



The Age-Effect on Co-Creation

The Impact of Age on Non-Participating Consumers'
Perception of the Innovation Ability of a Firm that Co-Create
Products with Consumers

Kristin Hjulstad Linderud

Dissertation written under the supervision of
Professor Claudia Costa, Ph.D

Dissertation submitted in partial fulfilment of the requirements for the degree of
MSc in Management with specialization in Strategy and Entrepreneurship, at the
Universidade Católica Portuguesa, 01.06.2017

Abstract

In the interest of developing products that meet customers' needs in a superior way, companies are increasingly involving consumers in their innovation process. Scholars acknowledge this novel concept of creating value and have begun investigating the effects of co-creation on non-participating consumers - those who do not participate in the product creation. However, little is known about how non-participating consumers' age affects the perception of firms that co-create, even though segmenting customers based on age is often carried out by companies. First, we demonstrate that non-participating consumers prefer firms that co-create with consumers over firms that use professional designers. Two important moderators of the *co-creation effect* are identified; consumers' prior familiarity with co-creation and consumers' perceived similarity with the co-creators. Second, this study reveals that consumers' age has important implications for managers. We demonstrate that younger consumers should be targeted with co-created products, because younger consumers are immune to the effect of the two moderators, and will prefer firms that co-create regardless of prior familiarity and perceived similarity.

No intuito de desenvolver produtos que vão ao encontro da necessidade dos consumidores de uma forma superior, as companhias estão cada vez mais a envolver os consumidores no seu processo de inovação. Os peritos reconhecem este conceito inovador de criar valor e estão a investigar o efeito da co-criação em consumidores não participantes- ou seja, naqueles consumidores que não tomam parte na criação do produto. No entanto, pouco se sabe como a idade dos não consumidores influencia a percepção das companhias que co-criam, apesar de que a segmentação dos clientes com base na idade seja realizada pelas empresas. Em primeiro lugar demonstramos como consumidores não participantes preferem empresas que criam em colaboração com os clientes (co-criação), a empresas que usam designers profissionais. São identificados dois moderadores importantes no efeito da co-criação; a familiaridade prévia dos consumidores com a co-criação e a sua percepção da semelhança com os co-criadores. Em segundo lugar, este estudo revela que a idade do consumidor tem implicações importantes para os gerentes. Demonstramos que os consumidores mais jovens devem ser atraídos com produtos co-criados, pois são imunes aos efeitos dos dois moderadores e preferem as empresas que co-criam independentemente da familiaridade prévia e da similaridade percebida.

Table of Content

- 1. INTRODUCTION..... 6**
- 2. LITERATURE REVIEW..... 9**
 - 2.1. DEFINITION 9
 - 2.2. CO-CREATION..... 10
 - 2.2.1. *Company Point of View*..... 10
 - 2.2.2. *Participating Consumers’ Point of View*..... 11
 - 2.3. HOW CO-CREATION AFFECT NON-PARTICIPATING CONSUMERS 12
 - 2.4. HOW AGE AFFECT PERCEPTION OF FIRMS THAT CO-CREATE 15
- 3. STUDY..... 18**
 - 3.1. OBJECTIVES AND OVERVIEW 18
 - 3.1.1. *Product Category* 18
 - 3.1.2. *Age Cohorts*..... 19
 - 3.2. METHOD 19
 - 3.3. MEASURES 20
- 4. RESULTS..... 21**
 - 4.1. PERCEIVED INNOVATION ABILITY..... 22
 - 4.2. MODERATORS OF THE CO-CREATION EFFECT..... 22
 - 4.3. THE AGE-EFFECT..... 25
 - 4.4. BEHAVIOURAL OUTCOMES..... 31
- 5. FINDINGS AND DISCUSSION 32**
 - 5.1. ACADEMIC IMPLICATIONS 35
 - 5.2. MANAGERIAL IMPLICATIONS 36
- 6. LIMITATIONS..... 37**
- SOURCES..... 39**
- APPENDIX..... 42**

List of Figures

Figure 1 Our Conceptual Model.....	9
Figure 2 Means of PIA, Familiar versus Not Familiar.....	23
Figure 3 Means of PIA, High versus Low Similarity	24
Figure 4 Means of Familiarity, by Age	26
Figure 5 PROCESS Model 3.....	27
Figure 6 Means of Perceived Similarity, by Age	29

List of Tables

Table 1 Measures	21
Table 2 Design Scenario on PIA	22
Table 3 PIA Means, Professionals versus Co-Created.....	22
Table 4 Familiarity*Design Scenario on PIA	23
Table 5 Familiarity Means, Familiar versus Not Familiar	24
Table 6 Similarity*Design Scenario on PIA	24
Table 7 Similarity Means, High versus Low Similarity.....	25
Table 8 Age Cohort*Design Scenario on PIA	26
Table 9 Conditional Effects, Age and Familiarity	27
Table 10 Conditional Effect of Design Scenario*Familiarity, at values of Age.....	29
Table 11 Conditional Effects, Age and Similarity	30
Table 12 Conditional Effect of Design Scenario*Similarity, at values of Age	31
Table 13 Age Cohort Reasoning	42
Table 15 Age Effect on Familiarity.....	42
Table 16 Descriptive Statistics, Similarity	43
Table 17 Age Effect on Similarity	43

Acknowledgements

First of all, I would like to thank my supervisor Professor Claudia Costa, Ph.D for her valuable guidance and advice throughout the dissertation semester. Also, I would like to express my appreciation to Filipa Reis, Professor Isabel Moreira and Professor Daniel Fernandes for taking the time to discuss the data analysis and sharing their knowledge on statistical programs. And lastly, I would like to thank my family and friends for their love, support and reviews.

1. Introduction

From 2012 to 2014, close to half (49.1%) of the companies in the European Union reported some form of innovation. Of these enterprises, approximately 24% implemented *product innovation* (Eurostat, 2017). Due to internal and external factors including globalization, increased market competition and shorter product-life cycles, many firms structure their product development process in a different way than before. Now, an efficient innovation process, a system of several interdependent innovation activities (Cardinal et al., 2001), has become key to company success (Barczak et al., 2009). Consequently, a subcategory of innovation, named Open Innovation, has gained attention in recent years. Open Innovation relies on the assumption that valuable ideas can originate from outside the company. The goal is to make the innovation process more efficient, allowing external stakeholders (e.g. consumers) to take over some of the innovation activities, often seen as companies outsourcing the idea generation process to their consumers (Chesbrough, 2006). The number of published articles, show that the topic of open innovation has gained great interest the past years¹.

Meanwhile, another class of companies emerged with a unique innovation process. These companies incorporate a *joint* innovation process, where firm and consumers collaborate to create value both unique to the customer and sustainable for the firm. This process is called co-creation of value (Prahalad and Ramaswamy, 2004). The term co-creation gained interest around the beginning of the 21st century. From 1980 to 2001, merely 20 articles on co-creation were circulated. From then on, an exponential growth occurred, leading up over 3,800 articles published today².

The internet and other information communication technologies have made consumer-involvement in the innovation process much easier and cheaper. Thanks to the internet, firms can construct online communities, encourage consumer-involvement and gain valuable customer feedback, which improves the company's ability to be innovative and to anticipate future consumer needs (Prahalad and Ramaswamy, 2002). As a result, the market has turned into a forum for conversation and interaction, involving customers, online communities and companies, as we see today (Prahalad and Ramaswamy, 2004; 2002).

¹ . Until 1999: 285 articles published, 2000-2010: 939 articles published, 2010-2017: 3.490 articles published. Numbers retrieved from <https://scholar.google.com/>, keyword: Open Innovation

² Numbers retrieved from <https://scholar.google.com/>, keyword: Co-creation

The market shift began in the late 1980s, when a few pioneers began to let customers participate in the product innovation process. For example, in 1988 The LEGO Group started a collaboration with Massachusetts Institute of Technology (MIT). Together, they began the development of an intelligent brick that would bring LEGO products to life via computer programming. In 1998, Kjeld Kirk Kristiansen, the CEO of the LEGO Group, partnered with the known inventor Dean Kamen. Together they launched a robot competition with over 200 student teams, introducing LEGO MINDSTORMS. The competition was well received by creative thinkers and robotic fans, which led to the establishment of an online community with users all over the world who create and command robots. Due to this success, LEGO launched an additional website dedicated to innovative consumers, called LEGO Ideas (<https://ideas.lego.com/>). The website allows consumers to submit and vote for LEGO product ideas. LEGO professionals select which ideas will be produced, with recognition and royalties to the consumer-creator (LEGO, 2017).

In the decades that followed, more companies started to experiment with co-creation initiatives, including Starbucks, BMW, Muji, Threadless and Adidas. For example, after experiencing a revenue downfall during the economic crisis in 2008, Starbucks launched the co-creation platform My Starbuck Idea (Ramaswamy and Gouillart, 2010), encouraging consumers to submit their ideas for new products and experiences (Starbucks, 2017). Within its first year, the platform was nominated the Most Embracing Social Media Application in the Forrester Groundswell Awards (Bernoff, 2008). Since then, Starbuck's co-creation platform has led to a great number of products and initiatives developed by the company (Ramaswamy and Gouillart, 2010).

The main objective of this study is to understand how non-participating consumers' age affect the perception of firms that co-create with consumers³. This *co-creation effect* can be measured in perceived innovation ability, and in turn, purchase intent and intention to recommend the brand to others (Lude et al., 2016). Interestingly, research has not yet investigated consumer characteristics such as age on perception of co-created products, with exception of the research of Lude et al. (2016). Thus, this study addresses the existing gap in literature and applies

³ To simplify, the terms consumers and customers are considered equal, and named *consumers* throughout this paper. This is because it is difficult to establish if participating and non-participating consumers also have purchased products prior to the co-creation initiative and can be correctly defined as customers of the firm.

quantitative insights of how age of non-participating consumers affect perception of firms that co-create. Furthermore, this study argues that from the perspective of non-participating consumers, co-creation may not be universally beneficial. Two boundary conditions based on consumer prior experience with co-creation and perceptions of the co-creators are investigated in this study. As well, it is argued to consider the importance of consumers' age and its effect on the expected moderators of perceived innovation ability of firms that co-create.

This study has important implications for entrepreneurs and companies. First, due to globalization, firms are more frequently introducing new products (Tellis et al., 2009). Second, research shows that products targeted to a specific segment with similar characteristics have a higher chance of success (Schmidt et al., 2012). Therefore, knowing which age group responds more positively to co-creation should increase the success rate of co-created products. Additionally, past research has found significant behavioural differences between age cohorts. Older consumers differ from younger consumers in their decision buying processes, with implications in brand loyalty, repeat purchasing, brand selection, brand consideration, risk-taking and openness to new products, which are of great managerial importance (Lambert-Pandraud et al., 2005; Lambert-Pandraud and Laurent, 2010). Thus, the analysis done in this study will provide important insights for managers considering co-creating with consumers.

