***Customization as a tool to enhance psychological ownership and willingness to pay***

*Chapter 1 – Introduction*

* 1. *Problem indication*

Most retailers fall far short of delivering the individualized experience demanded by customers. The vast majority have not even started to define what customization means to their consumers and business which is a crucial first step (Abraham et al., 2019). This could be produced due to several reasons. According to a survey made by Boudet et al (2019), fewer than 10% of the respondent companies currently deploy personalization beyond digital channels in a systematic way. Additionally, it is also important to mention the low investment, made by retailers, which is aimed to improve customization. Retailers are investing, on average, 0.7% of their revenues while top retailers are investing 0.9% or about 1.3 times more (Abraham et al., 2019).

Research conducted in 2019, found that only one in five organizations are effective at personalizing content at scale; moreover, although 14% of the marketing budget is going toward personalization, 74% of the organization surveyed said they are struggling with personalization efforts (Britt, 2019).

Customization occurs when the user indicates what he or she prefers to see, as a change, on a specific product, for instance through changing an automobile vendor’s site to display a particular car model with a specific color and feature options. Customization could lead to several benefits such as an increment in loyalty, a reduction of operational costs, or widening of the net (Nielsen, 2009). However, at the same time, misunderstandings regarding what, specifically, about the product could be customizable can lead to lost sales (Cardello & Nielsen).

With the appearance of the internet, the customization services provided by companies have increased sharply, for this reason nowadays it is more appropriate to talk about mass customization rather than just customization. Mass product customization is much more difficult than providing customization in goods to a reduced consumer group. The first step to ensure the product’s success is assembling the customer specification (Roy, 2021). Nowadays, companies are trying to embrace mass customization in an attempt to provide unique value to their customer; nevertheless, many managers at these companies have discovered that mass customization can produce unnecessary costs and complexity (Pine & Gilmore, 1997).

Customizing a product by each attribute tends to be onerous for consumers. As a result, the benefits produced by product customization could be countered by an increase in choice complexity, leading to a decrease in customer satisfaction along with other relevant variables as well (Hildebrand et al., 2014). Due to the high level of complexity around mass customization, it is fundamental to address the specific customers’ desires, within a customization context, to make the whole process simpler. Product customization necessities should be led by some determining factors such as the market demand, innovation, the value provided to the customers and the niche market the product is targeted at (Roy, 2021).

Research has been able to prove that companies have been struggling to achieve the cost improvements promised by mass customization. This could be produced by the pressure, faced by companies, to deliver customized and affordable products (Wiengarten et al., 2017). Cost increase, in a customization context, could be produced by the maintenance of a variety of machinery and infrastructure that can produce different products, colors, shapes, etc (Global Electronic Services, 2022). The tools and technologies required to reach mass customization at a low cost are not accessible easily yet. There is no specialized infrastructure that offers access to all the capabilities of mass customization (Roy, 2021).

From the previously stated problem indication, it is believed that companies, in an attempt to offer a very wide variety of options for their customers to customize products, are adding, unconsciously, complexity and unnecessary costs to the whole process. For this reason, organizations, which offer product customization, could consider narrowing the variety available for users to just include the specific type and number of features, to customize, that the customers are actually looking for.

To manage this complexity and unnecessary costs, it is proposed that companies should focus their efforts to identify the type of features that are the most appealing for users when customization is an available option for them. The negative effects of complexity on mass customization are lower for expert consumers (Dellaert & Stremersch, 2005). It is believed that these “expert consumers” are more associated with technical or utilitarian features while average consumers are linked with more visual or hedonic features. Based on the previous statement, it is considered that utilitarian features will have a significant differences from hedonic ones in the way that consumers interact with them under a customization context.

Customization studies have been able to reveal that in fact, customers designing their products might be willing to pay premium prices (Schreier, 2006). But an important detail that has not been deepened enough is the preferred level of customization available for consumers. After all, as has just been mentioned before, a product with a high level of features to be customized also could be seen as a complex task.

The new context, propelled by the circular economy, in accordance with Morewedge et al (2021), will produce important changes in consumption through the replacement of legal ownership of private goods with legal access to goods and services owned and used by others. Psychological ownership, among other items, were included in the “bundle of rights” provided by the legal ownership (Morewedge 2021).

One of the alternatives proposed by Morewedge et al (2021) to preserve psychological ownership is through customization. It has a great potential to retain psychological ownership, this statement could be confirmed by the research made by Arora et al (2021) which found that 71% of consumers expect companies to deliver personalized experiences and 76%, of them, get frustrated when this does not happen. Additionally, in accordance with Teasdale (2022), 33% of consumers interested in customization feel that standard products do not meet their expectations. There are important opportunities for companies to enhance customization experiences, offered to their clients, as a replacement for legal ownership.

Psychological ownership can be understood as a form of emotional attachment between consumers and the goods and services they use (Shu & Peck, 2011). Within this new context, psychological ownership could be threatened by the changes in consumption given that legal ownership, as was described previously, has been the main source of it in the traditional model (Morewedge et al., 2021). But at the same time, it represents a challenge for companies to find new alternatives, that allow them to protect or even boost this emotional link between users and products.

Psychological ownership is a relevant variable that deserves to be borne in mind by companies because it has an important influence on both approaches: for the consumers and the companies as well. According to Li & Atkinson (2020), psychological ownership fulfills basic psychological needs and therefore increments customer well-being. Additionally, this variable is positively associated with consumer demand, willingness to pay, word of mouth and competitive resistance (Morewedge et al., 2021), variables that are quite linked with the performance of companies in the short, mid and long term.

Despite the importance of psychological ownership and the potential of customization to protect it, companies nowadays are not well enough oriented in the search for the level and type of features that are the most appealing for customers at the time of customizing the products that will be used by them. These findings could be fundamental to strengthening psychological ownership and maximizing the perceived value of the products customized by users even if these are not owned by them. The overall purpose of this research is to contribute to finding answers to the problems, questions and uncertainties described above. This is expected to be achieved through the research which will enable us to determine if the level and type of features to customize products could have an impact on willingness to pay and also if this relationship is explained by the emotional link, between users and modified products, called psychological ownership.

