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Understanding Customer Churn Factors of Mobile Ticketing Services

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"I'm the size of what I see!"

Abstract

Technological advances and the use of mobile solutions to facilitate the daily life of smartphone users is a mindset that has revolutionized the lifestyle of society in the recent years.

In the public transport sector, as well as in many others, mobile payment and ticketing are examples of the applicability of mobile solutions in a real context. Using one smartphone to purchase and validate tickets is an innovative idea that has acquired fans around the world. The convenience of use and time savings throughout the process are positive factors for these new services. However, associated with the innovative idea are also concerns about privacy, interaction and reliability.

Worldwide some cities have deployed mobile ticketing solutions on their public transport network. Notwithstanding, the successful adoption of these services does not match the expected one. Given the advantages of these applications, researchers cannot understand the reasons behind the limited adoption of these apps and the progressive churn of them by users who know them.

This paradigm set the motivation for this dissertation. Thus, the need to understand the reasons why public transport customers use mobile tickets instead of traditional tickets has become imperative. In the same line of thought, knowing the reasons that lead users converted to these apps to churn them and return to traditional methods was equally indispensable.

Based on the case study of the Anda mobile application, developed in the city of Porto, Portugal, jointly by the Intermodal Transport of Porto (TIP) and the Faculty of Engineering of the University of Porto (FEUP), the adoption and churn factors of mobile ticketing apps were identified. Likewise, a strategy was proposed to capture and retain customers of this service.

With an analysis of complaints submitted to Anda over a six-month period, data on customer complaints and usage history were studied. Also, the complaints themselves, the complainers and the effects of complaints on the use of the app were evaluated. In addition, eight usability tests were carried out - four for regular users and four for first-time users - to assess the behavior of customers towards the app.

It was figured out that the reasons that motivate adoption are related to the accessibility of applications, application flexibility, being self-service, and be a sustainable service. On the other hand, the reasons that lead to the churn of these applications are the first bad experience of use, the recurrence of usability and technical problems, the lack of response to customer feedback, the depreciation of the customer's value; the negative influence of lost customers, and the lack of advertising campaigns.

The strategy of capturing and retaining customers consisted of defining four fundamental staged in the process of using mobile ticketing applications: user onboard, user engagement, user retention and user reinstall. For each of the stages of this lifecycle, the main concerns to be considered were listed, a series of tactics to be implemented and key performance indicators to measure the efficiency of the strategies.

Additionally, within the scope of this dissertation, a scientific paper was written and submitted to the Euro Working Group on Transportation conference.

Resumo

Os avanços tecnológicos e o uso de soluções móveis para facilitar o dia a dia dos utilizadores de smartphones é uma tendência que tem revolucionado o estilo de vida da sociedade nos últimos anos.

No setor de transporte público, assim como em muitos outros, o pagamento e a bilhética móvel são exemplos da aplicabilidade destas soluções em contexto real. Usar um smartphone para comprar e validar bilhetes de viagem é uma ideia inovadora que angariou admiradores em todo o mundo. A conveniência do uso e o tempo que se poupa durante todo o processo são fatores positivos à adoçao desses novos serviços. No entanto, associadas a esta ideia revolucionária estão também preocupações com privacidade, interação e confiabilidade.

Ao longo do mundo, algumas cidades implantaram soluções de bilhética móvel nas seus sistemas transportes públicos. Não obstante, a adoção bem-sucedida desses serviços não corresponde à esperada. Dadas as vantagens destas aplicações, os investigadores não conseguem entender as razões por detrás da adoção limitada destas apps e do abandono progressivo das mesmas por parte dos utilizadores que as conhecem.

Esse paradigma estabeleceu a motivação para esta dissertação. Assim, a necessidade de compreender as razões pelas quais os clientes de transporte público usam bilhetes móveis em vez de bilhetes tradicionais tornou-se imperativa. Na mesma linha de pensamento, é igualmente indispensável conhecer os motivos que levaram os utilizadores convertidos a estas aplicações a abandoná-las e a retornar aos métodos tradicionais.

Com base no estudo de caso da aplicação móvel Anda, desenvolvida na cidade do Porto, Portugal, em conjunto pelo Transporte Intermodais do Porto (TIP) e pela Faculdade de Engenharia da Universidade do Porto (FEUP), os fatores de adoção e abandono de aplicações de bilhética móvel foram identificados. Da mesma forma, foi proposta uma estratégia para capturar e reter clientes desse serviço.

Com uma análise das reclamações submetidas ao Anda, ao longo de um período de seis meses, foram estudados dados sobre reclamações de clientes e histórico de utilização. Além disso, foram avaliadas as próprias reclamações, os reclamantes e os efeitos das reclamações no uso da app. Mais ainda, oito testes de usabilidade foram realizados - quatro para utilizadores regulares e quatro para utilizadores iniciantes - para avaliar o comportamento dos clientes em relação à app.

Concluiu-se que os motivos que motivam a adoção estão relacionados com a acessibilidade da aplicação, flexibilidade da app, ser self-service e ser um serviço sustentável. Por outro lado, os motivos que levam ao abandono são uma primeira má experiência de utilização, a recorrência de problemas de usabilidade e técnicos, a falta de resposta ao feedback do cliente, a depreciação do valor do cliente, a influência negativa de clientes perdidos e a falta de campanhas publicitárias.

A estratégia de captura e retenção de clientes consistiu em definir quatro etapas fundamentais no processo de uso de aplicações de bilhética móvel: instalação da app, aquisição de utilizadores, retenção de utilizadores e reinstalação da app. Para cada uma das estapas deste ciclo de vida, foram identificadas as principais preocupações a considerar, uma série de táticas a pôr em prática e indicadores de desempenho para medir a eficiência das estratégias.

Além disso, no âmbito desta dissertação, um artigo científico foi escrito e enviado para a conferência do Euro Working Group on Transportation.

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List of abbreviations

CP- Comboios de Portugal

EWGT - Euro Working Group on Transportation

FEUP – Faculty of Engineering of University of Porto

FTUX – First-Time User Experience

GPS – Global Positioning System

GSM . Global System for Mobile Communications

KPI – Key Performance Indicators

M-payments – Mobile payments

M-ticket – Mobile ticket

M-ticketing – Mobile ticketing

MAP – Metropolitan Area of Porto

NFC – Near Field Communication

RFID - Radio Frequency Identification

PART- Tariff Reduction Support Program

PTO – Public Transport Operator

PDA – Personal Digital Assistant

STCP – Sociedade de Transportes Coletivos do Porto

TIP – Intermodal Transports of Porto

USSD - Unstructured Supplementary Service Data

WAP - Wireless Application Protocol

1 Introduction

This introductory section presents the background of the project, the problem description, the questions which motivated this research and the research objectives. At last, the report outline is also described.