As research on co-creation is rather novel, there is still confusion in the effects of co-creation on non-participating consumers and how consumers' age moderates this effect (Lude et al., 2016). A closer look at the literature provides several insights to why. First, when studying the effect of co-creation, academics have used different product category complexity, making the results difficult to compare across industries. Second, the different perceptions of what is defined as co-creation and other degrees of consumer-involvement has made it hard to compare findings across studies. Third, research investigating the effect of consumers' age use different age categories and intervals, making it difficult to compare the results across studies. This study aims to extend the literature on the concept of co-creation, its important moderators and the effect of consumers' age in a clear and measurable way by meticulously analysing previous limitations when selecting definition, product category and age cohorts used in this study.

The remaining chapters are organized as follows: In chapter two the existing literature on co-creation is presented and important moderators are identified. Based on the literature, key relationships are hypothesized. Chapter three provides an overview of research method and

developed measures incorporated in the analysis. In chapter four the results of the study are outlined, followed by a discussion and academic and managerial implications in chapter five. Lastly, limitations are discussed and areas of possible future research are suggested. Figure 1 represents our conceptual model.

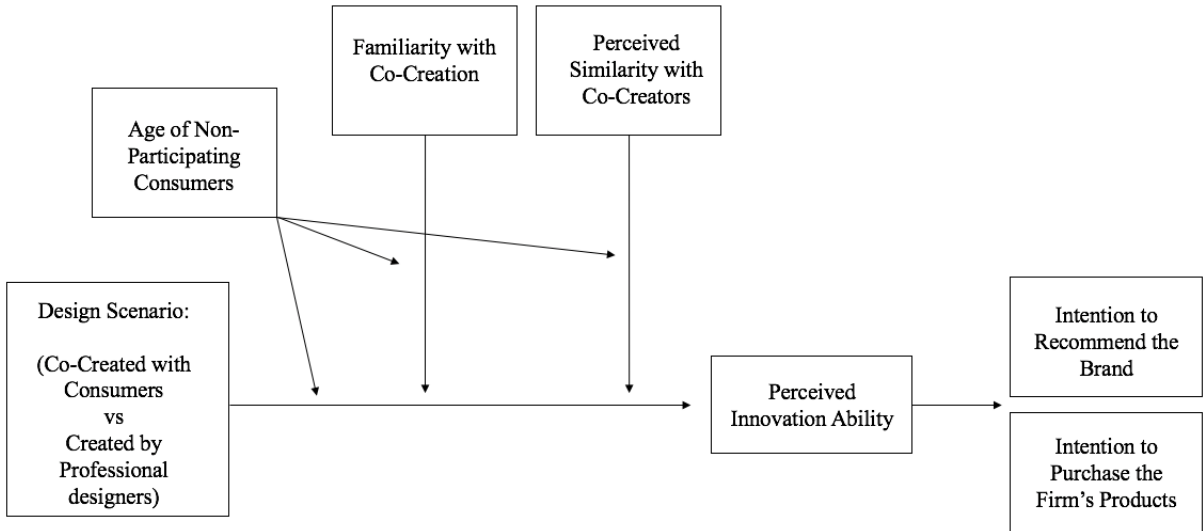


Figure 1 Our Conceptual Model

2. Literature Review

2.1. Definition

Co-creation is “an active, creative and social process, based on collaboration between producers and users, that is initiated by the firm to generate value for customers” (Roser et al., 2009 p.9). Previous research points out several definitions of co-creation and similar consumer-involvement initiatives. Inspired by O’Hern and Rindfleisch’s (2008), consumer involvement can be categorized into three different stages of consumer involvement in innovation: (1) Consumer Innovation, (2) Consumer-Design, and (3) Co-Creation.

First, Consumer Innovation is a process fully controlled by the users, where consumers solely innovate for their own benefit (von Hippel, 2005; Lude et al., 2016). The companies do not innovate themselves, but commercialize the consumer-made innovation at a large scale. Second, Consumer-Design is a process where consumers typically contribute in the beginning

of the product innovation process, such as submitting ideas for new products for firms to implement (Roser et al., 2009). The consumer-driven firm selects the ideas they want to pursue, either through consumer input (e.g. votes, comments, support from the community), usage of professional evaluation (e.g. industry specialists), or a combination of both. Third, Co-Creation is described as a process where consumers and firms jointly contribute to the product innovation process. The word *jointly* is important to highlight that they are equally involved. The main difference compared to Consumer-Design is that consumers can contribute at any stage of the innovation process (Prahalad and Ramaswamy, 2004).

2.2. Co-Creation

Existing literature highlights several advantages when including consumers in the innovation process. Particularly, past research has demonstrated the importance of how co-creation influence non-participating consumers – the consumers who do not participate in the product creation (e.g. von Hippel, 2005; Nishikawa et al., 2013; Schreier et al., 2012). First, however, it is necessary to understand the different aspects of co-creation. This because involving consumers in the innovation process do not only affect non-participating consumers, but also presents advantages for the firm's innovation process and positive outcomes for the participating consumers, which both are of managerial importance.

2.2.1. Company Point of View

Successfully launching new products is one of the main goals of organizations, albeit one of the most complex and difficult tasks (O'Hern and Rindfleisch, 2009; von Hippel, 2005). New product launches have notoriously high failure rates and the main culprit has often been understanding customer needs. In other words, new products do not fail because of technical shortcomings, but due to the difficulty of producing exactly what customers want (Ogawa and Piller, 2006). Researchers have identified four key advantages for firms when expanding the innovation process to include consumers: (1) Number of ideas, (2) diversity of ideas, (3) consumer-insights, and (4) just-in-time knowledge.

First, when including consumers in the innovative process, thousands of people can contribute with their ideas (Schreier et al., 2012). What follows is a common assumption that quantity breeds quality. The more ideas generated, the more likely to come up with innovative new products (e.g. Troy et al., 2001; Valacich et al. 1995). For example, the Threadless user-

community consists of more than 800,000 users who submit almost 200 new design ideas in one day. From these consumer-generated designs, more than 9 new t-shirts are selected to sell each week (Nishikawa et al., 2013).

Secondly, consumers may have a competitive advantage over professional designers in the product innovation process. Since the creators have the same characteristics as who they are creating for, they more easily interpret customers' needs and wants, leading to more successful innovations (Nishikawa et al., 2013). Additionally, some lead-users might already have tried to solve product issues by themselves, therefore they may forecast what consumers will demand in the future, giving companies a competitive edge (von Hippel, 2005).

Third, due to the large number of people accessible when co-creating, the creators are naturally more diverse compared to designers employed by a firm (Nishikawa et al., 2013). What follows is the assumption that divisibility increases the likelihood of generating an exceptional idea (e.g. Schreier et al., 2012; Surowiecki, 2004; Terwiesch and Ulrich, 2009).

Finally, co-creation also gives companies valuable just-in-time-knowledge. By connecting employees directly to customer communication (e.g. user-community forum), they are more likely to recognize flaws in products or services at a rapid pace. This knowledge is turned into learning for the company, enabling managers to be one step ahead of their competitors (Roser et al., 2009). Henkel and von Hippel (2005) found that reliable just-in-time knowledge about customer preferences is the most important factor for the innovation process.

In all, customer-involvement directly contributes to the effectiveness of the innovation process through increased number of ideas, greater diversity, consumer-insights and valuable just-in-time knowledge. This increases the likelihood of consumers valuing the products, thereby boosting the probability of a successful product launch (Hoyer et al., 2010). Hence, firms that manage this process effectively will achieve sustainable competitive advantage in the market (Prahalad and Ramaswamy, 2004).

2.2.2. Participating Consumers' Point of View

Past research has identified positive effect of consumer-involvement regarding participating consumers - consumers who participate in the co-creation initiative. This can be divided into

two streams: (1) the co-creation effect on participants' feelings toward the product and (2) the co-creation effect on participants' buying behaviour.

First, studying the effects of co-creation initiatives, Fuchs et al. (2010) found that participants developed stronger loyalty and feelings of ownership towards the product. Using t-shirts, participants reported the selected t-shirt would be more fun to wear, that they would take better care of it and that they would be more prepared to defend the t-shirt verbally in public. Other effects of consumer-involvement are emotional bonding, commitment, trust and greater customer satisfaction (Brodie et al., 2013; File et al., 1992). Second, consumers who feel a strong sense of ownership of a product have a greater sense of demand for that product (Peck and Shu, 2009). Fuchs et al. (2010) found that consumers who participate in the product selection process show a stronger demand for the product they have selected. Supporting these findings, Sawhney et al. (2005) found that participants have higher intentions to purchase products they have created themselves, showing an increased brand loyalty.

In all, researchers agree that involving consumers in the innovation process provides positive outcomes regarding the participating consumers. The participants have greater loyalty and commitment, and therefore, develop a higher demand for the firm's products.

2.3. How Co-Creation Affect Non-Participating Consumers

Moving on to the non-participating consumers, research agrees that co-created products also are attractive to consumers who do not participate in the product creation. This co-creation effect creates positive perceptions of brand and behavioural intentions towards the firm that co-create with consumers (e.g. Nishikawa et al., 2013; Schreier et al., 2012; Lude et al., 2016).

Collaborating with the Japanese consumer goods firm Muji, Nishikawa et al. (2013) found that user-generated products performed better, both by sales and profit, compared to products made by corporate designers. After three years on the market, the user-generated products' sales were five times better, generating sales revenues of approximately \$16 million USD more than design-generated products (Nishikawa, et al., 2013). To replicate Nishikawa and colleagues work, Nishikawa et al. (2017) conducted a field experiment with Muji's electronics and food division. They found that labelling products "ideated by consumers" increased the product's performance by up to 20%. Thus, involving consumers in the product innovation process do not only

generate more innovative ideas and committed participants, but also helps marketers differentiate themselves from competitors, which in turn, creates competitive advantage (Nishikawa et al., 2017).

Perceived Innovation Ability. Perception of a firm's innovation ability is defined as the consumers' belief that a company is able to produce innovative products (Brown and Dacin, 1997; Gürhan-Canli and Batra, 2004). Being perceived as innovative is categorized as a key competitive advantage, as it affects consumers' purchase intent and willingness to pay (Schreier et al., 2012; Lude et al., 2016). Therefore, influencing consumers' perceptions is an important strategy, allocated a great amount of effort and spending by companies (Barich and Kotler, 1991).