* 1. *Problem statement*

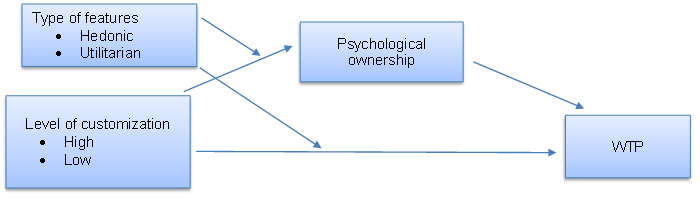
*To what extent is the relationship between the level of customization and willingness to pay explained by psychological ownership, and what is the moderating role of the type of features used to customize products on the relationships between the level of customization and both; willingness to pay and psychological ownership?*

* 1. *Research questions*
     1. *Theoretical research questions*

Supported by the literature review, the theoretical research questions that are expected to be answered are:

* What is psychological ownership?
* What is product customization?
* What is a hedonic feature?
* What is a utilitarian feature?
  + 1. *Empirical research questions*

Supported by an experimental design the empirical research questions that are expected to be answered are:

* To what extent is the willingness to pay affected by the level of customization on a product?
* To what extent is psychological ownership affected by the level of customization on a product?
* To what extent is the relationship between willingness to pay and level of customization moderated by the type of features used to customize products?
* To what extent is the relationship between psychological ownership and level of customization moderated by the type of features used to customize products?
* To what extent does psychological ownership have a mediating role in the relationship between the level of customization and willingness to pay?
  + 1. *****Conceptual model*
  1. *Research method*

To answer the problem statement and the research questions mentioned above a literature review and an online experiment will be carried out. The literature review will contribute to defining the main key concepts that are encompassed by this research. Additionally, it will help us to understand how the variables included are related to each other, based on previous research done; that, at the same time will support the hypotheses which are going to be eventually stated.

The experiment will include two treatment variables, each variable will have 2 conditions; therefore, it is going to be a 2x2 online between-subject design experiment. The respondents will be randomly assigned to each of the 4 experimental conditions and will be able to customize a car based on the conditions given. Afterward, they will be required to fill out a questionnaire that will be used as a guide to measuring psychological ownership. Finally, they will be asked to give their willingness to pay for the customized product.

* 1. *Relevance*

### The conceptual model depicted above has been developed to offer a customization framework to determine, through an emotional and economical approach, which are the most appealing type of features (utilitarian vs hedonic) for users when product customization is an alternative available for them. Additionally, it is intended to show the effect of the level of customization on both, psychological ownership and willingness to pay. Finally, it is desired to determine the degree to which this emotional link (psychological ownership) explains the relationship between customization and the economic value ascribed to a physically customized good (willingness to pay).

* + 1. *Academic relevance*

From an academic approach, this research could be relevant for several reasons. The main of them is that this study tries to test and develop a model based on one of the suggestions made by Morewedge et al., (2021) where the customization was proposed as a replacement of legal ownership as a response to the changes in consumption produced by the circular economy. Although the importance of this proposal, it has not been tested through an experimental design approach or not at least in the way how has been designed in this study.

Second, as it was mentioned before, customization studies have been able to reveal that in fact, customers designing their products might be willing to pay premium prices (Schreier, 2006); however, this literature fails to determine if psychological ownership is a variable that explains why customers tend to pay higher prices for customized goods. The present research dives deeply into the effects of customization on psychological ownership and on the willingness to pay for products modified by users.

Third, although utilitarian and hedonic conditions have been manipulated in other studies such as the one made by Dhar & Wertenbroch (2000), what makes this research different is that these conditions will be used as features rather than product types, it is believed that this is a relevant contrast based on the difference about how customers interact with the product, as a holistic unit, and how they interact with each feature, of the same product, but separately. Additionally, it is going to be measured its impact in a customization context which will lead us to determine what are the favorite type of features used to modify products. This answer has not been given yet by the current literature.

* + 1. *Managerial relevance*

From a managerial approach this research could also give relevant contributions. The first of these is based on the challenge identified by Hildebrand et al., (2014) who stated that customization could increase choice complexity due to the huge number of options offered and the high variability and diversity of customer preferences; therefore, companies need to offer just the options that are the most appealing for customers when product customization is an option available for them. After all, consumers tend to defer choice when the choice environment becomes more complex (Swait & Adamowicz, 2001).

Customization is a way to offer a unique and differentiated proposition to customers. But part and product complexity come at a price that could be harsh to measure, with hidden costs flying under the radar (Chaudhury et al., 2021). Given the previous statement, it is believed that strategically narrowing the options offered to users at the time to customize a product could be a painkiller to deal with issues related to operational costs, produced by the desire of companies to satisfy the high variety and diversity of customer preferences in customization context. This study intends to present a framework that leads to knowing which are the most appealing type of features and degrees of customization for users. Through this approach, it is expected to achieve this strategic narrowing.

* 1. *Structure of the thesis*

This thesis is divided into 5 chapters. The introduction is presented in the first one. In the second and third the theoretical framework and the methodology respectively, are discussed. Chapter four contains the obtained results and the analysis of those. Finally, chapter five includes the conclusion of the research, the managerial implications and the limitations, and future research as well.

1. *Chapter – Theoretical framework*
   1. *Main effect – Level of customization*

According to Clark (2021) customization is the process where the users, directly, make changes to a determined item to meet their needs or requirements. Building on this statement, consuming customized products is labeled as an experimental purchase because is more self-defining and gives uniqueness to consumers (Lee & Kim, 2020). To ensure the product in mind is developed within a customization context, customers must be aware of their preferences and must be able to depict them (Simonson, 2005). Given that even basic mass customization configurations have endless solutions (Franke et al.,2009), Huffman & Kahn (1998) say that the preferences customers generate when faced with the challenge of defining a product are a local optimum, if not an almost random choice.

Resting on the concept of customization and the definition behind it, it is important to introduce the concept of mass customization as well. Mass customization refers to the ability to quickly design, produce, and deliver products that meet specific customer needs at close to mass-production prices (Puligadda et al., 2010). Additionally, mass customization configuration refers to the outline or arrangement of the different product components that can be mass-customized (Dellaert & Stremersch, 2005). According to Schreier (2006) mass customization is a buyer-centric strategy whose main objective is to provide superior customer value through the increase of satisfaction triggered by the individualization of products. Mass customization configurations may differ in the number and levels of product modules that a consumer may customize (Dellaert & Stremersch, 2005). Nowadays, plenty of literature about customization, uses the concept of mass customization as a fundamental core of their research therefore, it is important to understand the concept itself and the main components behind it.

