Locus of Control Effect in the Purchase and Recommendation Decision of Co-Created Labeled Products

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Abstract

This study aims to understand the relationship between consumers' locus of control (how people perceive the causes of the events that occur in their life) and their willingness to buy and recommend co-created products (developed in partnership between consumers and companies). We tested two products from different categories, a mobile phone as a complex product and a hamburger as low complexity product. The results show that internals (people who believe that what happens in life comes from their own effort) are more likely to buy and recommend co-created products than externals (people who believe that luck and destiny traces life). Results also show that the relationship may be influenced by product characteristics, namely product complexity. Findings help managers to better target products through marketing and communication strategies in order to reach customers according to their locus of control profile.

Sumário

Este estudo tem como objectivo entender a relação existente entre o *locus of control* (modo como as pessoas percepcionam as causas dos eventos que ocorrem na sua vida) e a possibilidade de estes comprarem e recomendarem produtos co-criados (desenvolvidos em parceria entre consumidores e as empresas). Testámos dois produtos de diferentes categorias, um telemóvel como produto complexo e um hamburger como produto de baixa complexidade. Os resultados mostram que os *internals* (pessoas que acreditam que o que acontece na sua vida provem do seu próprio esforço) têm maior propensão a comprar e recomendar produtos co-criados que os *externals* (pessoas que acreditam que a sorte e o destino é que traçam a sua vida). Os resultados também mostram que esta relação pode ser influenciada pelas características do produto, nomeadamente o seu grau de complexidade. As conclusões permitem ajudar os administradores a posicionar os seus produtos através de estratégias de marketing e comunicação com vista a atingir clientes de acordo com o seu perfil de *locus of control*.

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1. Introduction

Nowadays, with the increasing competition, companies struggle to maintain their market shares. To maintain its competitiveness is necessary to constantly introduce new products to satisfy consumers' needs. Being ahead of competitors is increasingly more difficult namely attempts to increase market share and meet customers' needs. For this reason, is important to continuously research the market, searching for new and better ways of serving consumers more efficiently. Thus, a problem that companies face is to know which products to develop and the features attached. Traditionally, companies developed products by internal teams, predicting consumer needs and hoping those products will effectively address consumers' wants. Some companies realized that using ideas from their users' communities to create new products was an effective strategy (Dahl et al., 2015). Apache (software), Quirky (household products) and Muji (furniture) are success examples that inspired other companies to consider users as a valuable source of knowledge capable of create value to the firm (Von Hippel, 2005).

Many consumers enjoy to take part in the development process and to share their ideas with companies (Prahalad and Ramaswamy, 2013), which makes using consumer ideas a tempting strategy to follow. Many remarkable incentives have been found to increase sharing of knowledge and ideas by consumers (Toubia, 2004). Beyond company incentives, consumers also feel motivated to participate. Intrinsic motives such as innovation interest and curiosity and extrinsic motives such as showing ideas increase consumer's interest in co-create (Füller, 2010).

The process in which consumers participate in the firm's innovation process is known as co-creation (Mahr et al., 2014). Co-creation allows firms to create products that better fit consumer needs than if were created with the company resources exclusively, explaning a new managerial fashion (Gemser and Perks, 2015). Label a product as co-created can lead to positive effects such as increase in purchase intention, willingness to pay and willingness to recommend (Schreier et al., 2012) but also can have a negative effect on consumers, increasing skepticism about the competence of the co-creator and consequently decreasing perceived quality and demand (Fuchs et al., 2013; Thompson and Malaviya, 2013). For that reason is important to know in which conditions is advantageous to label a product as co-created.

If businesses understand how consumers think, the probability of developing a product with an adequate fit increases (Mathur et al., 2016). Thus a measure to characterize consumers' way of thinking becomes essential. Locus of control relates to an individualistic characteristic of those who co-create. Locus of control is the extent to which people believe they have power over events in their lives (Rotter, 1966). Like entrepreneurs that feel that are in control of things (Brockhaus, 1975), also consumers who participate in co-creation feel in control of product development because they have the same personality traits as entrepreneurs. Both entrepreneurs and co-creators behave in the same way, trying to create something new and changing things around them.

From the broader market point of view, individual consumers identify with people that share the same characteristics, beliefs and tastes as them, because it is congenial to their own orientation (Kelman, 1961). This way, consumers that believe that are in control of things (internals) feel associated with people that engage in co-creation. So, if consumers perceive the source (companies who co-create and also co-creators) as credible, they are more likely to purchase the products (Daneshvary and Schwer, 2000). As result we expect that an individual with internal locus of control is more willing to buy and recommend a product labeled as co-created than an individual with external locus of control. In the end, both participants in co-creation and consumers have the same kind of mindset (internal LOC).

This study is of managrial importance because it shows that companies can take advantage from segmenting the market based on peoples's mindset (Mathur et al., 2016), in this case locus of control. Firms can label theirs products as made with their own resources or in partnership with consumers, dependending on the segment they want to serve. If the target market presents external characteristics, firms should label products as co-created, otherwise should label as made with firm's own resources. For example, Martin and colleagues (2007) examined how the weight locus of control (beliefs in the control of body weight) of women influences how they react to female models with different body sizes in advertising. They found that women who believe that are able to control their weight (internals), respond most favorably to slim models in advertising, and this favorable response is mediated by self-referencing. In contrast, women who feel powerless about their weight (externals), self-reference larger-sized models, but only prefer

larger-sized models when the advertisement is for a non-fattening product. For fattening products, they show a similar preference for larger-sized models and slim models.

Similarly, internals can better react to a product labeled as co-created than externals because they identify with who created the product as they believe that similar others create that product. For example, a company that produces backpacks who wishes to launch a new model suited to transport a laptop to university students, known as having higher rate of internal locus of control (Rotter, 1966) would benefit from a co-creation strategy. If the development process was done under a co-creation strategy and labeled as co-created, the probability of successfully sell those backpacks to the students would be greater than if it was not labelled as co-created. This strategy could be applied to different age groups, to a specific gender, to a specific culture or even to geographical regions such as countries because can be characterized with specific level of locus of control as Rotter, (1966) found in their studies. In practice what companies need to know is how the target segment is characterized in terms of LOC in order to choose the product development or strategy.

This study is organized as follows. First, we present an overview of the existing literature. The literature research the fields of co-creation, marketing, advertising, innovation, consumer behavior and psychology. Then we built our hypotheses and present our methodology: questionnaires and data collection procedures. In these questionnaires we applied scales to measure locus of control (Mueller and Thomas, 2001), product involvement (Zaichkowsky, 1985) and willingness to buy/recommend (Dodds et al., 1991) with some demographic questions in the end. This data was prepared to be analyzed and to take conclusions. Lastly, we detail conclusions and recommendations, possible dissertation limitations and suggestions for future researches.

2. Literature Review

2.1. Locus of Control

The concept of locus of control (LOC) was first studied by the psychologist Julian Rotter in 1954 and developed from his social learning theory in 1960 to describe how individuals attribute the causality of events in their lives. Receiving a prize, being awarded, getting a promotion, getting fired and losing a game are common reinforcements that occur in people lives. Reinforcements may follow an action but can also be not entirely contingent upon that action. Some people perceive reinforcements as luck, chance, destiny, fate, controlled by someone with power or as unpredictable occurrence due to the high complexity of external forces. When people perceive what happen to them as a cause of an external force, we can say that they believe in external control. Conversely, when people believe that the events in their life results from his/her own behavior or characteristics, those persons are characterized by high internal control (Rotter, 1966). Locus of control can be perceived as a continuum varying in degree of a persons' perceived control (Rotter, 1966) in the sense that people can present mainly external characteristics with some internal ones and vice versa. Locus of control can be formally defined as a "*generalized expectancy that rewards, reinforcements or outcomes in life are controlled either by one's own actions (internality) or by other forces (externality)"* (Spector, 1988).

LOC allows characterizing the mindset of some groups of people as well as individuals (Rotter, 1966). Over time several studies were made with the same objective, relate people locus of control with their characteristics such as demographic, psychological, religion and job (Blau, 1993; Abouserie, 1994; Spector, 1982; Chubb, 1997). For example, Dailey (1980) found that people with an internal locus of control were more satisfied, motivated and had a high level of participation within their jobs. Lead users (users that innovate because anticipate high benefits from getting a solution to their needs and that are at the leading edge of important trends, experiencing needs that will later be experienced by many users (Franke et al., 2006)) in addition to their expertise and usage experience also have internal locus of control and strong innovativeness with rapid adoption of new products (Ozer, 2009; Schreier and Prügl, 2008).

Entrepreneurs are also characterized by high internal locus of control (Brockhaus, 1975; Shapero, 1975). Entrepreneurs have initiative in the creation of new businesses or new values in

established companies (Bird, 1988, 1992), in developing new methods of production or opening new markets (Schumpeter, 1934). According to Funk and Wagnall Standard Dictionary, an entrepreneur is "*one who undertakes to start and conduct an enterprise or business, assuming full control and risks*". The way entrepreneurs behave is very similar to people who participate in co-creation. Co-creators believe that are in control of things, therefore believe that can develop new products.

The traditional innovation model in which companies are responsible for new product ideas and choosing the product to lauch in the market is increasingly being challenegd by academics and professionals (Fuchs and Schreier, 2010). Due to the greater access to information, consumers become knowledge sources allowing consumers to make more informed decisions and thus, more demanding about the products launched by firms (Prahalad and Ramaswamy, 2004). Furthermore, the development of means of communication like internet facilitate the interaction between consumers and allowed the emergence of strong online communities where firms take part in order to receive ideas and feedback (Fuchs and Schreier, 2010). The emergence of co-creation and its increasing in popularity represents consumers' mentality change in the new generations. The change in the consumers' behaviour is in line with Gatz and Karel (1993) findings who related higher internality with people until mid age, reducing with aging. Thus, locus of control is a measurement that allows to characterize and differentiate people that participate in co-creation or that have the same mindset as co-creators from the remaining population.

2.2. Co-creation

In the past companies developed the products by using exclusively internal resources. The resulting products were question marks about the utility for consumers when launched to the market. In an increasingly competitive environment, companies started to integrate consumers in the products' development process, also known as co-creation (Dahl el al., 2015). Mahr and colleagues, (2014) defined co-creation as "*a process in which customers consciously and actively engage in a firm's innovation process, taking over innovation activities traditionally executed by the firm*". Nowadays an increasing number of companies launch products designed by consumers exclusively or alongside firm's professionals (Prahalad and Ramaswamy, 2004). One reason is

because users perceive themselves as less pressed by conditions such as time limits, revenues targets or company rules (Schreier et al., 2012).

The participation in the development process also creates a sense of belonging to a community in consumers (Nambisan and Baron, 2009) and makes consumers achieve a "*strong feeling of accomplishment*" (Franke et al., 2010). Furthermore many consumers enjoy to take part in the development process and to share their ideas with companies (Franke et al., 2010) because they can take value from the relation with the firm and create solutions that fit their own and other consumers' needs (Franke et al., 2006; Fuchs and Schreier, 2010). In turn, companies take advantage by learning about consumer's preferences and thus increasing the chances of predicting consumer needs and successfully fit the market (Ogawa and Piller, 2006), achieve faster time to market and resource efficiencies (Carbonell et al., 2009; Chang and Taylor, 2016).

As Gruner and Homburg, (2000) shown, product development is divided in several stages that can vary among companies and products, stages where consumers are integrated to arise company adaptability. The intensity of customer interaction and the success of new product launches are dependent on the product development stage where the relationship occurs (Gruner and Homburg, 2000). Thus, to take the maxium advantage, companies need to integrate consumers in the right phase according to consumer's abilities and company needs. For example, in the first steps of the development process, or designing stage, customers say what their needs and desires are, comment other consumers' input and evaluate product ideas to be considered (Gruner and Homburg, 2000; Kaplan and Haenlein, 2006). In the final or lunching stage, users can provide feedback about product usability, product performance, potential problems and the positioning and marketing mix of the new product. This increases the probability of lunching a product that better fit consumers' needs and helps achieving a more effective marketing mix (Henard and Szymanski, 2001; Ernst et al., 2010).