Schreier et al. (2012) analysed consumers' perception of companies that empowers their user community to generate ideas for new products. They found that companies that involve consumers in the innovation process enhances consumers' perceptions of the firm's innovation ability, compared to companies that use professional designers. Similar, Lude et al. (2016) found that companies that co-create with consumers are attributed significantly higher innovation ability compared to firms that internally create their products. Schreier et al. (2012) attempted to understand why consumers perceive companies that involve consumers in the innovation process as more innovative. They identified that non-participating consumers believe a higher number of people involved in the innovation process leads to a greater amount of ideas, which increases the likelihood of finding a good idea. Also, non-participants believe involving consumers in the innovation process leads to creators with more diverse backgrounds, interests and skillsets. This diversity is believed to generate more desirable products. Lastly, non-participants perceived consumer-creators as less constrained by company rules and goals, such as sales, profit and deadlines. This lack of restrictions is perceived as giving the creators more freedom to be more creative and innovative, which in turn creates more desirable products (Schrier et al., 2012). As such, the following relationship is hypothesised:

H1: Non-participating consumers perceive firms that co-create with consumers (vs. professional designers) as having higher (lower) levels of innovation ability.

Literature argues that the effect of co-creation is not universally beneficial (e.g. Schreier et al., 2012; Dahl et al., 2015; Lude et al., 2016). The level of perceived innovation ability is predicted to depend on consumer' prior experience with co-creation and perception of the participants. Specifically, the positive effect of co-creation should depend on non-participating consumers' (1) familiarity with co-creation and (2) perceived similarity with the co-creators.

Familiarity with Co-Creation. Familiarity with co-creation is defined as “the extent to which consumers have modified products themselves or know peers who have created their own innovations” (Schreier et al., 2012, p.21). Studying consumer-innovators, von Hippel et al. (2011) found that 6.1% of the UK population had created or modified consumer products themselves, representing almost 2.9 million people. For example, one respondent explained how he created a gardening tool: “I made a device for trimming the tops of trees. It’s a fishing rod with a large metal hook at the end. This enables me to reach the top of the trees, bend them down, and cut them.” Another reported: “My dog was having trouble eating. I used a flat piece of laminated wood and put an edge around it like a tray to stop her bowl from moving around the kitchen. It was a successful innovation.” (von Hippel et al., 2011, p. 12). In all, a large share of consumers modifies or creates products themselves, and in turn, many consumers know peers who have created their own innovations. Thus, the moderator is highly relevant and of importance to managers.

Studying mass customization, Loginova (2009) found that familiarity and product knowledge are critical factor for successful co-designing. This is because unexperienced consumers tend to have difficulties expressing their preferences. Studying consumer-involvement on non-participating consumers, Schreier et al. (2012) demonstrated that consumers' familiarity with co-creation is an important moderator of the co-creation effect. They found that consumers who are familiar with co-creation have a more positive perception of the innovation ability of firms that co-create, compared to those not familiar with co-creation. They argue that that familiarity affects to which degree non-participating consumers perceive the creators as having the necessary competence to design valuable products. As such, we hypothesises that:

H2: The positive effect of co-creation on non-participating consumers' perception of a firm's innovation ability is strengthened (weakened) for consumers who are (not) familiar with co-creation.

Perceived Similarity with Co-Creators. While studying the effect of consumers' age on perceived innovation ability of firms, Lude et al. (2016) argue the effect of consumers' perceived similarity with co-creators should be further analysed. They believe their survey respondents perceived the co-creators as young, even though this was not described in the survey, making the younger consumers identify themselves more with the creators. This presumed similarity might have affected the levels of perceived innovation ability for younger consumers. Studying the importance of the moderator, Dahl et al. (2015) found that non-participating consumers who feel similar to the participating consumers prefer products of the firm that involve consumers in the innovation process. They argue that consumers who feel less similar to the co-creators might not identify themselves with the creators. In contrast, consumers who feel similar to the co-creators will more likely to feel indirectly empowered, a so called *It could have been me- effect*. Thompson and Malaviya (2013) studied if brands benefit from communicating to non-participating consumers that an advertisement has been created with consumers. They found that non-participating consumers' perceived similarity affects whether the advertisement is seen with scepticism or identification with the ad creators. Therefore, the following relationship is hypothesised:

H3: The positive effect of co-creation on non-participating consumers' perception of a firm's innovation ability is strengthened (weakened) for consumers who (do not) feel similar to the co-creators.

2.4. How Age Affect Perception of Firms that Co-Create

Recent literature has provided little insights about the effects of consumers' characteristics on perception of firms that co-create with consumers (Lude et al., 2016). However, looking at literature on age in general, research agrees that younger consumers have a more positive perception of novel concepts, which creates behavioural intentions toward the firm in terms of product preference (e.g. Lambert-Pandraud and Laurent, 2010). This research, together with the research of Lude et al. (2016) is combined to hypothesize the expected effects of age on co-creation.

Age on Perceived Innovation Ability. Older consumers rate new services and products significantly lower than younger consumers. This is because older consumers prefer products they hold a long-term relationship with (Lauren Lambert-Pandraud et al., 2005; Schmidt et al.,

2012: Laurent and Lambert-Pandraud, 2010). On the contrary, younger consumers are more likely to change brand preference at a more rapid pace, and tend to behave more innovatively (Lambert-Pandraud and Laurent, 2010). Lesser and Kunkle (1991) describe exploratory behaviour as a main characteristic of young consumers. This exploratory behaviour makes younger people more likely to try new options, which may or may not lead to satisfaction. On the other side, older consumers are more likely to choose well-known options, even if they are not perfectly satisfying, to eliminate the risks of trying new products (Lambert-Pandraud and Laurent, 2010). Lude et al. (2016) argues that co-created products might be viewed as a novel concept by consumers. As younger consumers have a greater preference for novel ideas, they might favour the co-creation concept compared to older consumers.

The study of Lude et al. (2016) is one of the few that have looked at how age affect perception of firms that co-create with consumers. They found that younger consumers give higher levels of perceived innovation ability to firms that co-create compared to older consumers. By splitting their respondents into four age cohorts, analysis revealed that the youngest age group (14-25 years) had the most positive reaction to co-created products, while the oldest cohort (48+ years) had an insignificant difference, making them indifferent if the product was co-created or company-created. As such, we hypothesize that:

H4: The positive effect of co-creation on non-participating consumers' perception of a firm's innovation ability is strengthened (weakened) for younger (older) consumers.

We also expect that non-participating consumers' age will affect the perception of the innovation ability of firms that co-create *indirectly*. Specifically, age of consumers should moderate the moderation of (1) familiarity with co-creation and (2) perceived similarity with co-creators, on the relationship between design scenario and perceived innovation ability.

Age on Familiarity with Co-Creators. Most co-creation initiatives are executed online (Bayus, 2013), exemplified by the online communities of Threadless, Starbucks, BMW and Muji. The most frequent users of the Internet and online user communities are younger consumers, between 20 and 30 years old (Thayer & Ray, 2006). Growing up with access to the internet, younger consumers have had more regular exposure of consumer-involvement or not, regardless of directly participating in consumer-involvement in online communities. This exposure should make younger consumers more familiar with the concept of co-creation.

Supporting this, past research found that consumer-innovators tend to be young (Lüthje et al., 2005; Hienerth et al., 2011; Raasch et al., 2008; Tietz et al., 2005). As younger consumers are more likely to be consumer-innovators, they might also know more peers that have experience with creating or modifying products (see definition of familiarity with co-creation). Therefore, with higher exposure of user communities and higher likeliness of being and knowing consumer-innovators, younger consumers should be more familiar with co-creation. This increased familiarity will affect how non-participating consumers perceived the innovation ability of firms that co-create (Schreier et al., 2012)

Age on Perceived Similarity with co-creators. The findings above also tie into consumers' perceived similarity with co-creators. Consumers with experience in consumer-innovation might identify more with participants of the co-creation initiative. This shared interest should make younger consumers feel more similar to the co-creators. Supporting this, in recent years, a culture of uploading and sharing created content online has appeared, particularly for younger consumers (Fromm et al., 2011). This phenomenon should make younger consumers identify more with the co-creators in online communities, yielding a common social identity of *us who create content online*. Also, Lude et al. (2016) argued that their survey respondents perceived the co-creators as young, even though this was not described in the survey, identifying an assumption that younger consumers feel more similar to co-creators in general. Therefore, there is reason to believe that younger consumers will perceive themselves as more similar to the participants. This increased similarity will affect how non-participating consumers perceive the firms that co-create (Dahl et al., 2015). As such, we hypothesize:

H5a: Younger consumers (vs. older consumers) are more familiar with co-creation and therefore give higher levels of perceived innovation ability to firms that co-create with consumers.

H5b: Younger consumers (vs. older consumers) feel more similar to co-creators and therefore give higher levels of perceived innovation ability to firms that co-create with consumers, compared to older consumers.

Behavioural Outcomes. Higher levels of perceived innovation ability also represent behavioural benefits towards the firm. Both Schreier et al. (2012) and Lude et al. (2016) found that higher perceived innovation ability of a firm makes the consumer more likely to recommend the firm

to others (Schreier et al., 2012; Lude et al., 2016). Both studies reported that non-participating consumers were more eager to recommend firms that co-create with consumers, compared to firms that use professional designers. Furthermore, higher levels of perceived innovation ability also have measurable economic effects. Both Schreier et al. (2012) and Lude et al. (2016) found that consumers have higher intentions to purchase products from firms that co-create with consumers, compared to firms that use professional designers. Therefore, we can make the following hypotheses:

H6a: There is a positive relationship between perceived innovation ability and intention to recommend the brand to others.

H6b: There is a positive relationship between perceived innovation ability and intention to purchase the firm's products.

3. Study

3.1. Objectives and Overview

We tested the hypotheses presented using chocolate bars as the product category. First, we aimed to find evidence for the positive effects of co-creation, by establishing the effect of design mode on perceived innovation ability (H1). Furthermore, we explored how consumer familiarity with co-creation, and perceived similarity with co-creators are central to establishing the positive effect of co-creation (H2/H3). Then we explored the main purpose of this study, to evaluate how age effects perception of the firms' innovation ability (H4) and explored how age effects the two moderators central to establishing the effect of co-creation (H5a/b). Lastly, we explored the effects of co-creation on the behavioural measures, intention to recommend the brand to others (H6a) and intention to purchase products (H6b)

3.1.1. Product Category

The choice of product category was based on past research on perception of co-creation. First, studying consumer-innovators, von Hippel et al. (2011) argued that choice of product category can skew results in different directions. For example, the product category *extreme sports* should be more relevant to younger consumers, whereas *fly-fishing* might be more relevant to older consumers. This difference in relevance of product category might skew the results in

favour of a certain age group. In this study, we argue that the product category of chocolate minimizes the skewness of the results, as chocolate is known and relevant to all age groups.

Second, studying age differences in car purchases, Lambert-Pandraud et al. (2005) note in their limitations that the product category *cars* could be perceived as too complex. This might skew the results in favour of younger consumers due to older people's reduced cognitive abilities. They argue that product category needs to be simple to understand to give accurate results regarding age differences. T-shirts, household products and sports equipment are perceived as low-complexity consumer products, while electronics, mechanical products, and robotic toys are perceived as high-complexity products (Schreier et al., 2012). The product category chocolate can be categorized as an everyday consumer good, with high buying frequency and relatively low costs (Lude et al., 2016). Based on this, we argue that chocolate bars are perceived as low complexity products, where consumers can have an opinion about preferred flavour without a specific educational background or training.

