an approach that enables businesses to create a product that more closely matches the target market, and its consumers needs and wants (Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010; Mahr, Lievens, & Blazevic, 2014; Nambisan & Baron, 2009; Sanders & Stappers, 2008). Co-creation is seen as a successful source of innovation (Bogers, Afuah, & Bastian, 2010) and can be helpful to introduce more customizable products (Syam & Pazgal, 2013). Through active interaction between firms and users during the creation of new products, brands can build trust and become more authentic (Costa & Coelho do Vale, 2020). Co-creation is a topic which has been researched broadly (Galvagno & Dalli, 2014; Mustak, Jaakkola, & Halinen, 2013; Ramaswamy & Ozcan, 2018), and also can be seen as a source to gain competitive advantage (Fuchs, Prandelli, Schreier, & Dahl, 2013). Past research found out, that customers prefer co-created products than firm internally designed products (Schreier, Fuchs, & Dahl, 2012).

The process of cooperation involves exchange of resources: skills and knowledge that benefits the firm innovation process (Sun et al., 2020). The new products that result from co-creation once they are communicated to the broad market makes consumers display higher purchasing intentions, willingness to pay, customer loyalty and advocacy of the consumer (Schreier et al., 2012). Involving consumers to the innovation process increases the perception of innovation capabilities, brand trust and product quality (Cambra-Fierro, Melero-Polo, & Sese, 2018; Mingione, Cristofaro, & Mondi, 2020; Wasaya et al., 2021). This process of open innovation can rise the consumers satisfaction and directly impacts the brand experience, since users feel fulfilled by having a direct and personal impact on the company's product offering (Dahl, Fuchs, & Schreier, 2015). The success of co-creation is on the one hand dependent on the consumers which are actively taking part in the creation process (Mingione et al., 2020), but on the other hand also on those consumers, which are not having an active role in the creation process, the observing consumers (Costa & Coelho do Vale, 2018; Dahl et al., 2015; Fuchs & Schreier, 2011). Observing customers tend to associate co-created products with more customer orientation and perceive them as more useful, and with higher innovation abilities, which can lead to a stronger demand of co-created products on the market (Dahl et al., 2015; Fuchs & Schreier, 2011).

Besides these positive effects, co-creation can also have damaging effects on a brands' perception. The use of co-creation includes risks which need to be considered, like loss of

control and changing the brand image and DNA (Kozinets & Handelman, 2004). Because users might not recognize the expertise and abilities of other users, especially for luxury brands (Fuchs et al., 2013).

Co-creation has grown significantly with the rise of digital tools and technologies, particularly Web 2.0 platforms that enable greater collaboration and participation online (Bughin et al., 2010). These technologies have facilitated the creation of virtual communities and platforms that allow companies to engage with customers in new and innovative ways, leading to the co-creation of value for both parties (Vargo & Lusch, 2004).

The growth of co-creation can be attributed to several factors. Firstly, digital technologies have made it easier for companies to reach and engage with a wider and more diverse group of customers, who can provide valuable insights and ideas for product and service development (Prahalad & Ramaswamy, 2004). Secondly, digital technologies have enabled companies to gather and analyze customer data more efficiently, allowing for more targeted and personalized products and services (Bughin et al., 2010). This is particularly relevant for younger generations, such as Millennials and Generation Z, who are often more interested in and expectant of personalized and relevant products and services (Evans & Reid, 2011).

Overall, the growth of co-creation with digital tools has allowed for more efficient and effective collaboration between companies and their customers, resulting in the creation of more innovative and relevant products and services (Prahalad & Ramaswamy, 2004). As such, it has become an important strategy for firms looking to stay competitive in the digital economy (Evans & Reid, 2011).

2.1.1 Benefits

Companies that pursue a co-creation strategy consider their customers as an important and valuable part of building relationships and connections between a brand and the market that go beyond the purchase of products and services. In turn, this also means that customers of companies that use co-creation as one of their strategies are not only external participants, but also important innovation partners and internal stakeholders of a company. Such customer orientation creates a competitive advantage for companies, as they are perceived as more transparent (Fuchs & Schreier, 2011), and more innovative (Schreier et al., 2012), which is leading to a better attitude towards the product (Moghadamzadeh et al., 2020). From a business perspective, each interaction between consumers and business professionals enables new combinations of knowledge that can improve shared understanding and knowledge of consumer

needs (Grönroos, 2011; Mahr et al., 2014; Poetz & Schreier, 2012; Un & Asakawa, 2015). By including the consumers in the innovation process, many people can contribute with sharing their ideas (Schreier et al., 2012). The more ideas a company collects, the more likely new innovative ideas will come up (Troy & Davidow, 1998; Valacich, Wheeler, Mennecke, & Wachter, 1995). Consumers may have a competitive advantage over professional designers. Since the consumers who participate in the creation process share the same characteristics with the market, they can better interpret the needs and wants of the customers, which leads to successful innovation (Nishikawa et al., 2013). In addition, some lead users may have already tried product problems themselves and can therefore predict what consumers will demand in the future, giving companies a competitive advantage (Hippel, 2005). Due to the large number of participants in the innovation process, the collected ideas are naturally more diverse (Nishikawa et al., 2013). This leads to the assumption that the probability of developing new and innovative ideas is increased (Schreier et al., 2012; Surowiecki, 2004; Terwiesch & Ulrich, 2009). By real time communication with its consumers, a company gains valuable just-in-time knowledge, which can be used to recognize flaws in products or services faster. This knowledge helps companies to be one step ahead of their competitors (Roser, Samson, Humphreys, & Cruz-Valdivieso, 2009). Reliable just-in-time knowledge about customer preferences is perceived as the most important factor in innovation processes (Henkel & Hippel, 2005). Therefore, customer-involvement directly contributes to the effectiveness of innovation processes, increases the likelihood of new products, and increases the probability of a successful product launch (Hoyer et al., 2010). Companies that effectively manage this process will achieve a sustainable competitive advantage in the market (Prahalad & Ramaswamy, 2004), which may have a positive influence on their brand perception which can therefore generate higher purchase intentions and greater brand loyalty (Fuchs & Schreier, 2011).