Furthermore, companies that allow consumers take part in their innovation activities are perceived as having more innovative capabilities than firms that produce and innovate in a close environment (Schreier et al., 2012). Interestingly, at the point of purchase, labeling a product as co-created increases consumer's willingness to pay, willingness to recommend firm or product and intentions to buy (Schreier et al., 2012). The reason is consumers not only perceive companies that co-create as more innovative but also as more customer-oriented. Such companies

are considered to be more willing to understand user needs and put costumer's interest first. In addition, user participation increases customer satisfaction, productivity, firm growth and profitability (Bendapudi and Leone, 2003; Mahr et al., 2014).

Research has also identified a darker side to integrate consumers in product development (Fuchs et al., 2013). In the luxury fashion industry a product labeled as co-created is perceived to be lower in quality and fail to signal high status (Fuchs et al., 2013). Consumers prefer products that were designed exclusively by professionals and that work for the respective company because those people "*have acquired skills and capabilities that allow them to perform design tasks more effectively and at a higher level of quality*" (Ulrich, 2007, Chapter 3, pp. 5–6). Consequently, the efect of co-creation in consumers may be exactly the oposite. It may prejudice the image and reputation of companies and their brands (Dahl and Moreau, 2007; Fuchs et al., 2013).

Complex products also shown to negatively impact consumers perceptions. Consumers feel that a normal person like them is not capable of providing adequate inputs to the development of complex products due to the lack of knowledge (Schreier et al., 2012). Thus, a product labeled as co-created loses its perceived power when the unnderlying design task becomes too dificult to be effectively performed by a common user (Schreier et al., 2012).

In the majority of the cases, let cosumers participate in firm's activities and advertise that interaction is positive for companies and co-creators. Creates higher demand for co-created products, positive word of mouth and firm's are better perceived by consumers. In addintion, co-creators enjoy to take part in firm's activities (Schreier et al., 2012). The effects of co-creation labeling are not allways positive, so it is important to study what may be the causes of such differences.

2.3. Identification with similar others

Individuals tend to feel closer to people that they relate with (Kelman, 1961). So if they admire a person/group with a specific behavior or opinion, "*the individual will accept the influence because the induced behavior is congruent with his value system*" (Kelman, 1961, p. 65). The source of influence is also very important since the consumer will only accept the influence if the endorser is credible or attractive (Erdogan and Zafer, 1999) his/her performance is acceptable (Agrawal and Kamakura, 1995) or has a high level of expertise (Ohanian, 1990). Thus, purchase

behavior can be influenced by the endorsement of a product from a credible source. This is why brands spend millions for top players use their products. For example a tennis player that likes Roger Federer would like to use a Wilson racket or an amateur football player that likes Cristiano Ronaldo would like to use Nike boots.

Daneshvary and Schwer (2000) showed that consumers are more likely to follow a behavior advocated by an association if they identify with the group (identification). Additionally, if consumers associate the source as credible or as the result of expertise endorsed, consumers are likely to purchase the product (internalization). The identification and internalization processes reflect a change in persons' behavior, resulting in higher demand for the endorsed product (Daneshvary and Schwer, 2000).

Consumers not only identify with current users but also with who create the product or participate in the development process. Because consumers are also users, their social identities connect to the co-creators (Dahl et al., 2015). Thompson and Malaviya (2013) found that when the perceived similarity between the ad creator and the viewer increases (higher identification), ad acceptance is higher. However, if consumers feel dissimilar to users participating in the co-created ad, the effects are attenuated. This dissimilarity occurs when consumers differ from the participating community along demographics such gender or when consumers are not experts in the product domain. Thus, consumers feel that do not belong to the social group of participating users (Dahl et al., 2015). So, when consumers are not experts in the product domain or that do not believe that can produce certain product, they don't feel in control of things and behave as externals.

Obtaining customer information is a difficult process that demands a great amount of workload and resources in the form of time and money (Lilien et al., 2002). In order to study consumers' perceptions about co-created labeled products and the possible demand for the product, we used willingness to buy and willingness to recommend, variables were also used by Schreier and colleagues (2012) in their studies. It is easy to get data for both variables and can give a close forecast of the demand without launching the product to the market. Willingness to buy is a well-known variable for the measurement of the possible demand for certain product since it is a direct measure. On the other hand, willingness to recommend represents the word of mouth that is also an indicator of a well-accepted product. A consumer will only recommend the product if likes it

but will also not recommend if the consumer thinks the product is bad. Word of mouth has been an important role in spreading information about products without creating costs for companies. The effect of worth of mouth took even greater importance with the appearance of internet and more specifically the social media like Facebook, YouTube and Twitter where information is easily spread through the world. The results that we obtain with these variables do not correspond to the real demand but it is the closest we can get with a low budget.

Thus we can write our hypothesis:

H1: Internal consumers have higher willingness to buy a product labeled as co-created than external consumers.

H2: Internal consumers have higher willingness to recommend a product labeled as co-created than external consumers.

2.4. Product complexity

Product complexity is a theoretical concept where still doesn't exist geral concent from academic community. The diversity of research areas, scope and objectives creates a great amout of different definitions and measurements that makes difficult for companies to take the maximum benefit from existing knowledge when managing the impact of product complexity (Orfi et al., 2011). The increasing demand for product diversity makes companies pressured to improve the existing or create new products in order to fill consumers needs. Product complexity has been proven to negatively impact product development time, productivity and costs since it requires higher setup costs, more raw materials, more inventory, higher quality control, less economies of scale and more time, reducing efficiency (Orfi et al., 2011).

Several researchers have been adressing product complexity from different perspectives: design and development perspective, manufactoring and assembly or even from the variety of products. Pahl and Beitz (1996) defined complexity as "*the fewer the elements and the higher the level of standardization, the less complexity involved*". Rodriguez-Toro and coleagues (2002) divided complexity in two dimentions: component and assembly complexity. The former was related to the geometry of components while the later reflected the structure and number of operations of the assembly process. On the other hand, Barclay and Dann (2000) claimed that newness increase perceived complexity. To adress a more holitic perspective we accepted the definition of Hobday

(1998) and Novak and Eppinger, (2001) that argue that a product is complex if the "*process of design requires a wide variety of distinct skill and types of expert knowledge of technology, materials and processes*".

Is important do analyse product complexity because consumers perceive complexity in products in different ways. While the perceived necessity of expertise when performing simple design tasks sush as designing a new ice-cream or a breakfast cereal, is low, it is likely to be much higher when performing complicated desing tasks sush as designing consumer electronics (Schreier et al., 2012). Thus, is important that marketeers understand consumer perceptions about products complexity. If consumers perceive design tasks as too complex, marketeers should not label the product as co-created when the target is a broad market.

Internals' appetence to be more entrepreneurs than the average population (Brockhaus, 1975) makes them also more likely to participate in co-creation projects than externals. We also know that purchasing behavior can be determined, between other variables, through people's personality and through the influence of other groups or individuals (Mathur et al, 2016; Amos et al., 2008). Indeed, research on user innovation and lead users shows that innovating users often serve other consumers as strong opinion leaders (e.g., Morrison et al., 2004; Schreier et al., 2007). An individual is willing to buy a product if they trust in who developed and produced that product (Laffertya and Goldsmith, 1999). Thereby we can say that the relation of identification and internalisation that a consumer has with the co-creator is stronger for an internal than for an external. Therefore, a consumer with internal locus of control will have higher propensity to buy or recommend a co-created product than an external because would fell closer to the co-creators. However if the product is too complex, consumers can feel that do not belong to the social group of participating users because don't have enough knowledge about the product domain (Dahl et al., 2015). Product complexity moderates the role of locus of control in willingness to buy co-created products. Thus we can reformulate our hypothesis:

H3a): In high complexity products the differences between internals and externals willingness to buy and recommend are attenuated.

H3b): In low complexity products consumers defined as internals are more willing to buy and recommend co-created products than external consumers.

3. Methodology and Data Collection

Our study was based in 2 questionnaires, a pilot study and a main questionnaire based on the pilot study. Questionnaires are cheap and fast to get information but sometimes not very pleasant for respondents to respond so they should not be too long and also made with some moderation. We performed a pilot study to understand which products would get more value for consumers when co-created. Were used several products divided in complex and non-complex with the objective of choosing one from each category. Later on, we performed the main study with the chosen products from the pilot study. We measured respondents locus of control and willingness to buy and recommend those products, knowing that were co-created. With the results we could understand if exist a relation between locus of control and the willingness to buy and recommend co-created products.

3.1. Pilot Study

3.1.1. Participants and Methodology

In order to choose the products to be tested we conducted a pilot study. 30 Portuguese participants answered to an online questionnaire disseminated through facebook, 37% males and 63% females (Appendix 1). The average age was 24.6 (Appendix 2).

The goal of the pilot was to understand which products consumers perceive as having more potential to be co-created or that gain more value from being co-created. Were chosen 2 products with the highest values of value creation because we wanted products that gained value when co-created. If the chosen products didn't have value added when co-created, the results in the main study would be biased since consumers would prefer the product with more value added. With this procedure we aimed to increase the realism and thus the validity of our study. The products selected to our study were (software, videogame, cell phone, kids' toy, handbag, shoes, shirt, hamburger and ice-cream) because they belong to product categories well known to the great majority of the individuals in the sample, therefore products that participants could reason well.

The products were divided according to the complexity level following Hobday, (1998) and, Novak and Eppinger, (2001) definition that states that a product is complex if it is necessary a wide variety of skills and expert knowledge of technology, materials and processes in the process design. Thus, we separated the complex products (software, videogame and cellphone) from non-

complex products, which we could divide in food (hamburger and ice-cream) and clothes/accessories (handbag, shoes and shirt). The complexity division goes in line with what Schreier and collegues (2012) found in their studies where they asked 26 respondents about perceived product complexity. They concluded that T-shirts, household products, outdoor sports equipment and cereals could be discribed as low complexity products while consumer electronics, electrical/mechanical gardening products and robotic toys were perceived as much complex products. We chose product complexity to discriminate products because this is a variable to be tested in our hypothesis.

3.1.2. Procedure

Participants were asked to indicate on a 7 point scale (1 = lose all the value; 7 = perfect product) how much value the product gained from co-creation (Appendix 3). Then, participants were asked to suggest a product that was better when co-created and explain why. With this question was possible to identify other products and get the opinion of people about the importance of being co-created. Before finishing, respondents answered question on age and gender.

3.1.3. Measures

Table 3.1 – Pilot Study Measures

Variables:	Items:
Value added from co-creation	Evaluate the following [Product] to the value that co-creation would add them: [1] lose all the value … [7] perfect product
Product with higher value	Suggest a product that would give you more value if it were created between consumers and the company (co-created).
	Why it gives you more value?
Gender	Gender: [1]Female [2]Male
Age	Age:

3.1.4. Result Analysis

The average mean of product choice ranged from 4.6 (shirt and handbag) to 5.4 (videogame and cellphone). All values are higher than 4 (scale midpoint) meaning that every chosen product gives value for consumers by being co-created. Interestingly, all complex products had higher value added than non-complex products, which goes against our thoughts. Maybe, it can be related to

the composition of the sample by university students that are more knowledgeable than the average population. If the mean was under 4, consumers would not choose that product as a valuable co-created product. To confirm if the means were significantly different from 4 we performed a t-test for each product. The null hypothesis states that the true mean is equal to 4 and the alternative hypothesis states that the true mean is different from 4. The results can be seen in Table 3.2:

Table 3.2 – T-tests for co-creation utility by product

Complexity	Products	X	Mid-Point	Diff to Mid	t	P-Value
High	Software	5,033	4	1,033	4,447	<.000
	Videogame	5,400	4	1,400	6,770	<.000
	Cellphone	5,400	4	1,400	5,887	<.000
Low	Kid's toy	4,967	4	0,967	6,547	<.000
	Handbag	4,600	4	0,600	3,844	<.000
	Shoes	4,633	4	0,633	3,739	<.000
	Shirt	4,567	4	0,567	3,084	0,004
	Hamburger	4,967	4	0,967	4,966	<.000
	Ice-cream	4,833	4	0,833	5,000	<.000

All P-values are significant even for a 2 sided test meaning that co-creation contributed to add value to every product in the study. We were looking for the higher values but with different complexities. For a complex product, the cellphone is the best option since is more common and better known between individuals than a videogame. For the product with low complexity we chose the hamburger for the same reason as the high complexity. Besides being better understood between individuals, is also less complex than a kid's toy. Choosing products with low value added could impact negatively intentions to buy and recommend on the next study, biasing the results.