It is important to mention that level of customization has been included, in the present research, following the contributions made by Schreier (2006) and Franke et al. (2009). Both studies were aimed at analyzing the effect of customization on willingness to pay. While the first tested it through the comparison of self-design against standard products; the second made it through the assessment of the relationship between customization and WTP moderated by some variables such as preference insight, ability to express preferences and product involvement.

Additionally, this research will be influenced by the study carried out by Dellaert & Stremersch (2005). They found that consumers did not perceive a significant increment in product complexity over the rather wide range of modules and module levels manipulated in this study and they were in fact, able to get increased product utility. This is important to consider because initially it was believed that the relationship between the level of customization and willingness to pay could be quite obvious. As was said by Hildebrand et al (2014), customization by individual components could produce an increment in choice complexity and it could lead to the decrease of relevant variables such as product utility or even willingness to pay.

The connection between the level of customization and psychological ownership was introduced due to the influence of a study carried out by (Kim et al., 2021) where ownership was manipulated through the customization of a product. Their results showed that the participants who customize the product for themselves developed greater psychological ownership than those who modified it to make it more attractive to be purchased by others. Although, in this experiment customization was not a variable itself, but rather was a means to manipulate ownership, it showed that in fact, there could be a relationship between the level of customization and the psychological ownership of customers toward products modified directly by them.

Bearing in mind the previous theories, results and statements, the following hypotheses have been proposed:

**H1:** Products with a high degree of customization will produce a higher willingness to pay than products with a low degree of customization.

**H2:** Products with a high degree of customization will develop stronger psychological ownership, on customers, than products with a low degree of customization.

* 1. *Moderation effect – Type of features used to customize products*

### Products could be seen as bundles of features with their attractiveness determined as a compensatory function of feature levels (Lancaster, 1966). At a fundamental level, the appeal of a product can be viewed as a function of two factors: product features and the set of efforts to introduce the good in the market (Du et al., 2015). Features refer to a product´s physical characteristics which determine what the product consist of (Blakely, 2022). Consumers tend to assess products with many components more positively (vs products with few of them) because they think that each additional component gives new capabilities to the good (Irmak & Goodman, 2013). In accordance with the purposes of this research, the type of features used to customize products is going to be classified into two conditions: hedonic and utilitarian.

### This classification is based on the fact that consumption is supported by two main elements strongly related to both conditions. According to Batra & Ahtola (1990) purchasing and consumer behavior, of the customers, are driven by these elements which are: consummatory (hedonic) gratification, mainly triggered by sensory attributes; and instrumental (utilitarian) motivated by expectations of consequences. Based on the previous statement, it is possible to differentiate both concepts within a consumption context. Hedonic experiences are intrinsically motivated and fulfilling and for this reason, are sought after as a final destination. On the other hand, utilitarian experiences are extrinsic because they are seen as instruments to achieve a higher-level goal (Botti & Mcgill, 2011). It is fundamental to highlight the core difference between both concepts to understand how each one influences consumer behavior and the decisions made by them.

### Based on the research made by Crowley et al (1992) where they developed a framework for understanding the bidimensional (hedonic/utilitarian) approach to comprehend consumer attitudes towards product categories, the present paper goes a step further by applying this bidimensional framework toward a more specific approach based on the features that could be used to customize products. The utilitarian-hedonic classification is not limited to product level because some goods have both: utilitarian and hedonic characteristics (Chernev, 2004; Dhar & Wertenbroch 2000); therefore, this framework could be applied to features as well. While hedonic features are those linked with a sensory experience of aesthetic or sensual pleasure and fun; utilitarian attributes are those orientated to a specific goal and with the accomplishment of a practical task (Dhar & Wertenbroch 2000).

### It is believed that consumers are more attracted to hedonic elements than utilitarian ones. A recent survey carried out by Splashlight (2017) determined that almost 50% U.S. online consumers rate product images as the most influential factor at the time to make a purchase. In their research, Dhar & Wertenbroch (2000) were able to demonstrate that participants tend to assign a higher value to a hedonic product than to a utilitarian one, through an experiment that asked participants to imagine that they were to sell their car, therefore the minimum selling price should be stated. Additionally, hedonic products trigger more psychological ownership and more positive affect than utilitarian products (Shu & Peck, 2011). This literature review gives enough insights to formulate the hypotheses for the present study because it helps in the understanding of the consumers’ preference between hedonic and utilitarian features. Moreover, as it was demonstrated by Dhar & Wertenbroch (2000), hedonic products also generate more loss aversion, which at the same time, could be driven or influenced by the emotional attachment (Shu & Peck, 2011) developed by users towards products (psychological ownership).

### As it has been explained, consumers tend to develop stronger emotions, and therefore a higher willingness to pay, for hedonic products. Based on the contribution made by Irmak & Goodman (2013), stated previously, which says that consumers usually prefer products with a high number of features. Additionally, given the contributions made by Dellaert & Stremersch (2005) where it was found that complexity, perceived by consumers in a customization context, did not increase due to the manipulation of different module levels within a range of mass customization. Building on the previous theories, it is believed that products customized with a relatively high number of hedonic features will be preferred by the users rather than another type of customization configurations.

### The variable type of features used to customize products, and its two conditions, were proposed based on the research made by Bonaventure & Chebat (2015). This study showed that the type of product variable, and both conditions; hedonic and utilitarian, could have a moderating role. In this research the moderating role is significant in the relationship between touching products and both: willingness to pay and psychological ownership; therefore, it is expected that type of features used to customize products could have a moderating influence on the connection between the level of customization and the two previously described variables. Additionally, it is important to bear in mind the suggestion made by Jami et al (2021), who said that retailers can enhance psychological ownership by encouraging consumers to touch products or letting them customize them.

**H3:** Products with a high degree of customization will produce a higher willingness to pay than products with a low degree of customization and this relationship will be stronger for products customized through hedonic features than products customized through utilitarian ones.

**H4:** Products with a high degree of customization will develop stronger psychological ownership, on customers, than products with a low degree of customization and this relationship will be stronger for products customized through hedonic features than products customized through utilitarian ones.

* 1. *Mediation effect – Psychological ownership*

Ownership could be divided into two broad terms, first is psychological ownership and the second one is legal ownership. According to Li & Atkinson (2020), psychological ownership could be understood as the individual feeling of possession a consumer could hold for a target, it is based on subjective feelings. Legal ownership, on the other hand, is the possession of a product, endorsed by a legal document, usually a deed, a bill or a receipt. Although both concepts are closely related to each other they also can operate separately; specifically, psychological ownership can exist without legal ownership (Shu & Peck, 2011), for instance, consumers could develop psychological ownership towards ideas or goods for which they do not have any legal claim (Morewedge et al., 2021).