2.1.2 Perceived innovation ability

The customers' perception that a company is capable of producing innovative products is defined as the perception of innovation ability (Brown & Dacin, 1997; Gürhan-Canli & Batra, 2004). A company which is seen as innovative, has a competitive advantage, because this positively influences the consumer's willingness to pay as well as their purchase intention (Lude, Hauck, Prügl, & Hubert, 2016; Schreier et al., 2012). Influencing consumer perception is therefore considered an important and complex corporate strategy (Barich & Kotler, 1991). Previous studies investigated the consumers' perceptions of companies that let their customers

participate in new product development. The results showed that companies that involve consumers in the innovation process achieved an improved perception of innovation ability than companies that only use professional designers (Lude et al., 2016; Schreier et al., 2012). In addition, they also tried to find out why companies that involve consumers in the innovation process are perceived as more innovative. A number of factors were identified. Firstly, a much larger number of people are involved in the innovation process, which increases the number of ideas, which in turn increases the likelihood of finding good ideas. In addition, consumers believe that co-creation brings a variety of backgrounds, interests, and skills to the innovation process. This leads to the assumption that this diversity leads to desirable product ideas. Another finding is that consumers who participate in co-creation are not bound and constrained in their creativity by company guidelines or rules. This gives participants more freedom to be creative and innovative, which then increases the chances of inventing desirable products (Schreier et al., 2012).

H1: Companies that co-create are perceived with higher innovation ability than companies that only use internal professional designers.

2.1.3 Company trust

More and more companies are using co-creation to develop interaction with their customers. P&G has set up an online platform, P&G connect+develop, where the company is searching for innovative solutions to specific problems in collaboration with consumers. Sportswear manufacturer Adidas has developed "Adidas Indsiders", an online community for consumers that gives them the opportunity to give direct feedback and share ideas for new products and campaigns.

In these examples, companies only interact with their own and the participating consumers. Previous research has only ever focused on consumers participating in the co-creation process, whereas the observing consumers are actually more important as they make up a much larger share of the market (Fuchs et al., 2013). Co-creation has different effects on the participants and the observing consumers. The valuation of a company or brand can change when the market knows that consumers have been involved in the creation process (Fuchs & Schreier, 2011). This is because consumers perceive a brand or company as more consumer-oriented when consumers are involved in the company's internal processes (Solis, 2012).

Co-creation thus helps to build stronger trust between companies and their consumers. Through

communication between companies and participating as well as observing consumers, they create connections among themselves and share risks. Companies need to become more transparent and disclose a wide range of information, including negative information, about their products and their sourcing. Only in this way can co-creation be successfully integrated into the development process (Randall, Gravier, & Prybutok, 2011). In the past, companies provided little or no information to their consumers, which was to the companies' advantage. Today, however, it is necessary and desirable that companies become more transparent, as this can build better trust in the companies (Prahalad & Ramaswamy, 2004). Since companies automatically disclose more information through co-creation and thus become more transparent, the following hypothesis was developed:

H2: Companies that co-create are perceived with higher trust than companies that only use internal professional designers.

2.1.4 Quality perceptions

If a product is labelled as co-created, it affects consumers' perception of the product's quality (Fuchs et al., 2013). Quality perceptions are defined by how customers perceive the overall quality or benefits of a product over those of comparable alternatives (Keller, 2013). The consumer's knowledge that a product is co-created has a strong impact on the perception of quality (Fuchs et al., 2013). Therefore, the perception of quality is defined by the distinguishing features and specifications of a product. For example, sports products are mostly co-designed by their users, as they share personal experiences as feedback with the companies and consequently play a central role in the design of specific products, which are developed according to the needs of their users (Bogers et al., 2010). Therefore, co-creation is a technique that improves the external perception of brands through collaboration with customers, as they are involved in the idea and product development process and thus bring user experience into the process (van Dijk et al., 2014). Co-creation has gained increasing attention in recent years as a means of enhancing customer satisfaction and loyalty (Prahalad & Ramaswamy, 2004). One key aspect of co-creation that has received relatively little attention in the literature is the impact of co-creation on quality perceptions of the resulting products. Several studies have investigated the relationship between co-creation and quality perceptions. Researcher conducted a case study of a construction firm that involved customers in the design and delivery of their homes (Bresnen, Marshall, & Rowlinson, 2010). They found that customers who were

more involved in the co-creation process reported higher levels of satisfaction with the finished product, as well as higher levels of trust and loyalty towards the firm. Other researchers found that customers who participated in co-creation activities reported higher levels of satisfaction with the resulting products, compared to those who did not participate (van der Byl & Pretorius, 2013).

There are several factors that may influence quality perceptions of co-created products. One such factor is the level of customer involvement in the co-creation process. Research has shown that customers who are more actively involved in the co-creation process tend to have higher quality perceptions of the resulting product (Bresnen et al., 2010; van der Byl & Pretorius, 2013). This may be because customers who are more involved in the co-creation process feel a greater sense of ownership and personal connection to the product, leading to higher levels of satisfaction (Prahalad & Ramaswamy, 2004). Another factor that may influence quality perceptions of co-created products is the level of customization offered. Research has shown that customers who have the opportunity to customize products tend to have higher quality perceptions, as they feel that the product is tailored to their specific needs and preferences (Grewal, Levy, & Kumar, 2002). This may be particularly important in the case of co-created products, as customers are often more invested in the outcome of the co-creation process and therefore may place a higher value on the level of customization offered. In addition, offering customization options and designing and managing the co-creation process effectively can also contribute to higher quality perceptions of co-created products. In conclusion, the literature suggests that co-creation can lead to higher quality perceptions of the resulting products. A company's ability to innovate by creating and developing new ideas, products, and services influences customer perceptions (Schreier et al., 2012), which is strengthened by the associations of a brand with co-creation (Alves, Fernandes, & Raposo, 2016; Bogers et al., 2010).

H3: Products that co-created are perceived with higher quality than new products that result from internal professional designers.

