Faculdade de Design,
Tecnologia e Comunicação
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ENHANCING HUMAN-CENTERED DESIGN METHODS THROUGH JOBS TO BE DONE

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Dissertação apresentada ao IADE - Faculdade de Design, Tecnologia e Comunicação da Universidade Europeia, para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Comunicação Audiovisual e Multimédia realizada sob a orientação científica do Doutor Milton Cappelletti, Professor Auxiliar da Universidade Europeia e do Doutor Rodrigo Hernández-Ramírez, Professor Auxiliar da Universidade Europeia.

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palavras-chave

Jobs to be Done; Human-Centered Design; UX Design; Experiência do Usuário; Metodologia do Design.

resumo

Muitas vezes, a criação de produtos digitais tende a priorizar o Design da interface ao invés de focar em como resolver os problemas do usuário. Para realizar uma pesquisa de usuário mais profunda e criar produtos melhores, a metodologia Jobs To Be Done (JTBD) pode ser uma adição viável à caixa de ferramentas geral de UX. Apesar de o framework JTBD já existir há algum tempo, ele ganhou popularidade entre os UX Designers recentemente. No entanto, no momento desta pesquisa, não há pesquisas ou informações suficientes disponíveis sobre como combinar essas metodologias. Portanto, esta pesquisa realizou um estudo comparativo entre a metodologia Jobs To Be Done (JTBD) e a Metodologia UX, a fim de entender se sua fusão é viável e benéfica na realização de User Research.

Por meio de uma revisão de literatura seguida de uma pesquisa online, entrevista UX e entrevista JTBD, buscou-se entender as diferenças e semelhanças nas informações obtidas com cada framework. Por fim, com as informações obtidas, aplicamos os resultados a artefatos tangíveis, incluindo uma Análise do Concorrente, Persona do Usuário e Mapa de Jornada do Cliente, a fim de comparar visualmente a metodologia UX com o framework JTBD.

Este estudo levou a insights positivos sobre a combinação das metodologias JTBD e UX, pois concluímos que a fusão não é apenas alcançável, mas necessária para a metodologia HCD. As descobertas seriam benéficas para a comunidade de design, bem como para as empresas e instituições que investem no desenvolvimento de software e aplicativos e, mais importante, para o usuário final.

keywords

Jobs to be Done; Human-Centered Design; UX Design; User Experience; Design Methodology.

abstract

Often, the creation of digital products tends to prioritize the Design of the interface instead of focusing on how to solve the user's problems. In order to undertake deeper User Research and build better products, the Jobs To Be Done (JTBD) methodology might be a feasible addition to the general UX toolbox. Despite that the JTBD framework has been around for a while now, it has gained popularity among UX Designers just recently. Nevertheless, at the moment of this research, there is not enough research or information available about how to combine these methodologies. Therefore, this research carried out a comparative study between the Jobs To Be Done (JTBD) methodology and the UX Methodology, in order to understand if their merge is viable and beneficial in carrying out User Research.

Through a literature review followed by an online survey, UX interview and JTBD interview, we sought to understand the differences and similarities in the information obtained with each framework. Finally, with the information obtained, we applied the results to tangible artifacts, including a Competitor Analysis, User Persona and Customer Journey Map, in order to visually compare the UX methodology with the JTBD framework.

This study led to positive insights about the combination of JTBD and UX methodologies, as we concluded that the merge is not only attainable but necessary for the HCD methodology. The findings would be beneficial to the Design Community, as well as the companies and institutions investing in software and app development, and most importantly, for the end user.

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List of Abbreviations

HCD – Human Centered Design

JTBD – Jobs to Be Done

ODI – Outcome-Driven Innovation

SWOT Analysis – Strengths, Weaknesses, Opportunities, and Threats Analysis

UI Design – User Interaction Design

UX Design – User Experience Design

Chapter 1

1. INTRODUCTION

1.1. Context

Although design as a profession only emerged in the early nineteenth century, the concept of Design can be traced back to the fourteenth and fifteenth centuries in Europe (Cooley, 1999). The role of the designer is unthinkable without the separation between making (conceptualizing) and producing that the introduction of new forms of automation during the Industrial Revolution brought. Design, as a field, discipline and profession is fundamentally modern. The history of design theory and practice has evolved following the realization that designing is ultimately about (practically) researching the possibilities of making (Redström 2020), moving through different schools of thought, and developing along with technology. Yet, there is not a blueprint that everyone can follow when designing new products, instead a shared understanding of procedures (research, prototype, design, test, repeat.) that function like a guide that can be adapted to different situations.

With the continuous growth of digital products worldwide, designers face the challenge of understanding the increasingly complex technical constraints of technologies to create better products and interfaces. These products need to fit the user's lifestyle, but also help them achieve whatever task they have at hand without getting in their way. Because of the constantly changing nature of technology, there is no general methodology that designers can follow to create novel products that completely satisfy those requirements and anticipate any potential problems. Over the last decades, Human-Centered Design (HCD) has established itself as the dominating approach for digital product design. HCD defends that the focus of design should be the user's needs (Norman 2013; Johnson, 1998). Therefore, designers need to acquire first-hand knowledge about their users, their environments, motivations for using products, among other relevant information. Additionally, after being designed, the product needs to be tested by the people who are going to use it, to obtain as much feedback as possible about potential issues that might arise and that were not taken into account during the development phase. In theory, HCD should guarantee a high degree of success for product design, nonetheless, this approach is not entirely flawless.

For its part, the Jobs To Be Done (JTBD) framework has been gaining popularity recently among product developers and UX practitioners. Unlike HCD, which focuses on improving the users' existing circumstances through design, JTBD focuses on innovation; it attempts to forecast future needs and thus potential opportunities for product design. Both HCD and

JTBD put the users' needs at the center of the process but JTBD might actually have some advantages during the ideation phase of the design process.

Furthermore, the design discipline and the studies of communication are intertwined, as they share common objectives. If the design process is negatively impacted, the communication process with the user will suffer as well. In that sense, it is of extreme importance to refine the design methodology and enrich it continuously in order to keep up with the ever changing needs of the users and their environment.

1.2. M1 Project and Personal Motivations

In September 2019, after arriving in Lisbon to study at IADE, the author was told that the process to obtain a card to use the metro system would take about 10 days, or that she could opt for the urgent option, given only at specific locations, and that required to wait for a few hours (Portal Viva, 2021a). Having used other metro systems around the world, and being aware of mobile apps like the Oyster app in London, the process seemed outdated, not user friendly, wasteful of resources and users' time, and with a very big opportunity for improvement. By the time this work was written, an online application was available for users to obtain the card, but the waiting period remained the same. (Portal Viva, 2021b) Another alternative available is the Kiosk Viva, which provides a faster turnaround on the card, but works exclusively with the Citizen's card. This option leaves out all the tourists, students,

Figure 1

Kiosk Viva

Note. Picture of a user operating the Kiosk Viva at the Alameda Metro station in Lisbon, Portugal.

short and long term residents, and anyone else who does not have such a card. This is another example of non-inclusive solutions for a service widely used.

Additionally, if the user desires to refill their card online, a card reader is required to insert the user's citizen card and be able to perform this task. Such an option not only requires the user to purchase a piece of hardware, but it also leaves out all the people who do not possess a citizen's identification but need to refill their metro card. This is a clear example of a solution that was created without considering the user's needs, wants, environment, lifestyle, and other currently available technologies that would allow the user to refill their card online without the need of a government issued identification or a piece of hardware that has only one purpose.

Figure 2

Viva Card Reader

Note. Screenshot of a YouTube video where the card reader is advertised.

During the Masters in Audiovisual and Multimedia Communication, the author had a chance to participate on an integrated project, whose objectives were the conjunction of different classes to apply all the knowledge obtained during the semester. The author decided to undertake the challenge, by designing a mobile app that would radically improve the user experience while using the public transportation system in Lisbon. As a starting point, the Oyster app could function as a great example, as it works in conjunction with the metro card, and allows the user to pay, "manage multiple season tickets and cards on the go", among other tasks. (TfL, n.d.)

This project was intended to focus solely on the design of a mobile application, called M1. Nevertheless, similar tasks have been done repeatedly as a medium to obtain a Masters Degree in Design, and in the wake of learning about JTBD and the possibilities within the UX Design practice, the entire research took a different direction, and pivot towards the Design theory and plausible contributions with other areas of knowledge.

After learning about JTBD and the potential uses in design, we performed a quick research to understand how other designers are incorporating this framework into their work, but we quickly realized that a large quantity of them have not been able to do it successfully because of a lack of structure in the research methodology of JTBD. In addition, we found similarities with other theories, like the ones proposed by Simon (1988), Dewey (1938) and Foucault (1988), and attempted to perceive if these theories are applied in today's design practices.

1.3. Research Question

What is the possibility of integrating the Jobs-To-Be-Done framework with Human Centered Design practices in order to have a better understanding of the users' needs and design better products for them?

What are the tangible results of using the information obtained during this research to various deliverables applied to the M1 project?

1.4. Objectives

This thesis project intends to study:

- The possibility and the results of combining two research methodologies when designing a digital product, specifically a mobile application that would allow users to have an enhanced experience when using the public transportation system anywhere in the world.
- The current state of the UX practice and the JTBD framework through a literature review.
- The quantitative data obtained through an online survey, and qualitative data gained through individual interviews.
- The differences and similarities obtained when performing different frameworks to the same project, through the elaboration of distinct deliverables from the data obtained during the previous steps.

1.5. Hypothesis

We presume that:

- **H1:** The combination of the JTBD and HCD is not only attainable but rather necessary in

order to create better products for the user.

- **H2:** Regardless of the results of this semi-experimental research, we would accomplish a breakthrough in the field of user research and the fulfillment of users' needs, as we will discover if this proposal is worthy of further studies and research, or if the focus should be put somewhere else.
- **H3:** The information obtained during the interview process will be different from one framework to another. These contrasts would allow us to obtain diverse results when creating a Competitive Analysis, a User Persona and the Customer Journey Map with its counterpart from the JTBD methodology.
- **H4:** The Competitive Analysis obtained from the JTBD framework will be richer in information, as the JTBD encourages researchers to broaden their horizons when considering the competition to their products.
- **H5:** The User Persona from the UX methodology will be benefited from the JTBD practice, as more psychological information will be searched.
- **H6:** The User Journey Map commonly used in UX practice can be improved with the JTBD framework, because the data obtained will be much more detailed and descriptive of the process that the user undertakes when searching and using a product.

1.6. Methodology

In order to prove the hypothesis, we will undertake a literature review followed by quantitative and qualitative research. Through an integrative literature review, we "aim to assess, critique, and synthesize the literature (...) in a way that enables new theoretical frameworks and perspectives to emerge" (Snyder, 2019). Afterward, we apply these findings into a comparison study in the User Research portion of the Design methodology, in order to learn if such marriage of practices is feasible and if it brings benefits to the Design practice.

1.7. Structure of this dissertation

The first section of this work will outline a brief background of HCD and JTBD and carry out a comparative analysis of their main aspect, as well as the basic concepts and principles behind these frameworks. Next we explain the methodological approach used during this research, together with the results obtained from it. The last section proves how the information obtained can be applied directly to different deliverables for the M1 mobile app. This research does not intend to give a solution or final "formula", nor to argue that HCD should be abandoned, but rather to expand its scope and strengthen its panoply. Ultimately, the goal of this research is to contribute to the conversation about design methods and their future.

Chapter 2

2. STATE OF THE ART

2.1. HCD & UX: Current state and constraints

Human-Centered Design (HCD), as defined by Putnam et al. (2016) is a principle that states that the end user should be at the center of any technical design system. By doing so, the HCD methodology assures the creation of meaningful and usable information and communication technologies. Concurrently, UX Design (User Experience Design) is "the creation and synchronization of the elements that affect users' experience." (Unger et al., 2012) It includes physical and digital elements that the user can interact with, like digital interfaces and people. Equally to the HCD practice, the UX Design methodology considers the user as the point of departure when creating and synchronizing all elements.

HCD is arguably the leading approach for designing digital products nowadays. Although it can be used for the creation of any kind of product or service, people usually think about web or mobile applications when they hear about this framework. As the name implies, the focus should be the user, specifically, addressing his needs by shaping technologies so as to make them as usable, useful (and even) delightful as possible. The problem, however, is that in reality this focus on the user's experience is often limited to the User Interface (UI) design. And although to a certain degree the product is the interface, as Gould & Lewis (1985) presciently noted, the visual language should be the result of the input obtained through user research.

With this misunderstanding, some products lack a proper methodology when built, or are built based on insufficient user data. For example, one of the complaints in the Design Community is that User Personas, used as a characterization of the ideal user for a specific product, are created mainly with demographic data, when in reality the focus should be in the psychographics gathered during research (McKeen, 2019). In addition, there has been criticism regarding the fictional nature of the persona; because of the fictitious elements, it can be difficult to conceive a relationship between real users and a made-up profile. In the words of Ulwick (2016), when a user persona is based on demographic and psychographic data, they create "phantom targets" as the customer segments are highly misleading. Moreover, it is this fabrication of information that denies the User Persona the possibility to be considered as scientific information, as the objectivistic scientific paradigm states that "science consists of statements that can be verified" (Nielsen, 2014). While some may argue that the Design

process is not a scientific one, rooting a product's development on fictional information will not likely produce good results that translate into an improvement of the user's life.

Elseways, within the HCD practices, an important notion is Activity Theory, which defines activities as "generative forces that transform both subjects and objects" (Kaptelinin, 2014a). To a certain extent, this approach considers the human side of the user and his relationship to a context, but it still studies subject-object interaction without fully considering the dynamic nature of the "ecosystems" surrounding him. The focus on just one interaction in a specific context and time, might leave important information about the user's needs aside. In addition, it solves the current problems of the users, without even considering what the user aspires to be in the future. That is, without taking into account that users might undergo certain transformations through their interaction with technologies.

Regarding urban transportation mobile apps, the most popular and best rated include Transit, Citymapper, Moovit and Google Maps (App Grooves, 2022; Chan, 2021; and Hindy, 2021). While these applications provide information about several public transportation services as well as the best routes for the users to take, none of them allows them to make payments inside the app. Therefore, the user would need to download the specific app for the service they want to hire. In that sense, we notice a gap in today's offers, and the M1 app can lead the way to providing a better solution to the users.

2.2. Problems during the first steps in the UX Design process

Despite there is different literature that describe various steps regarding the UX Methodology, according to the Interaction Design Foundation (2020), the UX Design process usually follows 5 steps, which are Empathize with the User (to learn about them), Define the Problem (in order to identify the user's needs), Ideation (to generate design ideas), Prototype (to convert those design ideas into examples) and Test (to evaluate the design proposal). Before the Ideation phase, research is, or at least it should be, an essential part of the Design process. Many research methods and styles are used in today's Design practice, and with that, some problems have arisen, as there is no one-model everyone can follow. As mentioned by Ann Blandford during a conversation with Ditte Hvas Mortensen, in "How to Do a Thematic Analysis of User Interviews" (Ditte, 2020), one of the issues that designers encounter include data overwhelming. After conducting interviews and gathering data, it is common that researchers do not know where and how to start analyzing the information. This problem leads to confusion, and even accidentally leaving important information out.

Another problem found, mentioned by Ann Blandford as well, is the personal preference of some interviewed users. This phenomenon can occur when participants are charismatic or nice

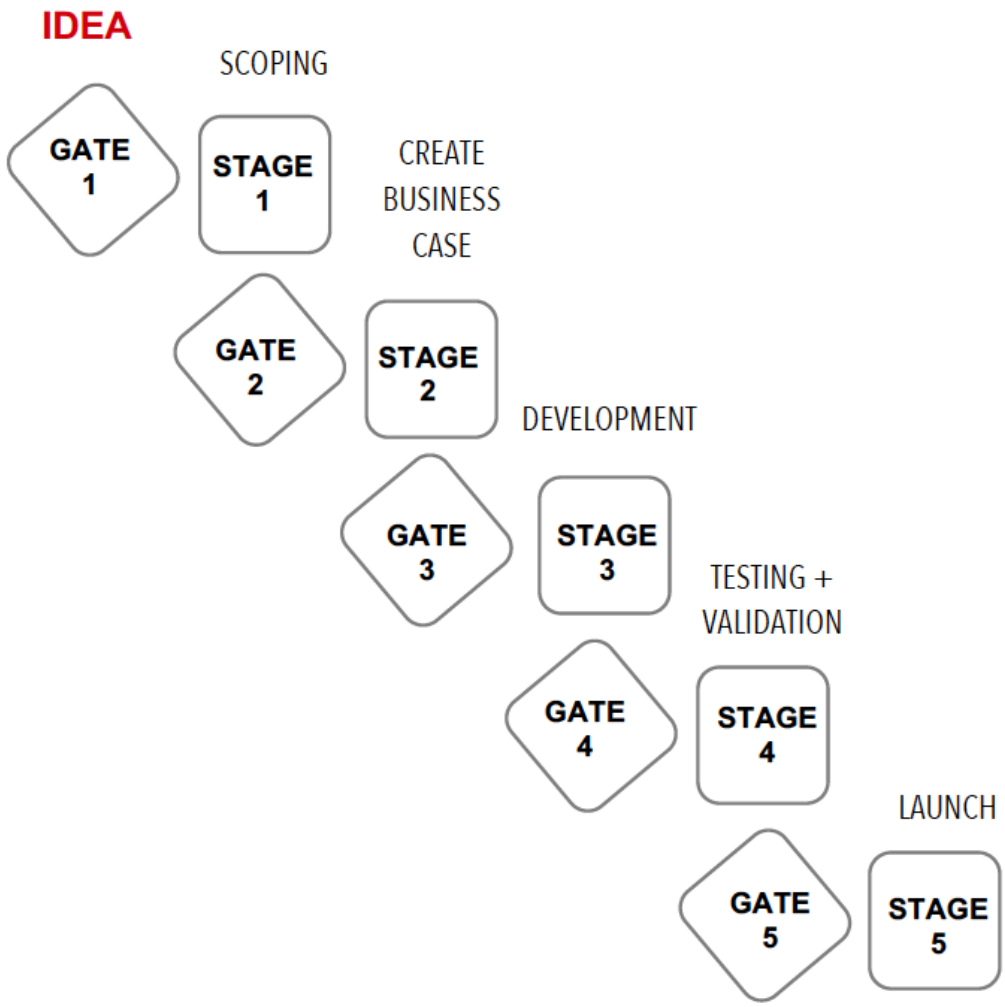
to researchers, so their input is given more weight, despite their profile might not necessarily fit the profile of the target audience. The most important issue of all, is confirmation bias. When researchers already have an hypothesis or an idea of the outcome of their research, and they encounter data that confirms that bias, it is common to overlook the rest of the data and base the entire conclusion in just a fragment of the information. (Ditte, 2020) Clearly, a new approach to research or a complementary method is necessary if we intend the Design practice to evolve and survive.

Additionally, there are other concerns about research for innovation in general. For example, as Ulwick (2016) explains, the Ideas-First Approach encourages companies to come up with as many ideas as possible as a method to innovate. During this process, after many proposals are generated, the ones that are likely to fail are filtered out and only the promising ones will continue along the process. With this largely accepted method, employees are encouraged to fail fast and cheaply, in order to save money for the company. While this method is widely used, it may not be the best way to fulfill the user's needs, as they are contemplated only after the ideas are generated.

The diagram on the next page explains in detail this process. The gates work like filters for ideas before they become a final product. In this case, the initial idea did not go through any filtering process, so the entire procedure is based on a suggestion or proposition with no supporting data or research. Each stage illustrates a phase undertaken in this innovation technique, similar to the steps taken during the UX methodology. In this case, after each phase a new gate or filter appears, to refine the ideas, until arriving at the launch of the product.

Figure 3

Ideas first diagram.