3.2. Questionnaire

3.2.1. Sample and Methodology

The main questionnaire (Appendix 4) was posted online via doodle for 9 days and all the participants included in the sample answered voluntarily. The study followed a 2 (product complexity: high, low) within subject design. The questionnaire was distributed through

facebook, in groups and by personal messages. A total 184 people started to respond the questionnaire but only 133 finished it. In the end, only the complete responses were analyzed.
The sample size was 133 respondents with 77% students (Appendix 5). The mean age was 24.14 and ranged from 18 to 53 with 124 (93.2%) respondents under 30 (Appendix 6). The gender was equally distributed with 71 (53.4%) females and 62 males (46.6%) (Appendix 7). Finally, 88% of the respondents were Portuguese and the remaining from other nationalities (Appendix 8).

3.2.2. Procedure

The questionnaire (Appendix 4) was administered in Portuguese and English, an option that had to be chosen before start responding to the questionnaire.

First, participants were told they were taking part in a study for a master thesis in which all answers were anonimous and that should responded with sicerity. The questionnaire started with a presentation of a scale to determine the degree to which individuals believe they have control over the events in their lifes (LOC). In order to evaluate items, participants were asked to indicate on a 5 point scale (1 = strongly agree; 5 = strongly disagree) how they agree or disagree on 12 sentences (e.g. my life is determined by my own actions; when I get what I want, it is usually because I am lucky).

In the second part of the questionnaire respodents were presented with 2 scenarios, both of them were very similar with the only difference in the product presented. Questions about a cell phone were administrated in the first part and about a hamburger in the second part.

First, we measured product involvement with a 5 points scale, from strongly agree to strongly disagree and that asked respondents to state their opinion about 10 sentences (e.g. I usually take many factors into account before purchasing a phone/hamburger; I usually seek advice from other people prior to purchasing a phone/hamburger).

In a new page of the questionnaire, a picture of a cellphone with the brand covered was shown for the first scenario and for the second scenario was shown a hamburguer. The pictures were followed by a short defenition of co-creation. After read the defenition, participants were asked about willingness to buy the product presented (e.g. the likelihood of purchasing this product is:) and about willingness to recommend (the likelihood of recommend the product to a friend is:).

Was asked to participants to select in a 5 point scale (1 = extremely high; 5 = extremely low) how likely were they to buy/recommend the two products.

At the end participants answered some demographic questions: gender, occupation, age and nationality.

3.2.3. Measures

Locus of control scale administrated in our study was used by (Mueller and Thomas, 2000). It was initialy developed by (Rotter, 1966) and reduced from a 20 to a 12 items scale by Mueller and Thomas, 2000. The objective was to reduce the questionnaire size to make it easier to be answered. The items 3, 4, 5, 8, 10 and 12 were reversed and needed to be corrected after collecting the data. The scale is defined as Internal-External Locus of Control Scale or abreviated as I-E scale (Rotter, 1966). This scale was tested in several groups, one of them, college students (Rotter, 1966), the major group of our sample.

Before we could start analysing the results, we tested the reliability of the scale. To test it, we applied the cronbach alpha. This method was developed by Lee Cronbach in 1951 with the objective of estimate the reliability of a psychometric test like our LOC scale. Although it also have been used in other areas like social sciences and business. The test measures the correlation between the several items in the scale. For a scale to be reliable, the items need to "measure the same" in order to individualy give the same information (Cronbach, 1951). We applied the test using R program and the result obtained was an alpha of 0.68 (Appendix 9). The scale is questionable according to George and Mallery, 2001 gradding:

Grade	Excellent	Good	Acceptable	Questionable	Poor	Unacceptable
Interval	[0,9 ; 1[	[0,8 ; 0,9[	[0,7 ; 0,8[	[0,6 ; 0,7[	[0,5 ; 0,6[	[0 ; 0,5[

Figure 3.1 – George and Mallerry, 2001 scale for scale reliability

We proceed by removing some items with the objective of inproving Cronbach alpha but was not possible as all the items retained important information. Therefore we retained the original items to build the scale.

The second part of the questionnaire was divided in 2 identical set of questions for 2 distinct products. The first one was a cellphone as representant of the complex product while the second, a hamburger, represented a non complex product. Here we defined a complex product as

requiring a wide variety of skills and expert knowledge of technology, materials and processes (Hobday, 1998; Novak and Eppinger, 2001). These two products were chosen because they had the highest means for co-creation added value in the pilot study, the individuals can reason well about them and also because they work for both genders. This way, we could use in our analysis every persons's response because they were evaluating a product that they are used to.

We use the product involvement scale developed by (Zaichkowsky, 1985). It is a reliable scale that have been used by several researchers, for instance (McQuarrie and Munson, 1992). According to (Zaichkowsky, 1985), involvement can be understood as: "... *a person's perceived relevance of the object based on inherent needs, values, and interests*". Involvement can influence the decision making of consumers (Bauer, et al., 2006) so it is relevant to use as control variable. Again, this scale was tested with Cronbach alpha (Cronbach, 1951), for both products, cellphone and burger as complex and non-complex products. We did several scales with different combination of items and we concluded that the best reliability scale for product involvement was composed by 8 items with a Cronbach alpha of 0.82 (Appendix 10) for complex product and 0.84 (Appendix 12) for non complex product.

The willingness to buy scale (Doods et al., 1991) was also subjected to the Cronbach alpha test obtaining the results of 0.9 and 0.94 for complex and non-complex products respectively (Appendix 11 and Appendix 13). For the willingness to recommend scale was not possible to apply the test because it was a single item question.

In order to test our hypothesis in R, were created 5 new variables with the items' average from each variable: LOC, involvement and willingness to buy for complex product and involvement and willingness to buy for low complexity product. For LOC scale, a low score corresponds to internal locus of control and a high score corresponds to external locus of control. For product involvement, a low value corresponds to high involvement and a high value corresponds to low involvement. For willingness to buy and recommend scales, a low value in the scale means high willingness to buy/recommend and vice-versa.

After collecting the results and preparing the data we could start analyzing it and see if in fact exist any relation between locus of control and its effects in willingness to purchase and recommend.

Table 3.3 – Questionnaire measurements

Variables:	Items:
Locus of Control (Alpha = 0.68) (Scale final items = 1 to 10) (Total items = 10)	You will evaluate the following sentences according with your opinion, choosing the option that best suits your feelings: 1. My success depends on whether I am lucky enough to be in the right place at the right time. [1]Strongly agree…[5]Strongly disagree / 2. To a great extent my life is controlled by accidental happenings. [1]Strongly agree…[5]Strongly disagree / 3. When I get what I want, it is usually because I am lucky. [1]Strongly agree…[5]Strongly disagree / 4. My life is determined by my own actions. [1]Strongly agree…[5]Strongly disagree / 5. When I get what I want, it is usually because I worked hard for it. [1]Strongly agree…[5]Strongly disagree / 6. It is not wise for me to plan too far ahead, because things turn out to be a matter of bad fortune. [1]Strongly agree…[5]Strongly disagree / 7. Whether or not I am successful in life depends mostly on my ability. [1]Strongly agree…[5]Strongly disagree / 8. I feel that what happens in my life is mostly determined by people in powerful positions. [1]Strongly agree…[5]Strongly disagree / 9. I feel in control of my life. [1]Strongly agree…[5]Strongly disagree / 10. Success in business is mostly a matter of luck. [1]Strongly agree…[5]Strongly disagree
Product Involvement (Alpha for complex product = 0.82) (Alpha for low complexity product = 0.84) (Scales final items = 1,2,3,7,8,9,10,11) (Total items = 8)	To what extend do you agree or disagree with the following sentences taking into account the described situation: 1. I would be interest in reading about (product). [1]Strongly agree…[5]Strongly disagree / 2. I would read reviews about (product). [1]Strongly agree…[5]Strongly disagree / 3. I have compared (product) characteristic among brands. [1]Strongly agree…[5]Strongly disagree / 4. I think there is a great deal of differences among brands. [1]Strongly agree…[5]Strongly disagree / 5. I have a most preferred brand of (product). [1]Strongly agree…[5]Strongly disagree / 6. I usually pay attention to ads for (product). [1]Strongly agree…[5]Strongly disagree / 7. I usually talk about (product) with other people. [1]Strongly agree…[5]Strongly disagree / 8. I usually seek advice from other people prior to purchasing a (product). [1]Strongly agree…[5]Strongly disagree / 9. I usually take many factors into account before purchasing a (product). [1]Strongly agree…[5]Strongly disagree / 10. I usually spend a lot of time choosing what kind to buy. [1]Strongly agree…[5]Strongly disagree / 11. How familiar are you with the (product) market? [1]Extremely familiar...[5]Not familiar at all / 12. How long ago did you buy your actual (product)? [1]Very recently...[5]A long long time ago
Willingness to Buy (Alpha for complex product = 0.90) (Alpha for low complexity product = 0.94) (Total items = 5)	In the following sentences select the option that better describes your situation.1. The likelihood of purchasing this (product) is: [1]Extremely high...[5]Extremely low / 2. The probability that I would consider buying the (product) is: [1]Extremely high...[5]Extremely low / 3. My willingness to buy the (product) is: [1]Extremely high...[5]Extremely low
Willingness to Recommend (Total items = 1)	In the following sentences select the option that better describes your situation. 1. The likelihood of recommend the (product) to a friend is: [1]Extremely high...[5]Extremely low
Gender	Gender: [1]Female [2]Male
Occupation	Select your occupation: [1]Student [2]Student and Worker [3]Worker [4]Unemployed [5]Retired
Age	What is your age?
Nationality	What is your nationality?

3.2.4. Result Analysis

Locus of control had a minimum value of 2.4, a maximum of 5 and a median of 3.8 (Appendix 13). The median was 0.8 scale points above the scale midpoint. It was expected since our scale source (Mueller and Thomas, 2001) had the same results with the same type of respondents, college students. College students are characterized as more internals than the average population (Rotter, 1966; Mueller and Thomas, 2001).

To analyze the data we used an analysis of variance (ANOVAs). In order to perform ANOVA tests we first needed to verify its assumptions. All models were tested for heteroscedasticity and all variables for normality (Appendix 14 and Appendix 15). The residuals against fitted plot shows if there is a pattern in the residuals. There are similar scatter thought fitted values which indicates the residuals are homoscedastic. To verify if the variables follow a normal distribution we applied a QQ plot. The closer the dots to the diagonal, the closer to a normal distribution the variable is. The deviation from the line shows a right skewness in all variables except involvement for low complexity product. A common transformation to correct right skewness is the logarithmic transformation, a procedure that we followed for all variables with skewness. With the application of the transformation we obtained a distribution closer to normality.

In order to test our hypotheses we started by dividing respondents into internals and externals. The criterion that we applied was to split the sample in a suitable breakpoint (median) in which the lower 50 percentile was separated from the upper 50 percentile (Mueller and Thomas, 2001; Sharma et al., 1981). This way, both groups stay with the same number of elements, otherwise the internal group would be much larger than the external group. But the score of the observations in the middle is very close to each other, meaning that there are no big differences among middle observations, similar to what Rotter (1966) found in their studies. A respondent that is considered internal with a score of 3.75 is not different from a respondent that is considered external with a score of 3.85. So it was necessary to remove the central observations to enhance the remaining ones (Sharma et al., 1981). After delete the central observations was necessary to transform the values into factors, the low values or "internals" became "0" and the high values or "externals" became "1".

To test H1 we performed an ANOVA with all the data from both products (Table 3.4). As expected, internals had higher willingness to buy than externals ($M_{internals}$ = 0.746; $M_{externals}$ =

0.876) and also higher willingness to recommend ($M_{internals}$ = 0.810; $M_{externals}$ = 0.916). We can only confirm H1 for willingness to buy (P-Value = 0.014) and not for willingness to recommend since the results are not significant (P-Value = 0.071).

Table 3.4 – ANOVA between Internals and Externals

	Internals Mean	Externals Mean	95 percent confidence interval:		t	P-Value
Log(WTB)	0,746	0,876	-0,234	-0,026	-2,466	0,014
Log(WTR)	0,810	0,916	-0,221	0,009	-1,815	0,071

To test our hypothesis, where we stated that product complexity moderates the role of locus of control in willingness to buy co-created products, we performed ANOVA tests.