2.2 Age Cohorts

Generations are changing over the years and with the switch from one generation to the next, a lot of attributes are changing as well. The new generation is perceived as very technological and more digital as previous generations. Technology has a strong impact on Generations Y and Z, which enables faster execution of co-creation processes. Generation Z is more exposed to new technologies than all previous generations, which is why they have a strong impact on technology. During the last decades, companies have noticed the importance of customer retention, which has led to customers being involved in production processes in the form of co-creation (Ramaswamy, 2009). Through co-creation, many customers contributed their knowledge to different production processes, thus increasing productivity and production value. Due to the strong improvement of technology, especially the young generation is involved in the co-creation processes. With new technologies such as online shopping, young customers have contributed a lot to co-creation. Companies have engaged their customers through online engagement, creating a better opportunity for interaction and improving products and services through direct feedback. The constant use of social media platforms like Facebook or Instagram, customers can interact with the brands and participate in product co-creation by giving feedback or participating in polls for example (Wallace, Torres, Augusto, & Stefuryn, 2022). This way companies could identify their most popular products among young generations (Jain, Paul, & Shrivastava, 2021).

2.2.1 Definition and characteristics of the different generations

Generation X is born between 1964 and 1978 (Kotler & Keller, 2012). Generation X is considered as less optimistic and seen by a rather difficult youth in economic and political terms. Nevertheless, it was through this generation that the internet, global thinking, and multiculturalism became popular (Ritson, 2007). In addition, they are considered the best educated generation with the highest level of education that introduced technology into the mainstream (Mitchell, McLean, & Turner, 2005). Generation X consumers spend a lot of money on clothing, housing, and entertainment (Chaney, Touzani, & Ben Slimane, 2017), while brand loyalty is not common usually. For example, Generation X consumers are less loyal than their predecessor generation, the baby boomers, because there is more advertising and the range of products and services has increased significantly (Mitchell et al., 2005). Due to their sceptical attitude towards passive marketing stimuli, Generation X consumers are generally more

difficult to convince (Bashford, 2010). When purchasing products, they attach great importance to information about the features and an explanation of the need, which is why they are considered demanding and selective. Generation X prefers to choose products and companies that excel in innovation rather than those that rush into the latest technologies (Moore & Carpenter, 2008). The generation is considered media and communication oriented, with media and communication tools being used more for entrepreneurial activities rather than leisure (Reisenwitz & Iyer, 2009).

Millennials, or Generation Y was born between 1979 and 1994 (Kotler & Keller, 2012). This generation is clearly different from its predecessors. One of the main distinguishing features is its size. In fact, the Millennial group is the largest in the US since the Baby Boomers (Jin Ma & Niehm, 2006; Paul, 2001). They are representing about 24% of the adult population within the EU and they have a high purchase power, which is making them interesting for companies. The Millennials are the first consumers that engaged with advanced consumer-based technologies and the internet in general at a young age (Smith, 2012). Generation Y travels more than the previous generations and at the same time they develop a more solid socially responsible attitude towards society and companies. In addition, Millennials have distinct social and economic characteristics that also apply to the cohort as a whole. This means a fast-paced society with the search for individuality and the internet as the main influencer (Williams & Page, 2011). Due to the large selection of different brands and their purchasing decisions, there is a high degree of individualisation of the identities, this attitude is characterised as materialistic. Consumers from generation Y have higher incomes than their predecessors, are more consumption oriented and have sophisticated tastes and preferences (Wolburg & Pokrywczynski, 2001). They are also always connected and look for inspiration to satisfy their needs via the internet (Bolton et al., 2013; Smith, 2011). Generation Y consumers were born in an era with lower unemployment than their predecessors, a commitment to equal treatment of women, and the normalization of multicultural households that support diversity. Their social consciousness surpasses that of previous generations. They are always looking for acceptance and try to interact with the people around them in a network (Hawkins & Mothersbaugh, 2010). Within this Generation, Marketing content featuring individuals from different ethnic backgrounds is perceived as natural, since millennials portray society as multicultural. They prefer to interact with brands that uphold their beliefs but are also variable and dynamic, leading to a preference for customisable and individualised products (Dietz, 2003).

Members of Generation Z were born approximately between 1995 to 2012 (Kitchen & Proctor, 2015). The still very young Generation Z is a unique group that is rapidly gaining economic power. According to a study, they have been influencing the consumption behaviour of all age groups for several years (Calmbach, Borgstedt, Borchard, Thomas, & Flaig, 2016). The impact of 9/11 and the associated global terror, as well as violence in schools and economic insecurity, are considered the most important events that have shaped the set of values of this generation (Williams & Page, 2011). Generation Z is the first generation born into a fully developed digital world where the internet and smartphones were always present. They are used to a fast flow of information and a high level of technology (Kitchen & Proctor, 2015). As this generation grows up in uncertain social, political, and environmental conditions, security is more valued among them than ever. Social acceptance and recognition among peers and gaining social affiliation is also more important than ever before. Generation Z is looking for authenticity and "realness" in social media interactions. This generation is expected to act more responsibly and draw on traditions and the importance of family (Williams & Page, 2011). With a global and diverse mindset, they come from a wide mix of backgrounds and benefit from unique ideas and experiences that they have grown up with. These shape their views of the world, education and working life (Bencsik, Juhász, & Horváth-Csikós, 2016).

Various authors described this generation as self-confident, fast learning, optimistic, impatient, imaginative, brave, impulsive, and able to work productively on different tasks at the same time (Bencsik et al., 2016; Kitchen & Proctor, 2015; Ozkan & Solmaz, 2015; Williams & Page, 2011).

2.2.2 Co-creation as an "old" concept

Digitalisation has opened new opportunities for collaboration between businesses and consumers. Through online platforms such as Instagram or blogs, companies can communicate directly with consumers. While younger generations are already growing up with web 4.0 and see it as natural and less innovative, older generations see a high potential for innovation in the new technology (Zhang, Lu, Torres, & Cobanoglu, 2020).

The interaction of consumers with a company is accelerated and simplified by technology and often it is even only made possible through technology (Zhang, Lu, & Kizildag, 2017). By using technology companies can exchange knowledge with their consumers, which allows them to understand customers' needs and wants. This helps companies to reach a better position and gaining a competitive advantage by providing goods and services tailored to customers' wishes

(Jain et al., 2021). Consumers are better connected to businesses through digital platforms and can therefore participate more easily and efficiently in the co-creation process (Frow, Nenonen, Payne, & Storbacka, 2015).