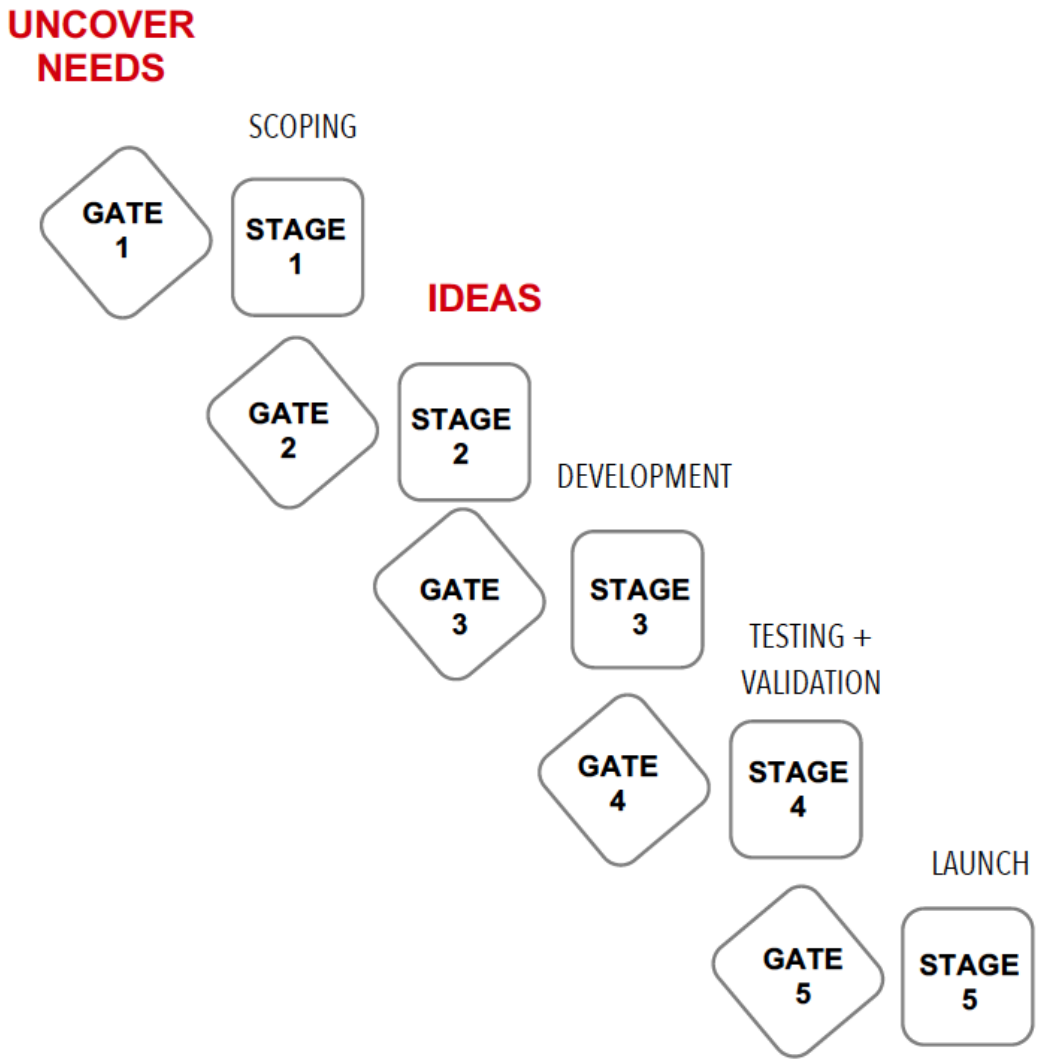


Note. Diagram taken from Ulwick (2016) where he explains the "Ideas first" approach.

The alternative proposed by Ulwick is the Needs-First Approach is shown on the next page. The same system of filters and phases illustrates an innovation process that has the research phase before the ideation phase.

Figure 4

Needs first diagram.



Note. Diagram taken from Ulwick (2016) where he explains the "Needs first" approach.

In this scenario, the ideas are generated after uncovering the user's needs and following a filtering process. With this approach, the user becomes the focal and starting point, so his needs can be addressed in a more accurate and timely manner. Additionally, the wasteland of ideas can be reduced dramatically, resulting in savings of money, time, human power, resources, etc.

While the Ideas-First Approach might seem like it is an agile system because it encourages the rapid creation and elimination of ideas, the results can be pointless if enough research is not

done beforehand. However, in any development method, agile or not, the starting point must be the research about the user and his needs. “User requirements (...) are typically gathered at the beginning of software development projects, and software development teams strive to get an accurate understanding of customer needs so that they can build software that meets those needs.” (Walz et al. 1993, as cited in Marupingg et al. 2009) In principle, all HCD exercises begin by understanding the user’s needs, but in practice this is not always the case.

2.3. Communication as a Design Problem

According to Aakhus (2007), in today’s society, “designers hold influence over the shaping and disciplining of communication”; the reason is that communication and design share a common problem, which is the relationship between interaction and communication. However, the process of understanding this relationship begins before the design process. In order to come up with an idea or concept, an understanding of socially accepted codes is required. During the creation or innovation process, designers can make use of those codes, but at the same time, they are able to invent new meanings and therefore incite a change in which humans communicate.

Another exercise during the first stages of a common UX Methodology that relies on communication, is the undertaking of user research, either through surveys, observation, or interviews with the end user. The appropriate design of these research tools is crucial, but the communication skills of the researcher can also have a significant influence in the results obtained.

Another way in which designers shape the communication process is through the use of affordances, which is a concept born from the psychology practice, later incorporated into the design practice by Norman (2013), and they help indicate intuitive action possibilities that the user can perform at a given time under certain circumstances (Kaptelinin, 2014b). After completing the product, assertive communication is key in order to deliver the information to the end user, so they understand the way in which his life will be improved when purchasing the product or hiring the service. In other words, communication and design are intertwined and the performance of each of them affects the other part equally.

A common misconception that exists is that design is a “neutral transporter of messages” (Barnard, 2005), but various theorists affirm that information always transforms the receiver of the message. In that sense, design, as a form of communication, is always transformative and serves not only as a communication tool, but as a transformation tool as well. Chapter 4 will inquire more into this concept and the relationship with the end user.

Finally, when the design process is based on incomplete or fragile user research, the communication system is in a manner deficient or debilitated. The results obtained from the research will determine how the designer or product team will decide what are the unmet needs of the user, and as a consequence the marketing process, the positioning of the product, the development of the product itself and even the sales operation will be influenced (Ulwick, 2016). On that account, it is extremely important to have a solid research method in order to identify the actual user needs, and only then begin the design process while taking into consideration all the communication portion as well. In principle, the JTBD framework offers to solve this problem; for that reason, we decided to explore and investigate it in the next chapter.

Chapter 3

3. JOBS TO BE DONE

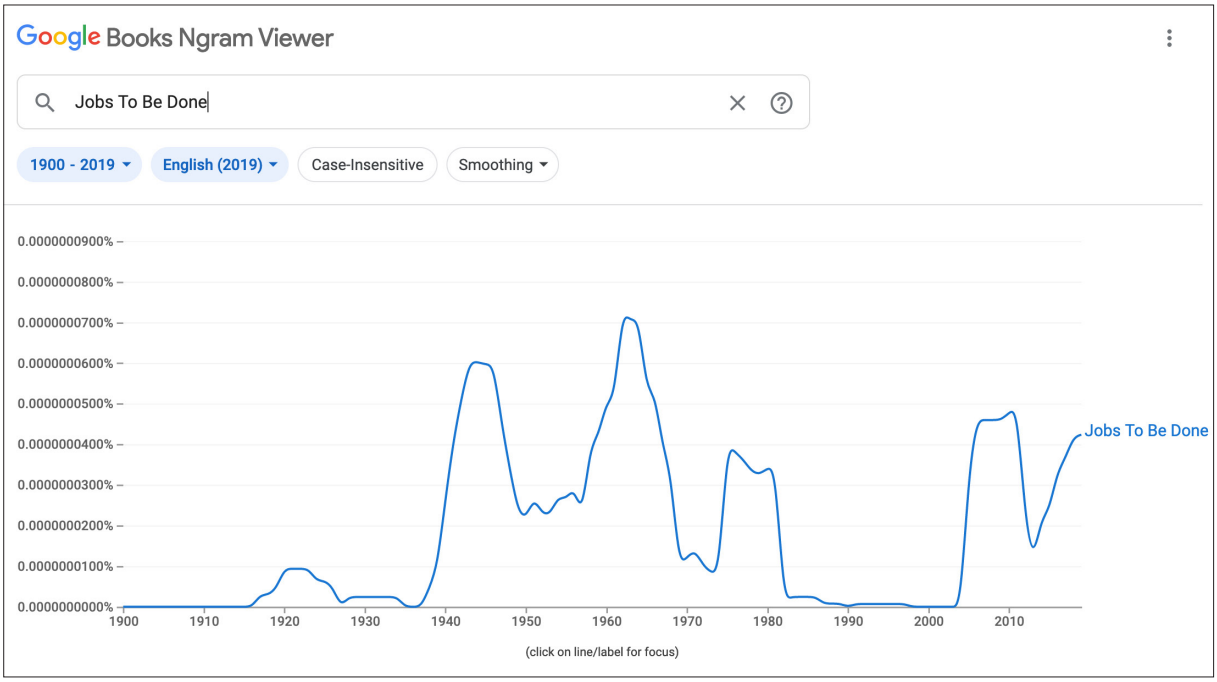
3.1. The emergence of JTBD

When designing digital products, the method of choice is usually some variation of Human-Centered Design (HCD), which puts the user as the most important element of the process. Arguably, however, there is still a limitation at the core of this methodology, as some authors claim that the human aspect is often neglected in methodological approaches of design (Badke-Schaub, 2005). In a sense, HCD does not fulfill the totality of the user's needs, mainly because it only focuses on a present problem and does not take into consideration the evolving nature of the user. Additionally, it has become increasingly evident "that the use of technology critically depends on complex, meaningful, social, and dynamic contexts in which it takes place" (Kaptelinin, 2014a). Hence, different approaches need to be taken in order to satisfy the requirements of the ever more demanding customer.

A simple search in Google Ngram Viewer[1] reveals the term "Jobs to Be Done" has been around for a long time.

Figure 5

Google Books Ngram Viewer: Jobs To Be Done

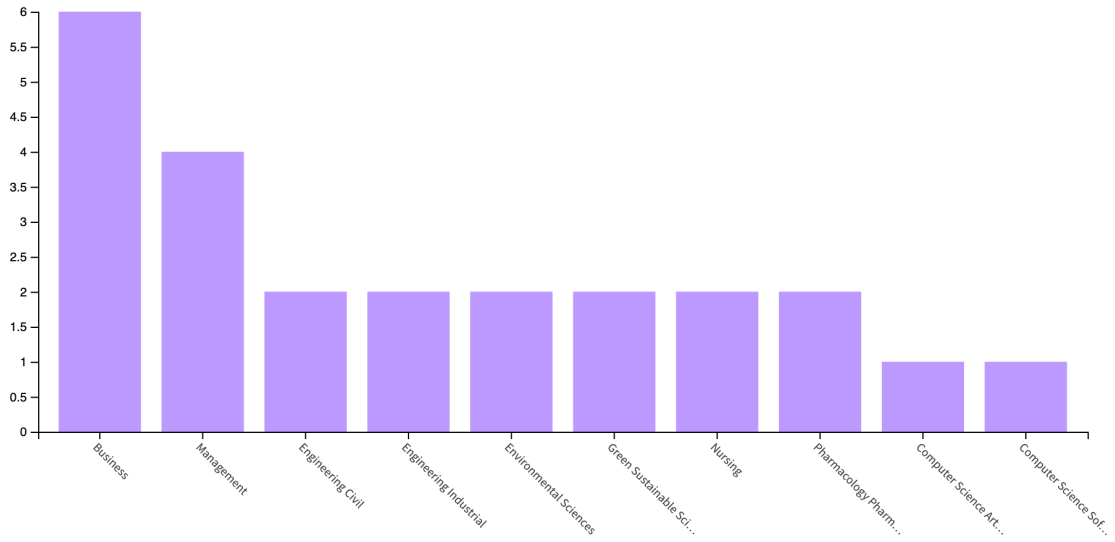


Note. Results showing the frequency in which the term "Jobs To Be Done" has been used from 1900 to 2019.

1 The Google Ngram Viewer is an online search engine that shows word or phrase frequencies within a compilation of books.

Figure 6

Web of Science results for "Jobs to Be Done"



Note. Results showing the frequency in which documents about "Jobs To Be Done" has been created.

If we perform the search for the term "Jobs to Be Done" in other databases like *Web of Science* (2021), we realize that only a handful of academic material has been produced regarding this topic, since 2013, and none of those publications are related to HCD. For that reason, we believe that this research seems appropriate and necessary in order to continue improving the Design Methodology.

According to Klement (2018a) the Customer Job Theory (later Jobs To Be Done) was born from the quality management movement with the intention of bringing into play the Voice of the Customer (VOC). Voice of Customer (VOC) is a term that emerged in a paper by Griffin and Hauser in 1993, in which they defined the VOC as "a complete set of customer wants and needs; expressed in the customer's own language; organized the way the customer thinks about, uses and interacts with the product and service; and prioritized by the customer in terms of both importance and performance" (Griffin, 1993). Moreover, the JTBD framework was developed to create new products and services, as it focused on the progress the customer desires to achieve, instead of the product itself. Although this theory was born in another area of study, the possibilities of using it in the design practice can close that broken link and help build better products overall.

On the other hand, Anthony W. Ulwick claims the JTBD theory originated from the Outcome-Driven Innovation (ODI) strategy. In 2002, the Harvard Business Review published Ulwicks' article "Turn Customer Input into Innovation", which eventually turned into a book released in 2005 titled What Customers Want: Using Outcome-Driven Innovation to Create Breakthrough Products. This book explains "in detail how ODI transforms Jobs-to-be-Done

Theory into an effective innovation practice" (Ulwick, 2016). Nonetheless, it only became associated as a framework for innovation in business in the mid-2000s, as the popularisation of a process called Outcome Driven Innovation, patented in the early 1990s (Ulwick, 2017). Consequently, although this process has been around for three decades, it started gaining popularity among the UX and Design and Communication professionals just recently.

In the words of Klement (2018b) there are two JTBD main interpretations: the Jobs As Activities model, which indicates that users acquire products because they want to "do work" with them, so products are seen as tools. Klement is one of the main representatives of this model. The second interpretation is the Jobs As Progress model, which implies that users are looking to create progress, or a positive change in their life. In this case, the attention should be put on such progress, and not just in the product and its functionality. Ulwick is one of the biggest voices of this second model.

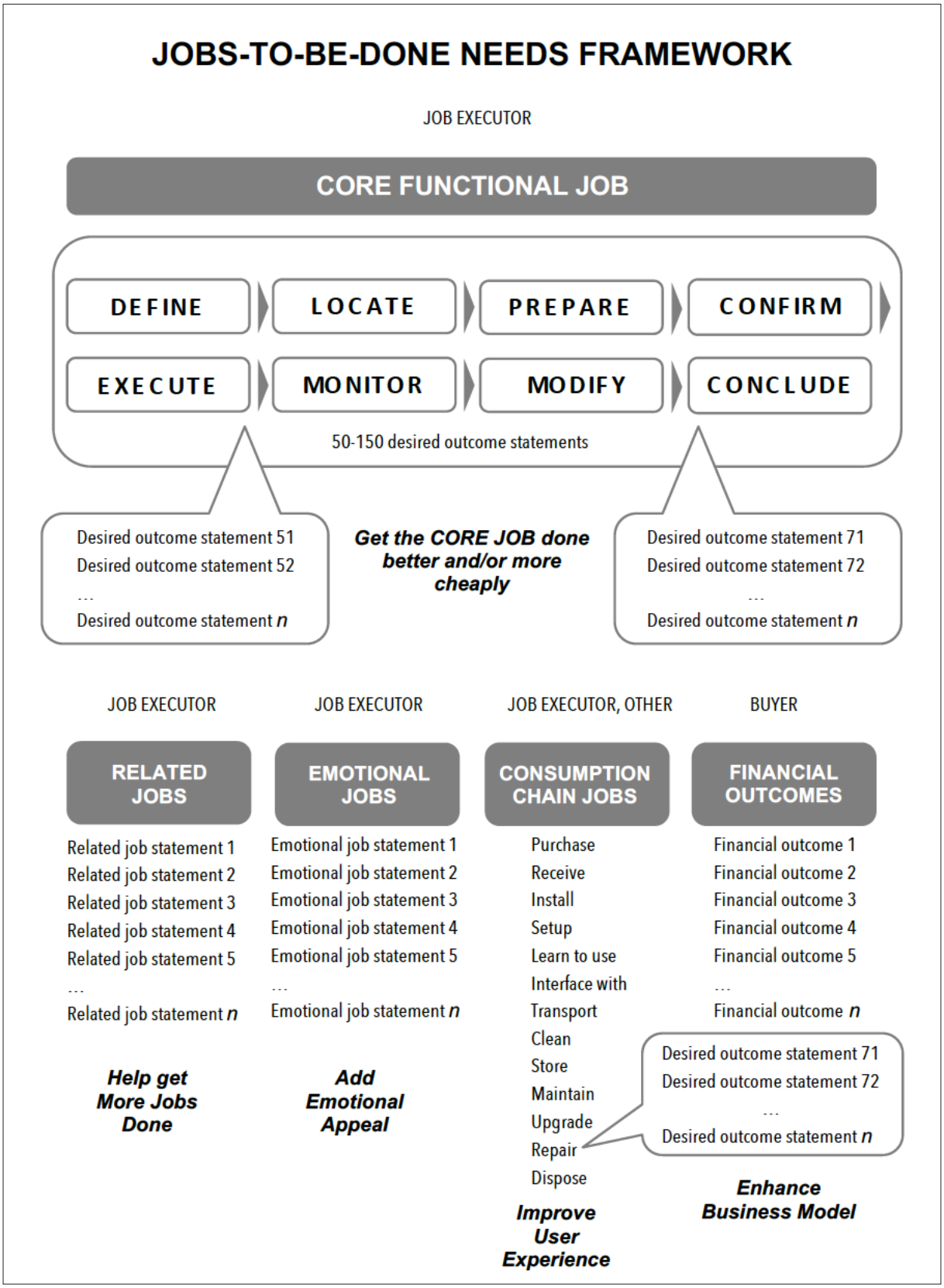
Both variants of the JTBD framework resemble other theories that are well known among designers. For example, Activity Theory, a research framework originating in Soviet psychology in the 1920s (Nardi, 1996), establishes the "activity" as the basic unit of analysis, providing a way to study both the subject and the object involved in the activity, and therefore avoid having any of them being studied separately, and without a context (Kaptelinin et al., 2006). Activity Theory, just as the JTBD framework emphasises the study of the subject along with her environment and the conditions, as well as her motivations and goals. Despite both authors basing their theory in different interpretations of the framework, the user is the focal point in their definitions.

3.2. Jobs as Activities model

Born from the ODI strategy, the JTBD model is a major component of Ulwick's practice inside his company Strategyn, where he uses a 84 step process, divided in 6 stages in order to help his clients understand what are the needs of their own customers, and to transform them into innovation leaders. The stages are: "(i) the core functional job-to-be-done, (ii) the desired outcomes tied to the core functional job-to-be-done, (iii) related jobs, (iv) emotional and social jobs, (v) consumption chain jobs, and (vi) the buyer's financial desired outcomes." (Ulwick, 2016) During this process, the JTBD theory is contemplated on each of the stages, but the steps cover a wide range of elements and tasks that go beyond the design and communication departments. For that matter, this research will focus solely on the first 2 steps of UX Methodology described in chapter 2, which are Empathize with the User and Define the Problem.

Figure 7

Jobs-to-be-done needs framework



Note. Diagram taken from Ulwick (2016) where he explains the "Jobs-to-be-done needs framework"

According to this interpretation of the framework, a Job ”describes the overall task the customer is trying to execute” (Ulwick, 2017). This Job is always stable, so they do not change over time; in addition, it has no geographical boundaries and is solution-agnostic. However, according to Ulwick, the job the user is trying to accomplish is not isolated, like other emotional, related, financial, and consumption chain jobs are also involved and they all should be considered during the research phase. Furthermore, the user goes through a series of steps when executing the job, which are: define, locate, prepare, confirm, execute, monitor, modify and conclude. (Ulwick, 2016) On the next page, the diagram explains in detail how Ulwick describes the user journey.