1.1 Project background

As the world becomes increasingly interconnected, technology adoption is one of the most determinative factors in human progress. Accessing internet right away or owning a smartphone is now assumed as granted in the many advanced economies. It permeates commerce, social interactions, politics, culture and daily life (Poushter & Stewart, 2016). Furthermore, while high-income economies keep using more internet and owning more high-tech gadgets, in the past years, there has been a tendency for the emerging countries to follow and copy these behaviours. These patterns are now global, regardless of how fast they grow in each type of economy. In 2018, more than 3.5 billion people, 47% of the world population, was connected to mobile internet (Bahia & Suardi, 2019).

Internet access and innovative services are contributing to the fulfilment of United Nations Sustainable Development Goals (United Nations 2017), facilitating the access to modern public health services, free education services and financial services, including mobile payments.

Accordingly, mobile has become a fundamental gateway to the digital economy. The general adoption of mobile devices to pay for goods and services is a wide-spreading reality. Mobile payments were designed to provide a secure, convenient, consistent, efficient and trusted payment experience to the users (European Payments Council 2017). Although, security and privacy issues, as well as interaction and reliability of the service, might be sometimes concerns that users share.

This system can be applied to several sectors such as public transport. There, mobile payment comprises, at the same time, both pay-as-you-go options, in which the mobile serves as a wallet and actual ticketing, where passengers buy and authenticate tickets on their mobile phone. The last feature is only possible due to an emerging technology called mobile ticketing.

Similarly, to what happens in mobile payment services, mobile ticketing is a process whereby customers can order, pay for, obtain, and validate tickets using only mobile devices and without needing the physical ticket. A mobile ticket contains a unique ticket verification varying accordingly to the technology used. While some m-ticketing systems require the validation through SMS text or a QR or barcode, others require Near Field Communication. (Amorim, 2018). Mobile ticketing service solutions take advantage of wireless communication and thus intend to free customers from the difficult purchase decisions, allowing easier access to other services.

The convenience of this technology makes it totally suitable to address the problems of urban congestions and stress of the metropolitan areas. As public transportation improves the mobility of passengers, by means that are safe and high-quality, it can be seen as the

required solution to urban sustainability. Although, complex transport networks and lack of seamless options reduces the attractiveness of the sector. The long waiting times in queues for purchasing and validating tickets make people drop this solution and choose to use their own vehicle instead. Mobile ticketing in public transport sector can deliver an innovative, ubiquitous and engaging service. (Ferreira et al., 2014)

Many countries have used for a while mobile ticketing for public transport. The first deployment occurred in 2007, in the UK for Chiltern Railways. In order to proceed other countries and to follow the trend of using this technology to facilitate the public services provision a mobile payment and ticketing application was deployed, Anda, in the Metropolitan Area of Porto, Portugal. The app, developed in 2018 by the Intermodal Transports of Porto (TIP) and the Faculty of Engineering of University of Porto (FEUP), allows users to ride buses, light rail and heavy-rail trains in the extensive public transport network of Porto, only with the need of their mobile phone (Transportes Intermodais do Porto 2018).

1.2   Problem Description

Although some cities implemented mobile ticketing solutions on their public transport network, the adoption of such services seems to achieve limited success. The causes that lead to such a low rate of utilization of the service are so far unknown however, researchers affirm that the churn factors are somehow related to the acquisition phase or to the user experience (Cheng, 2017).

To better understand the causal relationship between mobile ticketing applications and public transport, several investigations were carried out, in the past two decades. It stimulates the need to know which are the key factors that influence the adoption of this technology. The churn factors are important as well since they determine the causes for the customers to stop using the service.

In Porto, Anda is an example of how mobile ticketing solutions may present several difficulties in customer acquisition and retention. Despite being on the market for over a year and having more than 10.000 downloads in the Google Play Store, the rate of use of the service is very low (Google Play Store, 2020a). An analysis of the app allowed to conclude that there are many customers who have never used the application, even though they have downloaded it. Others have already used it during a period but preferred to give up the app and continue to use the traditional ticketing system.

The main problem associated with m-ticketing in public transport is that the reason that lead to the failure of costumer adoption and retention is yet to be identified. The purpose of the proposed dissertation is to contribute to identify and analyze the customer churn factors of mobile ticketing services, relying on the example of Porto. The analysis might not only solve the existing issues but also enable the definition of a customer retention strategy.

1.3   Research Questions

Given the paradigm presented above, there are three main questions the existing literature cannot answer:

R.Q.1 What are the customer adoption factors of mobile ticketing services, in public transport sector?

R.Q.2 What are the customer churn factors of mobile ticketing services?

R.Q.3 What strategies can be used to capture and retain mobile ticketing customers?

The first question (R.Q.1) intends to understand what makes customers adopt mobile ticketing solutions instead of traditional ones, in the public transport sector. The benefits obtained from using m-ticketing are well known to users, nevertheless these are not always the reasons why they choose this technology in the first place. There are unknown explanations about what really drives people to use this service and that is what this research is meant to figure out.

To understand the customer churn factors of these services (R.Q.2) is the main question the research points to answer. Comprehend what makes people abandon the system after using it for a while or why mobile ticketing systems can't get and then maintain a critical mass of consumers that become relevant is crucial to redefine the strategy towards that.

As the last question (R.Q.3) is related to capturing and retention mechanisms, what it aspires to figure out is what kind of tactics are useful to attract efficiently and effectively more customers. To know how permanently engage the users after retaining them is also an objective of the investigation.

1.4   Research Objectives

Given the literature on mobile ticketing solutions, there are existing gaps whose inconsistencies need to be complemented. Being so, the research objectives the dissertation intends to accomplish are:

R.O.1 Understand the meaning of travel history and complaints data from the Anda app.

R.O.2 Identify the lost, current, and potential Anda customers.

R.O.3 Identify customer adoption and churn factors of mobile ticketing services.

R.O.4 Define customer capture and retention strategies.

1.5   Report outline

This report is organized as follows. Chapter 2 provides a literature review of mobile ticketing services. At first, it makes clear how mobile payment is related to mobile ticketing and introduces some general concepts concerning both topics. Then, it's described the fitting of mobile ticketing solutions in the context of public transportation. It shows, in detail, and compares the technologies used in mobile ticketing. The benefits of these services and the challenges that are slowing down their expansion are demonstrated. Some examples of mobile ticketing adoption worldwide are presented as well. At last in this chapter, the contributions of this research are highlighted.

Chapter 3 exposes and characterizes the problem. It presents the contextualization of mobile ticketing in public transport networks. The explanation of how Andante network in Porto and Anda app work are also part of this chapter.

Chapter 4 explores the methodology that will be used in the course of the dissertation. It is divided into two topics that regard the choice of the research method and the explanation of steps and procedures that took place.