Researchers have found that co-creation and digital literacy are connected (Russo & Watkins, 2005). Co-creation is enhanced by the use of digital skills in companies, while digital platforms play an important role in the innovation process for the development of new products. By using such technologies from consumers, companies can efficiently gather information that can be directly translated into product-related knowledge (Potts et al., 2008).

Consumer autonomy in configuring computers, smartphones and other devices that serve as tools for interaction in the co-creation process are an example of digital literacy (Lember, 2018). Such plans are more likely to attract those who are familiar with the technologies. In addition, digital tools are already the preferred method for collaboration and information gathering (Zwass, 2010). Collaboration of both product co-creation and digital literacy reduces the chances of uncertainty (Balti & Trisnawati, 2021). The likelihood of collaboration in product co-design is related to the level of digital literacy. Therefore, it is assumed that the perceived ability to co-create is related to the perceived competence in using digital tools (Thompson, 2013).

2.2.3 How the characteristics of co-creation are likely to stopped being perceived as new

Co-creation initiatives are executed online in most cases (Bayus, 2013). Younger consumers, between 20 and 30 years old, make up the largest share of users of the internet and online communities (Thayer & Ray, 2006). As younger consumers have grown up with the internet, they have usually already had indirect or even direct experience with consumer participation. As a result, younger consumers are more familiar with the concept of co-creation and therefore no longer see the concept as a novelty. Consumer innovators are usually rather young and see the concept as normal due to the high familiarity (Hienerth, Keinz, & Lettl, 2011; Lüthje, Herstatt, & Hippel, 2005). Since consumer innovators are more likely from younger customer segments, chances are high, that they already know peers which made experiences with developing or changing a product in collaboration with a company. As younger consumers are more exposed to user communities and are also more likely to be innovators, they are already familiar with the concept of co-creation, why they tend to stop perceiving the concept as new (Schreier et al., 2012).

Over the last few years, a lot of self-created content has been shared on the internet, especially

by younger consumers (Fromm, Lindell, & Decker, 2011). This phenomenon leads to consumers identifying more strongly with the co-creators in online communities, and this is therefore no longer considered a special feature. In addition, previous studies found that respondents perceive co-designers as young, even though it was not described that way in the survey. Thus, it can be assumed that younger consumers no longer perceive the concept as new (Lude et al., 2016).

H4: Generation cohorts positively moderate the effect of co-creation on perceptions of a) firms innovation ability, b) firm trust and c) product quality.

2.3 Digital literacy as an explanation of co-creation having become mainstream

Electronic devices such as computers and smartphones can functionate as a tool for different operational activities in co-creation activities. Digital co-creation efforts are progressively facilitated through incentives for plans (Lember, 2018). By using new digital tools such as social networks, new skills can be learned faster and easier, and data can be distributed more easily. This facilitates and expands product co-creation.

In product co-creation, the use of new technologies has become inevitable. Therefore, digital literacy is a fundamental element for working together on projects, for exchanging ideas and for acquiring new knowledge (Zwass, 2010). Mobile apps, digital platforms, and social media channels are just a few digital tools that can be used for co-creation. By applying digital competences, possible communication problems are prevented and access to necessary data required for product development is ensured. Due to the additional development time required, it is assumed that co-created products must be offered at a premium price. Through the interaction of product co-creation and digital literacy, the chances of misunderstandings and uncertainties are reduced (Balti & Trisnawati, 2021). To advance co-creation in today's world, technological skills are generally required. Using digital literacy and tools, co-creation collaboration is simplified and improved. The targeted use of different tools in the individual processes increases speed and facilitates working on a large scale.

H5: The level of consumers' digital literacy positively moderates the effect of co-creation on perceptions of a) firm innovation ability, b) firm trust and c) product quality.

3. Methodology and Research Framework

This chapter presents a sustained account of the reasons for the intuition of our topic and the hypotheses presented in the literature review of our study. In addition, we have a study that investigates whether companies that co-create are perceived as more innovative than companies that only involve company professionals in product development. With the aim of consolidating the data collection, we then present our main findings and results.

3.1 Data Collection and Sampling

This study was conducted by means of an online survey in order to collect and subsequently analyse the responses of the participants. This method was chosen because there are no costs, possible geographical barriers can be overcome, and the answers of many participants can be collected in a short time (Evans & Mathur, 2005). The online survey was developed on Qualtrics and were shared among the author's personal network via social media including Facebook, Instagram, and WhatsApp. It was mandatory to answer all questions of the survey and participants were asked to answer all questions as honestly as possible. The participants also were informed, that all answers will be kept strictly confidential and anonymous and that there will be no way to link the responses to their identity.

3.1.1 Study

In total the survey collected 161 valid answers, of which 59,63% were male. For the analysis, we need approximately the same number of participants per age group, broken down into generations. In the end we had 42 participants of GenZ, 40 participants of Millennials, 38 GenX participants and additional 41 participants from older generations.

In the beginning of the questionnaire the participants were randomly assigned to one out of two innovation strategies, in order to collect answers in terms of co-creation as well as in terms of the traditional professional design. Therefore, no screening question was needed. In order to compare the differences of perceptions in regard to different generations, we have deleted 46 random answers of GenZ. After that, we were left with a similar number of participants for each generation and with 77 participants for the co-creation strategy and 84 participants for the professional's strategy, we had a relatively balanced level of answers for each scenario.

3.2 Design

After the introduction participants were randomly assigned to a different innovation strategy (co-creation vs. professionals), and they could read a short description about the assigned innovation strategy, it can be observed in the Appendix of the survey (Q1 Co-creation; Q2 Professionals).

Firstly, the participants answered a manipulation question about who was involved in the product development process for innovation strategy which was presented to them. This question was included in the survey to find out, if the participants understood the proposed scenario. Secondly, the participants had to answer three blocks of questions about innovation ability, company trust and perceived quality of a company's products in order to get insights about the general impact of the different innovation strategies. In the first block, participants had to rate the perceived innovation ability for a company that is using the presented innovation strategy. This question came from literature of (Luo & Bhattacharya, 2006). In the second block, the participants had to answer their agreement with five statements about perceived trust in the company. These statements were adapted from (Chen, 2013) and adjusted to Company trust. After that, in the third block the participants had to rate five quality perceptions about new products, developed with the presented innovation strategy. These perceptions came from literature of (Dodds, Monroe, & Grewal, 1991). Thirdly, the participants were asked about their purchase intentions of new products developed according to the presented innovation strategy. This was to have a final conclusion, about the overall perception of the innovation strategy. This Likert scale was adapted from (Mohr & Webb, 2005).