For H3a (Table 3.5), internals had slightly more willingness to buy ($M_{internals}$ = 0.861; $M_{externals}$ = 0.899; P-Value = 0,567) and recommend ($M_{internals}$ = 0.827; $M_{externals}$ = 0.870; P-Value = 0,596) than externals. In this case, results supported our hypothesis since t-values were not significant, meaning that differences between internals and externals are attenuated. In other words, for complex products we cannot say that internals have different propensity to buy and recommend a co-created labeled product than externals.

Table 3.5 – ANOVA for Complex Product with WTB and WTR

	Internals Mean	Externals Mean	95 percent confidence interval:		t	P-Value
Log(WTB)	0,861	0,899	-0,171	0,094	-0,575	0,567
Log(WTR)	0,827	0,870	-0,205	0,118	-0,533	0,596

We run the same analysis for the low complexity product in order to test H3b (Table 3.6). We did an ANOVA with LOC against willingness to buy ($M_{internals}$ = 0.631; $M_{externals}$ = 0.853; P-Value = 0,006). The P-value was very low so we could reject the null and confirm our hypothesis that exist difference between means. As we expected, internals had higher willingness to buy low complexity co-created labeled products than externals. Regarding willingness to recommend, we also found support for our hypothesis ($M_{internals}$ = 0.792; $M_{externals}$ = 0.963; P-Value = 0,044). This time P-value is higher but still significant, making possible the rejection of the null. With these results we can say that willingness to buy and willingness to recommend a low complexity co-

created labeled product is higher for consumers defined as internals than for externals, which confirm H3b.

Table 3.6 – ANOVA for Low Complexity Product with WTB and WTR

	Internals Mean	Externals Mean	95 percent confidence interval:		t	P-Value
Log(WTB)	0,631	0,853	-0,380	-0,064	-2,788	0,006
Log(WTR)	0,792	0,963	-0,336	-0,005	-2,040	0,044

With the help of the plots we can visualize that internals have higher willingness to buy and recommend than externals (Figure 3.2), but the difference between internals and externals is much higher for the low complexity product (means: WTB: I=0.631, E=0.853; WTR: I=0.792, E=0.963) than for the high complexity (means: WTB: I=0.861, E=0.899; WTR: I=0.827, E=0.870) which goes in line with our previous findings.

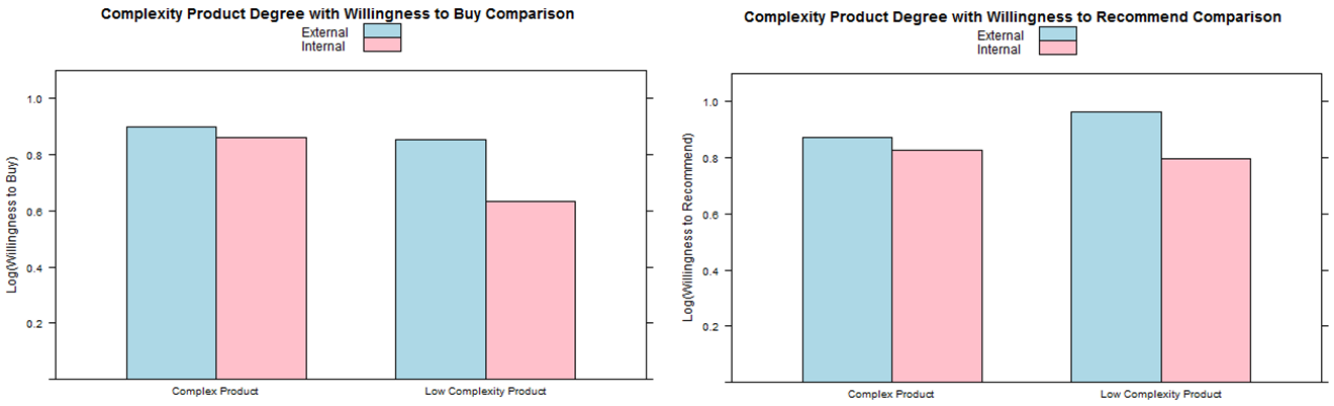

Figure 3.2 – Comparison of WTB and WTR between internals and externals

Involvement was used as a covariate variable since it can be a possible measure for WTB and WTR. If the main effect is still significant when adding the variable, means that the effect on WTB and WTR is beyond the level of product involvement. We performed an analysis of covariance (ANCOVA) with locus of control and involvement as independent variables for both product complexities. The same ANCOVA test was made for both dependent variables, willingness to buy and willingness to recommend.

First, we tested for the complex product, willingness to buy against LOC and product involvement (F_{loc} = 0.347; P_{loc} = 0.557; F_{invol} = 8.777; P_{invol} = 0.004) (Table 3.8) and as we can see no major changes occurred comparing with the restricted model (F_{loc} = 0.323; P_{loc} = 0.571)

(Table 3.7). For willingness to recommend the results followed the same path (F_{loc} = 0.330; P_{loc} = 0.570; F_{invol} = 11.000; P_{invol} = 0.001) (Table 3.8) meaning that the control variable didn't change the results.

For the low complexity product results were similar to high complexity product. Willingness to buy did not have the results changed comparing with the restricted model (F_{loc} = 7.993; P_{loc} = 0.006; F_{invol} = 9.12; P_{invol} = 0.003) (Table 3.8) and neither willingness to recommend (F_{loc} = 4.000; P_{loc} = 0.048; F_{invol} = 3.028; P_{invol} = 0.085) (Table 3.8). The main effect previously studied almost did not change which means that product involvement does not influence the results from the initial model for both product complexities.

Considering the results with the introduction of product involvement in the analysis, we can still confirm all our hypothesis.

Table 3.7 – ANOVA, restricted model for high and low complexity products

			Locus of Control		
Restricted model	Internals Mean	Externals Mean	F-value	P-value	Residuals Mean Sq
WTB (Complex)	0,861	0,899	0,323	0,571	0,247
WTR (Complex)	0,827	0,870	0,301	0,584	0,117
WTB (Non-Complex)	0,631	0,853	7,415	0,008	0,171
WTR (Non-Complex)	0,792	0,962	3,924	0,050	0,187

Table 3.8 – ANCOVA results with the introduction of product involvement

	Locus of Control		Product Involvement		
	F-value	P-value	F-value	P-value	Residuals Mean Sq
WTB (Complex)	0,347	0,557	8,777	0,004	0,109
WTR (Complex)	0,330	0,567	11,000	0,001	0,146
WTB (Non-Complex)	7,993	0,006	9,116	0,003	0,158
WTR (Non-Complex)	4,000	0,048	3,028	0,085	0,183

We tested demographic characteristics as control variables because they can influence results, as shown by several studies. For example Rotter, 1966 found significant differences between genders although the results were not consistent. In one sample (e.g. University of Connecticut) females were more externals and in the others, minimal differences appeared (e.g. Kansas State University and Ohio State University). Were verified differences between races (black and white

students) in which white students where more internals (Battle and Rotter, 1963). And when taking into account an economic level, high socioeconomic classes showed to be more internals (Franklin, 1963). Thus, a higher or lower internality level in the group may change the overall result so it's important to separate and analyze the groups individually to see if such differences appear. On top of that, many studies were not consistent, making the effects of demographic variables unpredictable. Therefore is even more important the analysis of those variables.

We run one ANCOVA test using a demographic variable each time. We made tests for each level of complexity and for both dependent variables. The analysis of covariance was first done for the complex product. Comparing with the restricted model ($F_{loc} = 0.323$; $P_{loc} = 0.571$) for WTB and ($F_{loc} = 0.301$; $P_{loc} = 0.584$) for WTR (Table 3.7) none of the control variables changed the main effect in locus of control for willingness to buy ($F_{gender} = 0.320$, $P_{gender} = 0.622$; $F_{occupation} = 0.317$, $P_{occupation} = 0.575$; $F_{age} = 0.322$, $P_{loc} = 0.572$; $F_{nationality} = 0.328$, $P_{nationality} = 0.568$) and for willingness to recommend ($F_{gender} = 0.298$, $P_{gender} = 0.586$; $F_{occupation} = 0.297$, $P_{occupation} = 0.587$; $F_{age} = 0.300$, $P_{loc} = 0.585$; $F_{nationality} = 0.304$, $P_{nationality} = 0.583$) (Table 3.9) . Also all effects remained insignificant.

We did not have different results for the low complexity product. For willingness to buy, the main effect did not change ($F_{gender} = 7.414$, $P_{gender} = 0.008$; $F_{occupation} = 7.570$, $P_{occupation} = 0.007$; $F_{age} = 7.373$, $P_{loc} = 0.008$; $F_{nationality} = 7.357$, $P_{nationality} = 0.008$) and neither for willingness to recommend ($F_{gender} = 3.957$, $P_{gender} = 0.049$; $F_{occupation} = 4.071$, $P_{occupation} = 0.046$; $F_{age} = 3.984$, $P_{loc} = 0.051$; $F_{nationality} = 3.984$, $P_{nationality} = 0.049$) when comparing with the restricted model ($F_{loc} = 7.415$; $P_{loc} = 0.008$) for WTB and ($F_{loc} = 3.924$; $P_{loc} = 0.050$) for WTR (Table 3.7). All P-Values of locus of control were under 0.05 except for WTR and age. With a P-Value of 0.051 we still consider it as significant. Taking into account this last point, all LOC P-Values remained significant alongside with unchangeable main effect.

We can conclude that gender, occupation, age and nationality don't have influence in the relation between willingness to buy/recommend and locus of control. Thus we can say that demographic aspects did not have influence in the validation of our hypothesis. All our hypothesis remained validated.

Table 3.9 – ANCOVA, results comparison with the introduction of demographic variables

			Locus of Control		Demographic Variables		
Scenario	Dependent Variable	Control Variable	F-value	P-value	F-value	P-value	Residuals Mean Sq
Complex Product	WTB	Gender	0,320	0,573	0,244	0,622	0,118
		Occupation	0,317	0,575	0,344	0,793	0,120
		Age	0,322	0,572	0,749	0,389	0,118
		Nationality	0,328	0,568	2,683	0,104	0,115
	WTR	Gender	0,298	0,586	0,033	0,856	0,162
		Occupation	0,297	0,587	0,509	0,677	0,163
		Age	0,300	0,585	0,697	0,406	0,161
		Nationality	0,304	0,583	1,950	0,166	0,159
Low Complexity Product	WTB	Gender	7,414	0,008	0,994	0,321	0,171
		Occupation	7,570	0,007	1,728	0,166	0,167
		Age	7,373	0,008	0,408	0,524	0,172
		Nationality	7,357	0,008	0,196	0,659	0,172
	WTR	Gender	3,957	0,049	1,876	0,174	0,185
		Occupation	4,071	0,046	2,301	0,082	0,180
		Age	3,913	0,051	0,706	0,403	0,187
		Nationality	3,984	0,049	2,612	0,109	0,184

Although the literature says that in some cases were found significant effects with the introduction of demographic variables as control variables, we did not find changes in the main effects of our hypothesis. Also with the introduction of the control variable product involvement, the effects remained the same.

After the data analysis, we saw that the role of locus of control in willingness to buy co-created labeled products is attenuated for high complexity products (H3b confirmed). Furthermore, consumers' willingness to buy/recommend low complexity products labeled as co-created is higher for internals than for externals (H3a confirmed). Thus, Product complexity moderates the role of locus of control in willingness to buy and recommend co-created labeled products.

4. Conclusions and Future Research

4.1. Main Conclusions

The motivation for this research lies on the understanding of how consumers react about communicating (or not) to the market that consumers are involved in the innovation process. To understand how different consumers react to a co-creation label, the present research makes a distinction between consumer's LOC and levels of product complexity. Using an experimental study, this study provides evidence that LOC is associated with distinct behavioral attitudes regarding the product.

4.1.1. Theoretical implications

Our dissertation contributed with valuable information about the relationship between consumer's locus of control and their willingness to buy or recommend products labeled as co-created, both for companies and for the academic community. The results show that the relationship between people's locus of control and their propensity to buy and recommend is contingent on product's complexity. Namely, this study shows that for low complexity products, internals are more willing to buy than externals. Furthermore, the results remain significant after we controlled for the level of consumers product involvement.