3.1.2. Age Cohorts

The choice of age cohort was based on past research regarding the effect of age on novel products and perception of co-creation, combined with study practicality (*see Appendix, Table 13: Age Cohort Reasoning*). As a result, respondents' age was captured by five age cohorts: 18-24, 25-34, 35-44, 45-54 and 55+ years old. The dataset was cleaned and balanced with approximately the same number of respondents in each cohort: 18-24 (20.5%), 25-34 (20.0%), 35-44 (18.9%), 45-54 (21.1%) and 55+ (19.5%), enabling each age cohort to equally represent itself. The sample represented an average age (40.2) close to the European median age of 42.4 years (Eurostat, 2016).

3.2. Method

The study was an online survey distributed to 185 consumers ($M_{Age} = 40.2$ years, 64% females). The survey first presented the goal (to evaluate the success of new products launched on the market) and informed participants about the product category (chocolate bars). The respondents then answered questions about their involvement with the product, captured by three items. After the first section, respondents were introduced to two chocolate bar firms, Firm A and Firm B, with two different innovation strategies; Firm A uses the innovation strategy *Co-Creation* where consumers and firms develop products together, while Firm B uses *professional*

designers to come up with new product ideas. The two firms were presented side by side with corresponding colour pictures of a collection of chocolate bars, displaying different flavours and ingredients. As a manipulation check, respondents were asked how strongly they believed consumers were involved in the product innovation process for both Firm A and Firm B. This was followed by a short questionnaire capturing perceived innovation ability, intention to purchase product and intention to recommend the firm to others, for both Firm A and Firm B. Next, respondents were asked to think about their own experience with co-creation, followed by two items capturing respondents' familiarity with co-creation. The respondents were then asked to think about the consumers who create new products with Firm A, followed by four items capturing perceived similarity with co-creators. Lastly, the respondents were asked to fill out demographics about themselves, including gender, nationality and age.

3.3. Measures

The questions were selected to capture the effect of co-creation, as well as important moderators. The survey questions were gathered, compared and selected based on results in corresponding research fields. By allowing respondents to use similar scales, we aimed to enable respondents to more easily compare the different scenarios with each other.

Measures		
Construct	Items	Ca
<i>Product Category Involvement</i>	"To me, this product category" (1) "Is unimportant/important" [1:7], (2) "Means nothing to me/means a lot to me" [1:7], (3) "Does not matter to me/Matters to me" [1:7]. (Zaichkowsky, 1985)	.94
<i>Perceived Innovation Ability</i>	"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]. (Luo & Bhattacharya, 2006)	.95
<i>Familiarity with Co-Creation</i>	"Have you ever developed a product yourself? (either modifying an existing product or creating a new from scratch)" (1) "Yes/Now" [1 = yes and 0 = no] Do you know someone who has developed a product? (either modifying an existing product or creating a new from scratch)" (2) "Yes/Now" [1 = yes and 0 = no] (Franke, Von Hippel, and Schreier, 2006)	.85
<i>Perceived Similarity with Co-Creators</i>	"How similar do you think the members of the user community are to yourself?" (1) "I feel (not) similar" [1:7],	.95

	(2) “There are no (many) similarities between me and members of the community” [1:7], (3) “I feel not (very) close to the members of the community” [1:7], (4) “I cannot (can) identify with the community members” [1:7]. (Dahl, Fuchs and Martin Schreier, 2015)	
<i>Intention to Recommend</i>	“I would recommend the brand (A/B)” (1) “Strongly disagree/strongly agree” [1:7], “I would talk up the brand (A/B) to my friends” (2) “Strongly disagree/strongly agree” [1:7]. (Bruner and Hensel, 2001)	.85
<i>Purchase Intention</i>	“I would actively search for this company” (1) “Strongly disagree/strongly agree” [1:7], “To me, purchasing a product from this company is” (2) “Very unlikely/likely” [1:7]. (Bruner and Hensel 2001)	.89

Table 1 Measures

4. Results

To understand the effect of design mode on consumer’s perception of a firm’s innovation ability (H1), and to explore the three moderators; familiarity with co-creation (H2), perceived similarity with co-creators (H3) and consumers’ age (H4), we performed analyses of variance (ANOVA) and analyses of the means (t-test). Next, we investigated if younger consumers are more familiar with co-creation, if consumers, given that they are familiar, rate the innovation ability of firm that co-create differently across age (H5a). For perceived similarity we investigated if younger consumers perceive themselves as more similar to the co-creators, and if consumers, given that they feel similar, rate the innovation ability of firm that co-create differently across age (H5b). To measure these two effects, we used Dr. Hayes’ PROCESS macro for SPSS, for estimating three way interactions in moderation models (Model 3). Lastly, the effect of perceived innovation ability on intention to recommend brand (H6a) and intention to purchase products (H6b) were both analysed by an analysis of variance (ANOVA). For all analyses, the homogeneity of variances assumption was validated by the Levene’s test.

A One way ANOVA on perceived consumer involvement of firm A and Firm B revealed that respondents perceived Firm A as involving consumers more than Firm B ($F(1,368) = 441.496$; $p < .001$). Thus, the manipulation check was successful and we can move forward with the analysis ($M_{\text{Consumer A}} = 5,68$ and $M_{\text{Consumer B}} = 2,58$; $p < .001$).

4.1. Perceived Innovation Ability

Perceived Innovation Ability (H1). H1 stated that non-participating consumers perceive companies that co-create with consumers as having higher levels of innovation ability, compared to firms that use professional designers. We performed a One-way ANOVA to test the effect of the design source on perceived innovation ability (PIA). The perceived innovation ability was used as the dependent variable and design scenario as the independent variable. The positive effect of co-creation on perceived innovation ability was identified ($F(1,368) = 31.506$, $p < .001$). Next, we used product involvement as a control (covariate) to understand whether the effect could be explained by involvement rather than design scenario. Although significant, results still show a positive relationship between perceived innovation ability and design scenario ($F(1,367) = 32.430$, $p < .001$).

TABLE 2

Dependent variable = Perceived Innovation Ability			
Source	F	df	Sig
Intercept	22,112	1	,001
Product Involvement	263,282	1	,001
Design Scenario	11,794	1	,001
Error	32,430	367	,001
Total		370	

Table 2 Design Scenario on PIA

In other words, companies that co-create products with consumers are perceived as displaying higher innovation ability, than firms using professional designers ($M_{\text{co-creation}} = 4.8090$ and $M_{\text{professionals}} = 3.9712$, $p < .001$). This finding supports H1 and provides evidence that co-creation generates positive feeling toward the company, which is in line with previous research.

TABLE 3

Dependent Variable: Perceived Innovation Ability				
Design Scenario	Mean	Std. Deviation	N	Sig
Professionals	3,9712	1,45724	185	,001
Co-created	4,8090	1,41363	185	
Total	4,3901	1,49377	370	

Table 3 PIA Means, Professionals versus Co-Created

4.2. Moderators of the Co-Creation Effect

Familiarity with Co-Creation (H2). H2 stated that the positive effect of co-creation on non-participating consumers' perception of a firm's innovation ability is strengthened for consumers

who are familiar with co-creation. An analysis of variance (ANOVA) revealed a significant interaction effect of prior familiarity with co-creation on perceived innovation ability of firms that co-create with consumers ($F(1,368) = 11.417, p < .001$).

TABLE 4

Dependent Variable: Perceived Innovation Ability			
Source	F	df	Sig
Intercept	270,275	1	,000
Prod. Involvement	11,956	1	,001
Familiarity	,658	1	,418
Design Scenario	37,075	1	,000
Familiarity*Design Scenario	11,417	1	,001
Error		365	
Total		369	

Table 4 Familiarity*Design Scenario on PIA

Further investigating this effect, an analysis of the means (t-test) revealed that those familiar with co-creation rate the innovation ability of firms that co-create with consumers higher ($M_{\text{Familiar}} = 5.0080$) than those not familiar with co-creation ($M_{\text{Non-familiar}} = 4.6471, p < .100$), which validates H2. Interestingly, familiarity with co-creation also affects how non-participating consumers rate the innovation ability of firms that use professional designers. Consumers not familiar with co-creation rate the innovation ability of firms that use professionals higher, than those familiar with co-creation ($M_{\text{Non-Familiar}} = 4.2516, M_{\text{Familiar}} = 3.6265, p < .001$).

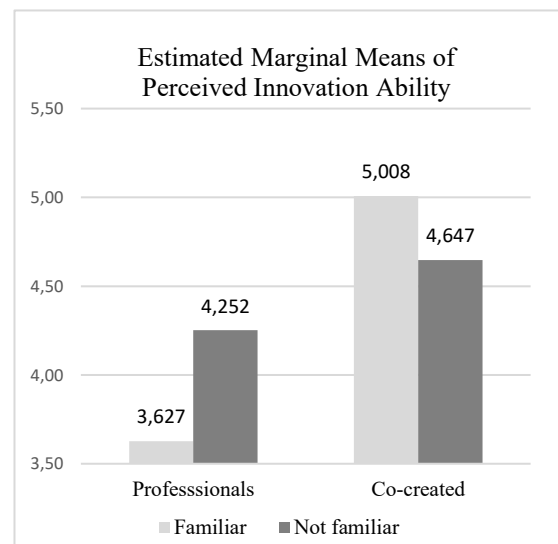


Figure 2 Means of PIA, Familiar versus Not Familiar

Next, a cross-test of the means (t-test) revealed that those familiar with co-creation rate the innovation ability of firms that co-create higher than firms that use professional designers ($M_{\text{Co-creation}} = 5.0080$ and $M_{\text{Professionals}} = 3.6205, p < .001$). On the other hand, consumers who are not familiar with co-creation rate the innovation ability of firms that use professionals higher than firms that co-create ($M_{\text{Professionals}} = 4.6471, M_{\text{Co-creation}} = 4.2516, p < .033$). Conclusively, familiarity with co-creation affects how consumers view the innovation ability of both firms that co-create with consumers and firms that use professional designers.

TABLE 5

Dependent variable: Perceived Innovation Ability					
Familiarity	Design Scenario	Mean	Std. Deviation	N	Sig
Familiar	Co-creation	5.0080	1,45760	83	,100
	Professionals	3.6265	1,52521	83	
Non-familiar	Co-creation	4.2516	1,34274	102	,033
	Professionals	4.6471	1,36257	102	
Total	Total	4,3901	1,49377	370	

Table 5 Familiarity Means, Familiar versus Not Familiar

Perceived Similarity with Co-Creators (H3). H3 stated that the positive effect of co-creation on non-participating consumers' perception of a firm's innovation ability is strengthened for consumers who feel similar to the co-creators. An analysis of variance (ANOVA) revealed a main interaction effect of design scenario and the perceived similarity with co-creators ($F(24,319) = 2.446, p < .001$).