The next question block was about digital literacy and consisted of four Yes and No questions, eleven familiarity checks with Internet-related items and one question about the participants' considered Internet skills. These questions were adapted from (Hargittai, 2005) and aimed to find out if the level of digital literacy influences the participants innovative perceptions of co-creation. In the second last question block, participants were asked about their familiarity with co-creation according to (Schreier et al., 2012).Lastly, respondents were asked to provide demographic information about themselves, including Age, Gender, Income, professional status, Education and Residence, which concludes the questionnaire.

In order to be able to make distinctions between the different generations, the age sections in the demographics have been chosen in such a way that a distinction can be made between generation X, Y, Z, and older.

3.3 Measures

Table 1, which is presented below lists all measures and item sources in the same order as asked in the in the questionnaire of the conducted online survey. The survey questions were assembled, compared, and selected on the basis of results in corresponding research areas. For most of the answers we used a 7-point Likert scale and one set of questions consisted of simple Yes/No/Not sure questions. After the table all measures will be fully described to have a better understanding of the table.

Variable	Scholar	Questions	Scale
Innovation Ability	(Luo & Bhattacharya, 2006)	"What do you think about the firm's innovation ability?"	(1) "Not very high/very high" [1:7], (2) "Not very strong/very strong" [1:7], (3) "Not excellent/excellent" [1:7].
Company Trust	Adapted from Chen (2013)	1. I feel that new products that result from this innovation strategy are generally reliable. 2. I feel that this company's performance is generally reliable. 3. This company is generally trustworthy. 4. This company's offer meets my expectations. 5. This company delivers on promises and commitments.	"Strongly disagree/Strongly agree" [1:7]
Quality Perceptions	(Dodds et al., 1991)	1. The likelihood that new a product is reliable. 2. The likelihood that the work skill of the new product is: 3. The likelihood that this new product is reliable is 4. This new product's quality should be: 5. The durability of this new product would be:	"Very low/Very high" [1:7]

Purchase Intention	(Mohr & Webb, 2005)	How likely are you to buy a new product from this company?	(1) "Very unlikely/Very likely" [1:7]
			(2) "Impossible/Very possible" [1:7]
			(3) "No chance/Certain" [1:7]
Digital Literacy	Hargittai (2005)	Do you know how to download a file from the World Wide Web to your computer?	"Yes/No/Not sure"
		Do you know how to send a file that is on your computer's hard drive to someone using another computer?	
		Do you know how to open an attachment someone sent you via email?	
		Do you know the name of any search engines?	
		How familiar are you with the following Internet-related items?	
		Browser, Server, HTML, Online communities, Spam, Click-through, Remote login, E-zine, Filtering software, Webblog, Message thread	"no understanding/full understanding" [1:7]
		How would you rate your Internet skills?	"not at all skilled/very skilled" [1:7]
Co-creation	Adapted from (Schreier et al. 2012)	How familiar are you with co-creation?	"Not familiar at all" to "Extremely familiar"
Demographics	Own construct	Age, Gender, Income, Occupation, Education, Residence	

Table 1 - Measures of the Survey

3.3.1 Innovation ability

This variable is used to compare the difference between the perceived innovation ability of both strategies. To assess perceived innovation ability, participants were asked to rate three questions on a 7-point Likert scale from 1 (*not very high/strong/excellent*) to 7 (*very high/strong/excellent*). The questions were based on the study by Luo & Bhattacharya (2006) and are intended to apply to a company using the innovation strategy presented at the beginning.

3.3.2 Company trust

The perceived trust in a company was evaluated by five statements following the 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The questions were adapted from from a study conducted by Chen (2013) and have been adjusted to relate to trust in a company and its products. The questions should be answered in relation to the innovation strategy presented at the beginning of the survey.

3.3.3 Quality perceptions

To explore how participants perceived a products quality, five questions regarding quality perception were adapted from a study by Dodds and collaborators (1991). These questions were presented in a 7-point Likert scale ranging from 1 (*Very low*) to 7 (*Very high*). These questions should as well be answered in relation to the innovation strategy which was presented in the beginning of the survey.

3.3.4 Purchase intention

The purchase intention of a product was evaluated by a question conducted from a study by Mohr & Webb (2005) following three different 7-point Likert scales ranging from 1 (*Very unlikely/impossible/No chance*) to 7 (*Very likely/Very possible/Certain*). Like the questions before, these answers should also be based on the innovation strategy which was presented to every individual participant in the beginning.

3.3.5 Digital literacy

To measure the digital literacy of the participants, three different question blocks have been adapted from a study by Hargittai (2005). The first question block consisted of four simple questions about how to execute internet related actions and were to answer with (*Yes/No/Not sure*).

In the second block, participants were asked to answer their understanding about eleven different internet related items on a 7-point Likert scale, ranging from 1 (*No understanding*) to 7 (*Full understanding*).

The last question about digital literacy was also adopted from Hargittai (2005). In this question participants were asked to rate their own internet skills on a 7-point Likert scale, ranging from 1 (*Not at all skilled*) to 7 (*very skilled*).

3.3.6 Co-creation

Close to the end of the survey, a control question was added. This question was derived from a study conducted by Schreier and collaborators (2012). Participants were asked to rate the question "*How familiar are you with co-creation?*" on a range from "*Not familiar at all*" to "*Extremely familiar*".

3.3.7 Demographics

The demographics in the end of the study follow an own construct including questions about Age, Gender, Income, Occupation, Education, and Residence. The most important part about the demographics was that the age was not presented in the usual age blocks. In order to distinguish between the different generations, the participants age was displayed in generational ranges. This was helping us, to be able to separate all participants into their individual generation groups.