The value-enhancing consequences derived from psychological ownership are linked with the traits associated with the self and positive self-associations that are transferred to the product thus, increasing the emotional attachment towards the good, which leads to the enhancement of its perception and value (Morewedge et al., 2021). This is fundamental in understanding, from a multidisciplinary view, the relationship between a customer and a product or brand. According to Pierce & Van Dyne (2004), there are three main elements to which psychological ownership has a strong link: attitudes, self-concept and sense of responsibility.

The literature about the psychology of possession has proved that people tend to develop positive feelings toward tangible and intangible targets of ownership (Pierce & Van Dyne, 2004). In regards to the self-concept, this same literature proposes that people are bound to view tangible and intangible possessions as part of the extended self, mainly caused by feelings of ownership (Belk, 1998). Finally, about the sense of responsibility, authors like Hall (1966) propose that possession compels people to protect and defend their ownership rights.

As was said by Morewedge et al (2021) willingness to pay is a variable positively related to psychological ownership. Based on the research previously described, where was found a positive relationship between the level of customization and willingness to pay, it is expected that level of customization could affect, in the same way as WTP, the emotional link developed by customers toward products called psychological ownership.

Based on the literature review done to carry out this research, the mediating effect of psychological ownership on willingness to pay has been already documented. For instance, Atasoy & Morewedge (2018), determined the influence of psychological ownership, as a mediator, between product format (digital vs physical) and product valuation (WTP). In their research, they were able to get significant partial mediation by psychological ownership, in the relationship between product format and willingness to pay. This could be considered an important influence in the present study because it helps us to understand how PO could explain the effect of both: the level of customization and types of features used to customize products on willingness to pay. After all, the treatment variable and the manipulation strategy used by them are quite related to the features of some determined products and the way that customers interact with them.

In addition, it is important to highlight the studies made by Shu & Peck (2011). In one of their experiments, they were able to show that in fact, this variable was significantly related to product valuation when the ownership length, towards a specific object, was manipulated. They even went further in their research to prove that the independent constructs of psychological ownership can help explain many of the endowment effect findings registered in the literature. In general terms, they tested across nine different studies that psychological ownership and affective reaction could have a significant effect, as mediators, on either object valuation or choice under a variety of manipulations. These approaches open several opportunities to formulate, and subsequently test, hypotheses based on the effect of psychological ownership as a mediator.

As it was stated before, hedonic products tend to develop stronger psychological ownership than utilitarian ones. As a complement, it is important to mention the research made by Norton et al (2012) where it was explained the IKEA effect. This effect states that persons tend to assign a higher product valuation when the good has been ensembled directly by them. In addition, it says that the positive impact of effort on product valuation is likely to happen when the effort ends up in the successful completion of a task. Based on this research, it is believed that products that have been customized, by users, modifying or changing more features, will develop this IKEA effect and therefore will get a higher willingness to pay and psychological ownership as well.

The present research is focused on determining the degree to which psychological ownership explains the effect of customization on willingness to pay for products modified by potential users. This challenge has not been addressed yet by the current literature so therefore, this is one of the key contributions expected to be given by this present study.

**H5:** Products with a high degree of customization will produce a higher willingness to pay than products with a low degree of customizationand the relationship will be mediated by the psychological ownership

**H6:** Products customized through hedonic features will produce a higher willingness to pay than products customized through utilitarian features and the relationship will be mediated by the psychological ownership

1. *Chapter – Methodology*
   1. *Experiment*

The purpose of this research is to determine the effect of the level of customization on willingness to pay and to see if this relationship is explained by psychological ownership. In addition, this research examines to what extent the type of features used to customize products moderate this relationship.

To test the hypotheses this study makes use of an experimental design. Experimental design is the process of carrying out research in an objective and controlled way so the accuracy is incremented as high as possible hence, specific conclusions can be drawn concerning the hypotheses statements (Bell, 2009). This methodology could be adapted to the main objective of the study because its focus on consumer behavior allows us to manipulate aspects of a stylized artificial scenario and measure consumer reactions to these hypothetical scenarios (Morales et al., 2017), which are fundamental processes to achieve the desired outcome.

Online experiments are behavioral research carried out through the internet. Leading behavioral experiments online, rather than through traditional means, can provide better external validity due to two main reasons: the more ecologically valid context and more participants’ diversity (Howell, 2022). A big advantage of this novel methodology is that they scale well because recruiting larger enough samples does not demand a high workload and specifically, hard-to-reach populations become more readably accessible (Sauter et al., 2020).

* 1. *Experimental design*

The experimental design approach that was applied in this research is a between-subject design experiment. According to Budiu (2018), between-subject studies have shorter sessions, than within-subject designs, and also are easier to set up, especially when you have multiple independent variables, just as how it is for this research. Randomized experiments enable us to scientifically determine the impact of a manipulation on a particular outcome of interest (Yale University, 2022). This is important to consider based on what was said by Birnbaum (2009), that a between-subject design experiment is characterized by the fact that each participant is randomly assigned to each experimental group.

The minimum number of participants required in this study is about 256. This quantity was determined through power analysis. In accordance with Cohen (1992), 64 participants are necessary, on each condition, to have a power of at least 80%. The respondents will be collected through some online crowdsourcing marketplaces such as MTruk or Prolific Academic. Initially, it was considered to generate the responses through a convenience sampling approach, but while this method could have several advantages, there is one huge downside, which it is desired to avoid, that is homogeneity (Netzer & Bellezza, 2021). The biggest concern regarding the data generated from these platforms is its quality; however, research carried out by Smith et al (2015) showed that the response pattern is quite similar between a sample group drawn from a “regular” online panel and a sample group gathered through one of these marketplaces; both samples belonged to the U.S. The chosen platform was Prolific because several studies have shown relevant results using this platform such as the ones carried out by Leung et al (2021) or Zheng et al (2022).

* + 1. *Pre-test*

For the second treatment, the type of features (hedonic and utilitarian), a pre-test was carried out to see if the participants were able to differentiate between both concepts and therefore, to see if the manipulation strategy was going to be well comprehended. Using an adapted procedure from Dhar & Wertenbroch (2000), respondents were asked to indicate, for some specific car features, if they are related to the hedonic or utilitarian definitions, these definitions were given at the beginning of the procedure. The used scale was 1 being a completely utilitarian feature and 7 being a completely hedonic feature.