TABLE 6

Dependent Variable: Perceived Innovation Ability			
Source	F	df	Sig
Intercept	250,381	1	,000
Prod. Involvement	2,405	1	,122
Design Scenario	9,310	1	,002
Similarity	0,890	24	,617
Similarity*Design Scenario	2,446	24	,000
Error		319	
Total		370	

Table 6 Similarity*Design Scenario on PIA

Next, we created two variables for those who feel more similar and those who feel less similar to the co-creators based on respondents' reported similarity, defined as *high similarity* ($median > 4,51$) and *low similarity* ($median \leq 4,50$). A t-test revealed that consumers who perceive themselves as highly similar with the co-creators rate the perceived innovation ability of firms that co-create higher than those feeling less similar ($M_{High\ Similarity} = 5.2857$ and $M_{Low\ Similarity} = 4.4125, p < .001$).

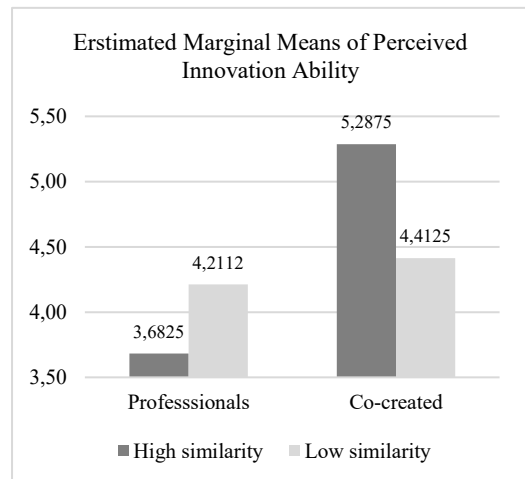


Figure 3 Means of PIA, High versus Low Similarity

Conclusively, H4 is supported. Further analysis revealed that similarity also affect how non-

participating consumers rate the innovation ability of firms that use professional designers. Consumers who feel less similar to the co-creators rate the innovation ability of firms that use professionals higher, compared to consumers who feel more similar to the co-creators ($M_{\text{Low Similarity}} = 4.2112$, $M_{\text{High Similarity}} = 3.6825$, $p < .012$).

Cross-testing the means, a t-test showed that consumers who feel more similar to the co-creators, rate perceived innovation ability of firms that co-create higher than firms that use professional designers ($M_{\text{Co-Creation}} = 5.2857$ and $M_{\text{Professionals}} = 3.6825$, $p < .001$). Furthermore, there is a non-significant difference in perceived innovation ability of the two firms when consumers feel less similar to co-creators ($M_{\text{Co-creation}} = 4.4125$ and $M_{\text{Professionals}} = 4.2112$, $p = .374$). Meaning, if the target consumers feel less similar, they do not perceive the innovation ability of the two firms differently.

TABLE 7

Dependent variable: Perceived Innovation Ability					
Similarity	Design Scenario	Mean	Std. Deviation	N	Sig
High Similarity	Co-creation	5,2857	1,12432	84	,001
	Professionals	3,6825	1,29659	84	
Low Similarity	Co-creation	4,4125	1,50934	101	Not sig.
	Professionals	4,2112	1,54397	101	
Total	Total	4,3901	1,49377	370	

Table 7 Similarity Means, High versus Low Similarity

4.3. The Age-Effect

Moving forward, we analyse the effect of consumers' age on perceived innovation ability. Predefined age cohorts were used to divide the sample into five different age groups: 18-24, 25-34, 35-44, 45-54, and 55+. H4 stated that the positive effect of co-creation on non-participating consumers' perception of a firms' innovation ability is strengthened for younger consumers, and weakened for older consumers. An One-way ANOVA revealed that age does not have a significant interaction effect on perceived innovation ability ($F(9,360) = 1.091$, $p = .303$). Hence, we find no evidence that age directly moderates the relationship between design scenario and perceived innovation ability and H4 is rejected.

TABLE 8

Dependent Variable: Perceived Innovation Ability			
Source	F	df	Sig
Intercept	3465,320	1	,000
Design Scenario	32,289	1	,000
Age Cohort	1,279	4	,278
Age Cohort*Design Scenario	1,217	4	,303
Error		360	
Total		370	

Table 8 Age Cohort*Design Scenario on PIA

We also expect that nonparticipating consumers' age will moderate the moderation of consumers' (1) familiarity with co-creation and (2) perceived similarity with co-creators, on the relationship between design scenario and perceived innovation ability.

Age on Familiarity with Co-Creation (H5a). H5a stated that younger consumers are more familiar with co-creation and therefore rate firms that co-create with higher levels of perceived innovation ability, compared to older consumers. We divided the expected effect in two parts. First, we investigated if younger consumers are more familiar with co-creation. Then, we explored if consumers, given that they are familiar, rate the innovation ability of firm that co-create differently across age.



Figure 4 Means of Familiarity, by Age

First, an analysis of the means revealed that it is not necessary the youngest consumers who are more familiar with co-creation. In fact, the tests showed that age cohort three (35-44 years) is more familiar with co-creation, compared to the other age cohorts ($M_{\text{Age cohort 3}} = 0.81, p < .001$). (See appendix: Table 15: *The Age Effect on Familiarity*)

Next, we investigated if consumers, given that they are familiar, rate the innovation ability of firm that co-create differently across age. We used PROCESS macro for SPSS, which uses the best fitting ordinary least square regression model for estimating three way interactions in moderation models (Model 3). Three-way interaction is used when a variable moderates a moderation, such as when W moderates the relationship between M and X, on Y (Hayes, 2012).

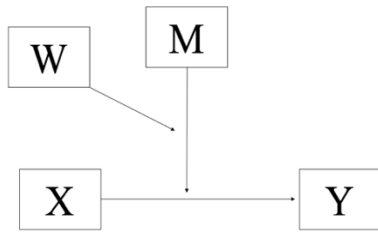


Figure 5 PROCESS Model 3

Y is perceived innovation ability, X is design scenario (1=co-creation, 0= professional designers), M is familiarity (1 = familiar, 0 = non-familiar), and W is age. PROCESS automatically construct conditional effects of co-creation on perceived innovation ability for each age and familiarity group. This yield three age cohorts:

younger respondents (1SD below the mean = 25.2268 years), respondents moderate in age (the mean = 40.1784 years) and older respondents (1SD above the mean = 55.1300 years), combined with two familiarity groups: Familiar and Not familiar. This should be considered slopes as of respondents were in groups for different levels of age and familiarity.

The output revealed that the three way interaction Design Scenario*Familiarity*Age does not have a significant effect on the model $F(1,362) = 1.3054$, $R^2\text{-change} = .002$, $p = .254$ ⁴. Thus, the age of consumers does not systematically affect the relationship of familiarity and design scenario on perceived innovation ability. Furthermore, we explored the specific outcomes for each age group.

TABLE 9

Conditional effect of Design Scenario on Perceived innovation ability, at values of Age and Familiarity				
Age	Familiarity	Effect	Relationship between X and Y	Sig
Younger (25.2 years)	Familiar	1.1343	Firm that co-create is perceived with higher innovation ability.	.002
Younger (25.2 years)	Not familiar	.5205	Firm that co-create is perceived with higher innovation ability.	.033
Moderate (40.2 years)	Familiar	1.3646	Firm that co-create is perceived with higher innovation ability.	.000
Moderate (40.2 years)	Not familiar	.3875	Firm that co-create is perceived with higher innovation ability.	.046
Older (55.1 years)	Familiar	1.5949	Firm that co-create is perceived with higher innovation ability.	.000
Older (55.1 years)	Not familiar	.2545	Design scenario <i>does not</i> affect perceived innovation ability.	.366

Table 9 Conditional Effects, Age and Familiarity

⁴ Bootstrapping is used to calculate standard errors and confidence intervals. Variance accounted for by all variables including interactions is significant ($F(7,362) = 6.0533$; $p < .001$, $R^2 = .11$).

With respect to H5a, we investigated whether the relationship between design scenario and perceived innovation ability differs between younger consumers (the first row) and consumers moderate in age (the third row). The difference of the two effects is $-.2303$ ($1.1343 - 1.3646 = -.2303$). As this effect is negative, this indicate that younger consumers, given familiarity, do not rate innovation ability of firm that co-create higher than older consumers, which contradicts H5a. In fact, it looks like the effect is reversed, and that older consumers rate innovation ability of firm that co-create higher than younger consumers. To explore this, we use an inferential test in PROCESS Command to see if 1.1343 is significantly lower than 1.3646 . With a standard error of $.5356$, the difference of $-.2303$ is not statistically significant, $t(362) = .9153$, $p = .361$. Neither is the difference between consumers moderate in age (third row) and older consumers (fifth row), nor the difference between younger consumers (first row) and older consumers (fifth row). In other words, given that consumers are *familiar with co-creation*, the perceived innovation ability of firms that co-create with consumers *do not differ across age*. In all, H5a is rejected.

Next, we test *the effect of being familiar versus not familiar* on perceived innovation ability of firms that co-create. While younger consumers have a familiarity effect of $.6138$. ($1.1343 - .5205 = .6138$), moderate and older consumers have higher familiarity effects of $.9771$ and 1.3404 respectively ($1.3646 - .3875 = .9771$ and $1.5949 - .2545 = 1.3404$). To test if the difference between being familiar and not familiar is significant for all age groups, we use an inferential test in PROCESS Command. The output shows that the difference of being familiar versus not familiar for younger consumers ($M_{\text{Younger}} = .6138$, $SE = 0.4369$), is not significantly different than zero, $t(362) = -1.4039$, $p = .161$. However, the older age groups' differences of $.9771$ and 1.3404 are both significant ($t(362) = -3.2101$, $p < .001$ and $t(362) = -3.0250$, $p < .002$). This indicates that older consumers perceive the innovation ability of firms that co-create as lower when not familiar with co-creation, and higher when familiar. For younger consumers, this difference is non-significant. Thus, if two younger consumers, one familiar and one not familiar with co-creation, rate the innovation ability of a firm that co-create, they would not rate it differently.