Chapter 5 explains the process of customer complaints and suggestions analysis. First it is explained how LinhAndante handles customer complaints and how the analysis of the complaints took place. Then it is presented the results and explored in detail the importance of three main aspects: the complaints, the complainers, and the effects of the complaints on the usage of Anda. The relevant factors of the analysis are shown at last, in this section.

Chapter 6 represents the usability tests performed in the scope of the dissertation. The purpose of the tests, as well as the sample of users, the test environment and the test itself are described. Additionally, the results obtained from each task evaluated are demonstrated and the relevant factors of the usability tests are identified.

Chapter 7 comprises the interpretation of the research findings and the resulting recommendations for this type of services. The adoption and churn factors are identified and a customer capture and retention strategy is defined. A series of suggestions to be put into place in the case of Anda is also presented. At last, it's presented the paper submission to the EWGT 2020 conference.

Chapter 8 concludes this dissertation. It discusses the main findings and contributions of the research and provides future research directions.

2 Literature Review

This section presents the literature review regarding the topics of mobile payments and mobile ticketing. In a first moment, both concepts are defined, as well as the advantages and disadvantages of each. A drill-down of these topics occurs then and it is described the mobile ticketing solutions in the context of public transport. Respecting this last theme, technologies used, benefits and the challenges of the service are demonstrated. Some examples of mobile ticketing adoption worldwide, in the context of public transportation, are presented as well. At last, it is highlighted the contributions of this research to the current literature.

2.1 Mobile Payment Services

Several authors have defined mobile payments differently accordingly to the scope of the study object. While some take into account the whole payment actions "any payment where a mobile device is used to initiate, authorize and confirm an exchange of financial value in return of goods and services" (Au & Kauffman, 2008). Mallat (2007) has a broader scope definition and consider mobile payments as "the use of a mobile device to conduct a payment transaction in which money or funds are transferred from a payer to a receiver via an intermediary, or directly without an intermediary".

In this context, mobile devices include all the equipment that can connect to communication networks at least at one stage of the payment process. It included mobile phones, smartphones, smartwatches, tablets, personal digital assistants (PDAs) and any other device that fulfil the requirement defined before (Herzberg, 2003).

M-payments can also be classified into remote and proximity payments. A remote payment occurs when the transaction requires a telecommunication network such as Global System for Mobile Communications (GSM) or Internet to take place. It can be made regardless of the location of the payer and can use SMS, Unstructured Supplementary Service Data (USSD), Wireless Application Protocol (WAP) or wireless communication (Wi-Fi or 3G/4G). A proximity payment, in its turn, is also known as contactless and only occur when the service provider and the costumer are in the same location. It requires Bluetooth, Radio Frequency Identification (RFID) or Near Field Communication (NFC) for data transfer (European Payments Council 2012).

The use of mobile payment solutions can be very advantageous for users. There were identified eleven determinants related to the technology adoption, namely: ease of use, usefulness, attitude, social influence, compatibility, cost, prior experience, trust, risk, use context and mobility (Mallat et al., 2008). On the other hand, costs, loss of privacy, perceived risk and trust, and usability issues are responsible for the low adoption of this payment method (Fontes et al., 2017). Besides their relevance for the subject, it is not understood the applicability of these studies to mobile ticketing solutions, especially in the public transport sector.

2.2   Mobile Ticketing Services

As mobile payment services, mobile ticketing requires the use of a mobile phone as well. Being so, m-ticketing is a solution that consists in the ordering, paying, obtaining and/or validating of a virtual ticket held on a mobile phone (Cheng, 2017). This new service provides the opportunity to "increase the efficiency of ticketing operations in the transport and entertainment sectors" (GSMA Association, 2011).

Mobile ticketing via mobile devices has the potential to reduce inconvenience, delay and cost of paying transit fares, by seamlessly linking fare payments to a debit/credit card or any other digital payment mechanism (Dutzik et al., 2013). However, users can feel disquieted about privacy, reliability and interaction issues of such solution ((Ferreira et al., 2014; Fontes et al., 2017).

2.3   Mobile Ticketing in Public Transport

Mobile ticketing in transport networks fills the purpose of buying and displaying tickets on mobile phones.

Mobile ticketing can be defined as a way to obtain "a virtual ticket that is held on mobile phones, tablets or PDAs and can be ordered and obtained from any location" (Puhe et al., 2014). As any ticketing system, "the ticket validation is required in order to use the service. Depending on the conditions of the ticket, it can be validated once, a predefined several times or indefinitely until a deadline" (Mut-Puigserver et al., 2012).

As so, in this dissertation the definition of mobile ticketing is the same considered in professor Marta Campos Ferreira PhD thesis (2018): "the use of a mobile device to purchase and/or validate a travel ticket or to initiate a journey. This definition includes the use of a mobile device to previously purchase and/or validate a travel ticket or to start a trip through a declared check-in or through a be-in/be-on scheme, whose information will then calculate the price to be paid for the journey" (See Figure 1).
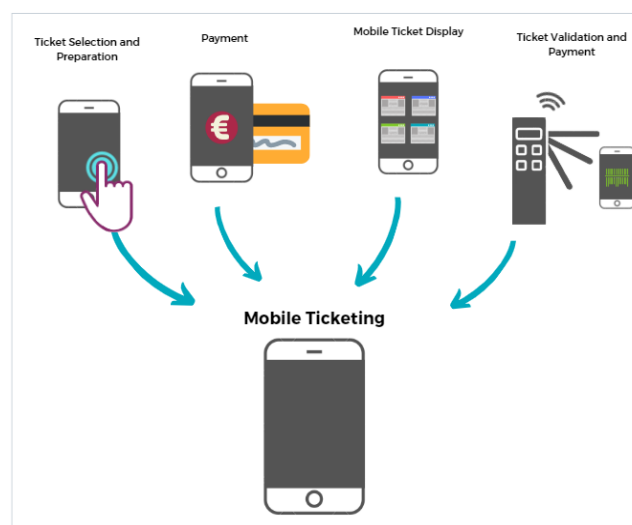
Figure 1 – Mobile ticketing services representation.

Technologies

Mobile ticketing solutions involve and can rely on more than one type of technology. Depending on the public transport network of the city where it is going to be implemented, the solution can be adapted. A research conducted by Gonzalez (2017) analysed twenty different public transport contexts and allowed to identify some of the most used technology in m-ticketing systems.

There are three main technologies which stand out due to their high use in different cities around the world: NFC, QR or Barcode and SMS (Gonzalez, 2017).

NFC is the most used technology for mobile payments in physical stores. However, in public transport systems, the lack of proper infrastructure and the complexity of multiple stakeholders have been obstacles. This contactless technology allows close proximity devices to connect with each other instantaneously and without any set up (Gonzalez, 2017).