3.4 Scale reliability

To examine the analysis of the internal consistency between concepts examined in the study, Cronbach's α is applied. The procedure shows the extent to which the questions in the survey reflect the research topic (Field, 2012). A value of 0.80 shows that the survey is very reliable (Field, 2012). The corrected item-Total correlation table shows the correlation between the single items. Here all values should be above 0.7. The reliability analysis was applied to three different blocks of variables with a 7-point Likert scale. These different blocks of Variables then could be summarized to one Variable for each set.

The Variable of innovation ability shows high reliability with a Cronbach's $\alpha = .917$ (see Table 2). Looking into Table 3, we can see the indicators of .85, .82, and .83, which indicates, that the items are correlated.

Looking into the Variable of the perceived firm trust, we have a Cronbach's α of $\alpha = .945$, which shows a high reliability of the Variable (Table 2). With the corrected item-Total correlations of .83, .84, .88, .86, and .84, we can see, that the items for firm trust have a strong correlation among each other (Table 3).

The Product quality perceptions variable shows a strong reliability with a Cronbach's α of $\alpha = .932$ (Table 2). Table 3 shows a strong correlation between the individual items with a item correlation of .81, .82, .84, .78, and .85.

VARIABLE	CRONBACH'S ALPHA
INNOVATION ABILITY	.917
FIRM TRUST	.945
PRODUCT QUALITY PERCEPTIONS	.932

Table 2 - Cronbach's Alpha Scale reliability

VARIABLE	CORRECTED ITEM-TOTAL CORRELATION
INNOVATION ABILITY	.85 / .82 / .83
FIRM TRUST	.83 / .84 / .88 / .86 / .84
PRODUCT QUALITY PERCEPTIONS	.81 / .82 / .84 / .78 / .85

Table 3 - Corrected item-Total correlation

3.5 Manipulation Check

In the first step of the survey, we performed a manipulation check to see if participants understood the design scenario they were assigned to (between co-creation vs company professionals). In the manipulation check we included a 3-point scale, where the participants should answer, who they think was involved in the product development for the company that was introduced. The scale was based on 1 = "External entities (e.g. customers) only", 2 = "External entities (e.g. customers) and company professionals", and 3 = "Company professionals only". It was performed an One-Way ANOVA, and the results show a significant difference between the means for both scenarios. $M_{Co\text{-}created} = 1,92$, $M_{Professionals} = 2,94$ with $p\text{-}value < ,001$ ($<0,05$), hence the scenarios were correctly understood by the participants, and we can proceed with the analysis.

4. Results

4.1 Hypothesis testing

Hypothesis H1 stated, that consumers perceive a higher innovation ability for companies that use co-creation in their Product development process compared to companies that only use professional designers. In order to test Hypothesis 1, a one-way-ANOVA was performed. We used the Variable of Innovation ability as the dependent Variable, and the innovation strategy as the independent variable. The co-creation strategy was perceived with a higher innovation ability with a Mean of $M_{Co\text{-}creation}$ = 5.28 and a Standard Deviation of $SD_{Co\text{-}creation}$ = 0.91 compared to the Professionals scenario with $M_{Professionals}$ = 3.42 and $SD_{Professionals}$ = 1.04 (see Table 4). The *p-value* of Scenario $p < .001$ shows us, that the innovation strategy has a significant impact on the perceptions of innovation ability across all our participants. Since the participants demonstrated a higher perception of innovation ability for co-created products, compared to products designed by professionals only, we can accept Hypothesis H1.

The second Hypothesis H2 assumes that consumers perceive a higher trust in companies and their products when they make use of co-creation compared to companies that only use their own employees to come up with new product ideas. Hypothesis 2 was tested with a one-way-ANOVA where we used Trust as the dependent variable, and the innovation strategy as the independent variable. Among all participants, the company which is using the co-creation strategy has a $M_{Co\text{-}creation}$ = 5.43 with $SD_{Co\text{-}creation}$ = .86 while for the professional's strategy the Mean is lower with $M_{Professionals}$ = 3.67 with a $SD_{Professionals}$ = 0.99 (see Table 4). Looking at the *p-Value* with $p < .001$, we can see that the innovation strategy has a significant impact on the trust perceptions of our participants in a company and their products. This means that the participants perceive higher trust for companies that use co-creation as an innovation strategy and Hypothesis H2 can therefore be accepted.

Hypothesis H3 is about the products quality perceptions. The Hypothesis stated, the consumers would have higher quality perceptions in products made by a company or brand which is using co-creation as an innovation strategy compared to companies or brands that leave the decisions in new product development only to their professionals. In the conducted one-way-ANOVA, Quality was used as the dependent Variable, while the innovation strategy was set for the independent variable. Looking at the means of all participants, the co-creation strategy was

perceived with higher quality $M_{Co\text{-}creation} = 5.41$ and $SD_{Co\text{-}creation} = .81$, compared to the professional's scenario with $M_{Professionals} = 3.69$ and $SD_{Professionals} = 1.04$ (see Table 4). Looking at the p-values, we see that the innovation strategy, which is performed by a firm, has a significant impact $p < .001$ on the quality perceptions by its consumer.

	INNOVATION ABILITY		FIRM TRUST		PRODUCT QUALITY	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
CO-CREATION	5.28	0.91	5.43	0.86	5.41	0.81
PROFESSIONALS	3.42	1.04	3.67	0.99	3.69	1.04
P-VALUE	< .001		< .001		< .001	

Table 4 - Perceptions of innovation ability, firm trust, product quality

Hypothesis H4 states, that the age of our participants has a positive and significant impact on the perceptions of innovation ability, company trust, and quality of products. To test this Hypothesis, three Univariate Analyses were performed. The generation and the innovation strategy were set as the fixed factors, while the dependent variable changed per performance for innovation ability, company trust, and product quality.

In Table 5, we can see that the results obtained previously from H1, H2 and H3 also apply across generations. Our findings show that Gen Z perceived higher innovation ability in co-creation strategy than in professionals design with $M_{co\text{-}creation} = 4.88$ vs $M_{professionals} = 3.46$. Similar findings can be drawn for firm trust, where Gen Z has a $M_{co\text{-}creation} = 5.11$ vs $M_{professionals} = 4.2$ and $p < .05$. Also, the perceived product quality is higher for co-created products than for professional's design ($M_{co\text{-}creation} = 5.05$ vs $M_{professionals} = 4.26$).