The results of the pre-test are depicted in table 1. Low scores (close to 1) were produced due to the interpretation of the participants of relating the attribute with the utilitarian definition, while high scores (above 3) were generated given the understanding of the respondents of linking the item with the hedonic concept. So, it is possible to see how a completely utilitarian feature such as the engine of the car has a relatively low score, while a hedonic feature such as the car body design has a relatively high score. These results indicate that the respondents can differentiate between the hedonic and utilitarian concepts for vehicle items.

|  |  |  |  |
| --- | --- | --- | --- |
| # | Field | Mean | Std Deviation |
| 1 | The engine of the car | 1.68 | 1.06 |
| 2 | Paint color of the car body | 5.23 | 0.85 |
| 3 | Size of the wheels | 3.23 | 1.04 |
| 4 | Material of the car upholstery | 4.41 | 1.27 |
| 5 | Type of brakes installed in the car | 1.64 | 0.88 |
| 6 | Color of the car interior lights | 4.91 | 1.04 |
| 7 | Fuel tank capacity | 1.73 | 0.86 |
| 8 | Car body design (sedan or hatchback) | 4.09 | 1.31 |
| 9 | Car transmission | 1.77 | 1.08 |
| 10 | Car sunroof | 4.45 | 1.2 |

Table 1: Results of the pre-test

* 1. *Sample*

The selected sample is full-time employees from the U.S. with an age range between 25-50 years old. These demographics were selected based on several studies. One of them was published by Birkett (2021) who says that people ages 25-54 purchase the most, new vehicles with SUV buyers tending to be a bit older. In the same way, the sample was selected to be in the U.S. based on the data shown by Statista (2022) which indicates that the market for the vehicle in the U.S. is the second largest in the world just behind China. Additionally, it was determined to include in the sample just full-time employees because it was desired that the questionnaire was completed by persons who actually were able to purchase a car. The income itself was not considered because some homogeneity regarding the employment status of the participants was desired.

* 1. *Method*
     1. *Treatments*

At the beginning of the experiment, the participants were shown the same vehicle regardless of their experimental assigned condition. The chosen vehicle was a Ford Fiesta 2022, this product was selected based on the fact that Ford is the most popular American brand in the U.S.(Ortiz, 2022) and the chosen model, Fiesta, was selected given that it is one of the most iconic models for the brand based on the fact that the manufacturer has produced it since 1976 with more than 16 million vehicles sold in the U.S., Europe, South America, Australia and Asia (Nowak, 2022).

The experiment consists of two treatments, each with two conditions in it which produce 4 experimental groups. The first treatment is the level of customization (high versus low). Following research carried out by Dellaert & Stremersch (2005), participants in the high-level of customization condition were able to customize 10 features of the car, while for the low-degree condition customized 5 features.

* + 1. *Measurement of dependent variable and mediator*

Psychological ownership, the mediator, is going to be measured based on a four item-scale developed by Pierce & Van Dyne (2004) and, adopted and suited by other authors in their research like the one carried out by Li & Atkinson (2020). This scale goes from 1 (strongly disagree) up to 7 (completely agree). The measured items are 1. I feel this car is mine; 2. I feel a very high degree of personal ownership towards this car; 3. I feel personally connected to this car; 4. it is easy for me to think about this car as mine.

Given that in the present experiment, participants are going to be told that they have to purchase a specific car, rather than sell their vehicles, they will just be required to give the additional amount of money, in U.S dollars, that they are willing to pay for that specific product after the whole manipulation was done. Initially, they were given a baseline price for the product in the U.S. market ($20.000) then, they were asked to give the additional amount of money that they were willing to pay based on the customizations done. This methodology allows us to reduce bias in the measurement of the WTP because instead of evaluating the entire product, it only measures respondents’ opinions of the customizations done. If the willingness to pay, for the whole product, had been asked without the baseline price, it would have produced biased data because the knowledge about vehicles and their actual market prices could have a significant variance among the respondents.

* + 1. *Covariates*

Given that homogeneity is desired regarding the location of the participants and that Prolific allows us to segment and select participants of specific locations, this is not going to be included as a covariate, rather just 4 variables will be considered. These are gender, age, means of transportation usually used, and prior knowledge about cars.

Gender as a covariate has been included based on the study carried out by Arısal & Cömert (2016). This study was able to examine the influence of hedonic and utilitarian motives on consumer behavior through the comparison of two cultures: Spanish and Turkish. Additionally, the study made by Walcher et al (2016), showed that women are more mass-customized oriented through the analysis of 500 online shops. The findings, on these two studies, are quite relevant to expect a significant difference in the present research between both genders.

Regarding age, several studies have documented a significant difference in willingness to pay among some age groups. For instance, the research made by Makkonen et al (2011), demonstrated that there is a significant difference regarding WTP for music tracks and that the group that differed from the other two groups was the age group under 30 years. These differences, it is believed, could be produced given the fact that normally, the older a person, the higher his/her income is, or probably due to the risk aversion that is not the same for all age groups.

The third and fourth covariates included are means of transportation usually used and prior knowledge about cars got by the respondents. These variables were included based on the belief that willingness to pay but especially psychological ownership, towards a car, are not going to be the same for a person who usually uses their private vehicle and knows a lot about cars, as for a person who frequently uses public transport and barely has knowledge regarding vehicles. It is going to be treated as a categorical variable.

* 1. *Procedure*

The experiment consists of 5 stages that are applied to the four groups. The questionnaire, developed in the online software *Qualtric*s, started with an introduction to the study. In the second stage, the respondents were introduced to the specific instructions and were shown the Ford Fiesta 2022 vehicle. Afterward, in the third stage, respondents were randomly assigned to one of the four conditions and is in this stage that participants actually were able to customize the product. Later, in the fourth stage, the dependent variable and the mediator were measured through 5 questions, 1 for the willingness to pay and 4 for the psychological ownership. Finally, in the last stage, respondents were asked about some basic demographics and the additional 2 covariates were determined as well.

1. *Chapter – Analysis and Results*
   1. *The data*
      1. *Randomization*

The final sample was about 260 participants. All participants were randomly assigned to one of the experimental groups. To assess the randomization, in the study, a one-way ANOVA was performed with gender as the dependent variable. The result produced by this one-way ANOVA confirms that the process of randomization was well applied because there is no significant difference between the groups (genders) (F(1) = 0.367, p = 0.5453). The same procedure was done to confirm this test but using age as a dependent variable (F(1) = 0.11, p = 0.740). Again, these results confirm the initial statement that randomization was correctly applied in the experiment.