To surpass the lack of NFC readers in poles and gates of some public transport networks, Public Transport Operators – which are the entities responsible for the operability of public transport – decided to combine NFC with other technologies. In Hong Kong, the model devised uses SIM card that works as an emulator and bridges the NFC to the technology built in the poles and gates (Gonzalez, 2017). In the Netherlands, for instance, users scan the physical smartcard they own and through the application buy tickets (Gonzalez, 2017). A mobile wallet is another model that requires NFC, allowing users to store their credit/debit card information in apps like Apple Pay or Android Pay and use smartphones to purchase the tickets (Gonzalez, 2017). At last, the combination of NFC with Bluetooth LE is a model used in Porto and was designed for networks in which users register their point of origin, by carrying the mobile near to the pole and are connected by Bluetooth to the transportation vehicle until they get out of it.

QR and Barcode are the most popular technology among PTOs, because of the reduced costs and the easiness of implementation. Users buy tickets through an application that automatically generates a QR or barcode which can serve for checking in and out or inspections (Gonzalez, 2017).

SMS model is one of the traditional mobile ticketing solutions and it is used in Prague and Antwerp. To buy tickets, everything users must do is send text messages to PTOs. This technology is limited because the encryption method is obsolete and there is difficulties associated with payment (Ferreira et al., 2014).

Besides the three mentioned in detail above, there are other models used for mobile ticketing in public transport networks. GPS tracking and ultrasonic sound waves are examples of the less common systems (Gonzalez, 2017).

Mobile Ticketing Benefits

Integrating mobile phones in the service delivery process is a mean to strengthen and tighten the relationships between Public Transport Operators and the costumers. These devices provide ubiquitous and remote access to payment services and the possibility to

avoid queues, unexpected need for payments, time pressure and lack of cash or loose change (Mallat, 2007).

In comparison with the current solutions, mobile tickets can be more advantageous. Paper magnetic stripe tickets are more likely to be lost and their intensive use demands them to be replaced very often. In this case, m-tickets are a more convenient and robust option (Ferreira et al., 2012). Contactless cards cannot hold more than one different ticket from one different PTO, while in smartphones, users can do that as well as manage their different cards and tickets anytime, anywhere (Ferreira, 2018).

Furthermore, mobile ticketing features allow PTOs to provide further services and thus, enhance customer experience and satisfaction, by reducing obstacles to ticket purchasing, validation, and inspection.

Mobile Ticketing Challenges

Despite being an innovative technology with clear benefits, a large number of mobile ticketing initiatives fail before they even reach and engage their intended users (Dahlberg, Guo, and Ondrus 2015). Several aspects must be considered as barriers to the expansion of m-ticketing solutions.

Mobile ticketing solutions are composed of different services (payment, transactions, etc.) which are almost always provided by different organizations. The complexity of the establishment of these services needs the involvement of many stakeholders, such as passengers, transport operators and authorities, mobile network operators, financial services organizations, technology and software providers, and government (Ferreira, 2018). All of the parts of the full ecosystem have their own personal interests that may collide with each other in terms of revenue sharing, customer ownership and support issues (Juntunen et al., 2010).

The implementation of mobile ticketing services expects a substantial amount of investment to cover the costs of establishment, operation and update of m-ticketing platform, upgrade of ticket vending machines, training of sales and train of personnel and upgrade or replacement of the existing ticket validation systems (Ferreira, 2018). Also, since introducing a new ticketing system does not eliminate the existing one, the costs of having to maintain both solutions may be considered as well.

Additionally, mobile ticketing systems make possible the gathering of many data regarding customers' personal information and travel habits. This, however, can become a challenge because it raises security and privacy concerns and demands expertise in Big Data analysis (Cerruela García et al., 2016).

2.4   Mobile Ticketing Examples Worldwide

Several public transport systems around the world have integrated mobile ticketing apps in their offerings to customers. This new solution - which does not replace the traditional methods of payment and use of transport at all - aims to make these services more attractive.

A benchmarking of mobile applications in the public transport sector was carried out and four apps used in different cities around the world were studied in detail: Octopus (Hong Kong, China), DB Navigator (several cities in Germany), MBTA mTicket (Massachusetts, USA) and TfL Oyster and contactless (London, United Kingdom). To see a detailed description of these mobile apps' operation, consult Appendix A to D.

It is noticeable that different mobile payment technologies can be adapted to specific services and respond to requirements in particular contexts. The current infrastructure and socio-cultural context have a major influence on the way mobile ticketing is thought of in each country, region or city. For example, DB Navigator is an automatic ticketing system, which works in Germany, given the free movement at stations. In contrast, Octopus had to create a complex process to allow free movement at public transport (Gonzalez, 2017).

Different business models generate different consumer experiences. Some services emphasize the pre-trip experience (consultation of schedules, stations and lines), while others value the process of purchasing tickets. However, it is difficult to determine how these differences in service affect the user, since in each location, users have a consequently different perspective and expectation of the service of transport and associated mobile payment (Cheng, 2017; Gonzalez, 2017).

The differences between technologies are significant, however between systems that use the same technological platform, it is possible to identify considerable discrepancies. The design of the user interface, the menu structure, services available, the existence of ads and the accuracy and reliability of the services are details that determine the user experience. In the case of DB Navigator, the different search options are an example of how a complex menu can be perceived as simple and easy to use since it meets the user's needs.

To optimize the user experience, issues related to technical and reliability issues need to be resolved quickly. In the case of TfL Oyster, the delay in validating tickets can easily be seen as a personal and social inconvenience. Design can though, help to combat these flaws. It is notable in the case of MBTA mTicket and DB Navigator that, even both based on QR technology, have different levels of user satisfaction (Gonzalez, 2017).

In short, the differences inherent to the socio-cultural and geographical context must be taken into account when designing a mobile ticketing and payment service in the transport sector. Still, the advantages and disadvantages of the different technological platforms must also be considered, since they determine the quality of the users' experience.

However, globally, this emerging technology appears to have some difficulty in fully accomplishing the purposes that motivated the implementation - attracting more people to public transport and simplify the use for current consumers. It is therefore urgent to define strategies for acquiring and retaining customers (Cheng, 2017).

2.5   Research Contributions

Even though the above-mentioned papers confirm that mobile payment and ticketing solutions deliver advantages for users and service providers, it is known that these systems usually fail to achieve sufficient consumer adoption (Slade et al., 2013). The

favourable points of using these solutions are well known by all the interested parties, even though, these are not the factors that lead to adoption, in the first place.

Moreover, the study about the Anda application performed by TIP allowed knowing that customers abandon the service at a stage of the process that for now remains unexplained. Whether by resisting the change from the traditional to the digital paradigm, by the type of technology used in these services or by factors that are external to the service, customer churn factors of mobile payment and ticketing solutions are yet to be discovered.

The proposed dissertation provides four main contributions. The first contribution is related to the state of art of mobile ticketing, as the dissertation provides an updated literature review about the topic. It details and compares the main technologies employed to use mobile tickets and demonstrates the main benefits and challenges inherent to them.