We found that there is a positive relation between willingness to buy/recommend and locus of control for low complexity products, that is, people with higher predominance of internal locus of control will have a greater predisposition to buy and recommend low complexity co-created labeled products. For more complex products such as mobile phone, the relation willingness to buy/recommend against LOC is more tenuous or can even disappear. The relationship with product complexity and co-created products was already highlighted by Schreier et al., 2012 who showed that the perceived value decreases when the underlying design task becomes too complex to be effectively performed by common users. One possible reason is the fact that consumers do not feel in control of things, that is, they do not perceive competencies in themselves to create such complex product. Thus, consumers no longer rely on the ability of people who produce the product or participate in the co-creation process since consumers do not create an identification with co-creators. As reported by other researchers (Schreier et al., 2012), consumers prefer professionals to be responsible for the development and production of more complex products.

This result highlights that some consumer product categories might be too complex for consumers to perceive users as able to provide meaningful input.

This study also investigated whether demographic variables would determine the consumer LOC and their willingness to buy/recommend. When studying the respondents demographics, this study did not find support that gender, occupation, age and nationality, influenced the relationship between willingness to buy/recommend and Locus of Control.

4.1.2. Managerial Implications

The way consumers with different levels of locus of control perceive co-created products can offer marketers more insights to the development of positioning and communication strategies in order to reach consumers with internal or external locus of control. Products labeled as being internally developed and made exclusively by professionals would have as target external customers and co-created labeled products would have as target internal customers. Furthermore, it is important that managers understand consumer perceptions on the complexity of their underlying product. If the product is perceived as too complex, managers should probably not label that product as designed by users (or at least they do not gain from labeling such products as co-created). This is because we found that for complex products such as a cell phone, internals tend to have similar behavior as externals in the purchasing decision. Although exist some successful cases of firms (e.g. Sparkfun electronics, Arduino, Lasersaur, Open Source Ecology) that labeled their complex products as co-created, managers should be cautious when using those labels. Consumers can feel that are not able to understand such complex product (that are not in control of things), resulting in a no identification with the endorser and ultimately decreasing product sales (or at least demand do not change). Thus, studying the LOC only makes sense for low complexity products which is important for managers that are in the fast-moving consumer goods.

4.2. Implications, Limitations and Future Research

This dissertation has some limitations and the first of them is related to the products themselves. The products were presented through a single image with the brand covered. Nevertheless, consumers can associate the image to a brand they know, making their answers biased. The analysis of other products would also be important for both complex and simple categories to

turn our findings more reliable. The analysis could be made for example with pizzas and ice creams for the non-complex products category and a watch, a car or even a medicine for the complex category.

The questionnaire could be done in a different way. Respondents were only presented with a co-created product to evaluate. If at the first instance had been presented a product made only by professionals and then a co-created one, would be possible to analyze the variation for each person individually while in our study the values were compared in relation to others. Thus, it would be possible to create a "control product" in order to analyze if the variation came only from the product itself or from the fact that the product was co-created.

The variable willingness to recommend was created based in one question with 1 item. In order to create a more reliable variable we should have done a question with several items as we did for willingness to buy.

Also the sample collected creates a further limitation in this study. As mentioned throughout the dissertation, the sample was constituted mainly by Portuguese university students, which concentrates the age of the sample in a small range. College students are characterized as more internals than the average population (Rotter, 1966; Mueller and Thomas, 2001). As consequence, the results may be biased and not reflecting what happens with the population in general. Also the disparity in the number of students compared to the rest of the groups (workers, unemployed, retired) may have influenced the results obtained. When doing the analysis, the sample was divided in two groups with the same size. This division was made in a sample characterized by being internal so the analysis was made comparing internals in general. The two groups were just relatively high or low in terms of internality. Thus, is important to utilize a way to collect a sample more homogeneous, for example doing questionnaires in the street.

Future studies could also focus in specific geographic areas such as other countries or specific regions of Portugal since in the north there are much more firms than in the south, meaning that those people are in general more entrepreneurial and consequently more internals than people from the south. Marketers may rely on geographical segmentation to create strategies that could be compatible with the predominant locus of control of that region. This type of segmentation would be an important tool for marketers to develop products and marketing messages that cold adapt better to such conditions.

Our study is based on literature that says that entrepreneurs are characterized by being more internals than the average population. We assumed that co-creators have the same behavior as entrepreneurs so it would be interesting to see if co-creators are also more internals than the average population in order to eliminate this assumption.

Another suggestion is to use other control variables beyond product involvement. For example purchase decision involvement would be more in line with our dependent variable (willingness to buy). Product involvement measures the interest in one product while purchase decision involvement shows the involvement when a consumers wants to buy a product. And we could use mediator variables as well. Familiarity with co-creation and how close consumers feel to who produce could be mediators that would reduce some assumptions we did and help in the analysis process.

The last suggestion we give is to use a more specific independent variable. Like the study from Martin and colleagues (2007) where they used weight locus of control as a way to measure women beliefs in the control of their body weight we could also use a specific LOC measurement to hold the belief of a person in their capacity to build, create or suggest ideas about a product. Would be a more reliable measurement that could bring different results from what we had.

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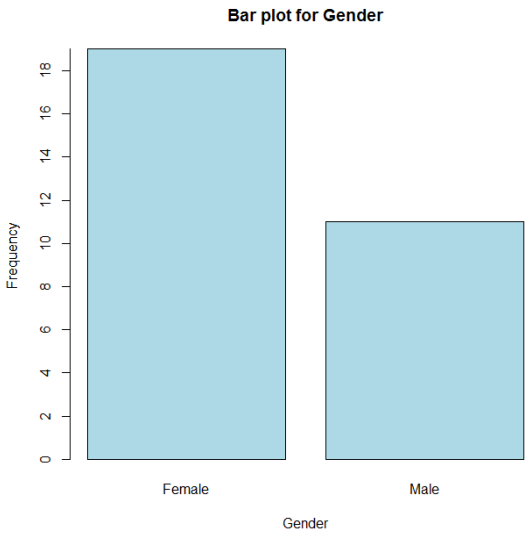
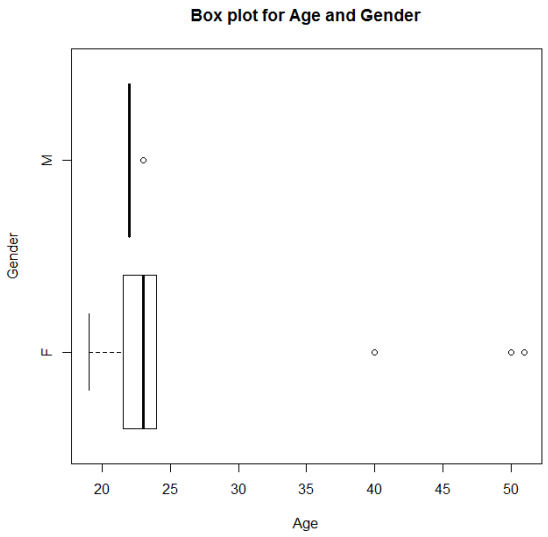
Appendices

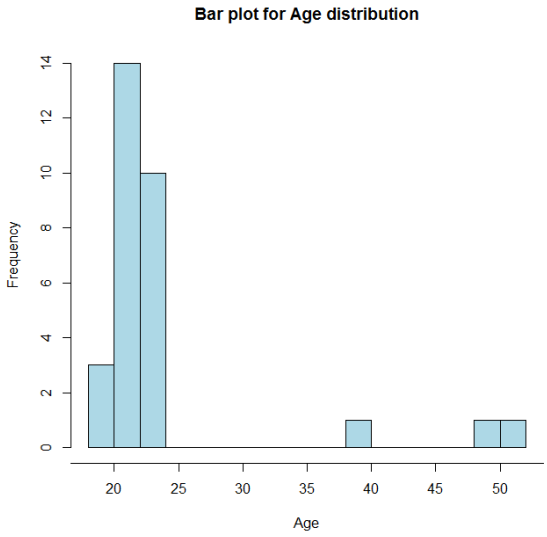
Appendix 1 – Gender Analysis

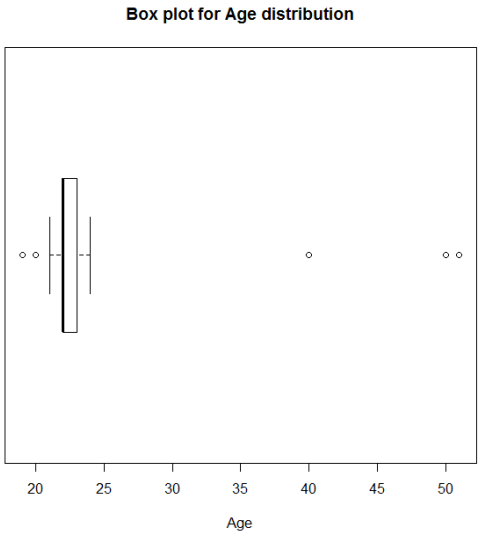




	Male	Female	% Male	% Female
Gender	11	19	36,7%	63,3%

Appendix 2 – Age analysis





	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Age	19	22	22	24,6	23	51

Appendix 3 – Pilot Study example

Co-criação ocorre quando os consumidores fornecem às empresas as suas ideias e conhecimentos para o desenvolvimento de novos produtos.

Avalie os produtos de acordo com o valor que a co-criação lhes acrescentaria.

	Perde todo o valor	Perde muito valor	Perde algum valor	Indiferente	Ganha algum valor	Ganha muito valor	Produto perfeito
Software	○	○	○	○	○	○	○
Videojogo	○	○	○	○	○	○	○
Telemóvel	○	○	○	○	○	○	○
Brinquedo	○	○	○	○	○	○	○
Mala	○	○	○	○	○	○	○
Sapatos	○	○	○	○	○	○	○
Camisola	○	○	○	○	○	○	○
Hambúrguer	○	○	○	○	○	○	○
Gelado	○	○	○	○	○	○	○

Sugira um produto a que daria mais valor se fosse criado entre os consumidores e a empresa (co-criado).

Porque razão lhe dá mais valor?

Género

- ○ Feminino
- ○ Masculino

Idade

Appendix 4 – Questionnaire example

Em que língua pretende responder ao questionário?

In which language do you want to perform the questionnaire?

- Português
- English

My name is André and I'm doing this survey in order to complete my Master Thesis at Católica Lisbon School of Business and Economics.

The objective of this study is to find out the way in which certain important events in our society affect different people and how it will affect the purchasing decision of some products.

Thank you in advance for your collaboration and time spent responding to the survey. It will be very important to the study completion.
There is no right or wrong answers. Every answer is anonymous. Be as honest as possible. The survey will take approximately 7 minutes.

In the first part of the questionnaire will be analyzed the way how you perceive your life.

You will evaluate the following sentences according with your opinion, choosing the option that best suits your feelings. Try to evaluate each sentence in an independently way of your previous responses.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
My success depends on whether I am lucky enough to be in the right place at the right time.	○	○	○	○	○
To a great extent my life is controlled by accidental happenings.	○	○	○	○	○
When I get what I want, it is usually because I am lucky.	○	○	○	○	○
My life is determined by my own actions.	○	○	○	○	○
When I get what I want, it is usually because I worked hard for it.	○	○	○	○	○
It is not wise for me to plan too far ahead, because things turn out to be a matter of bad fortune.	○	○	○	○	○
Whether or not I am successful in life depends mostly on my ability.	○	○	○	○	○
I feel that what happens in my life is mostly determined by people in powerful positions.	○	○	○	○	○
I feel in control of my life.	○	○	○	○	○
Success in business is mostly a matter of luck.	○	○	○	○	○

The next set of sentences will be useful to understand how involved are you when buying a phone.
Please imagine a situation in which you are interested in buying a phone.

To what extend do you agree or disagree with the following sentences taking into account the described situation:

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I would be interest in reading about phones.	○	○	○	○	○
I would read reviews about phones.	○	○	○	○	○
I have compared phone characteristic among brands.	○	○	○	○	○
I think there are a great deal of differences among brands.	○	○	○	○	○
I have a most preferred brand of phone.	○	○	○	○	○
I usually pay attention to ads for phones.	○	○	○	○	○
I usually talk about phones with other people.	○	○	○	○	○
I usually seek advice from other people prior to purchasing a phone.	○	○	○	○	○
I usually take many factors into account before purchasing a phone.	○	○	○	○	○
I usually spend a lot of time choosing what kind to buy.	○	○	○	○	○

How familiar are you with the phone market?