TABLE 10

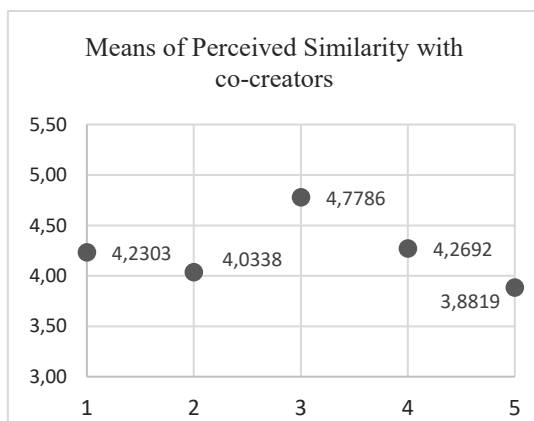
Conditional Effect of Design Scenario*Familiarity Interaction, at values of Age			
Age	Effect	X*M interaction on Y	Sig
Younger (25.2 years)	-.6138	There is <i>no difference</i> of being familiar versus not familiar on perceived innovation ability of firm that co-create	.161

Moderate (40.2 years)	-0.9771	There is a difference between being familiar versus not familiar on perceived innovation ability of firm that co-create	.002
Older (55.1 years)	-1.3404	There is a difference between being familiar versus not familiar on perceived innovation ability of firm that co-create	.003

Table 10 Conditional Effect of Design Scenario*Familiarity, at values of Age

In all, we have identified three interesting findings. First, consumers from 35 to 44 years old are more familiar with co-creation when compared to the other age cohorts, both younger and older. Second, given that consumers are familiar with co-creation, they do not differently rate the perceived innovation ability of the firm that co-create across age groups. Third, the difference of being familiar versus not familiar on the relationship between design scenario and perceived innovation ability is significant for moderate and older consumers, while insignificant for younger consumers. Conversely, for younger consumers' prior familiarity with co-creation does not impact how they evaluate co-created outcomes.

Age on Perceived Similarity with Co-Creators (H5b). H5b stated that younger consumers feel more similar to the co-creators and therefore rate firms that co-create with higher levels of perceived innovation ability, compared to older consumers. We also divided this expected interaction in two parts. First, we investigated if younger consumers feel more similar to co-creators. Then, we explored if consumers, given that they feel similar, rate the innovation ability of firm that co-create differently across age.



First, an analyse of the means revealed that age cohort three (35-44 years) feels more similar to the co-creator, compared to the other age cohorts ($M_{\text{Age cohort 3}} = 4,7786, p < .022$). Thus, we find no evidence that younger consumers feel more similar to the co-creators than older consumers, which contradicts H5b. (See appendix: Table 16: Descriptive Statistics, Similarity, and Table 17: Age Effect on Similarity)

Figure 6 Means of Perceived Similarity, by Age

Next, we investigated if consumers, given that they feel similar to the co-creators, rate the innovation ability of firms that co-create differently across age. The PROCESS output revealed that the interaction Design Scenario*Similarity*Age does not have a significant effect on the

model $F(1,362) = .7297$, $R^2\text{-change} = .002$, $p = .394$)⁵. Hence, age does not systematically affect the relationship between design scenario and perceived similarity with co-creators, on perceived innovation ability.

TABLE 11

Conditional effect of Design Scenario on Perceived innovation ability, at values of Age and Similarity				
Age	Similarity	Effect	Relationship between X and Y	Sig
Younger (25.2 years)	High similarity	1.4274	Firm that co-create is perceived with higher innovation ability.	.000
Younger (25.2 years)	Low similarity	.7750	Firm that co-create is perceived with higher innovation ability.	.015
Moderate (40.2 years)	High similarity	1.6032	Firm that co-create is perceived with higher innovation ability.	.000
Moderate (40.2 years)	Low similarity	.3013	Co-creation <i>does not</i> affect perceived innovation ability.	.356
Older (55.1 years)	High similarity	1.7790	Firm that co-create is perceived with higher innovation ability.	.000
Older (55.1 years)	Low similarity	.3276	Co-creation <i>does not</i> affect perceived innovation ability.	.683

Table 11 Conditional Effects, Age and Similarity

Furthermore, we explored the specific outcomes for each age group. With respect to H5b, we investigate whether the relationship between design scenario and perceived innovation ability differs between younger consumers with high similarity (the first row) and consumers moderate in age with low similarity (the third row). The difference in the two effects is $-.1758$ ($1.4274 - 1.6032 = -.2303$), which again is negative. This indicates that older consumers who feel highly similar to the co-creators rate the innovation ability of firms that co-create higher, compared to younger consumers who feel highly similar. To explore this, we use an inferential test in PROCESS Command to see if 1.4274 is significantly lower than 1.6032. The PROCESS output shows that the difference ($M_{\text{Younger}} = .1758$, $SE = .1875$), is not statistically significant, $t(362) = -.3930$, $p = .695$. Neither is the difference between consumers moderate in age (third row) and older consumers (fifth row), nor the difference between younger consumers (first row) and older consumers (fifth row). In other words, given that consumers *perceive themselves as highly similar* to the co-creators, the perceived innovation ability of firms that co-create *do not differ across age*. In all, H5b is rejected.

⁵ Variance accounted for by all variables including interactions, is significant ($F(7,362) = 11.1391$; $p < .001$, $R^2 = .14$).

Next, we test *the effect of feeling high similarity versus low similarity* on perceived innovation ability of firms that co-create. While younger consumers have a similarity effect of .6524 ($1.4274 - .7750 = 1.1524$), moderate and older consumers have both higher similarity effects of 1.4019 and 1.6514 respectively ($1.6032 - .2013 = 1.4019$ and $1.7790 - .1276 = 1.6514$). The PROCESS output shows that this difference for younger consumers of ($M_{\text{Younger}} = .6524$, $SE = .1035$) is not statistically significant, $t(362) = 1.7677$, $p = .163$. However, for older consumers the differences of 1.4019 and 1.6514 are both statistically significant, $t(362) = 4.5548$, $p < .001$ and $t(362) = 3.9662$, $p < .001$. This indicates that for older consumers, the perceived innovation ability of firms that co-create will be lower for consumers who feel less similar, and higher for consumers who feel more similar. For younger consumers, perceived similarity does not impact how they evaluate firms that co-create.

TABLE 12

Conditional Effect of Design Scenario*Similarity Interaction, at values of Age			
Age	Effect	X*M interaction on Y	Sig
Younger (25.2 years)	.6524	There is no difference of feeling similar versus not similar on perceived innovation ability of firm that co-create	.163
Moderate (40.2 years)	1.4019	There is a difference of feeling similar versus not similar on perceived innovation ability of firm that co-create	.000
Older (55.1 years)	1.6514	There is a difference of feeling similar versus not similar on perceived innovation ability of firm that co-create	.001

Table 12 Conditional Effect of Design Scenario*Similarity, at values of Age

In all, we have identified three interesting findings. First, consumers in age cohort from 35 to 44 years feel more similar to the co-creators, compared to the other age cohorts. Second, given that people feel highly similar to the co-creators, when evaluating co-creation, consumers do not perceive a company's innovation ability differently across age groups. Third, the difference of feeling more similar versus less similar on the relationship between design scenario and perceived innovation ability is significant for moderate and older consumers, while non-significant for younger consumers. Thus, age is a significant variable to explain the effects of similarity.

4.4. Behavioural Outcomes

Finally, we also identified the effects of higher levels of perceived innovation ability on the two downstream variables: (1) Intention to Recommend Brand and (2) Intention to Purchase Products from firm. To test H6a/b, we performed two analyses of variance (ANOVA), one with

intention to recommend and one with intention to purchase as dependent variables. For both regressions perceived innovation ability was used as the independent variable.

Intention to Recommend Brand (H6a). First, H6a stated that there is a positive relationship between perceived innovation ability and intention to recommend the brand to others. The relationship was tested and revealed a significant effect ($F(17,351) = 17.951, p < .001$). This supports H6a, and provides evidence that higher levels of perceived innovation ability lead to consumers having higher intention to recommend the brand to others. As there is positive a relationship between perceived innovation ability and design scenario (H1), these results indicate that consumers have higher intention to recommend the firms that co-create with consumers, compared to firms that use professional designers ($M_{\text{co-creation}} = 4.9865$ and $M_{\text{professionals}} = 3.9239, p < .001$)

Intention to Purchase Products (H6b). Second, H6b stated that there is a positive relationship between perceived innovation ability and intention to purchase products from the firm. An analysis of variance (ANOVA) revealed a significant effect of perceived innovation ability on intention to purchase ($F(17, 350) = 9.989, p < .001$), which supports H6b. In other words, these results indicate that consumers have higher intention to purchase products from firms that co-create with consumers, compared to firms that use professional designers ($M_{\text{co-creation}} = 4.9620$ and $M_{\text{professionals}} = 4.1156, p < .001$).

5. Findings and Discussion

Companies are increasingly incorporating consumers in their innovation process to generate new products. Still, little is known of how permanent consumer characteristic affects the perception of co-created outcomes. This study sought to identify if consumers' age affects how consumers respond to learn that a product has been co-created with consumers. To do so we first established the co-creation effect on non-participating consumers and identified its important moderators. Next, we investigated if consumer' age directly modifies the co-creation effect, following, if age influence consumers' prior familiarity with co-creation and perceived similarity with co-creators. These findings will now be discussed in the light of the previously conducted literature review.

Our findings suggest that a firm is perceived as having higher levels of perceived innovation ability if the firm communicate that they co-create with consumers (H1). In turn, this influence consumers' intention to recommend brand to others (H6a) and intention to purchase the firm's products (H6b). These findings establish a relationship between design scenario and firm preference, named the *Co-Creation Effect* (e.g. Lude et al., 2016; Schreier et al., 2012). However, this effect is not universally beneficial (eg. Dahl et al., 2015; Lude et al., 2016). Two important moderators have been identified, defined as Familiarity with Co-Creation and Perceived Similarity with Co-Creators. First, this study indicates that prior familiarity strengthens the positive effect of co-creating with consumers (H2). Further analysis highlights the importance of the moderator, as unfamiliar respondents favour firms that use professional designers. Drawing from the research of Schreier et al. (2012), we argue that this is because unfamiliar consumers do not believe peers have the necessary skills to create desirable products. Second, this study indicates that perceived similarity with co-creators strengthens the positive effect of co-creating with consumers (H3). In line with the literature, we argue that consumers who feel similar to the co-creators feel indirectly empowered by the co-creation initiative and therefore attribute higher innovation abilities to firms that co-create with consumers (Lude et al., 2016, Dahl et al., 2015). The importance of the moderator is strengthened as our findings display that consumers who feel less similar to the co-creators prefer firms that use professional designers.