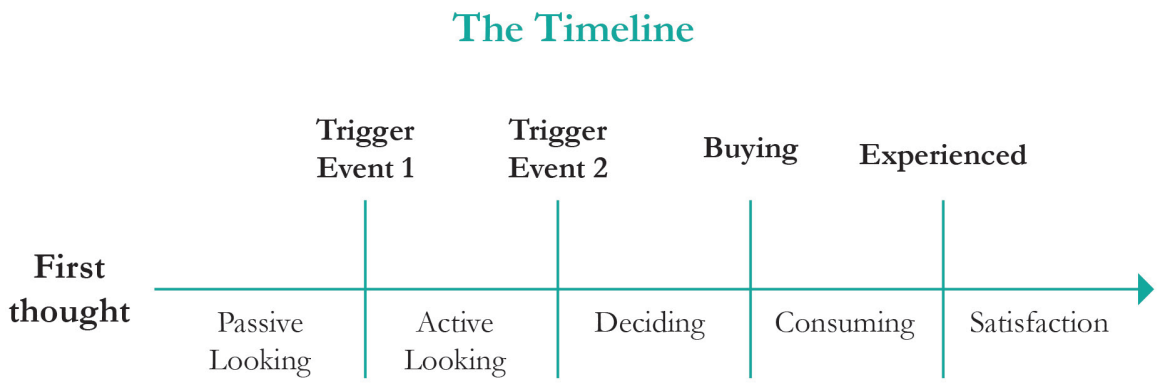
In the diagram, we can observe how the user tries to accomplish a task, according to Ulwick (2007). It all begins with a core functional job-to-be-done, and then the steps taken in order to achieve that job (Define, Locate, Prepare, Confirm, Execute, Monitor, Modify and Conclude). In between those steps, we can find many desired outcomes that the user has in addition to the main functional job. The related jobs are additional jobs that the user might try to accomplish as well, while the emotional jobs explain how the user wants to feel, or not to feel, while trying to execute the main job. The chain consumption jobs are the steps that users have to take after buying a product, like assembling furniture or installing a software. Finally, the financial outcomes are related directly to the money the user is willing to spend on a product or service. As we can see, this proposed model is quite extensive, and encompasses user research, positioning, marketing, and even the business model of the company.

3.3. Jobs as Progress model

According to Klement (2018a), “A Job to be Done is the process a consumer goes through whenever she aims to transform her existing life-situation into a preferred one, but cannot because there are constraints that stop her.” (Klement, In other words, the consumer or user has aspirations, they want to become a better version of themselves, but in order to do that, they need a product or service to assist them. When these aspirations are taken into consideration when designing new products and services, user’s needs can be fulfilled in a finer way leading to better products and more satisfied customers.

Figure 8

The Timeline

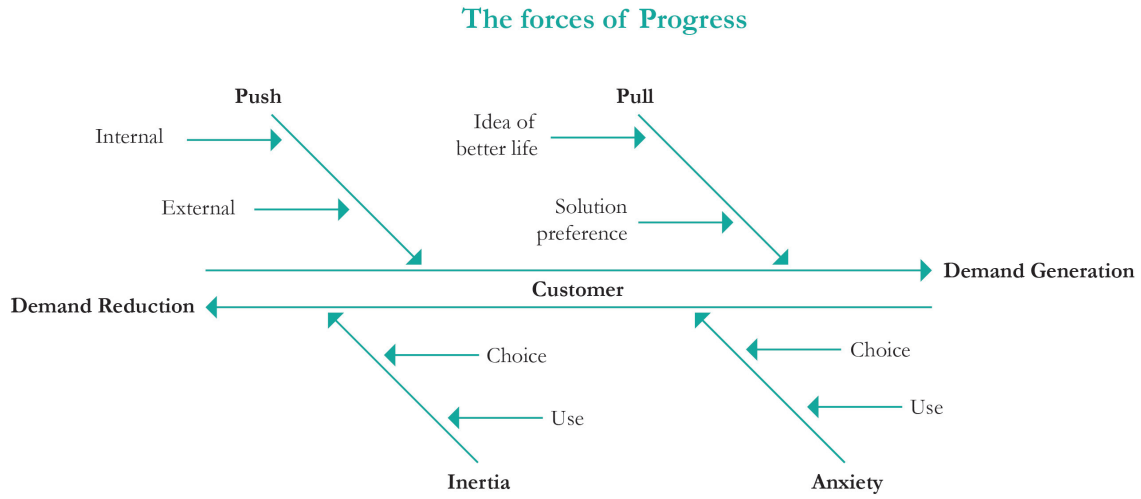


Note. Diagram taken from Klement (2018a) where he explains the steps a customer takes when choosing a solution

Within the Jobs as Progress model, there are two methods that help study and identify the different components of the user's ecosystem. The first one, a diagram titled The Timeline, illustrates the path that users follow before deciding to buy any new product or service. The timeline starts with the first thought, goes through passive looking, active looking, decision, consuming and ends in satisfaction. According to the Jobs as Progress model, every purchase made by the consumer goes through these stages, meaning that no new acquisitions are made without having thought about it first. While this diagram looks very similar to the customer journey, the main difference is that JTBD focuses primarily on the emotions that the user is experiencing while going through these phases, instead of just the mere actions.

Figure 9

The Forces of Progress



Note. Diagram taken from Klement (2018a) where he explains the forces that influence the customer's demand

The second diagram is called “The Forces of Progress”, and it brings to the fore the fact that there are forces that cause and regulate customers’ demand for a given product. At the center of the diagram, you find the user, which is influenced by forces of “Demand Generation” and “Demand Reduction”. The forces that generate demand are divided into two: Push forces (that can be either internal or external to the person, generally propelled by an event that changes the customary life of the user) and Pull forces (which are an idea of a better life and an existent preference to a certain solution). The forces that reduce the demand are inertia and anxiety. The Jobs as Progress Model claims to be a “Technology Independent Solution” (Klement, 2018a) as both of these diagrams can be of use when designing any type of product or service.

3.4. Limitations and Challenges

First and foremost, it can seem contradictory to base this research on a framework that has two conflicting origin theories, as well as two different interpretations of the framework itself. However, it is this confusion that makes it crucial to undertake an exploration of the topic, especially since there are UX Designers trying to implement this theory into their process nowadays.

Another issue we encountered is the fact that many people believe that the framework is not an accurate method to achieve innovation. For example, Ulwick’s book was reviewed on the Goodreads website (2021a) as creative rather than scientific, “a marketing tool for the author’s company” and a claim of success rate based on a very small number of cases. The author causes the impression of wanting to promote his own company, because he mentions the framework but then remarks that if the reader wishes to learn more and apply the method themselves, they can hire Ulwick’s services.

On the other hand, also on the Goodreads website, Klement’s book is accused of being an attempt to “rewrite history”, steal the framework from others like Ulwick, and also of being a compilation of previous blog posts from the author (2021b). Such reactions from the readers reiterate the problematic history of the JTBD framework.

In terms of research models, both variants of the JTBD framework present issues. Klement’s approach is less structured, as he encourages the use of qualitative data and interviews. He offers a model to perform the interview, but the organization and treatment of the obtained data seems ambiguous. On the other hand, Ulwick does not instruct on how to perform the interviews, but he has an 84-step process that guides you, as well as a JTBD canvas to organize all the information gathered during the research. The different approaches can not

be mixed and matched, as they hold a different perspective regarding JTBD, so they will be tested separately.

With these problems in sight, we decided to research further and try to come up with a more perspicuous description of the framework as well as the possibilities of integrating it into the Design practice. Although there is not enough literature suggesting which model to use, we decided to use Klement's because this and that, explained in chapter 5.

Chapter 4

4. HCD & JTBD

4.1. Theoretical Context

Human-Centered Design (HCD) was born as a response to technology-centered systems design; as a way to put human interests in the field of Human-Computer Interaction (Boy, 2012). HCD is a holistic approach for addressing and preventing problems that users might experience while interacting with technologies. Even though there may be different ways to name them, depending on the author and his approach, projects that follow HCD are normally broken down into five main stages of development: Scope, Analysis, Design, Validation, Delivery (Wallach, 2012). This framework is iterative, which means that designers have to continuously test the product with the users, incorporate their feedback to improve the design and test again. Ideally, the process should continue until every issue has been addressed. Consequently, HCD can be regarded as a cyclic model, where improvements on the product can be carried out infinitely—at least in theory because the users' needs change over time (Hartson, 2012).

Parallel to HCD, the Design thinking ideology, forged in the 1990's by David Kelley and Tim Brown (Gibbons, 2016), as an effort to come up with a unified method that could be replicated by anyone. This process has 6 passes: empathize, define, ideate, prototype, test, and implement. The steps are similar to the ones found in HCD methodologies, and can be merged with the JTBD methodology as well, specifically the first phase when we are trying to learn more about the end user in order to have more empathy.

In Herbert Simon's "Science of Design'' (1988), a scientific approach was intended to transform design from arts and crafts to a rational problem solving methodology that relied on conceptual schemes embodied in research practices. Most importantly, it defined design as a logical search of courses of action aimed at changing existing situations into preferred ones (Huppatz, 2015). Arguably, this idea was a reformulation of John Dewey's pragmatist understanding of "Inquiry", which he defined as a "controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole" (Dewey, 1964, as cited in Buchanan, 2009). Ultimately, Simon's proposal did not come to fruition mainly because it left aside the human element, but that new definition of design is now found in the "Jobs As Progress'' model of the JTBD framework, as the focus goes to that positive

change that the user is trying to achieve. The main difference is that JTBD takes into account all the emotional segments that Simon left out.

In 1988, Foucault introduced the term of Technologies of the self, and although it is an unfinished work, it keeps appearing as a reference in today's research, as we assume based in Hernández-Ramírez (2017). Technologies of the self are specific techniques found in tangible practices that shape people's lives. This way, individuals help transform themselves in order to obtain a preferred state (Abbas, 2009). This concept of transformation into a preferred state is one of the leading ideas in the Jobs As Progress model of the JTBD framework.

Foucault stated that humans have used tools or technologies in the process of enhancing themselves, and these tools have evolved and changed over time (Foucault et al., 1988). A common mistake is to focus on the tool itself, and try to design new tools and products as isolated objects. Instead, the effort should be into creating progress for the customer through new systems (Klement, 2018a). In other words, the effort should reside in understanding the progress that the user is trying to achieve, and having the tools and products as an outcome of that desire to change, and not the other way around. In that sense, the JTBD is not the first framework that proposes to change the focus from the tool or product to the user.

Now more than ever it is important to study the entire ecosystem and the user's interactions, since the distinction between online and offline environments is getting blurred, as our physical reality merges with the abstract world of cyberspace (Hernández-Ramírez, 2017). The user is no longer utilizing mobile apps and digital solutions as independent tools, but as part of an ecosystem of online and offline products that work together to solve everyday problems.

4.2. Possibilities for JTBD and HCD

Hypothetically, JTBD and HCD should complement each other and could be used together in the process of creating new products. However, there is not enough information available on how to combine these two frameworks, or studies that analyze the results obtained from using both of them. The few researchers that have embarked in the journey of trying to incorporate the JTBD framework into the Design field have not been successful. Some authors, like Settelen et al. (2020), believe that the JTBD framework hasn't been very effective because previous knowledge and experience is required to apply it correctly. The problem might reside in the lack of a proper system that can be replicated and applied.

If enough research leads to a robust JTBD methodology, the possible applications within the User Centered Design framework, go beyond the user research phase. For instance Livio

(2018) explains that JTBD may be applicable during the design of the User Interface. Klement (2018b) claims that the methodology should be used to determine competition in the mind of the user, and more importantly, to discover innovation opportunities within the product or in additional ones. The solution may be to merge the JTBD framework into the different stages of the HCD, instead of using them as separate solutions that can be used one without the other.

Some research has undertaken the task to create a step-by-step process for applying the JTBD framework. For example, Lucassen, et al. (2018) proposed a 5 stage process (Interview, Analysis, Survey, Prioritization and Project Definition). After testing they realized that the method was not as effective as they expected, and concluded that they lacked guidance and validation for their proposals. It is the job of designers, scholars and researchers alike to work together and find the best framework to design new products and services that serve the hyperconnected humans of today, using the combination of both frameworks.

4.3. How to incorporate JTBD into the User Research

The merge of the JTBD methodology into the HCD practice could lead the way to a more holistic approach to Design in which we take into consideration not only the subject-object relationship, as it has been done during the past couple decades, but also the ecosystem in which the subject inhabits (both offline and online) and the constant aspirations that are part of human nature. However, the difficulty occurs when we attempt to fit a very subjective and quantitative model into an actionable procedure that anyone can follow and replicate.

We believe that one way to make sense of this combination of methods, is through trial and error, testing the current JTBD theoretic frameworks during the HCD process, noting the similarities and differences, and reporting back so others can learn about it and hopefully continue the research work. We performed a research study with a standard HCD method, and with an experimental method that incorporates the JTBD framework, with the hopes of observing the compatibility of these frameworks.

Considering that we are surrounded by more digital products each day, Designers must study the user's ecosystem as well as the interactions with products. In addition, since reinventing oneself constantly is part of being human, the study of this aspiration for something better should be included in the design process. The latter can be achieved by incorporating the JTBD framework into the HCD practice.

However, before anybody can successfully incorporate the JTBD framework into HCD, we need to make sure: a) that we have a proper methodology that explains what are the

specific steps to execute; and b) that there are clear guidelines that allow anybody to evaluate and validate their process. Until both of these requirements are not met, people will fail to implement this process. Future Designers and researchers have the task of converting qualitative and subjective research into a proven methodology that can be replicated by anyone.

Chapter 5

5. RESEARCH

5.1. Methodological Approach

The first step in this comparison study was to undertake an integrative literature review to obtain a more understandable view of current UX Design as well as the JTBD framework, and realize the importance of combining both frameworks in today's design practice. The next phase encompasses a survey shared online through the researcher's social networks, in order to obtain quantitative data as well as potential interviewees. Later on, we conducted user interviews following two models, one for the UX Design practice and one for the JTBD framework. Subsequently, we carried out an analysis of the data obtained during the interviews, and finally we applied those insights into deliverables that would help us compare both methodologies in a more extensive manner. In order to have a direct object of study, we will take the M1 project, explained at the beginning of this document, as an example to test out all the data obtained during this investigation.

Following the literature review, we will proceed to gather, analyze and organize what others have done regarding user interviews within the JTBD framework, to create an interview script that can be replicated in the future by other researchers. Likewise, we will study how current UX interviews are performed for HCD projects, and create a script that can be used by other researchers in the future.

The M1 mobile application is meant for people who use the Metro in different places of the world, therefore the ideal study subjects would be people who travel constantly and who use the metro system. However, because of the physical limitations due to the COVID-19 and since this research does not have any financial resources other than the researcher's, we will try to obtain insights from as many people as possible who use urban transportation mobile applications as part of their routine, regardless of their travel habits.

To recruit the study subjects, the first step was to reach out to the author's online network using various channels, and ask them to answer the survey. During this first part, the goal was to obtain as much quantitative data as possible from people all over the world, so it was open to people of any age, gender, location and race. This survey has short questions, and the outcome was data that can be used to observe the characteristics of the sample being studied, and to construct the user persona under the UX methodology.

The people who wished to participate during the interview process, were asked to leave an email address for us to contact them afterwards. Moreover, not all of the participants willing to be interviewed were selected. The criteria used to select the participants were only the ones who use their mobile phone on a daily basis, and who have used any Metro system in the last two years. When we have gathered the data from the survey, we will code the answers to be able to create tables and graphs that will make information easy to read and analyze.

Online calls will be scheduled with the people who qualify to have one on one interviews to gather in depth information, and the selected participants from the survey will be separated into two groups, with the same size and similar demographics. One of the groups will participate inthe UX Design framework, and one for the JTBD method. Afterwards, the most important part of this study will be made through interviews, where we expect to collect qualitative data that will allow us to gather enough information to execute the rest of the study.

When performing User Research or User testing exercises, various researchers claim that 5 users are enough to obtain acceptable results (Nielsen, 2000). Others claim that this number is not sufficient. For example, Guest et al. (2006) noticed that they had reached data saturation with 12 interviews. Similarly, Nielsen et al. (1993) demonstrated that 6 participants can expose 80% of the major usability problems, and 90% of the data can be achieved with 12 participants. Considering these insights, as well as the limitations of this research, we decided to interview between 5 and 10 people, for each framework, depending on the number of participants who would be willing to be interviewed after responding to the survey.

The quantitative information obtained by this method will show limited data on the sample, and should not be used as a base to develop the rest of the research. This is the reason why we are combining it with 1:1 interviews that will provide in-depth data. The information obtained during both phases is directly influenced by the quality of the questions, and by the ability of the researcher to guide the interviewer properly without contaminating the results.

The interviews will be transcribed, and the text will be broken down into keywords that will be later placed into categories and examined closely. In UX, this is a thematic analysis for semi-structured interviews, and the Interaction Design Foundation suggests 6 steps to follow:

> “i) Familiarize yourself with your data. ii) Assign preliminary codes to your data in order to describe the content. iii) Search for patterns or themes in your codes across the different interviews. iv) Review themes. v) Define and name themes. vi)Produce your report.”
>
> (Ditte, 2020)

For the JTBD interview, a similar approach will be used, but predetermined categories of codes will be used, according to Klement’s approach, and based on Valchanova’s (2020)

approach to the JTBD framework. Both methods will be explained and exemplified in the Results chapter.

After studying the results from the survey and the interviews, we will create derivables often used in HCD, like the User Persona, the Competitor Analysis, the User Journey Map as well as an early prototype of the application. We will also determine if the communication process with the end user would be different by following each of the frameworks. By doing so, we will be able to see clearly how each framework affects the outcome of the User Research. Finally, we will compare the final results, analyze them and conclude if the JTBD methodology brings any benefits to the regular UX Design methodology.

The research method we are performing is a quasi-experimental one, since we are combining the use of descriptive methods to observe the similarities between the individuals who answered the survey, with an experimental framework to analyze the differences in results from both frameworks studied.

5.2. Survey

5.2.1. Description

Following the literature review, the first step in this research is to conduct a survey to better understand the way in which users utilize the public transportation system, the urban transportation mobile apps, and some of the problems they have encountered when doing so. This survey is just a preliminary study, and will not be considered as a compounded User Research or as a tool to understand current problems and determine plausible solutions.

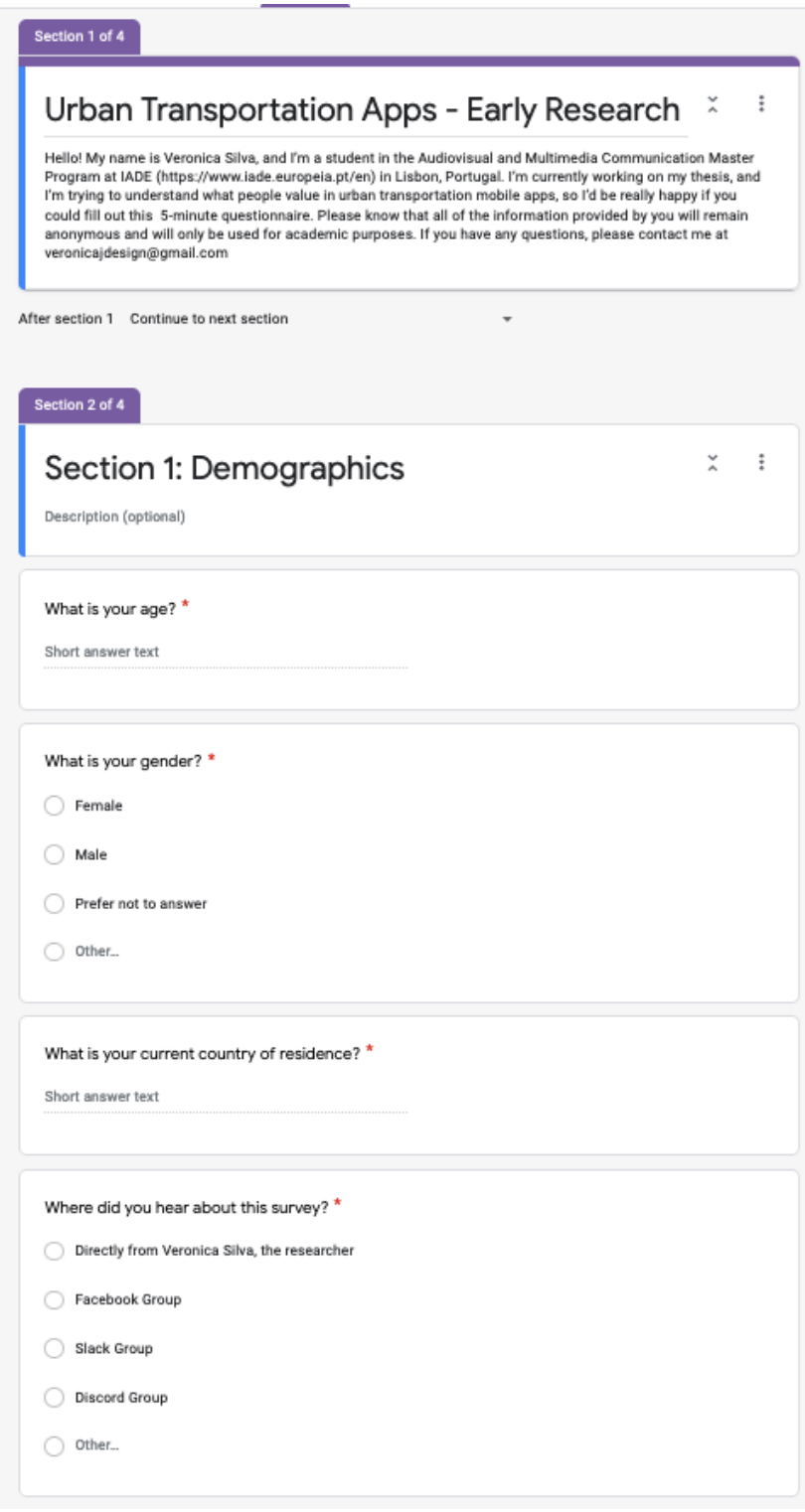
The survey was divided into 3 sections. The introduction explains the reason behind it, and it gives the contact information of the researcher in case any participant needs to do so. Section 1 focuses on demographic data, like age, gender, location, and the way in which they found out about this study. The data gathered in this section will not be a determinant when drafting the conclusion, it is meant to understand the research sample and as inspiration when creating the User Persona at the end of the research. Section 2 contains questions regarding the use of different transportation systems, while in their residence as well as when traveling, and the problems users have encountered during this process. Finally, section 3 focuses on the use of mobile apps, in general, and specific to urban transportation, as well as the features or characteristics that users value in mobile apps.