Extremely familiar	Very familiar	Moderately familiar	Slightly familiar	Not familiar at all
○	○	○	○	○

How long ago did you buy your actual phone?

Very recently	Recently	Some time ago	A long time ago	A long long time ago
○	○	○	○	○

Imagine a situation where you want to buy a phone and in your researches you find the following one:

In the details it says that is a co-created phone.

Co-creation is a process in which customers consciously and actively engage in a firm's innovation process, taking over innovation activities traditionally executed by the firm. In other words, consumers work together with the company in the development of their products.

The firm was really interested in providing to their customers a new design and useful apps. To do so it asked customers to design and develop applications. This phone is unique because it is the result of customers and professional working together, side by side.

It is also within the quality range that you are looking for and within your budget.

In the following sentences select the option that better describes your situation.

	Extremely high	Somewhat high	Neither high nor low	Somewhat low	Extremely low
The likelihood of purchasing this phone is:	○	○	○	○	○
The probability that I would consider buying the phone is:	○	○	○	○	○
My willingness to buy the phone is:	○	○	○	○	○
The likelihood of recommend the phone to a friend is:	○	○	○	○	○

The next set of sentences will be useful to understand how involved are you when buying burgers.

Think in a situation where you are interested in buying a burger.

To what extend do you agree or disagree with the following sentences:

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I would be interest in reading about burgers	○	○	○	○	○
I would read reviews about burgers	○	○	○	○	○
I have compared product characteristic among brands.	○	○	○	○	○
I think there are a great deal of differences among brands.	○	○	○	○	○
I have a most preferred brand of burger.	○	○	○	○	○
I usually pay attention to burger ads.	○	○	○	○	○
I usually talk about burgers with other people.	○	○	○	○	○
I usually seek advice from other people prior to purchasing a burger.	○	○	○	○	○
I usually take many factors into account before purchasing a burger.	○	○	○	○	○
I usually spend a lot of time choosing what kind to buy.	○	○	○	○	○

How familiar are you with the burger market?

Extremely familiar	Very familiar	Moderately familiar	Slightly familiar	Not familiar at all
○	○	○	○	○

Approximately, how long ago did you eat your last burger?

Very recently	Recently	Some time ago	A long time ago	A long long time ago
○	○	○	○	○

Imagine a situation where you want to eat a burger and in your researches you find a restaurant with a burger that caught your attention. That burger is represented on the following picture:

You read that it was developed together with the consumers (co-created).

Co-creation is a process in which customers consciously and actively engage in a firm's innovation process, taking over innovation activities traditionally executed by the firm. In other words, consumers work together with the company in the development new products.

The firm wanted to give consumers a new experience with a new type of burger. To do so it asked customers to build a burger with the ingredients they preferred. Also asked to develop a new sauce to add to the previous created burger. Customers and professionals working side by side resulted in this unique burger.

It is also within the quality range that you are looking for and within your budget.

Based on this information select the option that better describes your will.

	Extremely high	Somewhat high	Neither high nor low	Somewhat low	Extremely low
The likelihood of purchasing this burger is:	○	○	○	○	○
The probability that I would consider buying the burger is:	○	○	○	○	○
My willingness to buy the burger is:	○	○	○	○	○
The likelihood of recommend the burger to a friend is:	○	○	○	○	○

Gender:

- ○ Male
- ○ Female

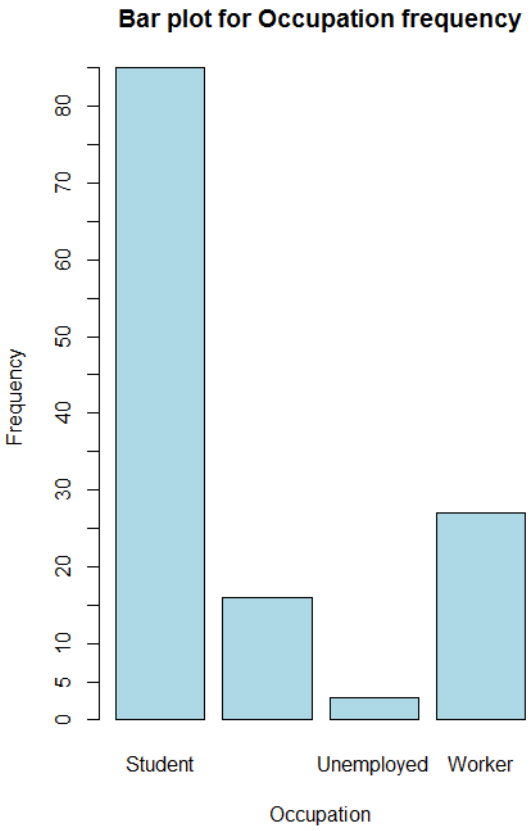
Select your occupation:

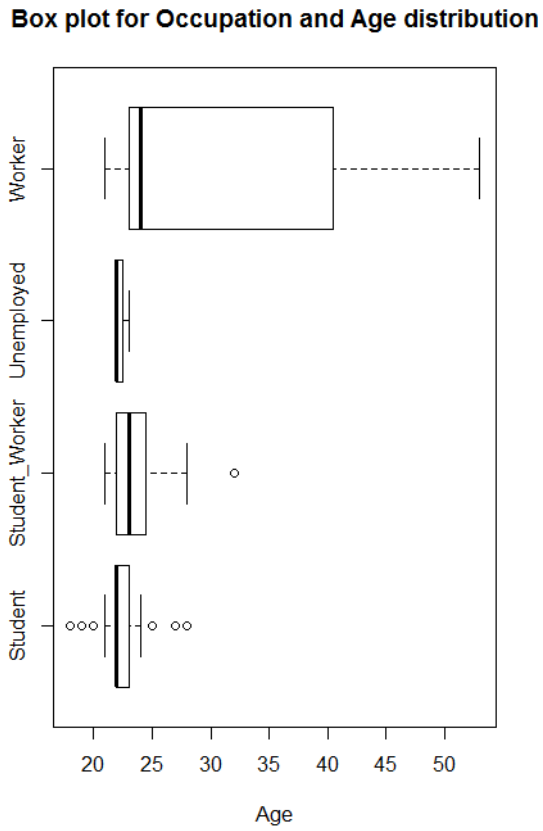
- ○ Student
- ○ Student and Worker
- ○ Worker
- ○ Unemployed
- ○ Retired

What is your age?

What is your nationality?

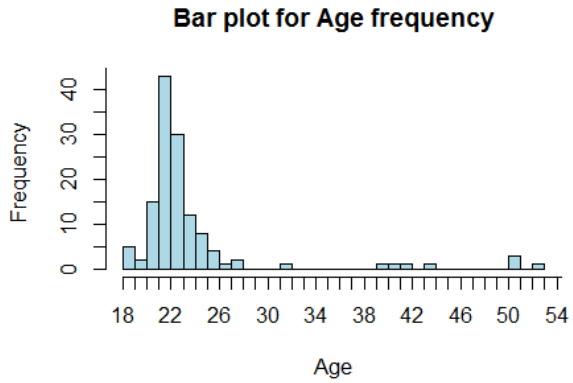
Appendix 5 – Occupation analysis

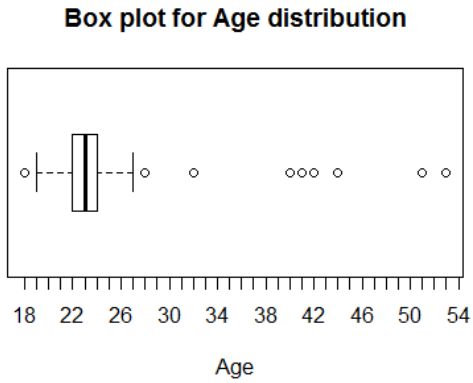




	Student	Student &Worker	Worker	Unemployed	Retired
Occupation	86	17	27	3	0
%	64,7%	12,8%	20,3%	2,3%	0,0%

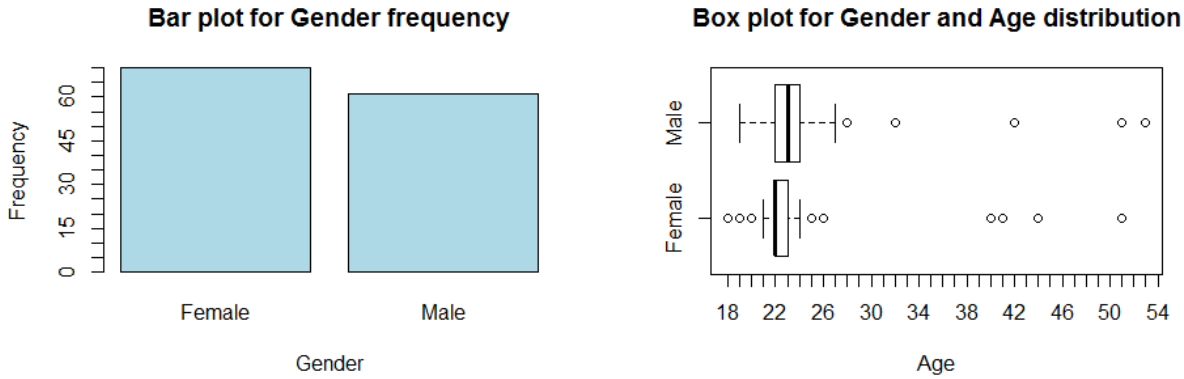
Appendix 6 – Age analysis





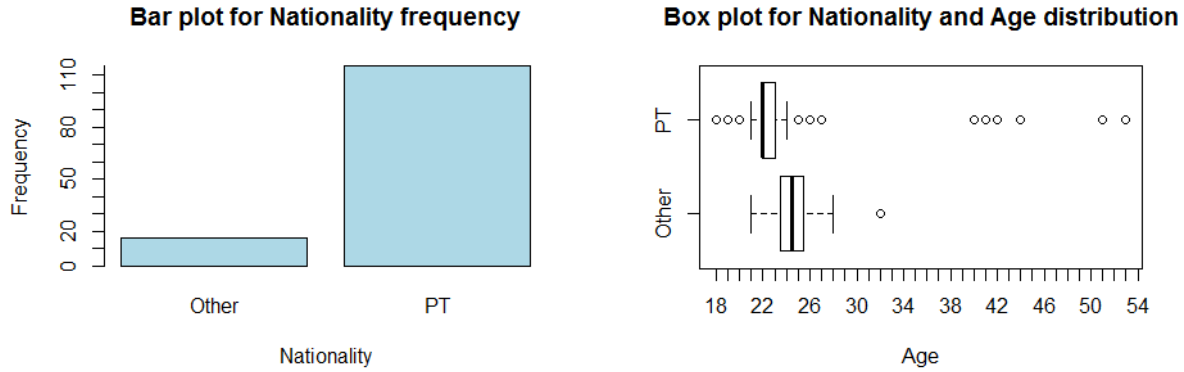
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Age	18	22	23	24,14	24	53

Appendix 7 – Gender analysis



	Male	Female	% Male	% Female
Gender	62	71	46,6%	53,4%

Appendix 8 – Nationality analysis



	PT	Others	% PT	% Others
Nationality	117	16	88,0%	12,0%

Appendix 9 – LOC scale reliability

raw_alpha	std.alpha	G6(smc)	average_r	S/N	Alpha se	mean	sd
0,68	0,69	0,74	0,18	2,2	0,052	3,7	0,47

95% confidence boundaries		
lower	alpha	upper
0,58	0,68	0,79

Reliability if na item is dropped:

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha se
Item 1	0,66	0,67	0,71	0,18	2,0	0,057
Item 2	0,63	0,64	0,69	0,17	1,8	0,061
Item 3	0,64	0,65	0,69	0,17	1,8	0,060
Item 4	0,67	0,68	0,71	0,19	2,1	0,056
Item 5	0,65	0,65	0,68	0,17	1,9	0,058
Item 6	0,66	0,67	0,72	0,18	2,0	0,057
Item 7	0,69	0,69	0,73	0,20	2,2	0,054
Item 8	0,68	0,69	0,73	0,20	2,2	0,055
Item 9	0,66	0,66	0,70	0,18	1,9	0,057
Item 10	0,68	0,69	0,73	0,20	2,2	0,055