This study aimed to identify how age affects consumers' perception of firms that co-create with consumers, which has been overlooked by past research. To identify this effect, we first tested non-participants' age as a direct moderator, and then as an indirect moderator by exploring the effect of age on prior familiarity and perceived similarity using PROCESS Model 3. Our study indicate that age do not directly affects perceived innovation ability, and therefore H4 was rejected. Next, our analysis revealed that consumers aged between 35 and 44 years are more likely to be familiar with co-creation compared to the other age cohorts. This finding came as a surprise, but a possible explanation can be that many people in that age have younger children, so creating innovative tools to solve child-related issues might be part of their daily lives. Von Hippel et al. (2011) found that 11% of consumers' innovations are child related, which could make parents of young children more familiar with moderating or creating new products. Based on this, one might predict this age cohort responds the best to co-created products, simply because those consumers are more likely to be familiar with co-creation. However, the difference of being familiar versus not familiar on perceived innovation ability of firms that co-

create is non-significant for younger consumers⁶, while significant for moderate⁷ and older⁸ consumers. Hence, for younger consumers it does not matter whether one is familiar with co-creation or not. In both cases, the perceived innovation ability of firms that co-create will be higher compared to firms that use professional designers. With no differences in perceived innovation ability across age groups when familiar, there is nothing to gain by targeting older age cohorts. In all, younger consumers should be targeted with co-created products, as it will eliminate the risk of targeting unfamiliar consumers in the older age groups and the corresponding negative effect unfamiliarity has on perceived innovation ability.

Studying the age effect on perceived similarity with the co-creators we find the same results. Consumers aged between 35 and 44 years feel more similar to the co-creators compared to the other age cohorts. This might be because those consumers are more likely to be familiar with co-creation, and therefore, feel more indirectly empowered by the co-creation initiative (Dahl et al., 2015). We encourage researchers to further investigate this relationship. Furthermore, the difference of feeling more similar versus less similar on the perceived innovation ability of firms that co-create is non-significant for younger consumers, while significant for moderate and older consumers. Therefore, younger consumers should be targeted with co-created products, because younger consumers will prefer firms that co-create regardless whether they feel similar to the co-creators. This will eliminate the risk of targeting consumers who feel less similar, present in the older cohorts.

In conclusion, younger consumers do not give higher levels of perceived innovation ability to firm that co-create due to higher levels of familiarity and perceived similarity (H5a/b). However, younger consumers should be targeted with co-created products because they rate the innovation ability of firms that co-create higher than firms that use professional designers, regardless of prior familiarity and feelings of similarity.

⁶ To simplify, we consider that the age cluster named “young” which is centered around 1SD less than the mean (25,2 years old) includes consumers aged 18-34 years old (age cohort 1 and 2)

⁷ To simplify, we consider that the age cluster named “moderate”, which is centered around the mean (40,2 years old) includes consumers aged 35-44 years old (age cohort 3)

⁸ To simplify, we consider that the age cluster named “older”, which is centered around 1SD over the mean (55,1 years old) includes consumers aged 45+ years old (age cohort 4 and 5)

5.1. Academic implications

As an increasing number of companies involve consumers in their innovation process, more researchers are investigating the effects of co-creation⁹. Although some papers have investigated non-participating consumers' perception of co-created products (e.g. Schreier et al., 2012, Dahl et al., 2015), almost no efforts have been made to investigate the effect of consumer's age on perception of co-creation (Lude et al., 2012). Our findings contribute to academia in three connected research fields: (1) The effects of co-creation on non-participating consumers, (2) The effect of age on buying behaviours and (3) The effect of age (as an indirect moderator) on co-creation.

First, the study strengthens the literature on the positive effects of co-creation, focusing on non-participating consumers' perception of a firm's innovation ability, the behavioural outcomes of co-creation and the moderators of the co-creation effect. Second, this study strengthens the literature of age differences in buying behaviour. Our results indicate that older consumers are affected by prior experience when evaluating a firm. This supports the findings of Lauren Lambert-Pandraud et al. (2005) and Lambert-Pandraud and Laurent (2010), which both found that older consumers prefer brands they have a long-term relationship with. Furthermore, our results indicate that younger consumers evaluate the firm based on new knowledge and not due to previous experience. This support Lambert-Pandraud and Laurent (2010) study demonstrating that younger consumers are more likely to try new products. Third, this study extends the literature on how age affect the perception of co-creation, initiated by Lude et al. (2016). We present novel findings by exploring how consumers' age moderates the contingent role of familiarity with co-creation and perceived similarity with co-creators, on the relationship between design scenario and perceived innovation ability. This has important implications for academia as the findings initiate a new research perspective of how consumers' characteristic affects the perception of co-created products. Also, this study contradicts Lude et al.'s (2016) suspicion that similarity influenced the younger respondents and therefore skewed their findings in favour of younger consumers. This highlight the complexity of the co-creation effect, and demonstrate that non-participating consumers' response to co-created products needs to be further investigated.

⁹ <https://scholar.google.com/>, keyword: Co-creation

5.2. Managerial Implications

An increasing number of companies invite consumers to contribute in the innovation process and launch co-created products to non-participating consumers. From a marketing perspective, two strategic decision arises: Should companies actively communicate to non-participating consumers that the product was made as a result of co-creation? And more interestingly, at which segment should the co-created product be targeted? The findings of this study provide answers to these questions and therefore offer important managerial implications.

First, this study identified that the source of creation can provides companies with valuable returns, with implications in positive perceptions and behavioural outcomes. Companies that co-create during the innovation process should therefore actively communicate the implemented consumer-involvement. This will enable them to differentiate themselves from competitors that use professional designers, creating competitive advantage (Nishikawa et al., 2017; Lude et al., 2016) There are several methods to communicate source of creation to non-participating consumers, for example, managers can label the product package, incorporate a tagline in the logo or add a description on the corporate website (Lude et al., 2016).

This study also provides a deeper insight into the complex phenomenon of co-creation through evaluation of the moderators of co-creation, which should be considered by managers *who target consumers across age groups*. First, we present the importance of consumers' prior familiarity with co-creation. Therefore, managers should identify target audiences' familiarity with co-creation before incorporating co-creation as the unique selling proposition, for example, through observation and mapping of consumer-innovators. Second, we demonstrate that consumers' perceived similarity affects the perception of firms that co-create. Therefore, managers should carefully choose which consumers they involve in the innovation process and communicate this selection. For example, if launching a co-created product to Boat Enthusiasts, managers should communicate that the product was created with consumers with similar interests.

Second, we provide managerial implications based on how consumers' age affects the perception on firms that co-create. This study indicate that managers should target younger consumer with co-created products, because younger consumers prefer firms that co-create over firms that use professionals, regardless whether the consumers are familiar with co-creation or

feel similar with the co-creators. Because dividing target segments based on demographics is often carried out by companies (Kokemuller, 2015), this study enables managers to better foresee reactions of their target segment before launching co-created products, and if possible, to strategically target the ideal segment of co-creation.

Our findings also provide managerial implications for companies that have a pre-defined customer base of moderate or older customers. As older consumers are affected by being familiar (or not) on how they perceive the innovation ability of firms that co-create, introducing measures that increase the familiarity with co-creation (e.g. consumer-innovation competition), might affect older consumers' perception of the firm, and in turn, increase the probability of a successful product launch. Similar, older consumers are affected by feeling more similar to the co-creators. Therefore, when targeting older consumers, managers should select consumers with similar characteristics and communicate this selection to the non-participating consumers. For example, when launching a co-created product targeting consumers who recently retired, managers should communicate that the product was created with consumers with similar characteristic.

In all, this study finds evidence that firms should target co-created products to younger consumers. This will lead to greater perceived innovation ability, which in turn, influences consumers' intent to recommend the brand to others and intent to purchase products from the firm. These insights provide important guidelines for managers regarding targeting the ideal age group when launching co-created products.

6. Limitations

This study has limitations which are encouraged to further investigate. First, this study was conducted with only one product category, chocolate bars. Despite that the product category was carefully selected, it might be challenging to generalize the findings to other more complex product categories (e.g. cars, computers). Also, this product category was chosen to give the most general perception of the co-creation effect. However, a firm's previous marketing might affect the effects of co-creation (Lude et al., 2016). This is should not be considered a great limitation, however is important to note for companies considering co-creation initiatives with a specific marketing strategy.

Second, this study only focused on a product category sold business-to-consumer, ignoring the business-to-business sector. In the business-to-business sector, the advantages (disadvantages) of involving consumers in the innovation process would be different, which would represent a different research approach (Ramaswamy and Gouillart, 2010). Therefore, our findings might not be relevant for the business-to-business sector.

Third, this study does not consider that co-creation can involve other stakeholders such as companies, suppliers or employees. Studying co-creation with stakeholders other than consumers would represent a completely different survey design, as the incentives would be contrasting (Ramaswamy and Gouillart, 2010). Therefore, our findings might not be relevant for companies implementing co-creation initiatives with other stakeholders.

Forth, a part of the identified effects may be biased due to an unbalanced dataset in the more complex research questions. When investigating if age of consumers moderate the moderation of non-participating consumers' familiarity and perceived similarity with co-creators, we divided the sample into comparable clusters. These clusters were based on age cohorts (younger, moderate, older) and the two moderators (familiar/non-familiar and similar/not similar). Consequently, some samples became small compared to other clusters. Therefore, we recommend replicating the study with a higher respondent number to avoid potential biases.

Conclusively, this study emphasizes the need for future research on involving consumers in the innovation process, and we encourage researchers to further explore how consumers' characteristics effects perception of co-created outcomes.

Sources

Barczak, Gloria, Abbie Griffin, and Kenneth B. Kahn. "Perspective: trends and drivers of success in NPD practices: results of the 2003 PDMA best practices study." *Journal of product innovation management* 26.1 (2009): 3-23.

Barich, Howard, and Philip Kotler. "A framework for marketing image management." *MIT Sloan Management Review* 32.2 (1991): 94.

Bernoff, Josh, and Charlene Li. "Harnessing the power of the oh-so-social web." *MIT Sloan management review* 49.3 (2008): 36.

Brown, Tom J., and Peter A. Dacin. "The company and the product: Corporate associations and consumer product responses." *The Journal of Marketing* (1997): 68-84.

Brodie, Roderick J., et al. "Consumer engagement in a virtual brand community: An exploratory analysis." *Journal of Business Research* 66.1 (2013): 105-114.

Cardinal, Laura B., Todd M. Alessandri, and Scott F. Turner. "Knowledge codifiability, resources, and science-based innovation." *Journal of knowledge management* 5.2 (2001): 195-204.

Central Intelligence Agency (CIA) "The World Factbook: Country Comparison to the World". Accessed March 15.

<https://www.cia.gov/library/publications/the-world-factbook/fields/2177.html#us>

Chesbrough, Henry William. *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press, 2006.

Chua, A. Y. K., & Banerjee, S. (2013). Customer knowledge management via social media: the case of Starbucks. *Journal of Knowledge Management*, 17(2), 237-249.

Dahl, Darren W., Christoph Fuchs, and Martin Schreier. "Why and when consumers prefer products of user-driven firms: A social identification account." *Management science* 61.8 (2014): 1978-1988.