This separation into topics makes it easier to analyze the results, and it is also a way to create smaller blocks of information and avoid participants feeling overwhelmed and abandoning

the survey before finishing it. Below are screenshots of the survey in Google Forms. The full transcript can be found in Annex A at the end of this dissertation.

Figure 10

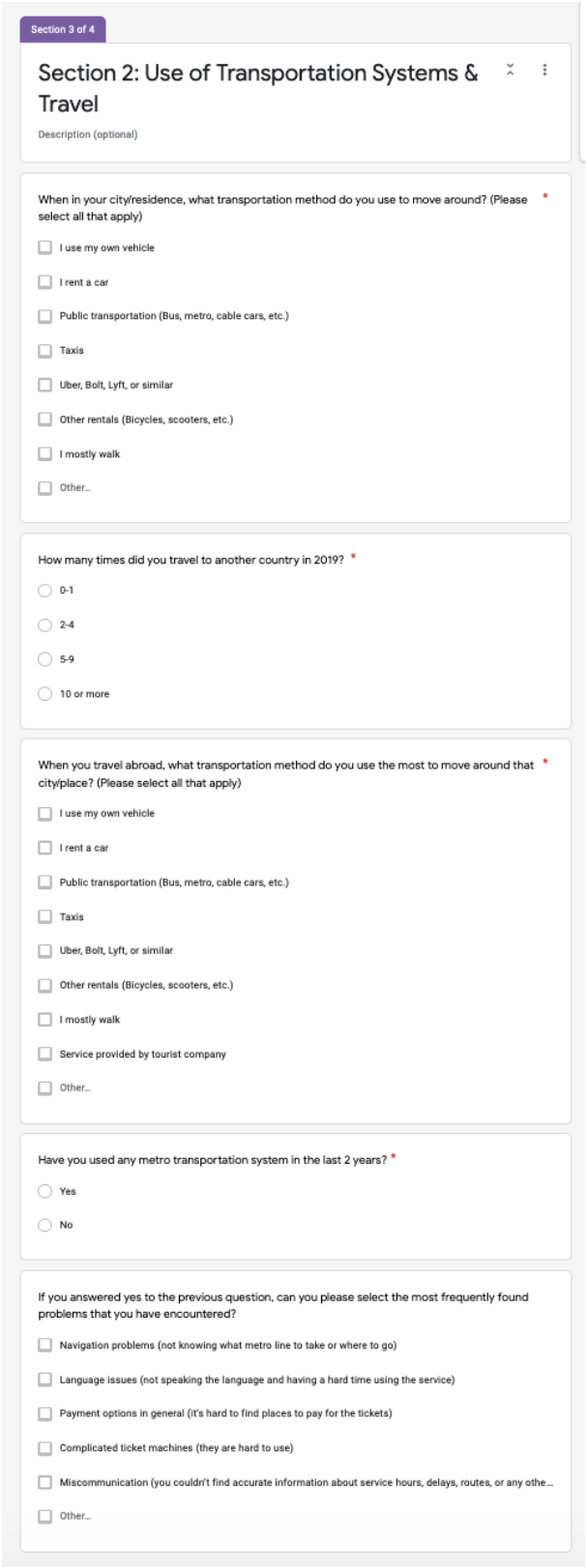
Survey: Introduction and Sectoin 1.



Note. Screenshot taken from the Survey shared online that show the Introduction and the Section 1.

Figure 11

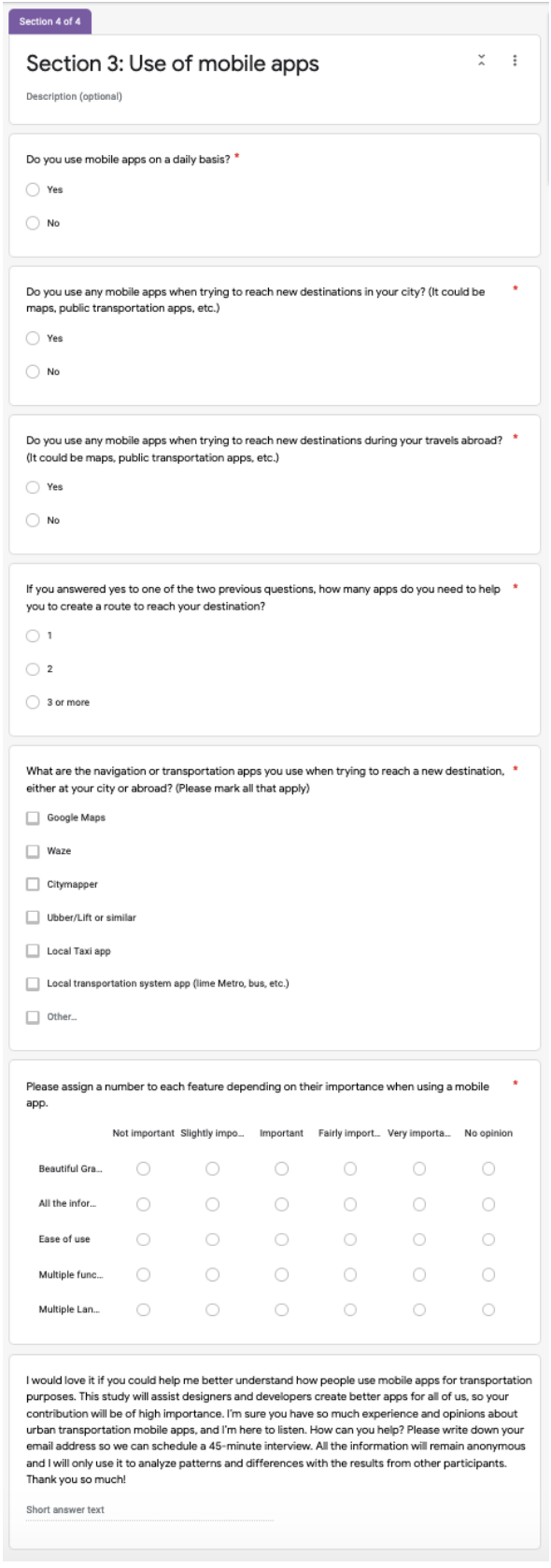
Survey: Section 2.



Note. Screenshot taken from the Survey shared online that show Section 2.

Figure 12

Survey: Section 3.



Note. Screenshot taken from the Survey shared online that show Section 3.

5.2.2. Sample Justification

For many years, researchers have used multiple survey methods to gather information for their studies, depending on the technology available to them at the moment. Some methods are more effective than others, but there are also specific factors that affect the response rates of surveys, such as length of the survey, assurance of confidentiality, interest in the research, among others. (Saleh et al., 2017) In an ideal scenario, we would use both online and offline resources to implement the survey, but the COVID-19 pandemic has limited our options, and that is why we decided to use Social Media and online communities to reach people, and not in-person techniques.

During 2020, a group of researchers from the New York University found that Social Media is in fact an effective method to collect data on a large scale during a short period of time (Ali et al., 2020). Their response rate was 2.8% of the total people reached, and from those who began answering the survey, 78.3% of them finished it. In this study performed by the NYU, Facebook Ads were used to promote it, but being this a school project with limited resources, we used an organic participation by reaching out to the Social Media groups in which the researcher is a part of, as well as her personal profiles.

The Social Media platforms used to share the survey were Facebook, Instagram, LinkedIn, Slack and Discord. According to a study made by the Pew Research Center earlier this year, (Auxier et al., 2021) Facebook, Linkedin and Instagram are in the top 5 of the online platforms currently being used by adults in the US, so we decided to utilize them to share the survey and increase the chances of people answering it.

Slack is a "channel-based messaging platform" (Slack, n.d.) used mostly in work environments, that also has private communities with shared interests. Discord is a "free voice, video, and text chat app" (Discord, n.d.) with invite-only spaces. Although both of these online platforms are less popular than Facebook or Instagram, Slack had about 12 million users in 2019, when their user figures were last updated[1], and Discord has 140 million users in 2021.

On the next page we present a list with the online groups and Social Media profiles used to share the link for the survey, with the number of contacts or group members for each one, as of June 6th, 2021.

1 Slack has not updated its daily active user figures since 2019. It had 10 million concurrents during the first coronavirus pandemic in April 2020." (Curry, 2021a)

Table 1

Sharing of the Online Survey

Type	Name	Number of Connections or Members
Personal Profiles	Facebook	826 connections
	Instagram	787 followers
	LinkedIn	532 followers
Facebook Groups	Female Digital Nomads	+68,000 members
	Digital Nomads Around the World	+142,000 members
	Women Who Travel	+150,000 members
	Digital Nomad Girls	+32,100 members
Slack Communities	Remote Year	2,478 members
	Remote Woman	4,578 members
	Better UX Community	4,544 members
	Remote POC	1,451 members
Discord Group	Design Buddies	19,392 members

Note. Channels where the Online Survey was shared, with the number of Connections or Members

In combination, and presuming that no members are part of more than one of the communities listed above, the total number of possible reached people is about 400,000. However, according to Vadivu (2015) the number of members in an online community does not determine the engagement rate, therefore the amount of people who will answer this survey is unknown and unpredictable.

The approach to the researcher's personal network was used because we expect people who know the researcher directly to be willing to answer the survey at higher rates. The Facebook groups were chosen because they have over 30,000 users, and the typical user is a target user for this study, which are people who travel abroad and use the public transportation systems.

The researcher identifies as a Digital Nomad[2], and that's the main reason she belongs to these groups on Facebook. Additionally, we expect to get a good insight on international use of urban transportation mobile applications, because according to Lee (2019), the transportation options and accessibility to a place is one of the highest priorities that Digital Nomads take into consideration when choosing places to work and live.

The Slack and Discord groups that we chose include our target user as well, or they are Design communities, and it's likely that they would be part of a UX Research survey and help a fellow Designer. In general, all of the groups utilized to share the survey have users from all over the world, from every gender and ethnicity. This mixture helps the study to be inclusive and to have a wide variety of respondents to ensure diversified data as a result. The information of the participants will remain anonymous at all times, and no personal information is asked besides age, gender and location.

Additionally, the researcher has an international profile because she has studied abroad in 2 countries, and during 2017 and 2018 she lived in 10 different countries and had access to a large network of people who work remotely and travel as a lifestyle. The contact with this specific segment of the world population, as well as the experiences lived across the globe, influenced the researcher's view about products and their possibility to be used across borders, not only physical but linguistic and cultural as well. For that reason, this project and the research objects maintain an international nature to them.

5.2.3. Survey Justification

Regarding the survey, on the first section, when asking for the gender, non-binary options were given as well as the choice of not respoonding to the question, because some people might find this information too sensitive and personal, therefore we tried to avoid making them feel uncomfortable. The data gathered in this first section will only give statistical data about the participants, and serves as an insight on the research pool.

The second section was designed to understand how often people travel abroad, how often they use the metro system and the issues they have encountered while using it, as well as what type of transportation systems they use when traveling and at home. On question number 8, the time set is 2 years, because the global pandemic has brought travel restrictions for more people, and not many have been able to travel as usual. During non-pandemic times, the time would be set between 6 months and 1 year. We understand it is recommended to give a short

2 "Digital nomads are people who are location-independent and use technology to perform their job, living a nomadic lifestyle." (Hayes, 2021)

time frame when making these types of questions, but given the circumstances we believed this was the best option to perform this specific question.

Question 5 gives the participant common issues that they might encounter when using the Metro, but it also gives them an open space for them to present other problems that we may have not thought about, and enrich this research. Question 6 has a specific year because that was still a typical year for most people before COVID-19; under different circumstances, we would ask them their travel frequency during the last 12 months. Questions 7 and 9 follow the same format as question 5, giving the participants a variety of possible answers but allowing them to offer other options.

The last section was built to gather information on mobile application usage, as well as types of apps used and what features do people prefer. By asking similar questions about habits while being in their city of residence and while traveling, we can study if there are major differences, and determine if people need additional features of applications when traveling abroad. These questions will just give us a raw idea about what people prefer, and after selecting the participants we can go more in-depth during the interview process and understand why people like or dislike such features in mobile apps.

The reason this survey was kept only with closed questions is that people tend to get overwhelmed if they see open questions and they might not respond to them. The participants who decide to go into the interview process may be more willing to answer longer questions, and that way we can obtain rich data in both the survey and the interviews.

Regarding the selection of the participants to continue to the next step, the interview process, they had to answer “yes” to questions 8 & 10, so they could have a fresh memory about the use of mobile applications as well as the metro system. By doing so, we ensure that the participants would fall into our target audience. We did not use age, gender, and location as determinant factors when choosing the participants, as we intended to preserve a balance and diversity among the participants.

5.3. Interview

After releasing the survey, we waited 10 days for people to submit their responses. Next, we gathered the data, organized it and did an analysis of the responses. Afterwards, we decided who would participate in the interview process and contacted them via email. Following the responses, we proceeded to split the participants into two groups, while taking into consideration age groups and location, to ensure diversity in both groups. One of the sets participated in the UX interview model, and the other one was part of the JTBD

interview approach. In view of the fact that the COVID-19 pandemic was still a health hazard worldwide at the moment of this research, and because the respondents of the survey live in different parts of the world, all of the interviews were performed online and recorded with the authorization of the participants in order to have a permanent record that will allow us to analyze the information in a thorough manner during the next phase of the research.

The introduction of the interviews was the same for both frameworks, and it was meant to give the participants some comfort and make them feel in a friendly environment so they could share their insights more freely. Below is the introductory part for both interview models.

> Hi (name), thank you for taking the time to share your experience with me. I'd love to know more about your experience with urban transportation mobile apps. As part of the research for my thesis, I've scheduled a couple of interviews with other people like you to hear their stories. My role here is to ask questions and listen. Please be 100% honest, as there is no right or wrong answer here. If you can't remember something that's ok. I'd like to finish this interview in 45 minutes if possible.
> Do you need to stop at this time or is it ok if we go on for a couple more minutes?
> Would you be comfortable if I recorded our conversation, so I don't need to take notes and instead be able to listen actively to you? Ok, I will press the record button now.
>
> (Start recording)
>
> Please feel free to give me as much detail as possible. These questions are very casual, and I hope you enjoy the conversation.

5.3.1. UX Interview

This is the UX interview script used during the research, based on common UX interviews and adapted to urban transportation mobile apps.

> **Background (Demographics)**
> Please tell me about yourself.
> (If they don't say it, ask about their age, location, occupation)
>
> **General use of mobile apps**
> Please describe to me your daily habits with mobile apps (morning, afternoon, evening, night, at work, etc.)
> Which is your favorite app? What do you like and dislike about it?
> Which is the app you use the most? What do you like and dislike about it?

Use of urban transportation apps

In your survey, you mentioned that you use "these" urban transportation apps. Which one do you prefer and why?

When you use these apps, can you do everything you want in there or do you have to switch apps to finish your task?

When you travel abroad, do you use the same mobile apps? Please explain.

Tasks

Let's choose one app from the urban transportation apps you use. For example, "name".

Can you walk me through the tasks you perform in the app?

Is there another app you have or you use that has the same functions? If yes, why do you use this one and not the other?

Pain Points

Is it hard or easy to use this app? Please explain.

Have you found any problems with the navigation? (That you can't find an item or the menu is confusing, etc.)

Can you recall if you've encountered any problems with the language of a mobile app? For example, the language you speak is not available or the terminology is confusing.

Have you had any problems with the payments inside a mobile app?

Is there anything else you want to add or something I did not ask that you want to share with us?

The UX interview script was based on other common scripts for user interviews, but the structure was built following the sample from the Interaction Design Foundation (2019) and adapted to this specific study with slight modifications. The format is semi-structured as we wish to encourage participants to converse in the most natural way possible and obtain as much qualitative information as we can.

The first section of the UX interview, Background (Demographics), was built to obtain demographic information about the person being interviewed. The opening question has the purpose of "kickstart the conversation and move to the main interview" (Qu, 2011). It also helps the person being interviewed get comfortable and be more open when answering the next questions. After that comes a note for the interviewer so they make sure to ask about this information in case the participant did not provide it. This is set up as a reminder instead of specific questions because the interview is semi-structured. The information gathered during this first moment of the interview will be useful to create User Personas later on. According to Mulder (2006), some of the segmentation options to create user personas are goals, behaviors, attitudes and demographics. We will be using demographics.

The second section, General use of mobile apps, intends to acquire data about the way people use mobile apps in their daily routine. In order to obtain information about how people use mobile apps on a regular basis, we will ask them to describe their routine and their use of mobile apps. On question number 3, when people think about their routines, they can remember things easily instead of making up answers that they believe the researcher wants to hear. In addition, by asking them about habits, we automatically leave out the exceptional behavior about mobile apps that they might have. With question number 4 we are trying to get insights on characteristics or functionalities that people have problems with. By asking them about their likes and dislikes, we hope to get the most authentic information possible. What do you like and dislike about it? Same as above, with question 5 we are looking to get valuable information about things that might work or not work for the user. Questions 4 & 5 are separate because some people may use an app out of need, and not because they like it, so this can help us obtain a better idea about the user experience.

The third section, Use of urban transportation apps, will let us understand how people use urban transportation apps, both at home and while traveling. Question 6 is narrowed down to specifically urban transportation mobile apps, as it is the study subject of this research. If people have installed different apps that do a similar job, we want to understand why they might have a preference towards a specific one. In question 7, instead of asking what features users need or want, we ask for real-life situations in which they needed additional features that the app they were using did not have, therefore they had to switch to another app. The objective of question eight is to find out if people use apps by habit, or if they research before going to a new place if there is a better app to use there. We also want to get information about apps that work well in an international environment, since our study subjects come from different nationalities and backgrounds.

The fourth section, Tasks, is a very short user testing exercise, which will allow us to better understand how people use the apps. On question 9, with this small exercise, we want to understand the user's journey from their perspective, and with a specific app in mind, it is easier for them to remember exactly what steps they follow when using it. In question 10, we want to know why users prefer one app instead of another one and understand what factors people value besides functionality.

The fifth and final section, Pain Points, lets us go further into the experience of the user and allow them to express any problems they have found while using the mobile apps discussed during the interview. Question 11 will help us know more about the pain points the user is having, without asking directly. This way, it is more probable that we get veridic information instead of a random answer just to please the researcher. Questions 12 through 14 ask about specific problems that the user might encounter. If they already mentioned any of these

problems during the previous question, the researcher could ask to give additional information or ask about specifics. The questions are broken down into individual questions instead of having a general one about problems, this way we aim to obtain more insights. Finally, question 15 intends to give closure to the interview, and get information that perhaps we did not think about and the participant remembered during the interrogation.

5.3.2. JTBD Interview

The JTBD interview script is based on Klement's script (2014) with slight changes. Unlike the UX interview, we did not alter the sections because this framework is fairly new, and we intend to obtain the insights that JTBD is built on. Below is the interview script.

Background (Psychographics)
Please tell me about yourself.
Please tell me about your lifestyle/ way of living.

The Point of Purchase
In your survey, you mentioned you use "these" apps. Do you remember which one you downloaded last? Where were you? Were you with someone?
Did you download other apps at the same time, or just this one?
Were you doing something else at the same time?

The first thought
When did you first realize you needed to download this app?
Were you with someone? What did they say?
Where were you?
Were you doing something else at the moment?

Building the consideration
What was going on in your life that led you to consider downloading this app?
How did you start looking for solutions to this problem?
What led you to this specific app?

Deciding
When you found out about this app, what made you feel confident about using it?
Did anyone recommend it to you?
Did you have any anxiety about the purchase, or the use of the app? Did you hear something about the app that made you nervous? What was it? Why did it make you nervous?
Before downloading it, did you imagine what it would be like to use this app?
Is there anything else you want to add or something I did not ask that you want to share with us?