Comparing the results for Millennials, we can see similar results. Millennials perceive higher innovation ability in co-creation strategy than in professionals design ($M_{co\text{-}creation} = 5.62$ vs $M_{professionals} = 3.75$). The same applies to firm trust with $M_{co\text{-}creation} = 5.71$ vs $M_{professionals} = 2.02$, and product quality with $M_{co\text{-}creation} = 5.68$ vs $M_{professionals} = 3.97$.

Looking into Gen X, we can see the same pattern for each category. Gen X perceives higher innovation ability ($M_{co\text{-}creation} = 5.5$ vs $M_{professionals} = 3.51$), higher firm trust ($M_{co\text{-}creation} = 5.56$ vs $M_{professionals} = 3.51$) and higher product quality ($M_{co\text{-}creation} = 5.55$ vs $M_{professionals} = 3.61$) for co-creation as innovation strategy compared to professional's design.

These perceptions also apply to older generations, where the perceived innovation ability for co-creation is at $M_{co\text{-}creation} = 5.31$ vs professionals design with $M_{professionals} = 2.9$, firm trust $M_{co\text{-}creation} = 5.49$ vs $M_{professionals} = 2.94$, and perceived product quality $M_{co\text{-}creation} = 5.51$ vs $M_{professionals}$

= 2.96. This post-Hoc analysis shows, that younger generations do not differ from older generations with the perceptions of innovation ability, firm trust, and product quality from co-creation as innovation strategy vs professionals design as innovation strategy.

Looking at the *p*-values of the generation cohorts, we can see that there is no significant impact for the different generations on the perceptions of innovation ability with $p_{innovation\ ability}$ = .026, firm trust with $p_{firm\ trust}$ = .013, and product quality with $p_{product\ quality}$ = .029 (see Table 5). Therefore, we can reject Hypotheses H4 since all generations perceive co-creation in the same way.

		INNOVATION ABILITY		FIRM TRUST		PRODUCT QUALITY	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
CO-CREATION	**GenZ**	4,88	0,95	5,11	0,9	5,05	0,86
	Millennials	5,62	1,12	5,71	1,22	5,68	1,18
	GenX	5,5	0,34	5,56	0,42	5,55	0,51
	older	5,31	0,98	5,49	0,83	5,51	0,61
PROFESSIONALS	**GenZ**	3,46	0,99	4,2	0,57	4,26	0,82
	Millennials	3,75	1,05	2,02	1,01	3,97	1,03
	GenX	3,51	1,09	3,51	0,91	3,61	0,86
	older	2,91	0,88	2,94	0,88	2,96	0,96
	p-vlaue Age	0,026		0,013		0,029	

Table 5 - Perceptions among generations

Hypothesis H5 assumed, that the higher perception moderators for co-created products can be explained by a higher digital literacy. To test this Hypothesis, three Univariate Analyses have been conducted. While the level of digital literacy and the innovation strategy were set as the fixed factors for every Analysis, the dependent variable was changed per performance for innovation ability, company trust, and product quality. Before we could start with the Analysis, we have created a new variable for the level of digital literacy. To do so, we have checked the Means and Standard Deviations for the digital literacy variable, in order to divide the digital literacy into "low digital literacy" and "high digital literacy". After performing a frequency test, we found that most participants had a high digital literacy. Therefore, we have deleted 46 answers which were close to the mean in order to get a more clear and more balanced table. The univariate Analysis for innovation ability showed, that participants with a high digital literacy perceive a higher innovation ability for both innovation strategies, with co-creation ($MH_{innovation\ ability}$ = 5.61 vs $ML_{innovation\ ability}$ = 4.73) vs professionals ($MH_{innovation\ ability}$ = 3.60 vs $ML_{innovation\ ability}$ = 3.28) and a *p*-value > 0.05 (p = .17) (see Table 6). Therefore, Hypothesis H5a can be rejected.

Looking into Table 6, we can see a higher trust of participants with high digital literacy in co-creation compared to participants with low digital literacy ($MH_{firm\ trust}$ = 5.74 vs $ML_{firm\ trust}$ = 4.85). For the professional's strategy, the Means are very close ($MH_{firm\ trust}$ = 3.83 vs $ML_{firm\ trust}$ = 3.60) with a p-value < .05 (p = .003). Therefore, Hypothesis H5b can be accepted.

For perceived product quality, we have similar results. In the co-creation strategy, participants with high digital literacy have higher quality perceptions ($MH_{product\ quality}$= 5.71 vs $ML_{product\ quality}$ = 4.88). The professional's strategy was perceived very similar for both, high and low digital literacy ($MH_{product\ quality}$= 3.80 vs $ML_{product\ quality}$ = 3.69) with a p-value of 0.05. Therefore, we can say that the level of digital literacy has a significant impact on perceived product quality, and Hypothesis H5c can be accepted.

		INNOVATION ABILITY		FIRM TRUST		PRODUCT QUALITY	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
CO-CREATION	high digital literacy	5.61	.81	5.74	.73	5.71	.83
	low digital literacy	4.73	.97	4.85	.89	4.88	.69
PROFESSIONALS	high digital literacy	3.60	1.04	3.83	1.02	3.80	1.04
	low digital literacy	3.28	1.22	3.60	1.07	3.69	1.12
	p-vlaue	.17		.003		.05	

Table 6 - Perceptions digital literacy

To summarize the findings of Hypothesis 5, we can say that digital literacy has a partially significant effect on perceptions of co-creation as innovation strategy. Digital literacy has no significant effect on the perceived innovation ability of a company, but partially significant effect on the perceived firm trust and product quality perceptions.

5. Discussion

5.1 Findings

Co-creation is nowadays being used in most branches and sectors in the business world. It is a way for companies to involve customers in the innovation process and to tap into their knowledge, skills, and insights. Co-creation can take many forms, such as co-design, co-development, co-production, and co-marketing, and can be applied to a wide range of industries, including manufacturing, service, and creative industries. Co-creation is increasingly being recognized as an important strategy for companies to create value for both themselves and their customers. It can lead to higher levels of customer satisfaction and loyalty, as well as increased innovation and differentiation in the market. Co-creation can also help companies to develop products and services that are more aligned with customer needs and preferences. Co-creation may be particularly important for companies that rely on customer feedback and input to drive innovation and that aim to create personalized and customized products or services. It may also be relevant for companies that seek to build strong relationships with their customers and to create a sense of community or belonging among them. In general, co-creation can be an effective way for companies to engage with and learn from their customers in order to create value for all stakeholders.