* + 1. *Cronbach’s Alpha – internal scale consistency*

Before running the main analysis, it is important to validate the internal consistency of some items within the questionnaire. Given that the unique variable that was measured through a scale was psychological ownership, this assessment was just applied to this variable but more precisely to the items related to it. As was explained by Cronbach (1951) when the alpha generated is higher than 0.70 it is possible to determine that the scale has a good consistency. The alpha obtained for the four items related to the measurement of psychological ownership was close to 0.96, this indicates that the scale has a very good level of reliability; therefore, the main analysis could be performed.

* 1. *Assumptions*

Given that this study uses analysis of variance to get the main outputs, some tests must be done to validate the basic assumptions behind ANOVA statistical model. First, the observations have to be independent, given that this is a between-subject design experiment it is possible to assume that this first condition was fulfilled.

The second of these assumptions is related to the concept of homoscedasticity or homogeneity of variances. To make this assessment, a Levene’s test should be carried out. It is important to recall that the null hypothesis in Levene’s test, states that all groups have equal variances. The test was done for both, willingness to pay (F(1, 258) = 0.675, p = 0.412) and psychological ownership (F( 1,258) = 6.174, p = 0.014). For the independent variable, there is no significant output; therefore, the null hypothesis is maintained and there is no difference between the variances. For the mediator there is a significant result, this means that it was observed different variances across the treatment groups. Usually, regarding Levene’s test, it is expected to avoid a significant p-value (lower than 0.05), but, according to Hair et al (2014) the violation of this assumption does not have a big impact if the groups have approximately the same size, that is the case in this study.

The third assumption is based on the concept of normality. To validate it, a Shapiro-Wilk test was carried out. This test suggests that normality was not found for either willingness to pay (W(260) = 0.95, p < 0.001) and psychological ownership (W(260) = 0.92, p <0.001). Although normality is always wanted, it is possible to be less concerned about it based on the contributions provided by Hogg et al (2012) who said that when the sample size is large enough (>200) the Central Limit Theorem guarantees a roughly normal distribution. Despite some results were not the expected ones, the general conditions were fulfilled therefore it was possible to carry out the main analyses.

* 1. *Descriptive statistics*

The descriptive statistics shown in table 2, summarize the data for each of the 4 experimental conditions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Condition | Willingness to pay | | Psychological ownership | |
| M | SD | M | SD |
| Hedonic-High (N = 65) | 1944 | (1188) | 4.74 | (1.61) |
| Hedonic-Low (N = 66) | 1531 | (1132) | 5.25 | (0.99) |
| Utilitarian-High (N = 65) | 2067 | (1324) | 4.93 | (1.49) |
| Utilitarian-Low (N = 64) | 2242 | (1361) | 4.95 | (1.61) |

Table 2: Mean and standard deviation of dependent variables and mediator.

Notes: Psychological ownership was measured using a scale from 1 to 7. The range to measure willingness to pay was from 0 to 5000 USD.

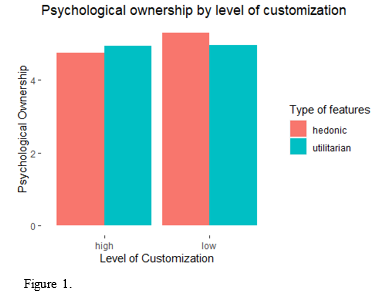
* 1. *Correlations*

Although there is an important scatter along the data collected (the correlation coefficients tend to be small) there are some interesting correlations that were identified along the data set. For instance the relationship between willingness to pay and psychological ownership (r(258) = 0.26, p < 0.001) or the one obtained between the type of features used to customize and WTP (r(258) = -0.16, p <0.01) confirm the theory previously detailed in chapter two. Additionally, other interesting and significant correlations were detected, like those two related to one of the covariates, knowledge held by participants, about cars. This covariate had relevant links with both, willingness to pay (r(258) = 0.13, p = 0.03) and psychological ownership (r(258) = 0.20, p < 0.01).

* 1. *Main analysis*

To carry out the main analysis, model 8 of the PROCESS macro developed by Hayes (2022) was used and run in R. This procedure gives the main outputs to determine the direct and indirect effect of the moderated mediation but also, with it, is possible to assess the influence of each variable (including the covariates) and also if there is an interaction between the two treatment variables and both, the mediator and the dependent variable. Additionally, some individual t-tests and one-way ANOVA were performed to see the individual influence of each treatment variable, and its interaction with each other, with both, willingness to pay and psychological ownership.

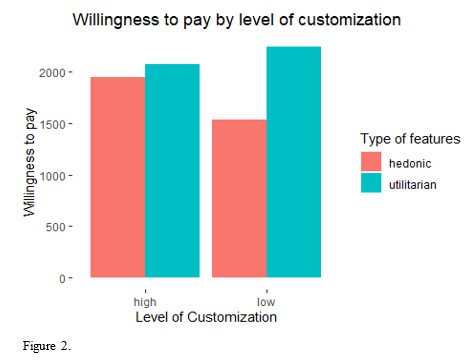
* + 1. *Psychological ownership – Mediator*

For psychological ownership, when the one-sided t-test was performed, there are no significant results regarding the second hypothesis (T(258) = -1.60, p = 0.94) therefore the hypothesis cannot be accepted because higher psychological ownership, for customers within the high-level condition, was not found, in fact, precisely the opposite was identified. Additionally, when the regression is performed to assess the interaction between the independent variable and the moderator, the level of significance is not relevant either (F(1) =2.55, p = 0.12). Hence the H4 cannot be accepted. If we take a deeper glance at the collected data regarding the mediator and each of the four experimental conditions, is possible to see a high degree of scattering, making it difficult to identify a pattern between the four groups and the mediator variable (M Hedonic-High = 4.74, SD = 1.61; M Hedonic-Low = 5.29, SD = 0.998; M Utilitarian-High = 4.93, SD = 1.49; M Utilitarian-Low = 4.95, SD = 1.61).

|  |  |  |  |
| --- | --- | --- | --- |
| Psychological Ownership | | | |
| Level of customization | Hedonic | Utilitarian | Mean |
| High-level | 4.74 (σ = 1.61) | 4.93 (σ = 1.49) | 4.83 (σ = 1.55) |
| Low-level | 5.29 (σ = 0.99) | 4.95 (σ = 1.61) | 5.12 (σ = 1.34) |

Table 3: Mean and standard deviation of psychological ownership by the level of customization and type of features used to customize.