The first section, Background (Psychographics), is similar to the one in the UX interview, but the main difference is that with the JTBD framework, demographic information is not important, and the focus is on lifestyle, emotions, way of thinking, etc. The first question helps start the interview and get the participant comfortable. The second question would help us understand the user better, but the information will not be used, unlike the UX interview.

Section 2, The Point of Purchase, was intended to gather information regarding the moment when the user purchases the product, or in this case, when the participants downloaded their urban transportation app. We decided to begin at the end of the Timeline (Klement, 2018), from the Jobs-as-Progress Model, because it might be easier for people to remember the most recent events, instead of the beginning, and from there we can construct the rest of the happenings. Question 4 can help us understand if people were trying different solutions or if they had a specific app in mind. With question 5, we want to understand if there were external influences that brought the participant to download the application.

Section 3, The first thought, explores the thought process of the user when they were looking for a solution. Question 6 can help us know how the participant thought about giving a solution to their problem. Same as question number 5, with question 7 we can learn if somebody else was an influence when making this decision. Environmental circumstances can have an influence when making a decision, so we want to learn more about that with question 8. Finally, question 9 can help us learn if the thought about getting this app was motivated by another event, or if it was considered at the same time as other solutions.

In section 4, Building the consideration, we aim to analyze what events or changes in their life pushed them to look for solutions for their problems. Inquiry number 10 is directly related to the “push” forces explained in “the forces of progress” diagram in chapter II of this work. People wouldn’t understand if we ask them directly what are the demand forces that shaped their decision, but most likely they would remember an event or series of events that led them to consider a solution for their problem. With question 11 we want to dig more into the user Timeline, explained in chapter 2 of this work, so we can get a better understanding of the jump from passive looking to active looking in the user’s journey. Question 12 would help us get more detail about the influences that the participant had in order to choose a product among other alternatives.

The final section, Deciding, goes into detail regarding the fears and anxieties that people might have had before downloading or using the app, as well as the reasons why they decided to download it or use it. With question 13, we would like to get an insight into the “pulling forces” that are part of the “forces of progress” diagram, explained in chapter II of this work. In the JTBD framework, it’s important to understand the motives that people had when

choosing a solution for their problem, and many times they come from another person, so we want to understand that influence with question 14. One of the “demand reduction” forces (part of “the forces of progress” diagram, explained in chapter II of this work) is anxiety, and the study of this phenomenon is one of the distinct characteristics of the JTBD framework. Other methods do not consider the user’s anxiety as one of the competitors of the solution chosen, so it is really important that we ask this in question 15. One of the concepts that the JTBD framework is built on is the belief that people are always trying to transform their current situation into a preferred one (Klement, 2018), and people usually imagine what that new state would be like, so question 16 would help us understand better what the participant was trying to achieve, or in other words, what was the job they wanted to get done. Is there anything else you want to add or something I did not ask that you want to share with us? Just as the UX interview, question 17 intends to give closure to the interview, and get information that perhaps we did not think about and the participant remembered during the interrogation.

Chapter 6

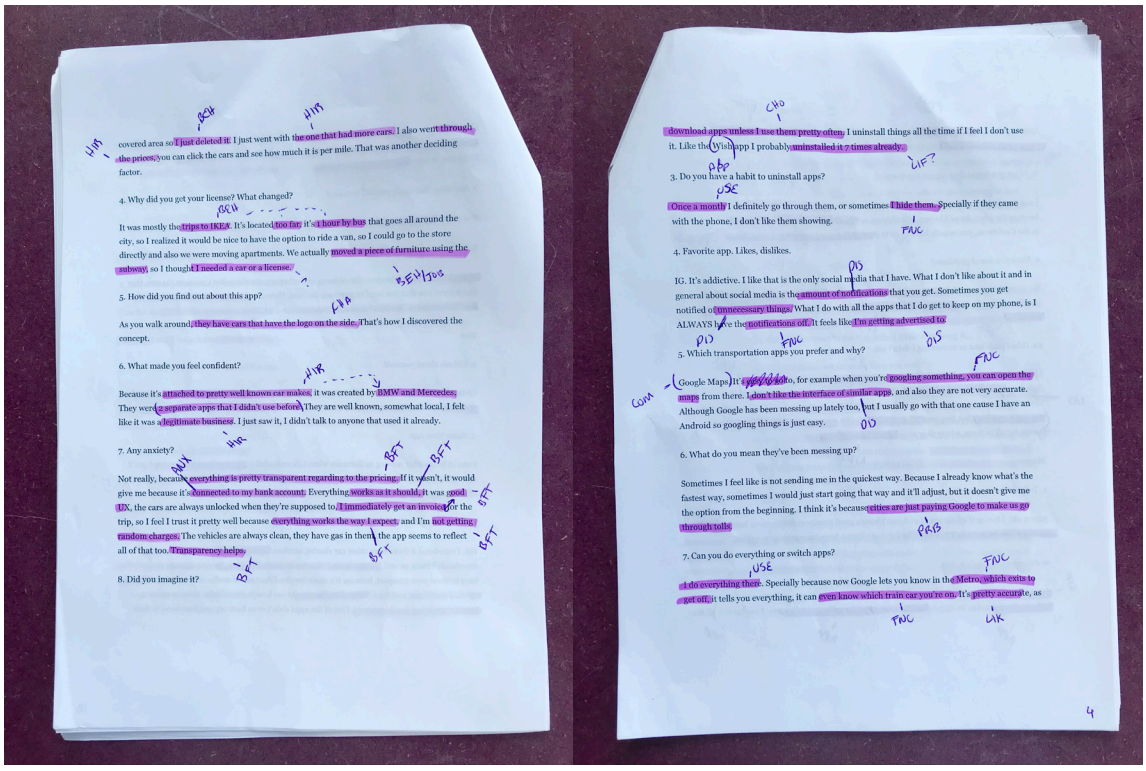
6. RESULTS

In this chapter, we will discuss the results from the survey and from both models of the interview. In general, the response of the participants was very positive and everyone seemed interested to participate in this research. The data collected during the survey was a little unexpected in some of the questions, that we will explain in detail further down. Because the survey was made using Google Forms, we were able to export the responses into an Excel spreadsheet, and that way we created the graphs shown below. The styling of each of the graphs was made using Adobe Illustrator.

For each of the interview models, we created different categories using the content analysis technique, to organize the information, that afterwards we analyze to draw conclusions and apply those insights. As mentioned before, all of the interviews were transcribed and keywords were obtained from the text. The differences when organizing the information were the codes established and the different categories being used. The images below show the transcribed surveys and highlighted keywords with their corresponding code, for both interview methods.

Figure 13

Interview transcripts



Note. Pictures of the interview transcripts after highlighting the keywords and writing notes that would facilitate the creation of categories to organize the data.

6.1. Survey

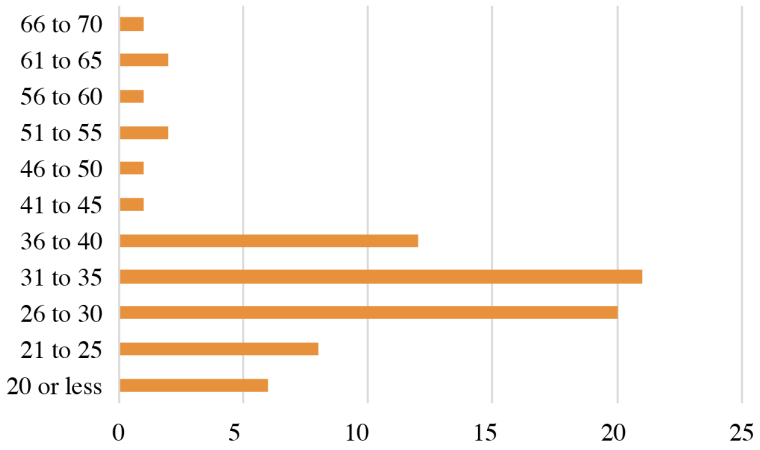
The link to the online survey was shared in the social media platforms in which the author is part of. At the beginning of this research it was intended to reach out to as many people as possible using personal profiles, Facebook groups, Slack communities and Discord. The link to the survey was only published in the author's personal profiles as well as Slack communities and the Discord group. Unfortunately, the Facebook groups did not allow us to share the link with their community. For that reason, we were only able to reach a smaller number of people we originally intended. Even though this was a huge setback, in total we got 75 answers for the survey during a period of 10 days. The survey was opened for submissions on the 28th of June, 2021 at 12:00 pm WEST time, and it was closed on the 8th of July, 2021 at 12:00 pm WEST time.

Regarding demographics, the results obtained from the survey showed that 53 of the participants are between 26 and 40 years old (Figure 14). In addition, 52 of the respondents are female and 23 are male (Figure 15), and most of them are based in the United States. The second country with the most participants was Mexico, followed by Portugal. (Figure 16) The answers reveal as well that 42 of the people who answered the survey heard about the project directly from the researcher, and the rest knew about it through Social Media channels or referrals from people who knew the author. (Figure 17)

From this data, we may assume that people are more willing to answer surveys and offer their help when they know the person directly or when someone else asks them to do it, like in the case of referrals. For this reason most of the participants that filled out the survey fall into that age category as well as the location because those are the group ages that the author has most contact with in real life. We believe that if the Facebook groups had allowed us to share the link with their communities, the variety and the number of participants could have been even greater.

Figure 14

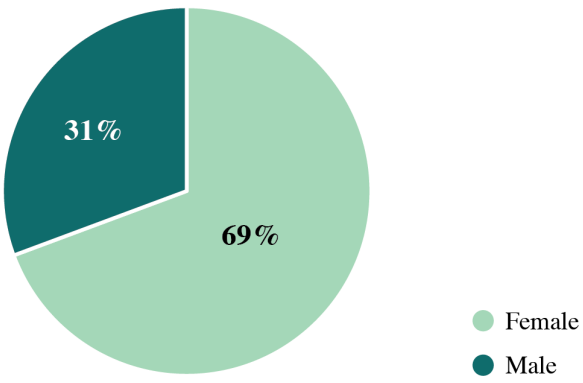
Question 1: What is your age?



Note. Graph that shows the survey participant's age.

Figure 15

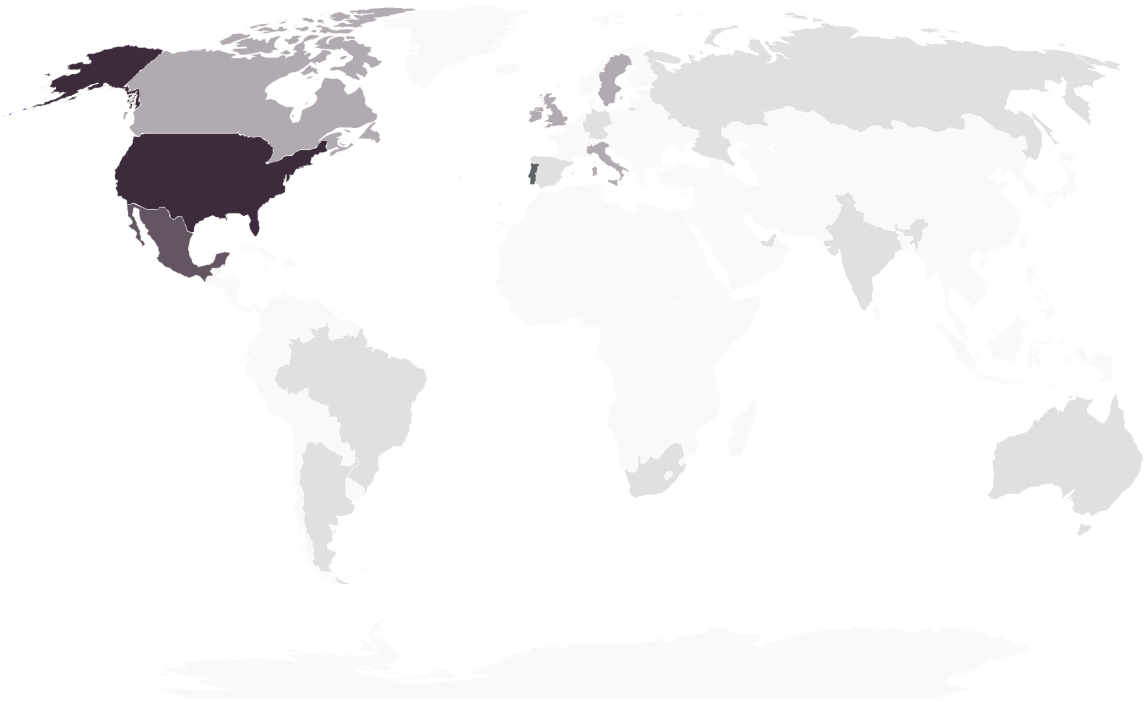
Question 2: What is your gender?



Note. Graph that shows the survey participant's gender.

Figure 16

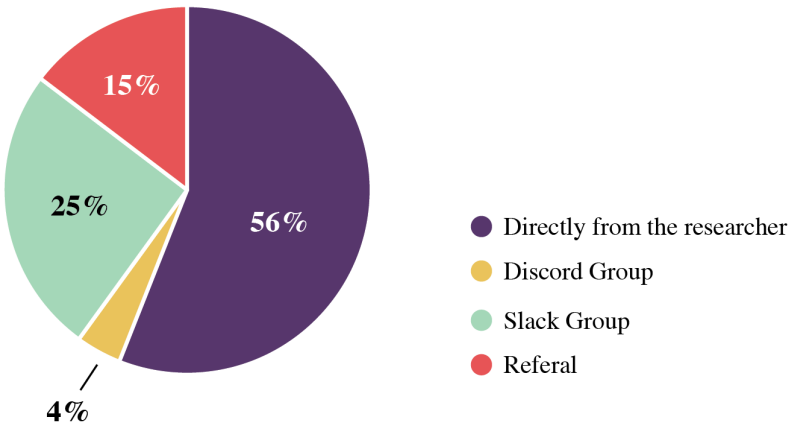
Question 3: What is your current country of residence?



Note. Map that shows the country of residence of the participants

Figure 17

Question 4: Where did you hear about this survey?

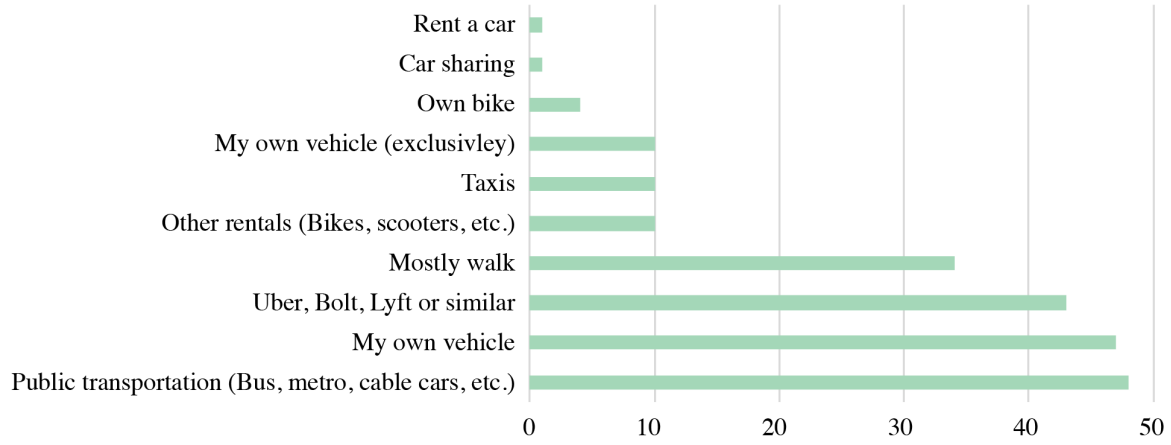


Note. Graph illustrating the way in which participants found out about the survey

In figure 18 we can observe that the most used transportation method while being in their hometown is public transportation, which includes busses, metro systems or cable cars. The second method most used is the private vehicle followed by services like Uber, Bolt, Lyft or similar. There are also a good amount of people that walk instead of using any other services. The minority of the participants rent a car or use a car-sharing service when they are in their hometown, or use a bike as a transportation method. This low number might have to do with the fact that not all the cities are equipped with bike lanes or the distances might be too long in order for users to use a bicycle to move around. Of the people that use their own vehicle, 10 people use it exclusively and the rest use their car in combination with another transportation system. This insight is a little surprising because we had assumed that people who use their own vehicle usually do not require another transportation method to move around, but this means that people are actually looking for more than one option when it comes to their transportation needs being met. This fact needs to be acknowledged not only by app developers or designers but by the cities themselves, so more options can be offered to the public.

Figure 18

Question 5: When in your city/residence, what transportation method do you use to move around?

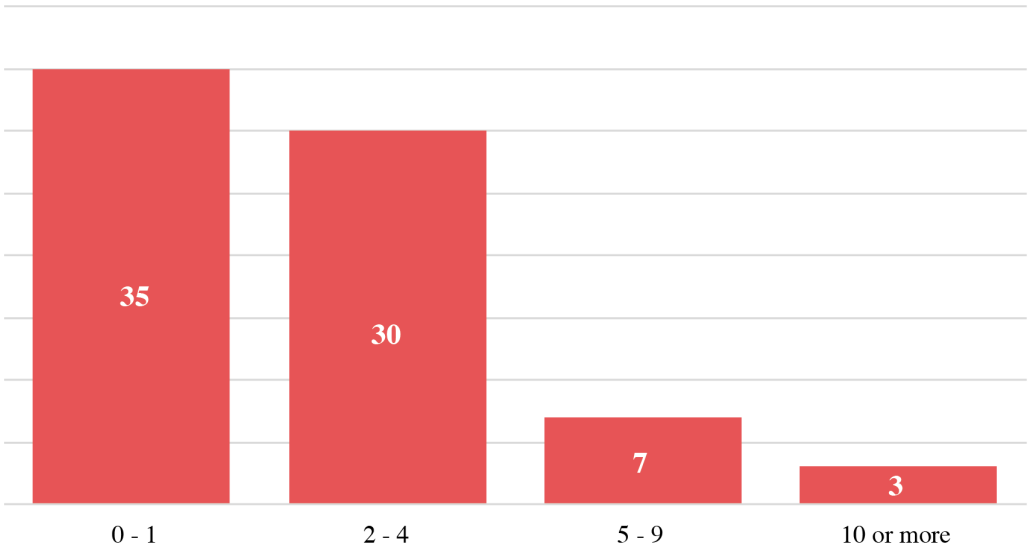


Note. Graph that shows the most common transportation methods participants use when they are in their usual residence

Figure 19 shows that only the minority of the participants had traveled five times or more during 2019 (which is considered a "normal" year, because it was before the COVID-19 pandemic started). Despite the fact that many of the author's network come from online digital nomad communities, not everyone was able to travel as much. However, this gave us the opportunity to interview and gather insights from people that do travel as well as people who do not travel at all or travel very little. This way we can design a product that can serve both travelers and non-travelers in the best way possible.

Figure 19

Question 6: How many times did you travel to another country in 2019?

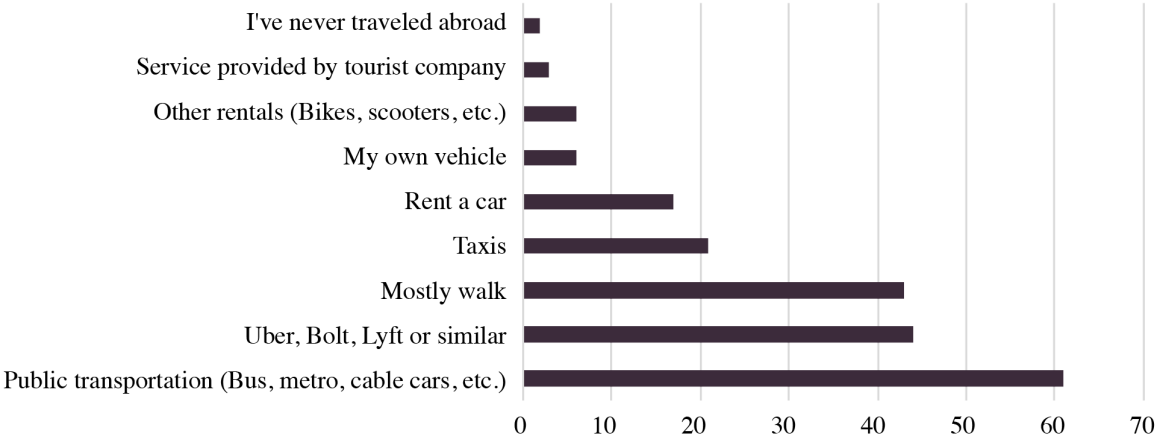


Note. Graph that illustrates the travel frequency of the participants during 2019

Figure 20 gave us interesting insights as well because we learned that 61 of the participants use public transportation when they are traveling. Some of them also use services like Uber, Bolt, Lyft or similar, or walk around. Two people replied that they have never traveled abroad and that is a mistake on our part, because we wrote down in the question “abroad”, and did not allow the participants to give us insights when they are traveling inside their own country.