The second contribution is about the adoption factors that lead people to start using m-ticketing systems. By using Anda app as a case study, in the course of the dissertation it is figured the casual relationship between mobile ticketing solutions and the factors that drive their use. The third contribution, on the other hand, can be associated with the determinants that prompt the abandonment of the service.

The fourth and last contribution is related to the capture and retention mechanisms that can be proven as crucial to make consumers keep using mobile ticketing apps over time. During the elaboration of the dissertation, the existing methods are analysed, and a strategy is defined.

3   Problem Characterization

After reviewing in detail all the relevant sources about mobile ticketing and payment services, the problem of the proposed dissertation can be defined as follows. The study on customer churn factors applied to mobile ticketing services is very innovative since there are very few studies about the topic. Typically, studies are more focused on adoption predictions, but none define strategies to capture and retain customers. Analysis of mobile ticketing services already implemented, and levels of utilization is lacking in the literature and so the work to be developed gave rise to a scientific paper.

3.1   Mobile Ticketing in Public Transport Network

As mobile phones are deeply rooted in our current culture (Fontes et al., 2017) the growing of attention to this matter in the public transport sector is spreading around the globe. PTOs of the most developed economies are turning from using expensive infrastructures to ticketing the service through users' mobile devices (Fontes et al., 2017). It is known that across the globe, in more than 100 cities and metropolitan areas, mobile ticketing solutions are already in place or under development. The spread of the use of m-tickets services and the reasons behind the adoption of those remain unexplained until now.

3.2   The Andante Network in Porto

Metropolitan Area of Porto (MAP) is composed of seventeen municipalities in an area of 2.040 square kilometeres and has a population of approximately 1.7 million people (Área Metropolitana do Porto 2020). The public transport system is comprised of three subsystems: buses, light rail, and suburban trains. In 2012, to better integrate the three subsystems, it was created a multimodal public transport ticketing system, Andante. TIP is the entity accountable for integrating and maintaining Andante in MAP and is composed of Metro do Porto (light rail), Sociedade de Transportes Colectivos do Porto (buses), Comboios de Portugal (suburban trains) and many other PTOs.

The Andante card uses RFID contactless technology with which is only needed to bring the card closer to the validating machines in the metro and train stations or in buses. Users can purchase a monthly pass card or an occasional card if they only need it for a limited number of travels (Amorim, 2018).

Andante is a distance-based system since MAP is divided into geographic travel zones and the journey fare depend on the number of zones crossed during a trip (Dias, 2019). The more the number of zones travelled, the more expensive the ticket is.

Furthermore, Andante is also a time-based system because commuters can change the mean of transport – among the ones compatible with Andante - as many times as they want during a given period of time, but once the time is out, the ticket has no longer utility. The further the passengers go from their origin, the more time they have to travel and the more expensive the ticket is (Linha Andante 2020).

In April 2019, a tariff reduction support program (PART) was launched to attract more customers to the public transport sector. Governmental funding was given to transport

authorities so they can reduce the fare they charge to consumers. Therefore, new tariffs were applied and as *Passe Único Municipal* - up to three zones – costs 30€/month, *Passe Único Geral* – more than three zones – costs 40€/month (Área Metropolitana do Porto 2020).

The complexity of the system used by Andante makes it harder for users to be familiar with zones' borders locations and to understand how the crossing system works. Although it is not a proven theory, this cause may lead people who live in Porto not to choose public transport options.

3.3 Anda app

Following the example of other cities around the world and as a way of facilitating the use of the Andante network, TIP, in collaboration with FEUP, deployed the mobile ticketing application Anda. The development of the app started in 2016 but the launch only happened at the end of June of 2018.

By using the app, the Andante card is dispensable because all action required to travel in MAP public transport, from tickets purchasing to validation, can be done with a mobile device.

Anda disposes of a postpaid billing system, which allows users to travel as they wish, since they will only be charged at the beginning of the following month. Through this feature, Anda will charge the less cost-effective alternative for users, because the app calculates the optimal fare, based on the travels they actually do. While in some months, it might make sense to buy a monthly pass, in others, when the usage is low, users instead buy occasional travel tickets (Amorim, 2018).

By using Anda, the zoning system complexity disappears too. Once the m-ticketing solution is based on users' point of origin and final destination, it can identify the type of travel ticket needed without requiring any input from the users.

To use Anda is necessary to have a smartphone with NFC – because the technology is required to validate the app before the travel initiate – and an Android 5.0 operating system or higher. It is also needed to have access to Bluetooth considering that Andante
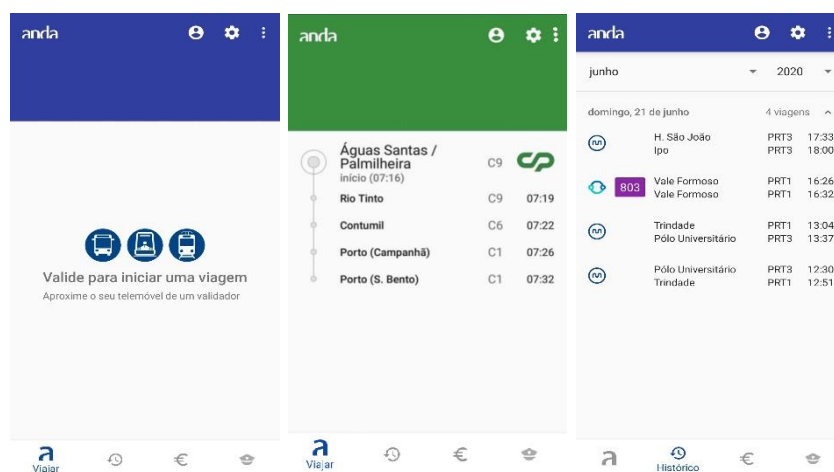
Figure 2 - Anda app screens.

network is a check-in be out system, Anda needs to connect with the vehicles to know where the user has started and completed the journey (See Figure 2.).

4   Methodology

This section is intended to present the work methodology followed to carry out this dissertation. First, the reasons for choosing this approach are justified and then the different stages of work are introduced.

4.1   Case Research Method

The method chosen to be followed in the elaboration of the dissertation is case research. As a qualitative method, case research uses as its basis case studies to fundament its results. It can include both data from observation and interviews and data from public and private archives.

The proposed dissertation intends to comprehend which are the adoption and churn factors of mobile ticketing applications, as well as define capture and retention mechanisms for these types of services. To conduct the research, the mobile app for public transport Anda will serve as the basis for an empirical study accomplishment. Several structured interviews were conducted to better understand users' relationship with the solution deployed in Porto. Users interacting with the app will also be tested throughout the investigation.