* + 1. *Willingness to pay – Dependent variable*

For the dependent variable, the effect of the independent variable is not significant (T(258) = 0.79, p = 0.21) although the mean for the high-level condition is higher than the low condition (M High = 2006, SD = 1254) (M Low =1881, SD = 1295); therefore, H1 has to be rejected. The effect of the interaction (IV\*MOD) is (F(1)= 2.68, p = 0.10). Although it was so close to being significant, based on the confidence interval stated for this research, we have to reject H3. If we analyze the result by the means of each group, it is possible to see how, in general, the average willingness to pay is higher for the two groups with the utilitarian condition assigned (M Utilitarian-High = 2067, SD = 1324; M Utilitarian-Low = 2242, SD = 1361; M Hedonic-High = 1944, SD = 1188; M Hedonic-Low = 1531; SD = 1132). Table 4 summarizes all the findings regarding the dependent variable.

|  |  |  |  |
| --- | --- | --- | --- |
| Willingness to Pay | | | |
| Level of customization | Hedonic | Utilitarian | Mean |
| High-level | 1944 (σ = 1188) | 2067 (σ = 1324) | 2006 (σ = 1254) |
| Low-level | 1531 (σ = 1132) | 2242 (σ = 1361) | 1881 (σ = 1295) |

Table 3: Mean and standard deviation of willingness to pay by the level of customization and type of features used to customize.

Although, when the one-sided t-tests were performed, the results were not the expected ones, it is possible to highlight that there are some significant differences when some two-sided t-tests were executed. Table 4 contains that information. In it, is possible to see how there is a significant difference in willingness to pay between the two conditions of the moderator.

|  |  |  |
| --- | --- | --- |
| Two-sided t-tests | | |
| Variables | Level of customization | Type of features |
| Psychological ownership | T(258) = -1.60; p = 0.11 | T(258) = 0.44; p = 0.66 |
| Willingness to pay | T(258) = 0.79; p = 0.43 | T(258) = -2.68; p = 0.01 |

Table 4: Coefficients and p-values of individual two-sided t-test.

* + 1. *Hayes Bootstrapping mediation analysis model 8*

To determine the possible mediation-moderation effect in our model, model 8 in the PROCESS macro developed by Hayes was executed. Figure 3 depicts the statistical diagram with all the relevant paths for the model.

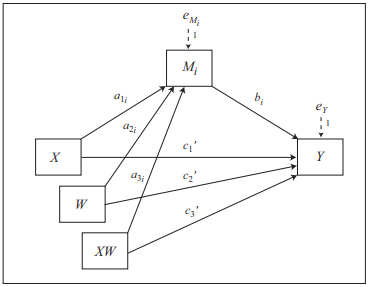


Figure 3: statistical diagram model 8 Hayes.

Table 5 and Table 6 contain the summarized information of the bootstrapping analysis with both variables, psychological ownership and willingness to pay as outcome variables. It is also important to mention that in both models, all the covariates determined for the study were included. For the first model (Table 5), it is important to highlight how this analysis confirms what was determined previously about the interaction between the treatment variables and its influence on psychological ownership (p = 0.128), although is not possible to say that is significant, it was close of being. Regarding the covariates the one with the highest degree of significance was knowledge got by respondents about cars (p = 0.014).

About table 6, it is possible to highlight several things. First is that in this model (model 2) the interaction between the treatment variables and the outcome variable, for this case willingness to pay, is significant (p = 0.039). This is an important output because gives us relevant insights into the moderating role and its influence on the relationship between the level of customization and willingness to pay. Second is the influence of the mediator on the dependent variable (p < 0.001). This result is in concordance with the individual correlation assessment made between both variables (t(258) = 4.280; p < 0.001). Although the correlation coefficient is relatively low due to the scattering in the dataset, there is a significant influence of psychological ownership on willingness to pay. Third, regarding the covariates, again the unique one with a significant effect on the outcome variable was the knowledge got by respondents about cars (p = 0.035).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model 1 Bootstrapping for Psychological Ownership | | | | |
| Variable | Path | Coeff | SE | P-value | |
| Level of customization (IV) | a1 | .507 | .249 | .046 | |
| Type of features (MOD) | a2 | .329 | .286 | .202 | |
| IV\*MOD | a3 | -.545 | .371 | .128 | |
| Gender (COV) |  | -.291 | .210 | .154 | |
| Car knowledge (COV) |  | .108 | .044 | .014 | |
| Favorite means of transportation (COV) |  | -.129 | .762 | .511 | |
| Age (COV) |  | .327 | .590 | .603 | |
| Model summary |  |  |  |  | |
| Total | .098 |  |  |  | |
| p | .039 |  |  |  | |
| F | 1.771 |  |  |  | |

Table 5: Result of the bootstrapping analysis with psychological ownership as the outcome variable.

Notes: The p-values are two-sided. This means that low p-values show a significant difference between the groups but these probably are not the best to test the previously stated hypotheses. For this model, the base conditions are High-level for the IV and Hedonic for the MOD.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model 2 Bootstrapping for Willingness to Pay | | | | |
| Variable | Path | Coeff | SE | P-value | |
| Psychological ownership (MED) | b1 | 221. | 54. | .001 | |
| Level of customization (IV) | c1 | -581. | 214. | .001 | |
| Type of features (MOD) | c2 | 142. | 217. | .513 | |
| IV\*MOD | c3 | 627. | 302. | .039 | |
| Gender (COV) |  | -8. | 172. | .963 | |
| Car knowledge (COV) |  | 79. | 37. | .035 | |
| Favorite means of transportation (COV) |  | 500. | 643. | .414 | |
| Age (COV) |  | 531. | 496. | .417 | |
| Model summary |  |  |  |  | |
| Total | .176 |  |  |  | |
| p | .000 |  |  |  | |
| F | 3.233 |  |  |  | |

Table 6: Result of the bootstrapping analysis with psychological ownership as the outcome variable.

Notes: The p-values are two-sided. This means that low p-values show a significant difference between the groups, but these probably are not the best to test the previously stated hypotheses. For this model, the base conditions are High-level for the IV and Hedonic for the MOD.