Figure 20

Question 7: When you travel abroad, what transportation method do you use the most to move around that city/place?

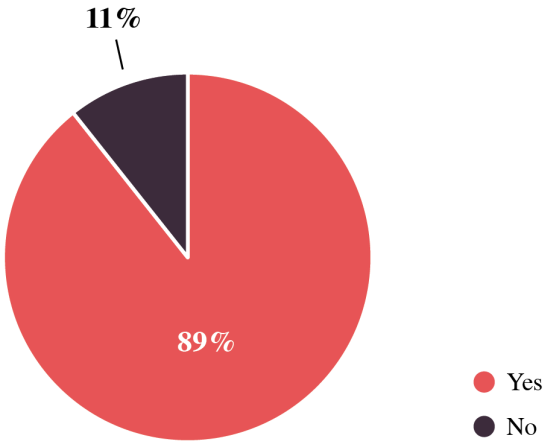


Note. Graph showing the main transportation methods that participants utilize when they travel abroad.

Figure 21 is a representation of the amount of people who have used any type of metro system during the last two years. Only 11% of the participants haven’t used the system, and this was also a surprise because 47 participants said that they use their own vehicle, so it is interesting to see that even though they have a private method of transportation they also use the Metro system. This is a positive insight for us because it shows that an updated urban transportation app would actually be a really good addition to people’s current lifestyle.

Figure 21

Question 8: Have you used any metro transportation system in the last 2 years?

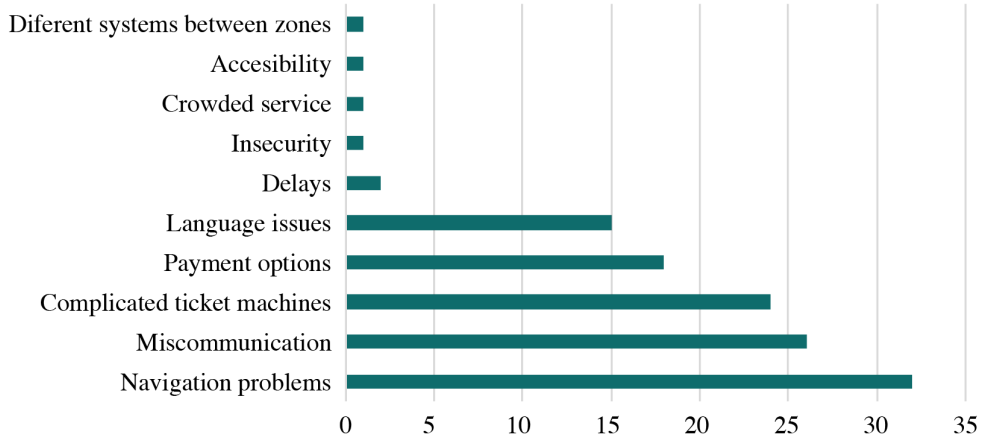


Note. Graph that shows that most of the participants have used the metro system in the past 2 years

In figure 22 we can see one of the most common issues that people have encountered when using the metro transportation system, is navigation problems. This means that they do not know which way to go or what train to take in order to arrive at their destination. Second, we have miscommunication, and this is something that can be fixed across all the channels, not only through a mobile application. We can use the signs inside the stations as well as any other touch points like websites or any customer service that is available to them. Many of the participants also have problems with the ticket machines, as well as payment options and language issues. All of these three problems can be solved with functionalities of a mobile app, like offering users the option to pay through the app, as well as more than one language available for their convenience. There were other issues that we did not list in the survey that the respondents gave us. Like service delays, insecurity, crowded service, accessibility and different systems between zones. While we cannot address these problems directly because the service providers are in charge of that, the mobile app that we intend to design can help users know about the issues beforehand so they can take some measures when using the service. For example, we can let them know about the running times, if there are any delays in the service, which stations are accessible for wheelchairs or strollers, how crowded the service is (just as Google maps does it already for example) or what is the level of security in different zones or different subway stations. These features can be very useful in countries where security is an issue, and also for female solo travelers who need to know if they will be safe or not during their commute.

Figure 22

Question 9: If you answered yes to the previous question, can you please select the most frequently found problems that you have encountered?

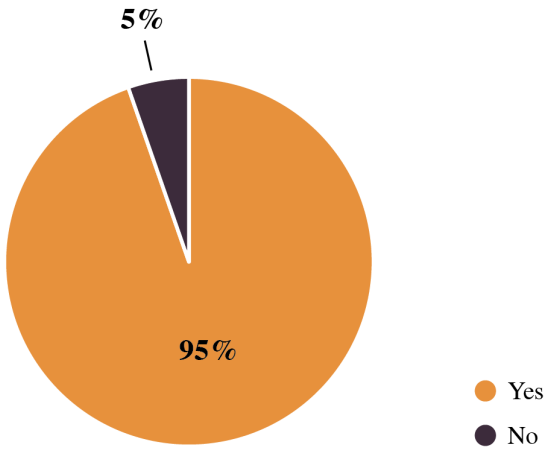


Note. Graph that illustrates the most common issues that people have encountered when using the metro system.

In figure 23 we can appreciate the results that we obtain when asking if users utilize mobile apps on a daily basis. The results were also a bit of a surprise since we had assumed that most of the people who would reply to the survey would use their phone every single day. It is interesting to see how despite the level of technology around us, there are still 4 people who can be off-line, or away from their phone, at least for some days.

Figure 23

Question 10: Do you use mobile apps on a daily basis?

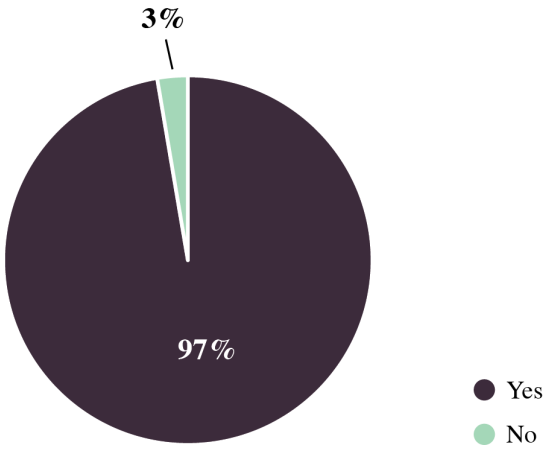


Note. Graph showing how the majority of participants (95%) use mobile apps daily.

Figures 24 and 25 show the amount of people that use mobile apps when they are trying to reach a new destination either at their residence or when traveling. The vast majority of them said yes, with 97% and 95% responses respectively. Only 3% of them do not use the apps when they are in their hometown, and 5% when they are traveling. We had anticipated that the people who do not use the mobile apps in their hometown will be greater, because we can assume that people already know the city where they live, so this insight is extremely important for this research, because it shows that we can also serve a lot of people who do not travel, but that need a mobile application to move around in their city.

Figure 24

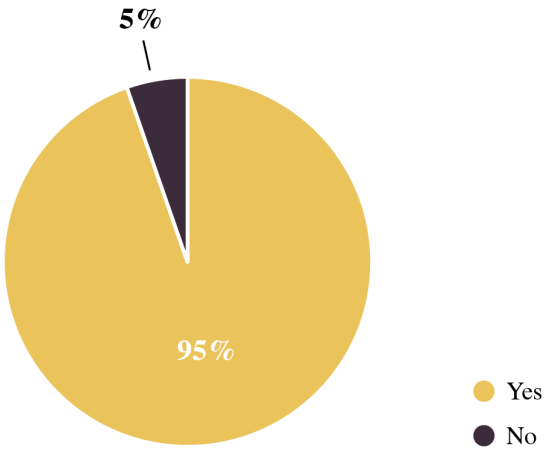
Question 11: Do you use any mobile apps when trying to reach new destinations in your city?



Note. Graph that illustrates that most of the participants use a mobile application when trying to reach a new destination when they are in their place of residence

Figure 25

Question 12: Do you use any mobile apps when trying to reach new destinations during your travels abroad?

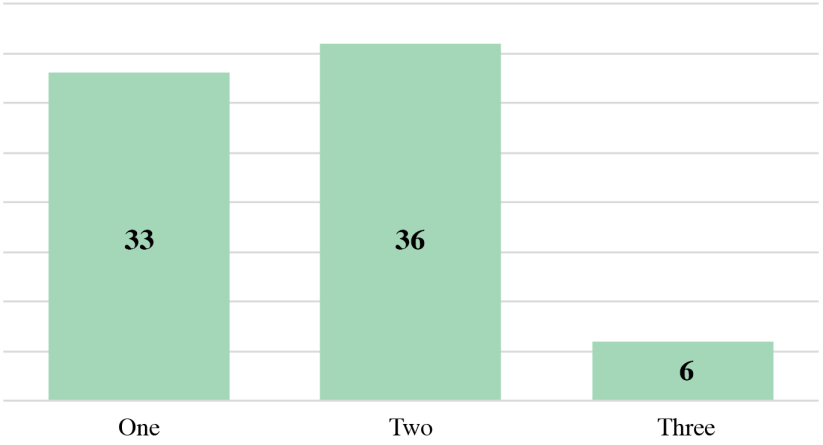


Note. Graph that shows that the majority of the participants use a mobile application when trying to arrive to a new place when they are traveling

In figure 26 we can appreciate the results that tell us how many mobile applications users need when they are trying to reach a new destination. 6 of them need three applications, while 36 use two mobile applications, and 33 of them use only one. This is a huge indicator that the mobile applications that people currently use do not satisfy all of their needs, and they are forced to combine products or solutions in order to solve the problem. This may be a sign that the typical UX research has not been done correctly by the agencies who developed the mobile applications, and therefore there are user needs that have not been addressed yet. This issue is a problem in HCD, because the user needs are supposed to be at the center of the entire design process.

Figure 26

Question 13: If you answered yes to one of the two previous questions, how many apps do you need to help you to create a route to reach your destination?

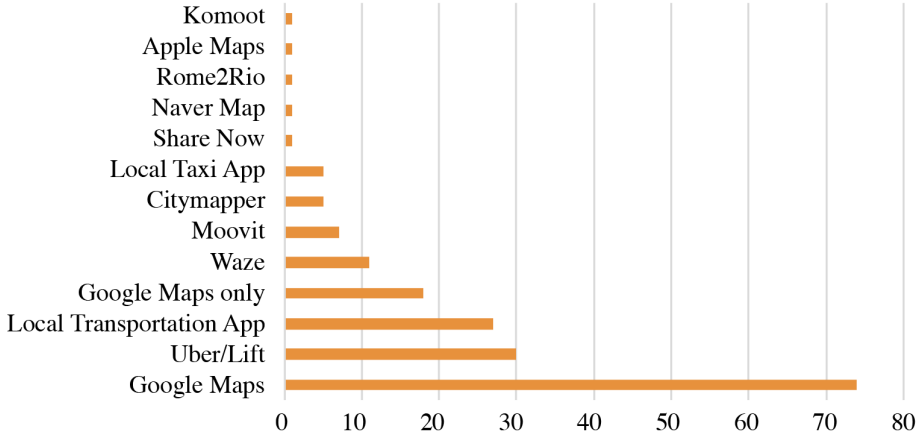


Note. Graph illustrating the amount of mobile applications participants need when trying to arrive to a new place

In figure 27 we can see a list of the main urban transportation mobile apps that users utilize in their daily lives. The one that has the most votes by far is Google Maps. Many of the people who answer the survey use Google Maps in combination with another mobile app. It is important that we understand which service people use so we can study what tasks they perform inside the app, as well as what functions they already know and use (for example, the level of crowdedness inside a public transportation system), regardless if the app to be designed is not 100% similar.

Figure 27

Question 14: What are the navigation or transportation apps you use when trying to reach a new destination, either at your city or abroad?



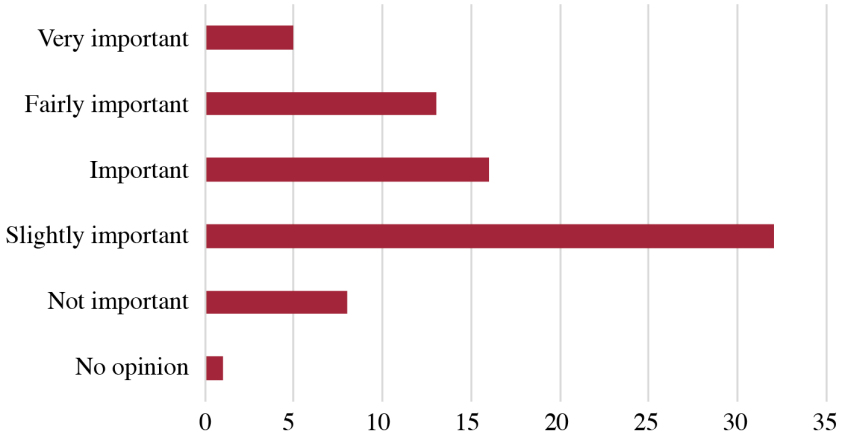
Note. Graph showing what mobile applications participants need when trying to arrive to a new place

In the last set of questions we asked the respondents to tell us how important it is for them to have certain features in their mobile applications. For example, in figure 28 we can see that the beautiful graphics are slightly important while, in figure 29, the data shows that having all of the information in one screen is important. With this insight, we can come to the conclusion that many of the current mobile applications in the market, with a vast amount of illustrations and visuals, are actually not satisfying user needs if they do not have other basic requirements. This information will be very useful when creating the wireframe of our mobile application later on.

Question 15: Please assign a number to each feature depending on their importance when using a mobile app. (Following 5 graphs)

Figure 28

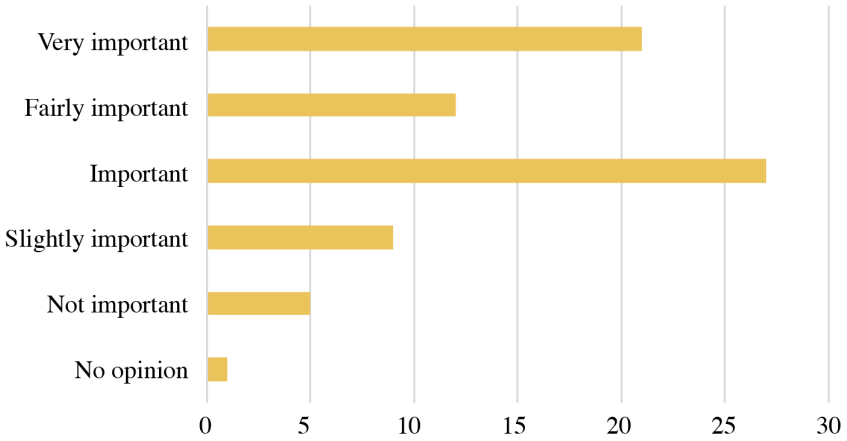
Importance of beautiful graphics



Note. Graph showing what importance participants give to beautiful graphics in mobile apps.

Figure 29

Importance of having all the information on one screen

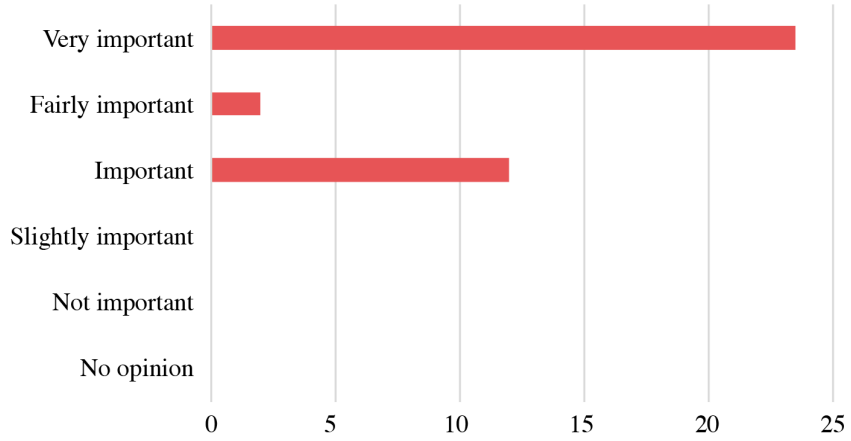


Note. Graph showing what importance participants give to having all the information they need on one screen when using mobile apps.

In figure 30 we can clearly observe that everyone thinks that the ease of use of the mobile application is important. Nobody answered that it is not important. This is a basic principle in HCD, and it should be a guiding axis when it comes to designing any mobile application or any product using the UX design methodology. This principle might seem very clear and obvious, but if we analyze the current products in the market, many of them are not as simple or as easy to use. We can also observe that the older generations are having trouble adapting to new technologies, because of this same issue.

Figure 30

Importance of ease of use

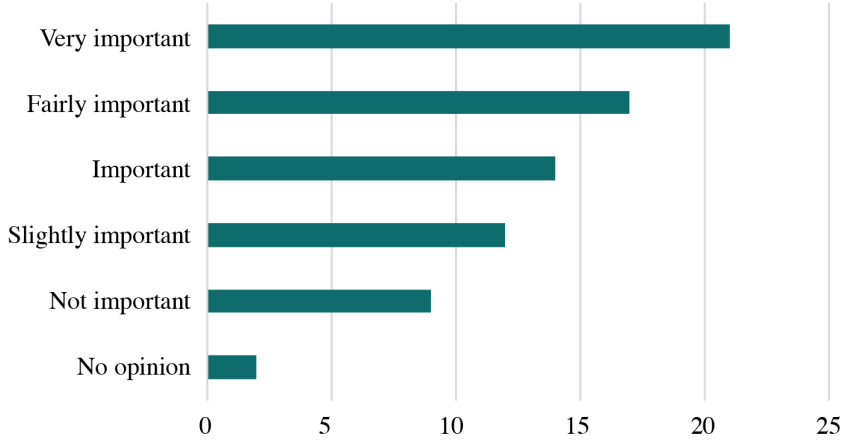


Note. Graph showing what importance participants give to ease of use in mobile apps

In figure 31 we can appreciate that 52 people believe that it is either very important, fairly important or important that mobile apps have multiple functionalities, but almost 15 people think that it's not important at all. Lastly, figure 32 shows that 25 people believe that it is important to have multiple languages available in a mobile app. This answer might change if the population being researched did not travel abroad frequently and the mobile applications they use are available in their native language.

Figure 31

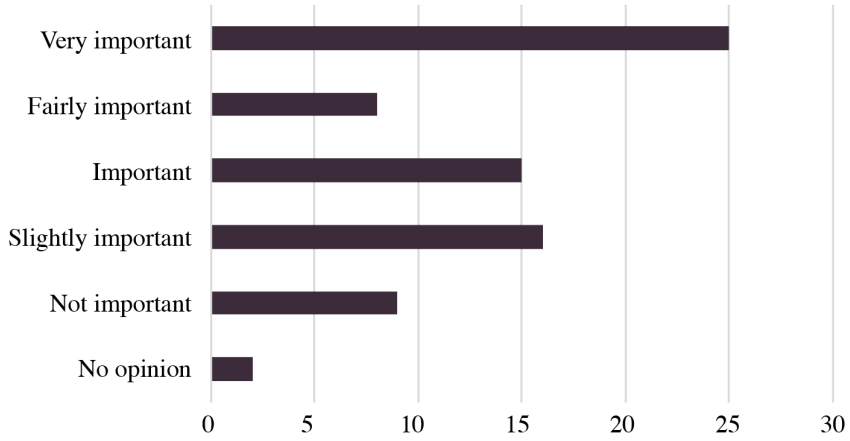
Importance of multiple functionalities



Note. Graph showing what importance participants give to multiple functionalities in mobile apps

Figure 32

Importance of multiple languages



Note. Graph showing what importance participants give to multiple languages in mobile apps

As a summary we can say that most of the participants were between 26 and 40 years old, mostly female and living in the United States of America, and were contacted directly from the researcher. Also most of them use any type of public transportation to move around either at home or when traveling. The majority of them travel only one time per year or less, and even though many of them use their own vehicle, they combine it with other transportation systems. In general, the most encountered problems when using the metro are navigation problems, miscommunication, complicated ticket machines, payment options and language issues. Not everyone uses mobile apps on a daily basis, but most of the participants use them when they are trying to reach a new destination either at home or when traveling. The urban transportation app most used is Google Maps. The features that are most important for users are having all of the information in one screen, ease-of-use and multiple functionalities.
We will use all of these insights when it comes to creating the User Persona as well as the wireframes and competitor analysis in the next chapter of this work.