Since co-creation is an innovation strategy, which is being used for more than 20 years already, this dissertation wanted to find out, if it is still perceived as an innovative strategy among younger generations. Therefore, we have tested three hypotheses about the perceived innovation ability, trust in a company and their products, and the perceived product quality. Then it was tested whether these differences can be attributed to age cohorts or whether the digital literacy of the participants is more decisive for the differences between co-creation and professional design.

The first three hypotheses confirmed the assumption that co-creation has a positive effect on the ability to innovate for a company, the trust in a company and its products, as well as on the quality of the products. The tests of the fourth hypotheses then showed that co-creation is perceived about equally well by all age groups. The evaluation of the fifth hypothesis then showed that the level of digital literacy influences the perception of co-creation. According to this, participants with a higher level of digital literacy were also more convinced of co-creation, in terms of firm trust and perceived product quality, than participants who are less digitally

literate. In general, we can conclude that co-creation is still seen as an innovative innovation strategy among all generations.

5.2 Managerial Implications

Co-creation, or the process of actively involving customers in the creation and development of a product or service, has been a popular innovation strategy for businesses in recent years. However, it is important to consider whether co-creation is still seen as an innovative and well-perceived strategy among younger generations. There are a few potential managerial implications to consider in relation to this topic.

The process of co-creation can be a powerful way to increase customer engagement and loyalty, particularly among younger generations who may value a sense of ownership and involvement in the products and services they use (Gassmann, Enkel, & Chesbrough, 2010). By involving customers in the co-creation process, businesses can potentially build stronger relationships with their customers and increase customer satisfaction (Bughin et al., 2010). Co-creation can function as a mean of gathering customer insights. Involving customers in the co-creation process can also provide valuable insights for businesses about what customers want and need (Hippel, 2005). This can be particularly useful for businesses looking to target younger generations, who may have different preferences and needs compared to older demographics (Prahalad & Ramaswamy, 2004).

The strategy of co-creation is a way to drive innovation. By involving customers in the innovation process, businesses can tap into a wider pool of ideas and perspectives, potentially leading to more innovative and differentiated products and services (Chesbrough, 2003). This can be especially valuable for businesses looking to stay ahead of the curve in an increasingly competitive marketplace (Tidd & Bessant, 2018).

There are some potential challenges with co-creation. While co-creation can offer many benefits, it is important for managers to consider potential challenges as well. For example, managing the co-creation process and ensuring that all stakeholders are heard and respected can be challenging. Additionally, there may be concerns about the intellectual property and ownership of ideas that are generated through the co-creation process (Gassmann et al., 2010). Managers will need to carefully consider these and other potential challenges in order to successfully implement co-creation as an innovation strategy.

5.3 Academic Implications

In addition to managerial implications, there are also potential academic implications that need to be considered in research.

One of them would be the role of younger generations in co-creation. Further research could explore the specific preferences and needs of younger generations in relation to co-creation, and how these may differ from those of other demographic groups. This could help to inform the development of co-creation strategies that are tailored to the preferences of younger customers.

Another limitation is the impact of co-creation on customer loyalty. Research could also examine the relationship between co-creation and customer loyalty, particularly among younger generations. This could help to understand the extent to which co-creation can effectively drive customer loyalty and engagement.

We identified the potential challenges and benefits of co-creation as a third academic implication. Future research could also explore the potential challenges and benefits of co-creation in more depth, including issues such as managing the co-creation process and addressing intellectual property concerns. This could help to inform the development of best practices for implementing co-creation as an innovation strategy.

Another academic implication could be the role of co-creation in driving innovation. Finally, research could examine the role of co-creation in driving innovation, and how it compares to other innovation strategies. This could help to understand the relative effectiveness of co-creation as an innovation approach, and the circumstances under which it may be most appropriate to use.

6. Limitations

Within this study we have some limitations which should be considered when analysing our results. First, this study was conducted generally about the perceptions of co-created products. It may be that for different types of products, we can draw different results for specific products. Thus, we recommend further research on co-creation with respect to different product categories.

Further, since the questions were directed to consumers, this study focused on business-to-customer products only. It is to be expected that our results do not apply to the business-to-business sector, as the advantages and disadvantages of co-creation differ fundamentally between the sectors, which would consequently require a different research approach to study the business-to-business sector (Ramaswamy & Gouillart, 2010).

Third, co-creation which involves other stakeholders such as companies, suppliers or employees was not specifically considered in this study. The study of co-creation with stakeholders different from consumers would require a different study design, as the incentives would be opposite (Ramaswamy & Gouillart, 2010).Therefore, our findings may not be relevant to companies implementing co-creation initiatives with other stakeholders. As the questionnaire was distributed online, respondents already had average or higher technological skills when they were able to fill in a questionnaire via their computer or mobile phone. This means that technically impaired people were automatically excluded, leading to a bias in the sample. Furthermore, the use of a questionnaire to conduct primary research opens up the possibility of response bias, where subjects consciously or unconsciously give the answer, they think the researcher expected.

In summary, this study highlights the need for future research on consumers involvement in the innovation process, and co-creation is influencing consumers perceptions of brands and products. We encourage researchers to further investigate how consumer age and level of digital literacy affects perceptions of co-created outcomes the general perception of this method.

7. Appendix

Co-creation

Co-Creation is a process of cross creation with ententies external to the local firm, e.g., the customers.

These entities or individuals actively participate, give ideas, suggestions and engage in the development of new products for the firm. These external ententies have the same role as firm's professionals in any of the stage of the new product development process.

Co-Creation is a model very different from the innovation activities traditionally executed by the firm.

Q1: Co-creation as innovation strategy

traditional

In the traditional product development process only company professionals are involved in the innovation strategy.

This means all ideas, suggestions and engagement in the development of new products for the firm are executed by company professionals and no third party is involved in any of the stage of the new product development process.

Q2: Professionals Design as innovation strategy

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