4.2   Steps and Procedures

The dissertation is composed of the different stages as shown in Figure 3. The sequence of the stages is the same as the one represented in the figure.
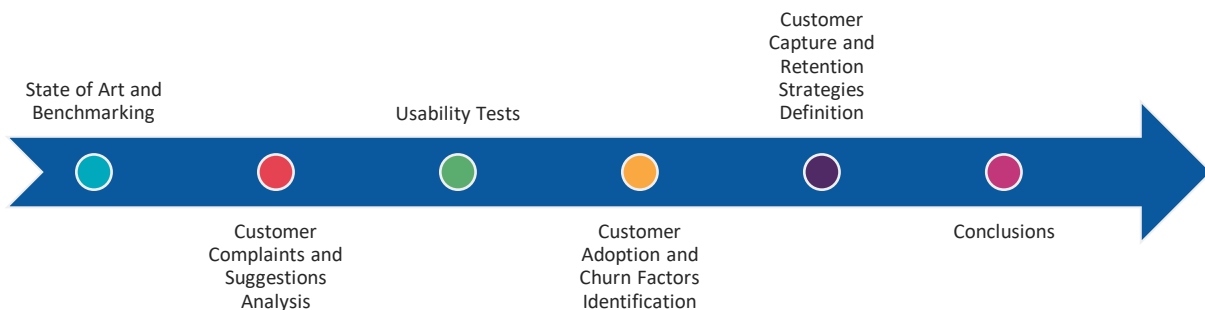
Figure 3 – Stages of the work.

State of Art and Benchmarking

The initial phase of the dissertation consisted of analyzing the existing literature on mobile payment and ticketing services. Solutions of this type already implemented in different cities around the world were evaluated and put into comparison. Thus, a state of the art and benchmarking of mobile ticketing applications for the public transport sector was carried out. The different capture and retention mechanisms used by these applications were also evaluated.

Customer Complaints and Suggestion Analysis

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In a second stage, the group of tasks to be performed comprised the analysis of complaints and suggestions from customers in relation to Anda.

The analysis included complaints and suggestions made by TIP customers to Anda over a period of 6 months - from September 2019 to February 2020. At this moment, in addition to the complaints data, data from the validations with the Anda application were also studied. That is, it was intended to understand the relationship between complaint-use. Complaints were analysed using MS Excel and RapidMiner software.

Also, at this stage - with the results obtained from it - a scientific paper was written and submitted for the EWGT 2020 conference.

Usability Tests

At this stage, usability tests to Anda were carried out. The tasks of this stage included, first, the definition of usability tests to be performed, the selection of users and the planning of test scenarios in context.

Second, Anda usability tests were carried out with eight participants. Of the chosen customers, four were regular users of Anda for over a year and four were people who had never been in contact with the application. Of the regular users, two people of the selected were users who had submitted complaints to the system during the period under analysis. The tests consisted of a pre-test questionnaire to characterize the participant, the performance of 16 tasks in the app and a post-test interview to understand the general feedback.

Finally, a careful and detailed analysis of the test results was carried out, highlighting the differences between the various types of users.

Customer Adoption and Churn Factors Identification

Subsequently, using the data obtained in the previous steps, the main adoption factors that lead people to start using mobile ticketing systems were identified. The churn factors that lead to service abandonment were also recognised at this stage.

Customer Capture and Retention Strategies Definition

In this step, a strategy was proposed to capture and retain customers of mobile ticketing applications. Considering the conclusions of the analysis of the complaints, the insights from the participants in the usability tests and the crossing of data from both methods, four fundamental stages of the service were established. For each of them, action strategies and performance indicators were introduced.

Recommendations and Conclusions

The final step included the preparation of recommendations for Anda, a summary of the main conclusions of this investigation, and opportunities for future research.

5   Customer Complaints and Suggestions

To have a better understanding of how to capture and retain customers, it is crucial to first evaluate and then become entirely informed of current users' behaviour. By identifying patterns of usage, as well as their tendency, it becomes easier to perceive the indicators of customers who are about to churn.

Customer feedback is a valuable tool to understand how the service has been communicated to current and potential users. Complaints analysis, for instance, enables the understanding of how users perceive the app and what are their expectations and needs regarding it. By that, it is easier to recognise the vital areas for customer communication improvement and therefore the service improvement as well.

5.1   Customer Complaints Handling by LinhAndante

In Intermodal Transport of Porto, all the interaction with the customer is carried out at Andante stores or through LinhAndante. Both emerged as part of the implementation of the Porto Intermodal System and aim to clarify any issue adjacent to Andante, whether by physical means - in stores - or through the helpline - LinhAndante.

Since LinhAndante is responsible for assisting and clarifying customers, its functions also include receiving, resolving, monitoring and responding to all complaints made to the service provided. This team is in charge of the treatment of any statement submitted, from the moment of its reception until its closing.

TIP recognizes the need for fairness, objectivity and impartiality, whether for the individual who complains or for themselves. In this way, LinhAndante bears the responsibilities of:

1- Inform the customer that the complaint is under analysis.
2- Register and classify the complaint on the Portal.
3- Forward the issue to Technical Teams, if necessary.
4- Ensure that the Technical Team follows up on the complaint's investigation, resolution and monitoring.
5- Inform the customer of the problem resolution.
6- Close the registration of the complaint.

Despite the efforts, in practice, the definition of responsibilities for each stakeholder is not as clear as necessary for the process to flow naturally. The communication failures between LinhAndante and the technical teams - which support the front office and back office of the systems operated by the TIP - are evident and are reflected in the quality service. The interaction between customer support teams and the various transport operators also influences the way customers perceive the application.

As a result of a little active leadership on the part of the TIP towards all Andante's and Anda's stakeholders complaints are not being properly addressed, nor are they subject to continuous analysis. In this way, a series of improvement opportunities are not being put into practice because there are no joining efforts in this direction.

5.2 Customer Complaints Analysis

In the past years, Anda has received numerous complaints for the most various reasons and on the most diverse issues. The object of this study is the complaints received by TIP over 6 months of use of Anda - from September 2019 to February 2020. The choice of this time interval is related to the fact that it is intended to study a normal period of use, with only regular updates to the app, but without major changes that would imply a greater influx of complaints.

The analysis included three main aspects: the complaints, the complainers, and the effects of the complaints on the usage of Anda. First, data on the complaints include the date when the statements were presented, the reasons which motivated them, the responsible transport operators, and the media through which they were submitted. Second, regarding the complainers, it is gathered information about their social profile – whether they belong to a specific age group or benefit from aids because of their social status – and about the type of ticket they most use. The information on the distribution of complainers over the different months was also collected. Finally, to assess the impact of the complaints on usage, data from app's validation history are considered.

To perform a descriptive analysis of the data gathered, MS Excel and RapidMiner Software were required.

5.3 Results of Customer Complaints Analysis

This section includes the results of the analysis performed. In the first moment, the data of the complaints is presented. This is followed by the presentation of complainers' characterization and in the end, the results focus on the cross of data from the history of usage of Anda app and the complaints data.