Eurostat. "Population Structure and Aging". (2016). Accessed February 2017
http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing

Eurostat. "Innovation Statistics". (2017). Accessed May 2017
http://ec.europa.eu/eurostat/statistics-explained/index.php/Innovation_statistics

Fromm, Jeff, Celeste Lindell, and Lainie Decker. "American millennials: deciphering the enigma generation." *This report from Barkley is based on research conducted as part of a joint partnership with Service Management Group, The Boston Consulting Group, and Barkley* (2011).

Fuchs, Christoph, and Martin Schreier. "Customer empowerment in new product development." *Journal of Product Innovation Management* 28.1 (2011): 17-32.

Gürhan-Canli, Zeynep, and Rajeev Batra. "When corporate image affects product evaluations: The moderating role of perceived risk." *Journal of marketing research* 41.2 (2004): 197-205.

Hayes, Andrew F. "PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling." (2012).

Henkel, Joachim, and Eric Hippel. "Welfare implications of user innovation." *Essays in Honor of Edwin Mansfield* (2005): 45-59.

- Hoyer, Wayne D., et al. "Consumer cocreation in new product development." *Journal of service research* 13.3 (2010): 283-296.
- Knickman, James R., and Emily K. Snell. "The 2030 problem: caring for aging baby boomers." *Health services research* 37.4 (2002): 849-884.
- Kokemuller, Neil. "What are the top ways to segment marketing?", Accessed May 2017. <http://smallbusiness.chron.com/top-ways-segment-marketing-54167.html>
- Lambert-Pandraud, Raphaëlle, Gilles Laurent, and Eric Lapersonne. "Repeat purchasing of new automobiles by older consumers: empirical evidence and interpretations." *Journal of Marketing* 69.2 (2005): 97-113.
- Lambert-Pandraud, Raphaëlle, and Gilles Laurent. "Why do older consumers buy older brands? The role of attachment and declining innovativeness." *Journal of Marketing* 74.5 (2010): 104-121.
- LEGO, "LEGO Ideas". (2017). Accessed March 2017 <https://ideas.lego.com/>
- Loginova, Oksana. "Brand familiarity and product knowledge in customization." *International Journal of Economic Theory* 6.3 (2010): 297-309.
- Lude, Maximilian Lude, Jana Hauck, Reinhard Prügl, Marc Linzmajer, and Marco Hubert, M."When Co-Creation does not benefit companies' perceived innovation ability". 2016.
- Maru File, Karen, Ben B. Judd, and Russ Alan Prince. "Interactive marketing: the influence of participation on positive word-of-mouth and referrals." *Journal of services marketing* 6.4 (1992): 5-14.
- Nishikawa, Hidehiko, et al. "The value of marketing crowdsourced new products as such: Evidence from two randomized field experiments." *Journal of Marketing Research* (2017).
- Nishikawa, Hidehiko, Martin Schreier, and Susumu Ogawa. "User-generated versus designer-generated products: A performance assessment at Muji." *International Journal of Research in Marketing* 30.2 (2013): 160-167.
- O'Hern, Matthew S., and Aric Rindfleisch. "Customer co-creation." Review of marketing research. Emerald Group Publishing Limited, 2010. 84-106.
- Ogawa, Susumu, and Frank T. Piller. "Reducing the risks of new product development." *MIT Sloan management review* 47.2 (2006): 65.
- Peck, Joann and Suzanne B. Shu (2009), "The Effect of Mere Touch on Perceived Ownership," *Journal of Consumer Research*, 36 (3), 434-47.
- Pisano, Gary P., and Roberto Verganti. "Which kind of collaboration is right for you." *Harvard business review* 86.12 (2008): 78-86.
- Prahalad, Coimbatore K., and Venkatram Ramaswamy. "The co-creation connection." *Strategy and Business* (2002): 50-61.
- Prahalad, Coimbatore K., and Venkat Ramaswamy. "Co-creation experiences: The next practice in value creation." *Journal of interactive marketing* 18.3 (2004): 5-14.
- Prandelli, Emanuela, Gianmario Verona, and Deborah Raccagni. "Diffusion of web-based product innovation." *California Management Review* 48.4 (2006): 109-135.

- Roser, Thorsten, et al. "Co-creation: new pathways to value: an overview." *Promise & LSE Enterprise* (2009).
- Sawhney, Mohanbir, Gianmario Verona, and Emanuela Prandelli. "Collaborating to create: The Internet as a platform for customer engagement in product innovation." *Journal of interactive marketing* 19.4 (2005): 4-17.
- Schau, Hope Jensen, Albert M. Muñoz Jr, and Eric J. Arnould. "How brand community practices create value." *Journal of marketing* 73.5 (2009): 30-51.
- Schmidt, Jeffrey B., Linda Tuncay Zayer, and Roger J. Calantone. "Grumpier old men: Age and sex differences in the evaluation of new services." *Journal of Product Innovation Management* 29.1 (2012): 88-99.
- Schreier, Martin, Christoph Fuchs, and Darren W. Dahl. "The innovation effect of user design: Exploring consumers' innovation perceptions of firms selling products designed by users." *Journal of Marketing* 76.5 (2012): 18-32.
- Schrier, Martin, Hidehiko Nishikawa, Christoph Fuchs, and Susumu Ogawa. "Crowdsourced products sell better when they're marketed that way." *Harvard Business Review* (2016)
- Starbucks. "My Starbucks Idea" (2017). Accessed March 2017.
<https://www.starbucks.com/coffeehouse/learn-more/my-starbucks-idea>
- Strokes, Bruce. Pew Research Centre. (2017). Accessed February 2017
<http://www.pewresearch.org/fact-tank/2015/02/09/who-are-europes-millennials/>
- Surowiecki, James. "The wisdom of crowds: Why the many are smarter and how collective wisdom shapes business, economies, societies, and nations." (2004).
- Tellis, Gerard J., Eden Yin, and Simon Bell. "Global consumer innovativeness: Cross-country differences and demographic commonalities." *Journal of International Marketing* 17.2 (2009): 1-22.
- Thompson, Debora V., and Prashant Malaviya. "Consumer-generated ads: does awareness of advertising co-creation help or hurt persuasion?." *Journal of Marketing* 77.3 (2013): 33-47.
- Terwiesch, Christian, and Karl T. Ulrich. *Innovation tournaments: Creating and selecting exceptional opportunities*. Harvard Business Press, 2009.
- Troy, Lisa C., and Moshe Davidow. "The relationship between customer-perceived product innovativeness and a new product's potential for success." *American Marketing Association. Conference Proceedings*. Vol. 9. American Marketing Association, 1998.
- Von Hippel, Eric. "Democratizing innovation: The evolving phenomenon of user innovation." *Journal für Betriebswirtschaft* 55.1 (2005): 63-78.
- Von Hippel, Eric, Susumu Ogawa, and Jeroen PJ De Jong. "The age of the consumer-innovator." *MIT Sloan Management Review* 53.1 (2011): 27.
- York, Emily Bryson. "Starbucks gets its business brewing again with social media." *Advertising Age* 81.8 (2010): 34.
- Valacich, Joseph S., et al. "The effects of numerical and logical group size on computer-mediated idea generation." *Organizational Behavior and Human Decision Processes* 62.3 (1995): 318-329.

Appendix

TABLE 13: Age Cohort Reasoning

Definition	Pros	Cons
Generations: Baby boomers, Generation X, and Generation Y.	<ul style="list-style-type: none"> Commonly known definitions outside the research community 	<ul style="list-style-type: none"> Unclear age intervals, especially for Generation X Many different names of Generation X (Millennials, Echo Boomers, Digital Natives), which can create confusion.
Schmidt et al. (2012): 21 and under, 21–34 years, and 35 years old		<ul style="list-style-type: none"> Oldest cohort is broad and included young respondents (Schmidt et al., 2012) Low average age of study compared to the U.S population (37.9) (CIA, 2016).
Von Hippel et al. (2011): 18-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, and 65+ years old.	<ul style="list-style-type: none"> Same age cohorts as UK Office of National Statistics, enabling them to compare population statistics with findings. 	<ul style="list-style-type: none"> Creating six age cohorts might be difficult in terms of practicality (number of respondents)
Lambert-Pandraud et al. (2005): “young” (-39), “middle aged” (30-59), “young-old” (60-75) “old-old” (75+) (Schaie, 1996).	<ul style="list-style-type: none"> Used weighted numbers, 18–39 (32%), 40–59 (39%), 60–74 (25%) and 75 and above (4%), to replicate the French car market. 	<ul style="list-style-type: none"> Using weighted numbers might result in a cohort being represented by few respondents. Separating age cohort 60-75 and 75+ might be difficult in terms of practicality (number of respondents)
Lude et al. (2016): 14-25 years, 26-30 years, 31-47 years, and 48+ years old	<ul style="list-style-type: none"> Equally distributed age groups based on the respondents’ exact age. 	<ul style="list-style-type: none"> Low average age of study (36.71) compared to the German median age (46.8) (CIA, 2016).
This study: 18-24 years, 25-34 years, 35-44 years, 45-55 years, and 55+ year old.	<ul style="list-style-type: none"> A balanced dataset: 18-24 (20,5%), 25-34 (20,0%), 35-44 (18,9%), 45-55 (21,1%) and 55+ (19,5%). Average age (40,2) close to European median age (42,4) (Eurostat, 2016). 	<ul style="list-style-type: none"> Sample is not weighted to replicate the European chocolate market Do not capture differences in people aged 55 and older.

Table 13 Age Cohort Reasoning

TABLE 15: Age Effect on Familiarity

Dependent variable: Familiarity with co-creation					
Age cohort	1 (18-24)	2 (25-34)	3 (35-44)	4 (45-54)	5 (55+)
1 (18-24)	-	Not sig.	p<.001	p<.016	Not sig.
2 (25-34)	Not sig.	-	p<.001	p<.001	Not sig.
3 (35-44)	p<.001	p<.001	-	p<.001	p<.001
4 (45-54)	p<.016	p<.001	p<.001	-	Not sig.
5 (55+)	Not sig.	Not sig.	p<.001	Not sig.	-

Table 14 Age Effect on Familiarity

TABLE 16: Descriptive Statistics, Similarity

Dependent variable: Perceived similarity with co-creators			
Age cohort	Mean	Std. Deviation	N
1	4,2303	1,37281	79
2	4,0338	1,23749	74
3	4,7786	1,12148	70
4	4,2692	1,46095	78
5	3,8819	1,42474	72
Total	4,2351	1,36650	370

Table 15 Descriptive Statistics, Similarity

TABLE 17: Age Effect on Similarity

Dependent variable: Perceived similarity with co-creators					
Age cohort	1	2	3	4	5
1	-	Not sig.	p<.011	Not sig.	Not sig.
2	Not sig.	-	p<.001	Not sig.	Not sig.
3	p<.011	p<.001	-	p<.022	p<.001
4	Not sig.	Not sig.	p<.022	-	Not sig.
5	Not sig.	Not sig.	p<.001	Not sig.	-

Table 16 Age Effect on Similarity