6.2. UX Interview Results

The information of the people selected for the UX Interview is shown in the table below. We tried to maintain a balance of gender, age and location, in order to obtain diverse insights.

Table 2

UX interview participants

Age	Gender	Location
21	F	Portugal
28	M	USA
30	M	Mxico
30	F	USA
31	M	Portugal
33	F	Mexico
36	F	Canada
39	F	USA
64	M	USA

Note. Table containing the Age, Gender and Location of the participants from the UX interview group

After highlighting the keywords in the transcripts we followed the content analysis technique to group the words into categories. To analyze the information obtained during the UX Interview process, we used an *emergent coding* approach, while in the JTBD process we utilized the *a priori coding* (Stemler, 2000). In general, during the UX Methodology, researches come up with the categories after analyzing the data and depending on the nature of the project. For that reason, we decided to follow the same approach. However, since the JTDB framework is fairly new, and there are specific categories and guidelines, we used the *a priori coding* technique, that we explain in further detail in the JTBD Interview Results section. Below are the categories for the UX Interview data:

1. LIF: Lifestyle. The information obtained in this category can help us build the user personas. It is not a determinant factor in the behavior of the user, but it helps to build empathy with the prospect user.
2. USE: Use of technology (specifically mobile apps). We want to understand how people currently use their phone, and what are the main tasks they perform. As we kept this question open, only some of the responses have to do with urban transportation apps.
3. APP: Mobile applications they use. These mobile applications are not related to the M1 app or any urban transportation app. However, we believe it is important to get to know about this, because we can get information on the kind of features that people are used to having, and therefore expect in any new app that they try to use.
4. COM: Competitors. We asked the participants what solutions they currently try to meet their transportation needs. This is extremely important for the competitor analysis as well as the design of our own product, as we can learn from other applications that are already available in the market.
5. CHO: Choice. When speaking to the participants, they shared with us what are some of the factors that come into play when they are choosing a product or a service, so we decided to include this category as it can give us valuable information.
6. NDS: Needs. Even though we did not ask this directly, some of the respondents shared with us what their unmet needs are or what they would like to see in a product. A rule of thumb in UX Design is to never ask the user what they need or what they want (Nielsen, 2001) so the information obtained from this category will be carefully reviewed before we take it into consideration to make decisions.
7. LIK: Likes. What people like about their current apps or services. With this information we can learn what are some of the features that people already value.
8. DIS: Dislikes. What people dislike about the apps or services they currently use. This is slightly important, but it does not mean that it is a need we have to address.
9. PRB: Problems. We asked the participants about current problems they have found when using their mobile apps. This information is extremely important because it gives us the opportunity to build a product that will be better than the competitors as we will solve existing problems that the users encounter.

10. FNC: Functions. The information obtained from this category of keywords is very important, because it provides us with insights about how people use the apps, as well as what functionalities they are already expecting in a product. If we come up with a design that is lacking a basic function that the participants are already used to, they will not change their current service or product for a new one.

Below are the results organized by categories for the UX interview. Further down we discuss the most important findings.

Table 3

UX interview results: Lifestyle and Use of Technology

LIF	Mentions	USE	Mentions
Use apps all the time	3	Games	5
Remote Work	2	Social Media	4
Marketing	2	Stay in touch	3
Nomadic Life	1	Source of news	1
Student	1	Travel/Holiday Plans	1
Adveritising Designer	1	Research tool	1
Travel weekly to another city	1	Contact local company directly	1
Travel and study abroad	1	Pin places	1
Service industry	1	Entire trip/vacation	1
Programmer	1	Travel between hometown and work/study place	1
		Find the best and fastest route	1
		Check service status	1

Note. Table showing the times a keyword in the LIF and USE categories came up during the UX Interviews

Table 4

UX interview results: Mobile Applications, Competitors and Choice

APP	Mentions	COM	Mentions	CHO	Mentions
Instagram	4	Google Maps	9	Unfamiliar with public transportation or city	2
WhatsApp	4	Local app	4	Urgency level	1
YouTube	4	Uber	4	Plane or something else	1
Facebook	3	Lyft	1	Consilidator app or vendor	1
Netflix	3	Rome2Rio	1	My current app already does the work	1
LinkedIn	2	Oyster Card	1	Visuals	1
Spotify	2	MTA	1	Use frequency	1
Slack	1	Bolt	1	Interface	1
Expedia	1	Moovit	1	Recommendations on blogs	1
Skyscanner	1	Waze	1	Trust in the app	1
Inspirock	1	Apple Maps	1	Used the solution for a long time now	1
Zillow	1				
Wish	1				
Telegram	1				

Note. Table showing the times a keyword in the APP, COM and CHO categories came up during the UX Interviews

Table 5

UX interview results: Needs and Likes

NDS	Mentions	LIK	Mentions
Integration between the app and transportation companies	2	User friendly/Intuitive	4
Pay for different services in the same place	2	Accurate	3
More audio instructions	1	Free Account/Low price	3
Updated information about service status	1	Access everywhere (take it with me)	2
Use weird websites to get address	1	Give suggestions	1
Safe mode	1	Quick onboarding process (less than 5 min)	1
Syncronized with google	1	Personalized messages	1
Different plans (student, etc.)	1	Virtually everywhere	1
Tourist recommendations	1	User feedback in real time	1
Description of icons	1	Incentives (points, discounts)	1
		Coverage (virtually everywhere)	1
		Customer Service	1

Note. Table showing the times a keyword in the NDS and LIK categories came up during the UX Interviews

Table 6

UX interview results: Dislikes, Problems and Functions

DIS	Mentions	PRB	Mentions	FNC	Mentions
Not always accurate	2	Not accurate location	4	Estimated time/Fastest way	5
Taking advantage of people	2	Local system not included	3	Bus/Metro Times/Schedules	3
Ads	2	Not enough information provided	3	Different categories	3
One-purpose only	2	Data not up to date	3	Compare/Choose transportation options	3
Not gettng all in one place	2	Does not choose fastest route	2	Connect different transportation services	3
Missing businesses	2	Not accurate	2	Pulls information from other source	3
They store all my info	1	Price information not current	1	Connect dots in map/Add stops	3
Too intrusive	1	Can't do payments or refill my card	1	See/Compare Prices	2
Only text based	1	Service reach	1	Sharable itnieraries/places	2
Lack of interactivity	1	App language	1	Personalized	2
Not "fun" to use	1	Incorrect traffic estimate	1	Private mode	2
Suggest to download app	1	GPS instructions	1	Offline Mode	2
Don't recognize app is downloaded already	1	Google is choosing routes with higher tolls	1	Open the maps from Google	2
Amount of notifications	1	Rely on signal and GPS	1	Which metro car you're in	2
They're just making a profit	1	Drop pins because there is no address	1	Very interactive	2
Constant updates	1	Get's stuck	1	Point which metro exit to use	1
ID yourself all the time	1	Unsafe route	1	Notification on app or watch	1
Need many apps	1	Untrustworthy	1	Daily Planner	1
Opposite scrolling	1	Stops working if not updated	1	Travel Profile	1
Not user friendly	1	Real time accuracy	1	Calendar sync	1
		Designed web first	1	Routes around me	1
				Collaboration with other users	1
				Save favorites (past and future)	1
				Silent Mode	1
				Choose current location/Starting point	1
				Choose final destination	1
				Hide unactive apps	1
				Turn off notifications	1
				User input	1
				Traffic estimate	1
				Input CC info with camera	1

Note. Table showing the times a keyword in the DIS, PRB and FNC categories came up during the UX Interviews

From these results, we observed that the participants of the UX interview travel frequently and 3 of them also mentioned that they use their mobile phone all the time. They use their phone for games, social media or to stay in touch with friends and family. While this might not be related to our study, it shows us the shift in user behavior. Before smartphones, people used the phone with the only purpose of communicating with others. Nowadays, users expect

their phone to have multiple functionalities, and this is reflected in the way they expect mobile apps to work as well.

Some of the unrelated mobile apps mentioned by the people interviewed were Instagram, Whatsapp, YouTube, Facebook, among others. Despite being in a completely different category of mobile applications, it may be useful to undertake a deeper study and understand what functionalities inside those apps can be migrated into our application. The urban transportation app that everyone uses is Google Maps, followed by local apps and Uber. We learned that everyone goes to Google first, but many times they do not find the local buses or services outside metropolitan areas, and that is why they have to download local apps, either at home or when traveling.

2 people mentioned that if they are unfamiliar with the city or the public transportation system, they would rely on services like Uber. Some of the factors that help users decide on which service to use are the interface and visuals of the apps, how much they can trust it, if it was recommended by someone else, the urgency level they have at the moment, etc. This is an issue that can be solved within a mobile application, by including more guidance for the users, as well as letting them know in the advertising and other communication channels that they would have the help they need when using new systems when they travel. We also obtained a list of needs people say they have, but 2 of them were mentioned twice: having a better integration between the app and the transportation companies (because sometimes things are happening that stop the service, and the users never get notified about it), and being able to pay for different services inside the same app (for example in Lisbon, when changing from the Metro system to the trains that go outside of the city). In order to validate the rest of the responses, we would need to perform additional research and verify that these are indeed common needs for other users as well.

Some researchers might think that the likes and dislikes of users are not important when building a product, but it has been proved that, for example, online reviews play an important role in the decision making of the user when making a purchase (Hu et al., 2008). When people like a product, it is likely that they write positive reviews online, and that they recommend it to the people they know as well. For this reason, we believe it is extremely important to take into consideration what people like and dislike about the mobile applications they currently use. From the results of this question regarding what people like in other applications, we can observe that users like user-friendly interfaces, mainly because they are used to interacting with several of them throughout the day, so they have become more skilled and educated in terms of what they can expect from a mobile application. They also prefer free or low cost apps, and dislike apps. If a mobile app will have a cost, it needs to deliver a great advantage over all the others that already exist for free.

The main problems that users have with their current solutions are lack of accuracy with their location, missing local services, incomplete or outdated information, etc. The most used functionalities of the apps include having different categories for the transportation systems, as well as the places on a map, being able to see the schedule of all the systems as well as how to transfer in between them, and adding stops inside a trip or route. When designing any urban transportation mobile applications, the top functionalities mentioned here must be included.

6.3. JTBD Interview Results

The information of the people selected for the JTBD Interview is shown in the table below. Just as in the UX interview, we attempted to maintain a balance of gender, age and location, in order to obtain diverse insights.

Table 7

JTBD interview participants

Age	Gender	Location
21	F	Mexico
28	M	USA
30	M	USA
33	F	Mexico
33	F	Germany
39	M	Mexico
39	F	South Africa
50	M	USA
65	F	USA

Note. Table containing the Age, Gender and Location of the participants from the JTBD interview group

After highlighting the keywords in the transcripts, we decided to group them in categories following the example of Valchanova (2020), which at the same time was designed following Klement's timeline. We used the same categories proposed by Valchanova's research, and we added the competitors category, because all of the participants mentioned other mobile applications that can help us better understand their needs and how they meet them. The categories of analysis are as follow:

1. “ANX: Anxieties. What almost stopped users from trying your solution or what they didn’t like about a competitor.
2. BEH: Behaviors. What did your users do while searching for a solution, testing them out or using yours.
3. BFT: Benefits. What users liked in a solution they were trying out.
4. CHA: Channels. What channels they used to find out about new solutions.
5. REQ: Feature requests. You will largely disregard these during the JTBD research but you may want to forward them to the product team.
6. HIR: Hiring criteria. What criteria did they use to evaluate different solutions and choose the right one for them.
7. JOB: Jobs. What were they trying to achieve by using the product, what was the goal, the final outcome, the emotional or social dimensions attached to it.” (Valchanova, 2020)

For the competitors category, the definition used was:

8. COM: Competitors. What solutions the users have tried or use currently in order to meet their needs.

Below are the results organized by categories for the JTBD interview. Further down we discuss the most important findings.

Table 8

JTBD interview results: Anxieties and Behaviors

ANX	Mentions	BEH
Safety	2	Delete the apps I didn't like
Is my credit card information safe?	2	Think about my objectives
How is it organanized?	1	Travel
How popular is it?	1	Stopped using public transportation (Covid)
How easy is it to use?	1	Purchased a local card to use the public transportation
I don't know what to expect	1	I expected to find an app
High costs	1	Googled solutions
Public transportation experience	1	Looked at their reach before commiting
Is it too complicated to use?	1	
I don't know the city/system	1	
Reviews not in English	1	
Apps tracking you	1	

Note. Table showing the times a keyword in the ANX and BEH categories came up during the JTBD Interviews

Table 9

JTBD interview results: Benefits and Channels

BFT	Mentions	CHA	Mentions
Real time updates and notifications	3	Direct recommendation	6
Trip tracking	2	Advertising	3
Social feature	2	Social Media	2
User input	2	Referal codes from friends	1
Way to dispute	2	I saw someone else using it	1
Price transparency	2	Blog	1
Peace of mind	1		
Improved quality of life	1		
Fastest route	1		
Estimated time	1		
Very well explained	1		
No need to consider bus schedules	1		
Avoid crowded services	1		
Able to go to new places	1		
Cash back	1		
Refer friends	1		
Informative emails	1		
Personalized routine	1		
Free version	1		
Includes all the transportation systems	1		
Tells you when to transfer or get down	1		
Exact and punctual service	1		
Works as expected	1		
Adapted to English speakers	1		
Better service	1		

Note. Table showing the times a keyword in the BFT and CHA categories came up during the JTBD Interviews

Table 10

JTBD interview results: Hiring and Requests

HIR	Mentions	REQ	Mentions
Service reach/Access to service	3		
Service reputation	3		
It was recommended to me	3		
Popularity	2		
Value in my life	2		
Reviews	2		
Transparency	2		
Price	2		
Safe service	2		
New cars	1		
Good service	1		
Personalized	1		
Categories	1		
Few options available	1		
Clean cars	1		
Experience	1		
Walking distance	1		
Frequency of service	1		
Trackability	1		
My information is safe	1		
Ease of use	1		
Can I do it offline instead?	1		
Sign Up experience	1		
No user input	1		
One function only	1		
Service included in my car	1		
Relatable	1		
Trustworthy	1		

Note. Table showing the times a keyword in the HIR and REQ categories came up during the JTBD Interviews

Table 11

JTBD interview results: Job and Competitors

JOB	Mentions	COM	Mentions
Move around with no car	1	Google Maps	4
Walk more	1	Uber	3
Move around with my car	1	Waze	2
Locate myself when traveling	1	Didi	1
Deliver my products to my clients	1	Taxi apps	1
Have my wife move around safely	1		
Go to the other side of the city	1		
Use the public transportation abroad	1		
Know routes and times	1		
Move a piece of furniture	1		
Move around independently	1		
Get to the office	1		
Weekly errands	1		
Weekend getaway	1		

Note. Table showing the times a keyword in the JOB and COM categories came up during the JTBD Interviews

From the results, we can observe that people care about their own safety and also their credit card information being shared when hiring a service or buying a product. Some of the other anxieties people experience have to do with the User Interface, as well as how it is communicated to the user. Those anxieties can be prevented easily with a clear Information Architecture that makes it easy for the person using the app, as well as a reinforced message for them to understand how they can use our product even before downloading it.

Many of the behaviors explained by the participants had to do with the COVID-19 pandemic, as they had to change their usual way of transport. Some of them stopped traveling, while others stopped using public transportation. Either way, they needed some tool to help them arrive at their destination, and for that reason they never stopped using mobile applications.

The list of benefits we obtained is very similar to the functionalities category from the UX interview. However, with this framework, people gave us more information beyond just functions of the app. What people value the most are real time notifications or updates, as well as the social feature of the app and the transparency. For instance, people from both groups mentioned the app Waze, that allows users to input information, and that way the data is created for traffic and other roadblocks. It seems that users really trust fellow users and also they feel excited to contribute with their own data as well.

The most popular way in which users find out about a solution, is through direct recommendation, either by family members, friends, roommates, etc. The second and third

ways are regular advertising or social media. This information lets us see that despite online reviews and other ways to find out about products, word-of-mouth is still an important factor that helps users decide what solution to get.

There are many factors that people take into account when choosing a product, but the ones that were mentioned more are the access to the service or reach area, the reputation of the service, and if someone else recommended it to them. Safety, transparency and price were mentioned often as well.

When we asked what users were trying to accomplish, we learned that all of them had different responses. However, it can be boiled down to: move from point A to point B, regardless of the transportation method, the day of the week or the occasion, while being at home as well as traveling, and do it in a safe manner while having access to important information.

Just as the UX interviews, the participants here mentioned Google Maps and Uber the most. However, because of the nature of the questions, they did not mention many apps or other solutions they prefer. We believe that in order to obtain more information about this, a separate study should be performed, or additional questions should be asked. Nobody mentioned any requests, so we deleted that category from our research. Perhaps this has to do with the fact that we were asking about general use of other mobile apps. If we had a product already, and interviewed current users of our app, it is possible that they would have requests.

Chapter 7

7. RESULTS APPLIED TO THE M1 PROJECT

After performing the UX and JTBD interviews, we demonstrated the differences and similarities between the results obtained with each of the frameworks. Taking that information as a starting point, as well as the information obtained from the survey, we analyzed it and created sets of deliverables that will further demonstrate the differences and similarities in the results obtained from this comparison of frameworks. These deliverables are constructed for the M1 app, which is a mobile app that would allow users to utilize the Metro transportation system seamlessly.

Within the HCD practice, certain steps and exercises are necessary to perform before arriving at the design phase of any project. Some of the most common ones are competitor analysis (to understand what the competition is doing, what are their strengths and weaknesses, and how the product or service being built can fill the gaps), user persona (to have a clear idea of who the end-user is, what are their goals and needs and basic demographic information), user journey map (which is a visual representation of the process that the user undertakes in order to accomplish a goal).

While the JTBD framework does not utilize the exact same tools during its process, there are similarities between their methods and the ones HCD uses. In the next pages, we present a comparison of instruments created after analyzing the information that was gathered following each framework.

7.1. Competitor Analysis

In the UX Design practice, competitive analysis is a crucial element of the research process. “A competitive analysis provides strategic insights into the features, functions, flows, and feelings evoked by the design solutions of your competitors.” (DaSilva, 2020) Only after analyzing and understanding how similar products work, can we design a solution that will be superior, and therefore cover the unmet needs of the users. Because of the nature of this exercise, the competitors analized are usually very similar products. In our case, we would like to observe the Oyster app from the London Metro service, as it is the closest example we could find to our product idea.

On the other hand, one of the principles of JTBD is to go beyond the obvious competitors, and observe how people are achieving their goals, not only with similar products. For example,

Klement (2018a) proposes that users consider anything a competitor, as long as the job they are trying to accomplish gets done. Moreover, Ulwick (2017) performs an extensive competitor analysis in which he asks users to evaluate other offers taking a set of desired outcome statements as a starting point. Because of time constraints and limited resources, we will not be able to perform Ulwick's study, but we encourage fellow designers and researchers to apply it to their investigation.

While there are many ways to perform a competitor analysis, we will utilize the SWOT method, as it is already used in the UX design framework, and we consider it is a viable solution for the JTBD competitor analysis as well. The SWOT method analyzes the Strengths, Weaknesses, Opportunities and Threats of different products. (Nicolotti, 2020) This method can be applied to as many solutions as you need, but for this study we will evaluate only one example per framework, as we have limited resources and time. Companies usually perform the analysis in a higher number of competitors, so it is adviced to extend this exercise if you have more resources. During the UX interview, all of the participants mentioned that they use Google Maps, and while it is an urban transportation app, it does not coincide 100% with the model of the M1 app. Users also mentioned they use local transportation apps, and one participant mentioned the Oyster app, so we will perform the analysis on it.

On the next page is the SWOT analysis performed on the Oyster mobile app.

Table 12

SWOT analysis performed for the Oyster app

Strengths: • Top up your pay as you go credit and get notifications when it gets low • Check your journey history • Get notifications before your Travelcard and Bus & Tram Pass expires • Manage multiple season tickets and cards on the go • The most affordable way to move around in London (TfL, n.d.)	**Weaknesses:** • It only works in London • To top up your card, you need to wait 30 minutes and then physically your your card with a "yellow" reader • Lacks voice over feature, so visually impared people can not use it (App Store, 2021) • Only available in English
Opportunities: • Expand the service to other cities and countries • Allow the use of the app without the card • Include other languages • Build necessary functions for people with disabilities	**Threats:** • People who already use the system may not have a reason to download the app when they have the card • Apps like Uber allow users to "hire" a service worldwide without the need of another app

Note. Table showing the Strengths, Weaknesses, Opportunities and Threats of the Oyster mobile app

As we can see in the table above, the Oyster app is an amazing solution for the regular users of the London transportation system and for tourists as well. One of the issues is that you need to bring your card close to a reader at the stations after topping up your account using the app. If they find a better solution for that, it would mean one step less for the users and much more comfort. Additionally, it only works in London, so for Europe travelers for example, it might be an inconvenience to download yet another mobile application, so they would choose to utilize one of the apps they already have and that offer a worldwide service, like Uber. Despite the fact that people with disabilities do not represent the majority of the users, it is immensely

important to take their needs into consideration, in order to build more inclusive products and services.