Appendix 10 – Involvement scale reliability for complex product.

raw_alpha	std.alpha	G6(smc)	average_r	S/N	Alpha se	mean	sd
0,82	0,81	0,83	0,35	4,3	0,04	2,3	0,76

95% confidence boundaries		
lower	alpha	upper
0,74	0,82	0,89

Reliability if an item is dropped:

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha se
Item 1	0,79	0,78	0,79	0,34	3,6	0,046
Item 2	0,77	0,77	0,78	0,33	3,4	0,048
Item 3	0,78	0,77	0,79	0,33	3,4	0,048
Item 7	0,81	0,8	0,82	0,36	4,0	0,044
Item 8	0,82	0,82	0,83	0,39	4,5	0,042
Item 9	0,78	0,77	0,78	0,33	3,4	0,047
Item 10	0,80	0,79	0,80	0,35	3,8	0,045
Item 11	0,82	0,82	0,83	0,39	4,5	0,043

Appendix 11 - Willingness to buy scale reliability for complex product

raw_alpha	std.alpha	G6(smc)	average_r	S/N	Alpha se	mean	sd
0,9	0,9	0,87	0,76	9,3	0,065	2,5	0,87

95% confidence boundaries		
lower	alpha	upper
0,78	0,9	1,03

Reliability if an item is dropped:

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha se
Item 1	0,87	0,87	0,77	0,77	6,6	0,11
Item 2	0,82	0,82	0,70	0,70	4,7	0,11
Item 3	0,89	0,89	0,80	0,80	8,0	0,11

Appendix 12 - Involvement scale reliability for low complexity product.

raw_alpha	std.alpha	G6(smc)	average_r	S/N	Alpha se	mean	sd
0,84	0,84	0,84	0,39	5,1	0,037	3,4	0,8

95% confidence boundaries		
lower	alpha	upper
0,77	0,84	0,91

Reliability if an item is dropped:

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha se
Item 1	0,81	0,81	0,81	0,38	4,3	0,043
Item 2	0,82	0,81	0,81	0,38	4,3	0,043
Item 3	0,82	0,81	0,82	0,38	4,3	0,043
Item 7	0,82	0,81	0,82	0,38	4,3	0,043
Item 8	0,80	0,80	0,81	0,36	4,0	0,044
Item 9	0,82	0,81	0,81	0,38	4,3	0,043
Item 10	0,83	0,82	0,82	0,40	4,6	0,042
Item 11	0,84	0,84	0,84	0,43	5,3	0,040

Appendix 13 - Willingness to buy scale reliability for low complexity product.

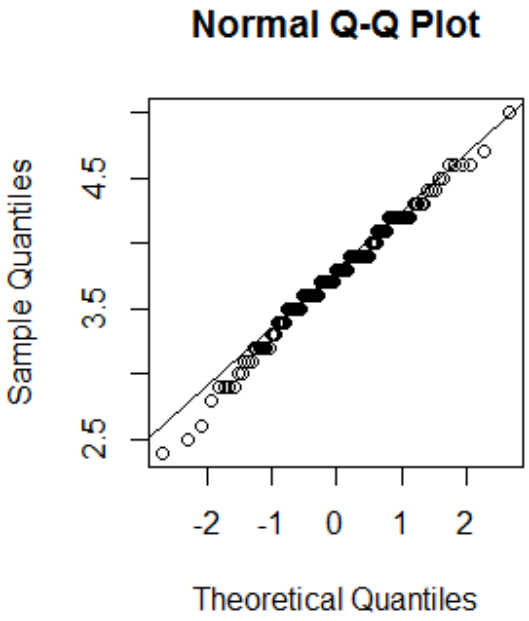
raw_alpha	std.alpha	G6(smc)	average_r	S/N	Alpha se	mean	sd
0,94	0,94	0,91	0,83	15	0,06	2,3	0,9

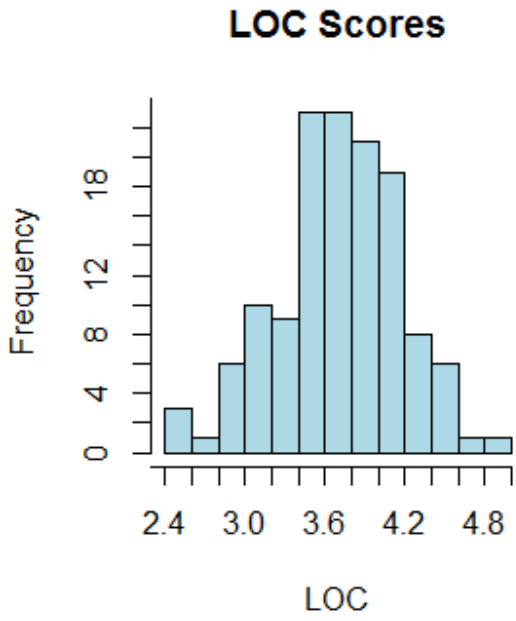
95% confidence boundaries		
lower	alpha	upper
0,82	0,94	1,05

Reliability if na item is dropped:

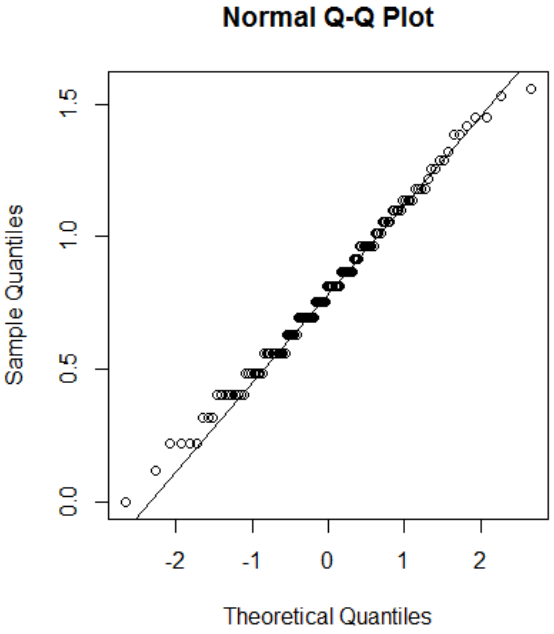
	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha se
Item 1	0,91	0,91	0,84	0,84	10,2	0,1
Item 2	0,90	0,90	0,82	0,82	9,1	0,1
Item 3	0,92	0,92	0,85	0,85	11,2	0,1

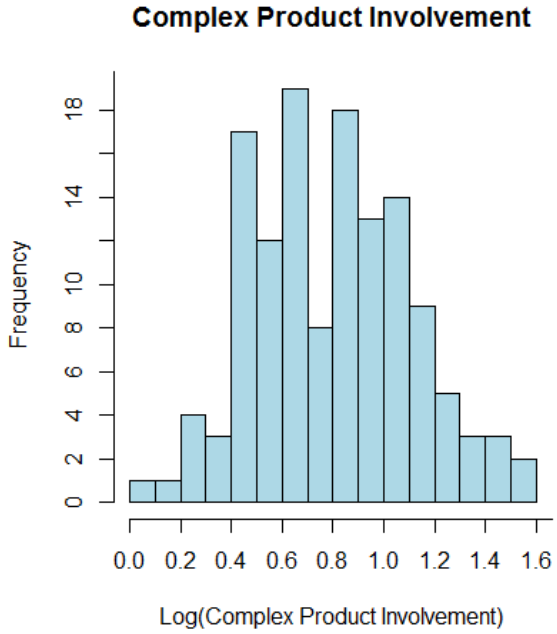
Appendix 14 – Variables analysis and normality tests



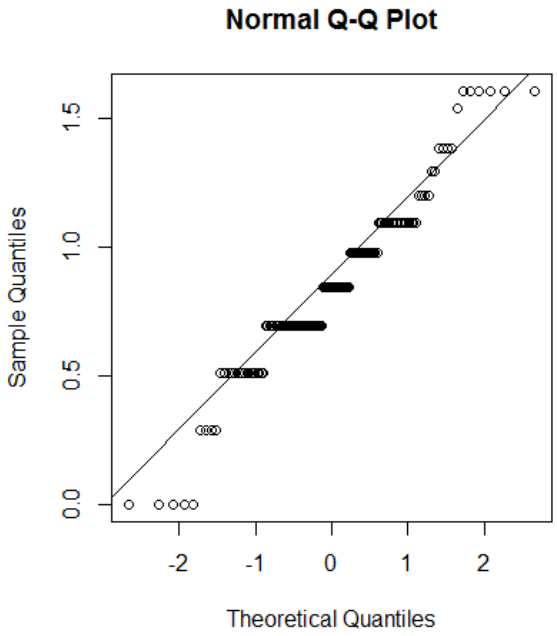


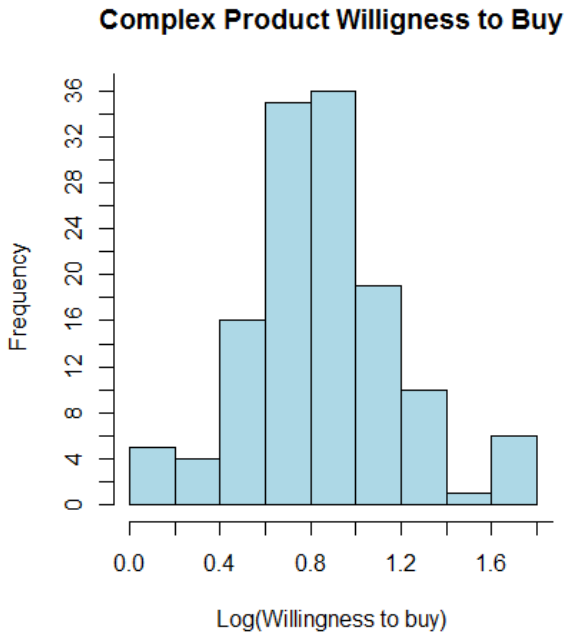
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
LOC	2,4	3,5	3,8	3,746	4,1	5



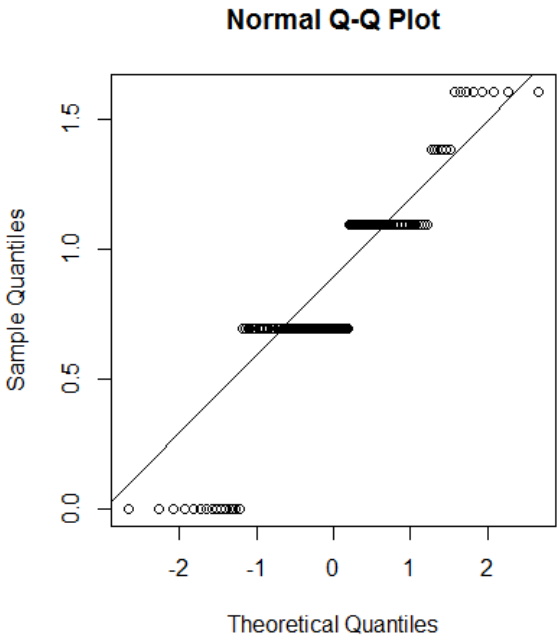


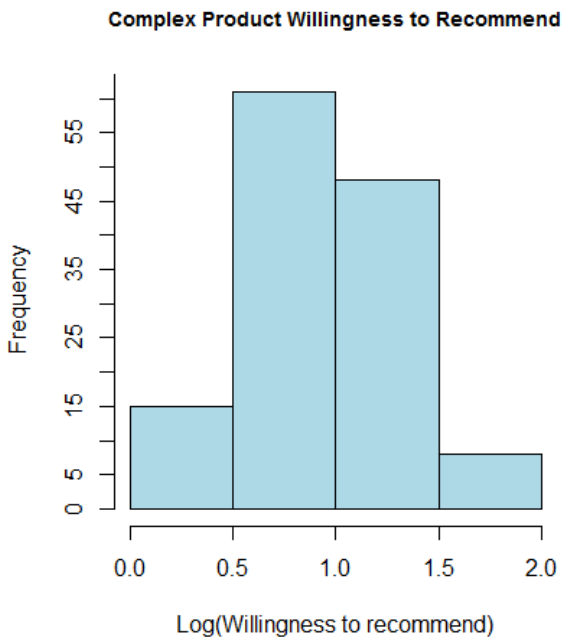
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Phone Inv.	1	1,75	2,25	2,327	2,75	4,75