The complaints

During the period of time under analysis, the total of complaints Anda app received is at total 1223. Of those, only 68% (832 complaints) were submitted by different users, which means that 32% of the users complained at least more than once. To the date, the majority of those records (95,5%) are resolved and closed, but those which are still open require action by a third party – for example, external technical teams.

The problems that can arise in the use of Anda are several and can be categorized by the reasons that caused them. The main reasons are related to travel validation, login and register in the app, the correct completion of trips, the consultation of personal information, the associated tariff, and the disregarding of intermediate travel stops. Figure 4. shows the distribution of the main complaint reasons. Additionally, there are other reasons that can lead to a complaint - beacons, payment methods, questions, enrol, data change, improvement suggestions, inspection, and account deletion - but the total number of records with these reasons is not relevant to be considered in this study.

The Intermodal Transports of Porto is constituted of 11 public transport operators and Anda can be used in all of them. Besides that, it is important to mention that 76,3% of the complaints is not related to travel itself and to the operators, but to issues related to the app or billing. The complaints to the transport operators are 23,7% of the total.
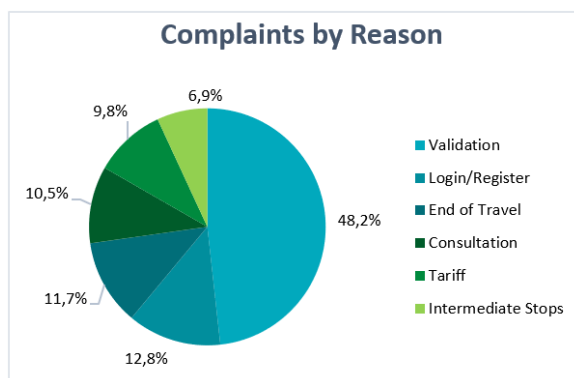
Figure 4 - Distribution of complaints by reason.

Anda's complaints can be submitted through the most varied means of communication, but two of them stand out for their great use: the app's crash report (64%) and email (32,5%). Among the rest are phone calls (3%), the official Facebook page (0,4%) and the Google Play Store (0,2%).

The complainers

The total number of Anda users from September 2019 to February 2020 is 5759 and 14% of them are complainers of the service. Usage data allows to know that, on average, about 3103 people use the app to travel on Porto's transport services per month. Likewise, it is also known that approximately 203 complaints are submitted per month. In Figure 5. it is verified that, over the studied period, the relationship between the number of users and the total number of complaints received remained practically constant.
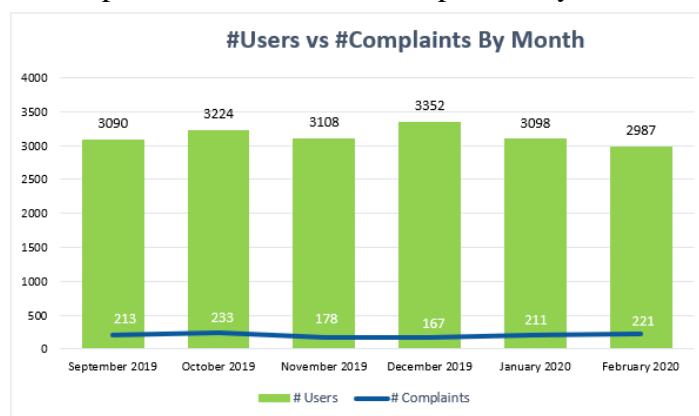
Figure 5 – Number of users vs number of complaints, per month.

Based on validation data, it is known what types of tickets were purchased by the complainers. The majority of people who complain buy single tickets (69,9%), i.e. for occasional trips. In Figure 6. shows the percentage distribution by different types of tickets. Additionally, TIP groups users by social profile according to their age group or

social status. Through the analysis of these data, it can be seen in Figure 7. that most of the complainers belong to the "Normal" social profile - which means they are adults who do not benefit from any type of discount. Among the remaining profiles are people who have lower rates (Social +), university students, students - under 18 - and seniors - over
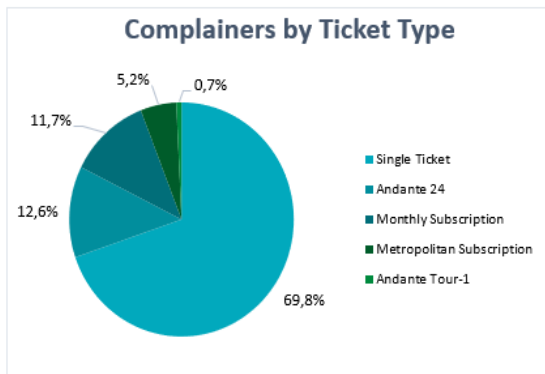
Figure 6 – Distribution of complainers by ticket type.
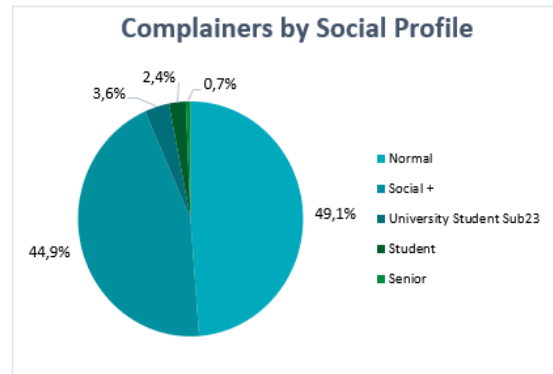
Figure 7 – Distribution of complaints by social profile.

65.

The distribution of users by social profile also allows knowing that the users who most complain are the "Normal" and "Social +". Also, Figure 8. shows that in all groups, the number of complaints is higher than the number of complainers, which, once again, reaffirms that there are users complaining more than once.
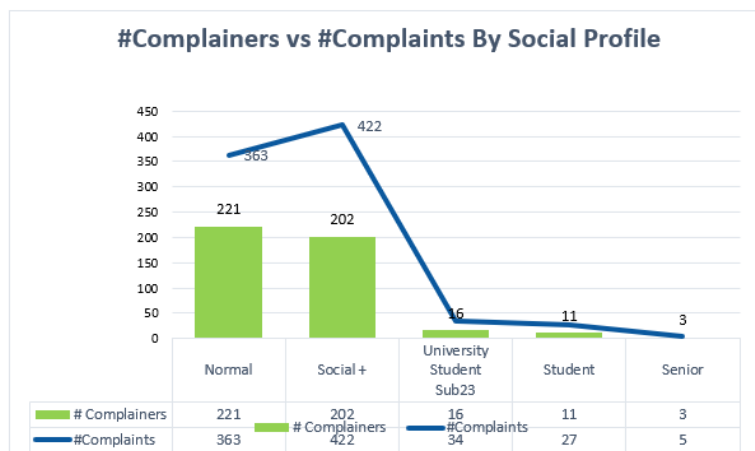
Figure 8 – Number of complainers vs number of complaints, by social profile.

