**Thesis**

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1. *Chapter – Introduction*
2. *Chapter – Theoretical framework*
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   1. *Experiment*

The main target behind 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, it is intended to obtain to what extent the type of features used to customize products could have a moderation role between the level of customization and both variables: psychological ownership and willingness to pay for a customized product.

Although several research approaches could be adopted to test the hypotheses developed so far, the one that suits the best purpose of the study is the 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 in regard to 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.

Traditionally, in behavioral sciences, there are two types of experiments: laboratory experiments and field experiments (Reips, 2000); however, none of these are suitable neither for the methodology nor for the context of this research. These traditional approaches have shown several constraints, at the time of carrying out research, that goes from problems with the number of participants to organizational or institutional limitations (Reips, 2000). Based on this, the approach that will be adapted to carry out this research is the one based on online experimental design.

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. This kind of experiment is characterized by the fact that each participant is randomly assigned to each experimental group, (Birnbaum, 2009). On it, different people test each condition; hence, each person is only exposed to an individual user interface (Budiu , 2018). 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.

Given that the research has 2 treatment variables (level of customization and type of features) and each variable has two conditions, the study will have 4 experimental groups. Each participant will be assigned randomly to one of the conditions of the treatment variables. Randomized experiments enable us to scientifically determine the impact of a manipulation on a particular outcome of interest (Yale University, 2022).

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%. Given that this research has 4 experimental conditions, the required number is the one stated above. 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. *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 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.

* 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; for it, there are two conditions that are a high degree or a low degree. For the high-degree condition, participants were able to customize 10 features of the car, while for the low-degree condition they were able to customize just half of the high-degree condition, 5 features. The number of features to customize, for each group of this treatment, was stated based on the research carried out by Dellaert & Stremersch (2005). In it, they manipulated the number of mass-customizable modules for a personal computer, 4 being for the low-level condition and 8 for the high-level condition. This gives us enough insights to establish that this quantity is appropriate for the experiment's manipulation goals if the low condition includes half as many features as the high condition.

The second treatment, the type of features used to customize products, is also divided into two conditions, 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 adapted and comprehended. This procedure was done based on the research carried out by Dhar & Wertenbroch (2000); in it, they conducted the pre-test to ensure that participants were able to differentiate between hedonic and utilitarian concepts for some pairs of attributes related to some specific choice options. This framework was adapted following the purposes of this study; for it, the 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 6 being a completely hedonic feature.

The results of the pre-test are depicted in table 1. Low scores (below 3) 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.

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| # | 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. *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 0 (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. In the research, the authors demonstrated that female respondents tended to be more hedonic motivations than male respondents in both countries. Additionally, the study made by Walkcher et al (2016), showed that women are more mass-customized oriented through the analysis of 500 online shops. The data obtained by the authors showed that while 60% of women have already purchased an MC-product online, only 44% of men were MC-users. These findings are quite relevant to expect a significant difference in the present research between both genders.

In regard to 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 own 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 four 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.