There are other relevant and interesting insights that could be interpreted through the coefficients. For instance, the coefficient produced in model 1 regarding the independent variable is positive, but in model 2 is negative, this means that, on average, the respondents on the high condition were willing to pay more for the product than those in the low condition; but, at the same time they showed lower psychological ownership compared with the opposite condition related to the independent variable.

When the overall outputs were analyzed to determine if there is moderated mediation effect in the model, the approach, given by Hayes (2022) was followed. According to it, to make inferences regarding the moderated mediation effect involves determining whether an interval estimate, for the direct and indirect paths, includes zero. For the case of this study, the bootstrap interval includes zero (LLCI = -296; ULCI = 44); therefore, there is not enough evidence to support a significant moderated mediation effect in this model. It is not possible to be certain that the indirect effect was caused by the moderator if the confidence interval encompassed zero (Hayes, 2022). Based on the previous statements, the null hypotheses for H5 and H6 cannot be rejected.

1. *Chapter - Discussion, conclusions and recommendations*
   1. *Conclusions and discussion*

The two main objectives of this study were, first to determine if the tendency of consumers to pay premium prices for customized products was explained by psychological ownership and second to see to what extent the type of features used to customize products could affect the relationship between the level of customization of a product and both, psychological ownership and willingness to pay.

To handle these targets some research questions were stated. The first and second were focused on understanding how willingness to pay and psychological ownership were affected by the level of customization on a product. Although the mean of willingness to pay was higher for the expected conditions, the results were not significant according to either, the t-test or the moderated mediation analysis. This lack of significant difference could have been produced, following Dellaert & Stremersch (2005) contribution, perhaps because the number of modules to customize a product, probably, is not the most relevant parameter at the time of setting a customization configuration based on a specific product. In the case of psychological ownership, the two-sided t-test was close to being significant but not in the expected direction. The results showed higher psychological ownership for the low-level condition than for the high-level condition. Again, this could be explained by the customization configurations parameters theory previously exposed.

The third and fourth questions were aimed to identify a possible moderation effect of the type of features used to customize products on the relationship between the level of customization on a product and both, psychological ownership and willingness to pay. For both cases, the interactions, carried out using one-way ANOVA, were close to being significant but in the bootstrapping analysis, the interaction between the moderator and the independent variable, and their influence on willingness to pay was in fact significant.

Although the p-value obtained in the measurement of the interaction and its effect on the dependent variable could be considered positive; again, the direction of the effect was not the expected one. Of the 4 experimental groups, the two related to the utilitarian condition showed a higher WTP than those linked with the hedonic one. These results go against some theories, previously exposed in chapter 2, like those proposed by, Dhar & Wertenbroch (2000) or Shu & Peck (2011) which say that hedonic items tend to produce more positive effects, on respondents, than utilitarian ones. This contradiction could be produced and explained by the selected product which was customized by respondents. First, although the respondents were able to identify correctly the utilitarian and hedonic components of the car, through the pre-test, the product as a whole could be perceived more as utilitarian given that it fulfills a specific goal, for that reason, participants probably valued higher utilitarian attributes than hedonic ones. Second, the model of the car, Ford Fiesta 2022, also could be seen as a regular car that is not very linked with customization purposes, if the shown car had been a more extravagant or fancy model (e.g., a Lamborghini Gallardo, Porsche 911) the interpretation of the respondents probably would have been different and the result would have leaned more towards the hedonic condition than to the utilitarian one.

The last question was about the possible mediating role of psychological ownership on the level of customization and willingness to pay. This procedure was crucial in determining whether this variable was the cause of why customers pay more for customized goods. Although a significant correlation was found between WTP and the mediator, the final results, supported by Hayes’s (2022) conditional analysis and bootstrapping technique, do not allow us to say that psychological ownership mediates the relationship between the level of customization and willingness to pay.

Initially, the findings of this study are aligned with the theory previously discussed in chapter two regarding psychological ownership. As was said by Morewedge et al (2021) psychological ownership is positively related to WTP and this research confirms it. Nevertheless, these findings do not match other research contributions like the one made by Atasoy & Morewedge (2018) who proposed an approach where psychological ownership performs as a mediator between product format and willingness to pay.

In summary, there were not enough significant results to affirm that there is a moderated mediation effect in this experiment; however, there are some interesting insights that are worth to be highlighted. The most interesting significant finding was the one related to the interaction between the level of customization the and type of features used to customize products and its influence on willingness to pay. From it, we learned that for this experiment, participants valued more utilitarian attributes than hedonic which is a statement that goes against some research papers related to customization and willingness to pay literature. Also, was interesting to see the level of significance in the relationship between psychological ownership and WTP. Finally, is worth reminding the influence of the knowledge about cars held by the respondents on the two previously mentioned variables.

* 1. *Managerial implications.*

As explained previously, based on the literature research, customers are willing to pay premium prices for customized goods. With the development of new technologies and digital platforms, each time is easier for companies to offer customization products to their customers. In fact, the actual discussion, regarding customization, is about what kind of configurations should be offered to customers, based on several features related to the customization modules, and the product itself. This implication is completely aligned with the research written by Dellaert & Stremersch (2005), which aimed to explain why consumers prefer one mass customization configuration over another. Some results of this research don’t match with the ones provided by the research literature checked in chapter 2, probably due to the customized product and the way that it was modified.

Another interesting implication for companies is the fact that customers' prior knowledge of the product that needs to be customized, actually matters. Of all the covariates, this one was unique that actually had a positive significant influence on both, willingness to pay and psychological ownership. This implication again is aligned with the research made by Dellaert & Stremersch (2005), which states that expert customers are a potentially appealing target sector for mass customization.

* 1. *Limitations and future research*

The present research has some limitations but also some recommendations and opportunities for future research.

Regarding the limitations, the biggest one is regarding the means used to carry out the experiment. Although the experiment should have been carried out through online means, because nowadays all customization applications are online, the main tool used which was Qualtrics is not the best one in order to simulate a mass customization application. This is important to consider given that, for the manipulation to be successful, it was important to simulate the most appealing and realistic customization environment to get the information required.

Another limitation is related to the kind of experiment used for this research. According to Reips (2000), online experiments have issues related to the extent to which they control the experimental situation; therefore, for future research, probably the best way to conduct it is through a kind of mixture between online and lab experiment sessions, where the participants could customize the product through online means but under a more controlled environment.

Hopefully, these recommendations will be borne in mind by future research to understand better the main issues related to customization and its relationships with psychological ownership and willingness to pay.

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