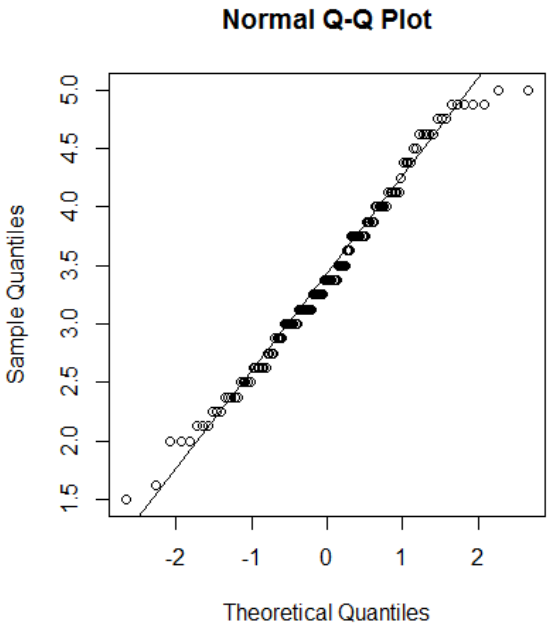


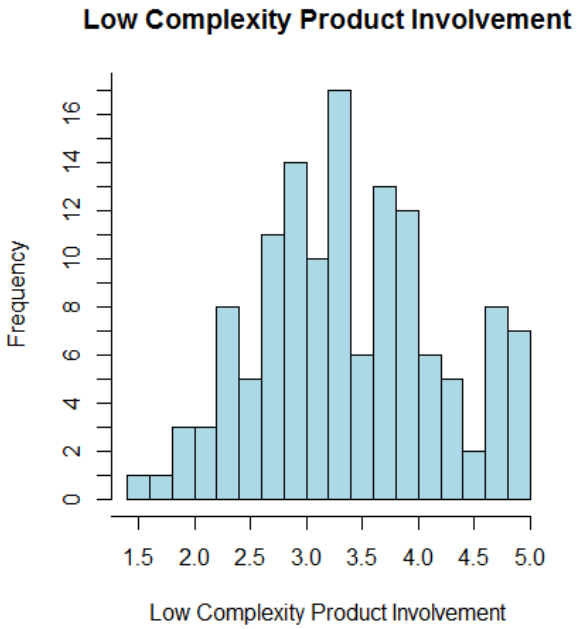
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Phone WTB	1	2	2,333	2,471	3	5



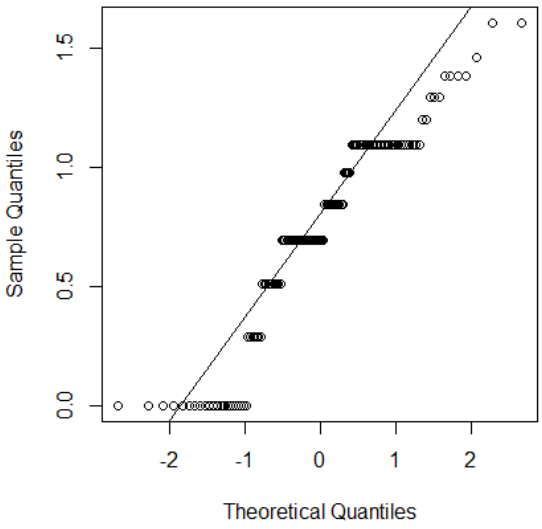


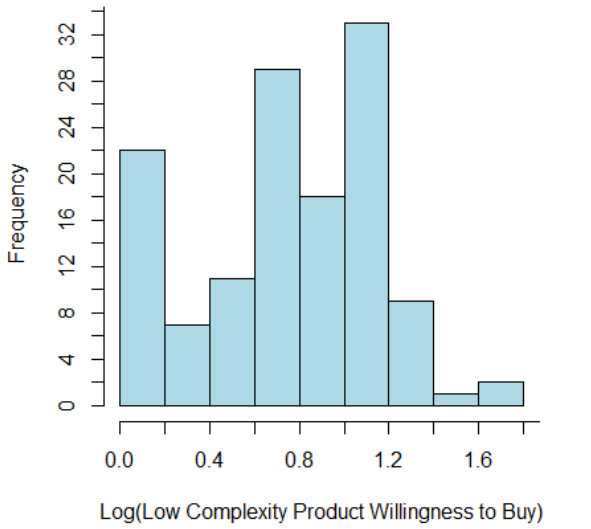
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Phone WTR	1	2	2	2,481	3	5



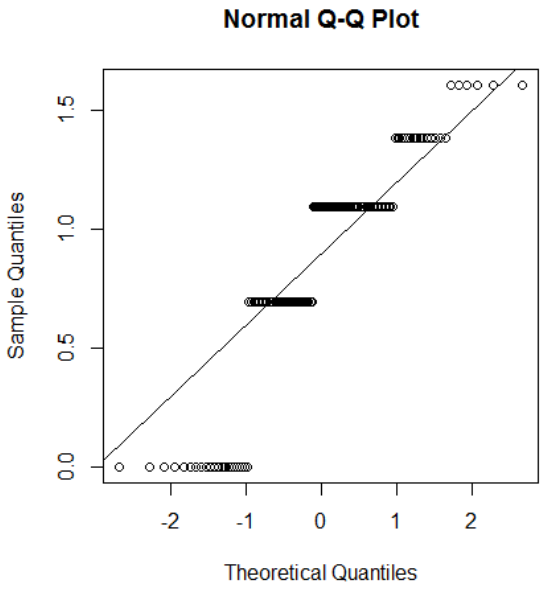


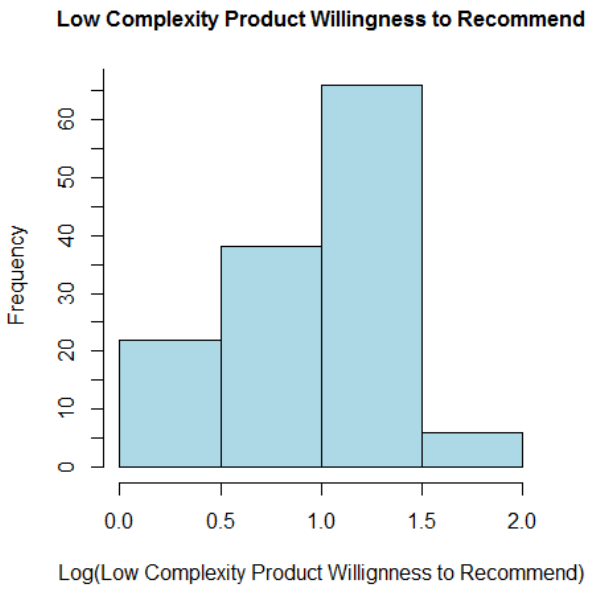
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Burger Inv.	1,5	2,875	3,375	3,396	4	5





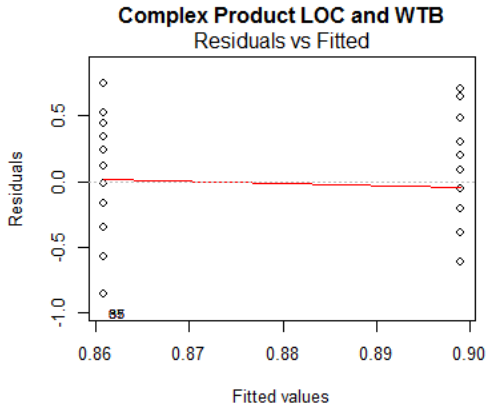
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Burger WTB	1	1,667	2	2,265	3	5

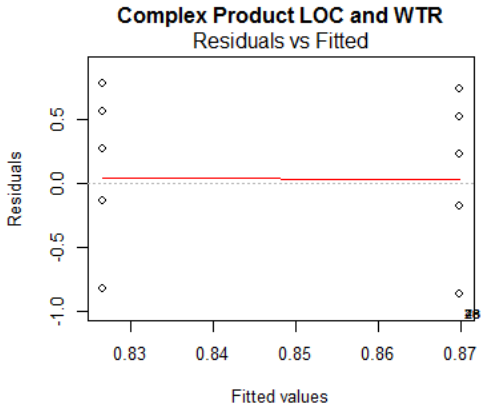


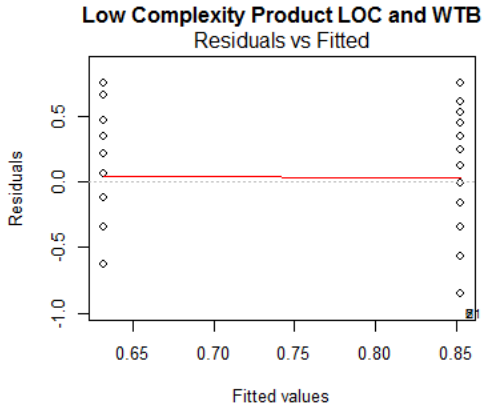


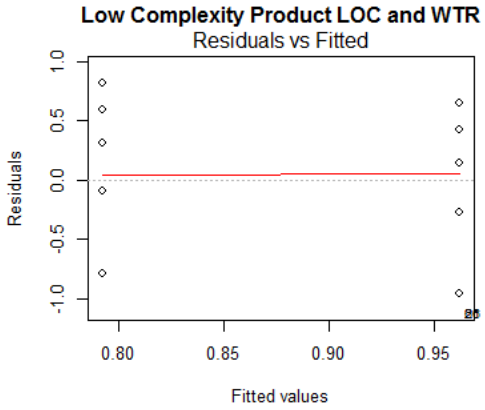
	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Burger WTR	1	2	3	2,595	3	5

Appendix 15 – Residuals vs Fitted Values to visualize Heteroscedasticity









Appendix 16 – WTB/WTR Means for Gender

		LOC	Female	Male
High Complexity Product	Log(WTB)	Internal	0,873	0,848
	Log(WTB)	External	0,920	0,874
	Log(WTR)	Internal	0,805	0,849
	Log(WTR)	External	0,914	0,817
Low Complexity Product	Log(WTB)	Internal	0,587	0,679
	Log(WTB)	External	0,824	0,887
	Log(WTR)	Internal	0,759	0,883
	Log(WTR)	External	0,831	1,057

Appendix 17 – WTB/WTR Means for Occupation

		LOC	Student	Student and Worker	Unemployed	Worker
High Complexity Product	Log(WTB)	Internal	0,827	0,885	0,973	0,953
	Log(WTB)	External	0,886	1,000	0,847	0,890
	Log(WTR)	Internal	0,803	0,783	1,099	0,906
	Log(WTR)	External	0,855	1,060	1,099	0,798
Low Complexity Product	Log(WTB)	Internal	0,536	0,790	0,914	0,824
	Log(WTB)	External	0,867	1,136	0,847	0,691
	Log(WTR)	Internal	0,702	0,930	1,099	0,988
	Log(WTR)	External	0,940	1,292	1,386	0,830

Appendix 18 – WTB/WTR Means for Nationality

		LOC	Portuguese	Other
High Complexity Product	Log(WTB)	Internal	0,918	0,846
	Log(WTB)	External	1,498	0,871
	Log(WTR)	Internal	0,879	0,812
	Log(WTR)	External	1,498	0,840
Low Complexity Product	Log(WTB)	Internal	0,634	0,621
	Log(WTB)	External	0,835	1,242
	Log(WTR)	Internal	0,756	0,937
	Log(WTR)	External	0,949	1,242

Appendix 19 – WTB/WTR Means for Age

		LOC	Age until 30	Age higher than 30
High Complexity Product	Log(WTB)	Internal	0,863	0,821
	Log(WTB)	External	0,907	0,840
	Log(WTR)	Internal	0,834	0,723
	Log(WTR)	External	0,887	0,738
Low Complexity Product	Log(WTB)	Internal	0,625	0,723
	Log(WTB)	External	0,852	0,863
	Log(WTR)	Internal	0,799	0,723
	Log(WTR)	External	0,951	1,051

Appendix 20 – Age Frequency and Distribution (Transformed)