During the JTBD interview, some of the participants mentioned that they would prefer to use Uber instead of public transportation, for safety reasons, previous public transportation experience, and also when they do not know the city or system very well, taking a car would be a better option. For this reason, despite the fact that Uber does not belong to the Metro system, in the mind of our users it is considered a competitor, because it helps them get the job better. In some cases, they mentioned that Uber is a better solution because they not only get the job done, but also they have other benefits from using that service that is lacking in the Metro system or in any other public transportation system. For that reason, we performed the competitor analysis on the Uber app.

On the next page is the SWOT analysis performed on the Uber mobile app.

Table 13

SWOT analysis performed for the Uber app

Strengths: • Available worldwide in over 10,000 cities (Uber, 2020) • Very user friendly • Trackability • Price transparency • Real time notifications • Offers a way to dispute problems • One account lets you use other services like Uber Eats & Bicycle rental services • Offers different price brackets • Some countries offer scooter or boat rides, besides the usual vehicles • 100 different languages with in-app translation option (Sawers, 2020)	**Weaknesses:** • It can be very expensive in some places • Because of isolated issues or incidents, the company has some reputation problems • The only way they tackle environmental protection in is through their electric car service, which is very limited and not always available
Opportunities: • Find a way to be more sustainable • Just like they have deals with restaurants, local transportation companies could offer Uber as a way of payment	**Threats:** • Cheaper options like Lyft or Didi • Other public transportation systems that are cheaper • Local taxis with mobile apps

Note. Table showing the Strengths, Weaknesses, Opportunities and Threats of the Uber mobile app

From the previous analysis, we are able to observe that Uber has many strengths as well. Even though the app is not used for Metro systems, we can learn many things from them to incorporate certain functionalities in the M1 app, as well as things to avoid. The biggest strengths we see in Uber that would like to replicate, are the multiple languages, the worldwide coverage and other functionalities that the users interviewed consider to be basic, like trackability, price transparency, user friendly interface and real time notifications. Two of the main problems that Uber has can be solved with the M1 app: the high prices and the environmentally friendly approach. Using existing public transportation networks is better for the environment than using a car, especially for people traveling alone. In addition, public transportation systems are more affordable than taxis or Ubers. That being said, we would take the stronger functionalities that Uber has, like multiple languages, availability in many cities around the world, in-app payment options, price transparency, real time notifications, and add them to the design of the M1 app.

From the creation of both SWOT analysis, we can deduce that the JTBD framework can be helpful in finding out what other solutions people consider a competition to our product, besides the obvious direct competitors usually being analyzed during the UX methodology. In this case, people talked about another mobile app, but this insight can change drastically depending on the problem or job being discussed.

7.2. User Persona

A tool that is widely used in UX is the user persona. Some authors like Nielsen (2014) believe that “still no clear definition of what the method encompasses”, and opinions differ in which information should be included, and if the information should be based on assumptions or real data. In the same article, Nielsen explains that there are 4 common types of user personas: goal-directed, role-based, engaging and fiction based. For this study, we will create a goal directed persona that focuses on the goals that the user wants to accomplish. These goals are similar to the jobs that the JTBD framework proposes, so we believed it would be easier and more accurate to compare frameworks by using this User Persona model.

On the next page is an example of the UX Persona, based on the information we gathered during the survey, as well as the interview. On the left side there is a picture and basic demographic information, that have the purpose of creating empathy from the designer to the user. We also see the concerns that the person has, as well as the needs and goals. The information on the right side of this table should be given more weight, as it represents the most important things to be addressed in the creation of the product.

Table 14 / Figure 33

User Persona for the UX framework / Picture of Woman

Needs:

- Accurate and updated information
- Transportation options comparison
- Estimated arrival time
- Pay for different services in one app
- Good integration between the app and transportation companies
- Information broken down into categories
- Offline mode
- Private mode
- Shareability
- Personalized itinerary

Katie:

- Female
- 31-35
- US based
- Travels frequently
- Works in marketing

Goals:

- Arrive safely to her destination
- Save time
- Save money
- Be as environmentally friendly as possible
- Have an immersive experience when visiting new places
- Plan the trip ahead with peace of mind
- Being able to control how intrusive the app is

Opportunities:

- Personal Safety
- Service availability and reach
- Have her credit card information stolen

Note. Table showing the basic demographic information of the User persona for the UX framework, along with their Needs, Goals and Opportunities / Picture of a woman on the street as a representation of the User Persona (Stecanella, 2018)

The JTBD persona was created following Laubheimer (2017) example, and based on the information gathered during the interviews. In comparison to the UX model, this model eliminates completely the demographic data, as the JTBD framework puts emphasis on the job the user wants to achieve, as well as their objectives and everything that affects their decision making. On the JTBD framework, the users are divided into groups according to their needs or jobs. Such groups can contain people from all genders, ages, locations, and so on, as the determinant factors are their needs and jobs, not their demographic information.

Table 15

User Persona for the JTBD framework

Job-To-Be-Done: • Move around in a city I am not familiar with	**Emotional Criteria (Personal):** • Comfort during the trip • How safe do I feel • Value in my life
Functional Criteria (Objective): • Fastest and cheapest way to transport • Easily purchase a ticket or pay for the service • Have accurate and real time notifications about the service • Price transparency	**Emotional Criteria (Social):** • User input makes it more reliable • Share my itinerary with friends and family • Many people recommended the service

Note. Table showing the Job-to-be-done, Emotional Criteria (Personal and Social) and Functional Criteria of the User persona for the JTBD framework.

As we can observe from both Persona models, the information written in each of the cases varies significantly. The JTBD model deletes completely the demographic information, but it also divides the needs and goals into different categories, like emotional and functional criteria. Therefore, we believe the best way to undertake this part of the User research during the creation of any product or service, is not to eliminate one of the frameworks, but to combine them in order to develop a deeper understanding of the user. Perhaps more than one User Persona can be created, or the best solution might be to produce a thorough analysis of the user.

7.3. JTBD Timeline & Customer Journey Map

The Customer Journey Map was created based on Gibbons (2017) from The Nielsen Norman Group. This map focuses on the specific interaction between a user and the product or service. He describes a couple of maps most used in the UX practice, but we chose to use the Customer Journey Map, as it is the most similar to the JTBD diagrams, and it will facilitate a more accurate comparison.

Table 16

Customer Journey Map

Scenario: Katie is traveling to Europe next summer, and she wants to find a mobile app that will let her use public transportation in many countries, but that is cheaper than Uber and more eco-friendly.		**Expectations:** • User friendly interface • In-app payment • Accurate and updated information • Available in her language	
Define: 1. Review current apps on her phone 2. Define expectations or parameters	**Compare:** 3. Sees an ad on Instagram 4. Googles the app 5. Reads online reviews	**Negotiate:** 6. Downloads app to test it 7. Compares it to her current apps	**Select:** 8. Decides that the M1 app is the better solution to her needs 9. Switches to the M1 app even at her place of residence

Note. Table showing the Scenario, Expectations and steps the user goes through according to the UX framework

For the JTBD diagrams, we will take the example of a 33 year old female living in Mexico. During the interview she shared with us her experience while looking for a solution when studying in Rome to use the public transportation system. Below is a diagram based on the Timeline in the Jobs As Progress model.

In order to accommodate all of the information obtained during the interview, we decided to flip the diagram and have all the information contained inside. We believe this would facilitate

the reading and analysis of the data, as well as clearly display the different steps taken by the user.

This is perhaps the most similar result we obtained during this comparison of frameworks. They both explain the steps that the user follows when choosing and using a product, but the JTBD gives more details and breaks the steps into specific categories that helps us understand what influenced the user's decision making. In practice, the information contained in the Timeline can be added to the Customer Journey Map, to create a deeper image of the user and all the elements that affect the decision making process.

Table 17

The Timeline with data from interview

First thought	**I need an app or service that will facilitate the use of the Metro and other transportation systems while I'm in Rome.**
Passive Looking	The Italian embassy in Mexico suggested that I purchase a card.
Trigger Event 1	I read on a blog that there are local apps that give you more information and facilitate the use of the transportation system.
Active Looking	Search in the App Store for the recommended application as well as similar ones.
Trigger Event 2	I arrived to Rome and I need to find a solution.
Deciding	I will download them all, and delete the ones I don't like.
Buying	I prefer the one recommended by the blog. Besides, if they have used it in Italy and their experience was good, it should be the best option for me.
Consuming	I used Google Maps and this app, only because I'm used to Google. I compared them regarding information provided and accuracy.
Experienced	I realized the recommended app was much better than Google Maps because it gives you a lot of detailed and accurate information, and it's very well synchronized with the public transportation system.
Satisfaction	I am happy with this app, and will continue to use it while I'm living in Rome.

Note. Table showing the steps the user goes through according to the JTBD framework

Chapter 8

8. CONCLUSION

After conducting the research, all of the hypothesis proposed were confirmed, as we believe that the combination of the JTBD framework and the UX methodology may result in improvements during the User Research phase performed at the beginning of HCD practice. The gains will be not only for the communication and design community or the companies involved, but mostly for the end user, who in theory is the focus of every investigation when creating new products.

While undertaking each step of this investigation, we obtained very insightful data about the differences and similarities between both frameworks. During the interview process, There was plenty of overlap in the responses from all of the interviews, despite the questions being formulated completely differently from the UX methodology to the JTBD framework. We obtained more information from the UX model regarding specific functionalities that people use as well as problems they had encountered when using urban transportation apps, in comparison with the JTBD model. However, this result might have to do with the fact that the author of this thesis is lacking the proper experience to perform the JTBD interview. We encourage further research and practice in this specific topic.

In the case of the UX interview, we learned that users are familiar with many features in the mobile apps they currently use. The ones that we can carry into the M1 app are: select final destination, estimated time of travel, schedules, connect different transportation services, add stops, shareable itineraries, personalized options, traffic and crowdedness estimates. Offering users a solution that does not include the functionalities mentioned above would be a downgrade to the current solution they use.

In addition, the participants also mentioned that they have some unmet needs, for example: pay for the service through the app, updated information about the status of the service, tourist recommendations and availability of different languages. Therefore, if we address these problems and incorporate the solutions into our design, the M1 app would have an advantage over its competitors.

For the JTBD interview, we utilized the example given by Klement (2018b), mainly because there is no research available about different questions for this specific framework. When continuing this investigation we believe it might be a good practice to experiment with

additional questions, to observe if richer data can be obtained. Again, this fault might be a result of the researcher's lack of experience regarding the JTBD interview model.

The main difference between these two approaches is the nature of the information that we were given back. For example, the UX participants mentioned a handful of technical details and functionalities that they see in the apps they use, while the JTBD people talked more about general goals they are trying to accomplish when hiring a service. This was expected to a certain extent, because that is the nature of the JTBD framework. However, up to this point, we believe that further research will be required before launching a product.

As we talked about at the beginning of this dissertation, one of the problems that UX designers face when performing User Research is information overwhelming. The JTBD framework offers specific categories (Anxieties, Behaviors, Benefits, Channels, Feature Requests, Hiring Criteria and Jobs) that can help the researcher to have a more concise way to organize the information. The JTBD framework proposes these specific criteria that can be analyzed with the Timeline, to better understand the user's journey when selecting and using a solution. For the UX method, the categories are made depending on the project and on the information obtained during the research phase. However, we found them to be limiting, and we decided to create one additional category, which is the competitors., according to valuable information we obtained during the interviews. We understand this is not a practice suggested by the JTBD framework, but we believe that certain flexibility can benefit the UX researcher when combining both methodologies.

It is important for the HCD practice that we take into consideration all of the solutions that users consider a competitor for a certain solution, and not only products within the same category and with similar functionalities. For the UX method, in order to compare functionalities and features, it makes sense to have similar products to be able to compare them. However, it is possible to expand the UX horizons, analyze other products and the benefits that they bring to the studied users, and then translate them into functionalities inside the product being developed. We strongly believe that this is a way in which novel products can be created, and more user needs can be met. Mention the JTBD SWOT analysis.

In terms of the User Persona, this research revealed that the best option might be to combine both approaches to have richer information on the user, and not to use them separately. The information gathered during the JTBD interview and portrayed in the User Persona, gives us a very deep understanding of the user and their motivations and concerns. This information can serve to fight the lack of depth of many of the User Personas being used in the UX practice. We consider that the best option to construct a User Persona is with real information obtained

from surveys and interviews, and never supposed data crafted by the designer in order to build an imaginary personage. Both the integration of richer information and the use of real data would help eliminate the problems related to User Personas that are a constant complaint within the UX community.

Regarding the JTBD Timeline and the Customer Journey Map, this was the method in which we found the most similarities between both frameworks. They both illustrate the steps that the user might take when buying a product, but the JTBD has fixed categories that provide us with data regarding motivations and events that shape the decision making of the user. Just as the User Personas, we highly encourage researchers to utilize real data when constructing these diagrams, as the insight can be more reliable. In that sense, the JTBD interview script offers a technique that researchers can easily follow, in order to obtain the necessary information to construct both the Timeline and the User Journey Map.

In terms of the communication, while the UX interview gave us some information that could be useful to construct the entire communication plan, the JTBD framework offers more data, specifically with the anxieties that the users experience before purchasing a product or service. Any product, being built or already established, could be benefited by this information, and connect better with the customer. The information obtained for this purpose, can benefit other departments besides the UX Design, such as Marketing and Sales.

One of the aspects of mobile apps often overlooked is the communication part, not only during the interview process as explained in chapter 2, but also within the final product offered to the user. This communication process happens in the advertisements, and in every touchpoint and channel between the app and the final user, like the interface, website, social media channels, customer service, etc.

From this study, we can observe that the JTBD framework provides a handful of information that can be used in the positioning of the product. All of the anxieties that users have before trying the product can be addressed in the design of the product, as well as the description of it and the advertisement used to promote it. In this way, the communication would be based on the changes that the user can experience in their lives and the problems that would be solved, instead of the features or technicality of the mobile application.

In general, many designers and advertisers utilize features and technical information when promoting a product, but when addressing the inner needs and concerns of the user the result can be extremely successful. One of the most famous examples of this type of communication is Apple’s commercial from 1998 Think Different. What is outstanding about this commercial

is the fact that they never mention their products, but they talk directly to the dreams and aspirations of their target audience. While many people might consider this an inappropriate way to sell their products, this example and the JTBD framework can serve as proof that it can be an effective way to communicate with the user.

Accordingly, both the M1 app and all of the communication through all the channels and touchpoints, would address the anxieties mentioned during the interviews. In that sense, we believe that the JTBD framework would bring immense benefits to the design process of a mobile application. We will discuss this in the next chapter.

In general we can conclude that the benefits brought by the JTBD framework are evident, and can be achieved when following the steps described in this work, as well as the work of the authors cited here However,We believe that if we had more time and resources, we could have achieved better results and have a better understanding of the benefits that the JTBD framework might bring to the HCD methodology. .

8.1. How to continue this research

As mentioned before, one of the setbacks that we had was the fact that the link to the survey was not possible to share in the Facebook groups that we had anticipated. If this research had fundings behind it, we would have been able to look for respondents somewhere else, but because this research was done by one person, the resources were fairly limited.

Another way in which this research could be continued and improved is by having full access to Ulwick's method, as right now is only available to his paying customers. This way we could have a broader perspective, and compare both JTBD models described in this dissertation. In addition, if more resources and time is given to the continuation of this research, we encourage researchers to increase the number of participants, to assure the data can be considered representative of the population being studied.

Finally, further research on this work could be done for the next steps in the UX Design process. This includes the creation and testing of wireframes. After the creation of the wireframes, following the UX design process, we would take them and test them on prospective users, asking them to locate functionalities or to perform tasks on the wireframes. This exercise would help us spot possible problems with the structure of the application and the information architecture, which are more important than the visual elements of the final design. Later on, adjustments would be made depending on the feedback obtained, and only then we would work on the visual elements of the application, also based on the information obtained from the interviews and survey. Additionally, it would be extremely interesting to

observe the differences and similarities between the final prototypes when following each of the frameworks. Because of the length of this study, we did not undertake these tasks at the moment, but they are the perfect next step in this investigation.

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Appendixes

Appendix I

Interview script shared using Google Forms.

Hello! My name is Veronica Silva, and I'm a student in the Audiovisual and Multimedia Communication Master Program at IADE (https://www.iade.europeia.pt/en) in Lisbon, Portugal. I'm currently working on my thesis, and I'm trying to understand what people value in urban transportation mobile apps, so I'd be really happy if you could fill out this 5-minute questionnaire. Please know that all of the information provided by you will remain anonymous and will only be used for academic purposes. If you have any questions, please contact me at veronicajdesign@gmail.com

Section 1: Demographics

1. What is your age?
   (Number)

2. What is your gender?
   a. Female
   b. Male
   c. Other
   d. Prefer not to answer

3. What is your current country of residence?
   (Name)

4. Where did you hear about this survey?
   a. Directly from Veronica Silva, the researcher
   b. Facebook Group
   c. Slack Group
   d. Discord Group
   e. Other (Please specify)

Section 2: Use of Transportation Systems & Travel

5. When in your city/residence, what transportation method do you use to move around? (Please select all that apply)
   a. I use my own vehicle
   b. I rent a car
   c. Public transportation (Bus, metro, cable cars, etc.)

d. Taxis
e. Uber, Bolt, Lyft, or similar
f. Other rentals (Bicycles, scooters, etc.)
g. I mostly walk
h. Other: please specify

6. How many times did you travel to another country in 2019?
    a. 0 - 1
    b. 2 - 4
    c. 6 - 9
    d. 10 or more

7. When you travel abroad, what transportation method do you use the most to move around that city/place? (Please select all that apply)
    a. I use my own vehicle
    b. I rent a car
    c. Public transportation (Bus, metro, cable cars, etc.)
    d. Taxis
    e. Uber, Bolt, Lyft, or similar
    f. Other rentals (Bicycles, scooters, etc.)
    g. I mostly walk
    h. Service provided by tourist company
    i. Other: please specify

8. Have you used any metro transportation system in the last 2 years?
    a. Yes
    b. No

9. If you answered yes to the previous question, can you please select the most frequently found problems that you have encountered?
    a. Navigation problems (not knowing what metro line to take or where to go)
    b. Language issues (not speaking the language and having a hard time using the service)
    c. Payment options in general (it's hard to find places to pay for the tickets)
    d. Complicated ticket machines (they are hard to use)
    e. Miscommunication (you couldn't find accurate information about service hours, delays, routes, or any other important information)
    f. Other (please explain)

Section 3: Use of mobile apps

10. Do you use mobile apps on a daily basis?
    a. Yes
    b. No

11. Do you use any mobile apps when trying to reach new destinations in your city? (It could be maps, public transportation apps, etc.)
    a. Yes
    b. No

12. Do you use any mobile apps when trying to reach new destinations during your travels abroad? (It could be maps, public transportation apps, etc.)
    a. Yes
    b. No

13. If you answered yes to one of the two previous questions, how many apps do you need to help you to create a route to reach your destination?
    a. 1
    b. 2
    c. 3 or more

14. What are the navigation or transportation apps you use when trying to reach a new destination, either at your city or abroad? (Please mark all that apply)
    a. Google Maps
    b. Waze
    c. Citymapper
    d. Uber/Lift
    e. Local Taxi app
    f. Local transportation system app (like Metro, bus, etc.)
    g. Other: please specify

15. Please assign a number to each feature depending on their importance when using a mobile app.
    1 - Not important
    2 - Slightly important
    3 - Important
    4 - Fairly important
    5 - Very important
    0 - No opinion

Beautiful Graphics _____
All the information I need on one screen _____
Ease of use _____
Multiple functionalities (Ex. map + payment) _____
Multiple languages _____

I would love it if you could help me better understand how people use mobile apps for transportation purposes. This study will assist designers and developers create better apps for all of us, so your contribution will be of high importance. I'm sure you have so much experience and opinions about urban transportation mobile apps, and I'm here to listen.

How can you help? Please write down your email address so we can schedule a 45-minute interview. All the information will remain anonymous and I will only use it to analyze patterns and differences with the results from other participants. Thank you so much!