The effects of the complaints

Finally, to understand the effect of complaints on the use of Anda, it is necessary to cross the data of both – complaints and validations. By knowing the complainers, it is noticeable their influence on the use of the application. Likewise, it is interesting to find out whether the use-complaint relationship is uni or bilateral.

When categorizing by type of users, as seen in Figure 9., it is possible to confirm that 78.7% of the complainers are people who use the app to make trips. However, 17,6% of app users complained without ever having used it – 9,9% complained before using it and

7,7% complained without ever having used it. In addition, 3,7% of complainers submit their statement at the time of their first trip. To deepen this connection, it was also assessed the use of the app on trips after the last complaint. In Figure10. it can be seen that the majority (79%) have continued to use Anda, but 21% have not done so again.
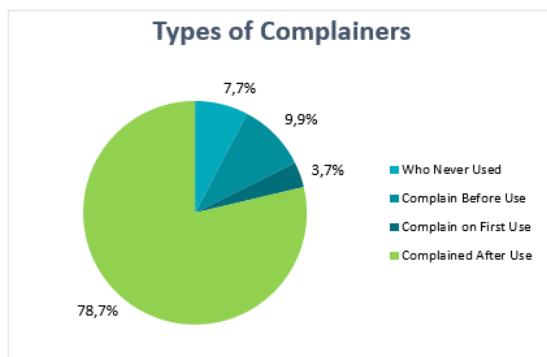
Figure 9 – Types of complainers.
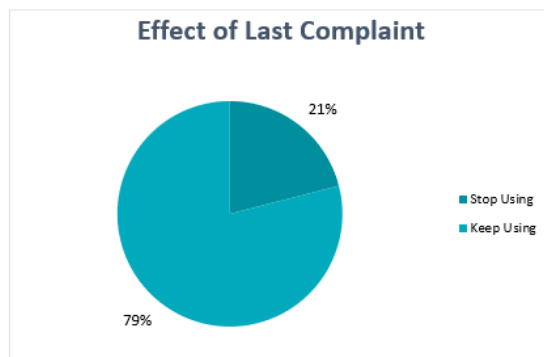
Figure 10 - Effect of the last complaint.

5.4 Relevant Factors in the Analysis of Customer Complaints

From the analysis of complaints made to Anda, several aspects stand out and might be at the root of the reasons that lead users to stop using the app.

Among the results obtained it is highlighted those which might become critical. The data regarding users who complain without having ever used the app are indicators that their first interactions with the service are not meeting their expectations. For technical or usability reasons, some users do not initially find the type of experience they were looking for and gave up on the app before actually using it.

Once familiar with the service, users need to be converted and start using it consistently and frequently. The data collected demonstrated that 9,9% of the complainers are people who complained before travelling with the app. Furthermore, 3,7% are users who complained right after using the app for the first time. If these values aren't taken into account and if these users are not motivated to give the service a new chance, it is very likely that they will churn it.

Likewise, attention is drawn to data on the number of complaints and the number of complainers for each social profile. While in the "Normal" profile the number of complaints per complainer is approximately 3/2, in the rest the values increase by about two times. This information can become relevant in the sense that users dissatisfied with the service tend not only to abandon it but to negatively influence potential new users. The more complaints a customer has submitted, the greater their dissatisfaction with the service.

At last, it is also important to consider the data concerning the effect of the last complaint submitted. That is, 21% of complainers have stopped using Anda since they made their last complaint. This aspect means that the reasons that motivated the complaint or the resolution obtained have become a reason to stop using the app. Thus, the likelihood of uninstalling the app increases, the more time has passed since the last time it was used.

6 Usability Testing

Usability testing is a tool intended to determine the extent an interface facilitates a user's ability to complete routine tasks. The test is conducted with a group of potential and current users, on-site. Users are asked to complete a series of routine tasks. Sessions were recorded and analysed to identify potential areas for improvement to the app and to the service. In Appendix E, there are some pictures of the usability tests performed.

6.1 Test Purpose

The usability test carried out on Anda was intended to determine the degree of easiness of the mobile ticketing app. It was intended to understand how intuitive the app is for new users - who had never been in contact with it - and at the same time, to identify problems in the daily interaction of the regular users.

The test results were expected to generate relevant and valuable suggestions to make the application clearer and more accessible to everyone who uses public transport. It was also expected that the test results in a list of usability problems that lead consumers to churn this type of services.

6.2 Sample of Users

As abovementioned, Anda is a mobile application that requires a smartphone with Android operating system, version 5.0 or higher, NFC technology and Bluetooth. It is meant for the public transport sector in the Porto metropolitan area and can be used in buses, light trains and suburban trains. So, target users are people who meet these requirements.

In carrying out the usability test, four people who use Anda on their usual trips - regular users - and four people who had never been in contact with the app - first-time users were selected. The choice of participants took into account some aspects that were relevant to be analyzed. Demographically, people of both genders and all age groups were selected in order to get in what sense the existing problems can result from generational differences.

Participants with different degrees of knowledge of the Intermodal Andante system were also chosen. On the one hand, it was picked participants who usually know and use this transport network, and on the other hand, participants who use public transport but on a less regular basis. All regular users chosen are customers who have used the app for at least a year

Another aspect that was considered when choosing test participants, has to do with complaints made to the app, during the period under review - from September 2019 to February 2020. From regular users, it was chosen some who had submitted complaints during that period and others that don't.

The demographic information of the participants, as well as their level of knowledge of Andante, and the complaints presented to Anda are detailed in Table 1 and Table 2 respectively.

| Age | First-Time Users | | Regular Users | | | |
| | | | Complainers | | Non-Complainers | |
	Female	Male	Female	Male	Female	Male
18-29	2	1	0	0	0	1
30-44	0	0	1	0	0	0
45-59	1	0	0	1	0	0
60 or more	0	0	0	0	1	0

Table 1 – Test Participants demographics.

	First-Time Users	Regular Users
Inexistent	0	0
Little	1	0
Reasonable	1	0
Good	1	1
Very Good	1	3

Table 2 – Test Participants knowledge of Andante system.

6.3 Test Environment and Role of the Administrator

Since the purpose of the test was to evaluate the issues that could arise during the normal use of the app, the test was carried out in context. It was performed with each participant individually. That is, only the user and the test administrator were present so that there was no external influence on the behaviors took.

For each participant, a trip was carried out, whose start and end stops were chosen by them. The means of transport used was also chosen by the users.

The test administrator was responsible for introducing the application to users, explaining the purpose of the test and how it would take place, reading the tasks and questions on the test form, asking for permission to recording audio and video, writing the answers and comments from participants, timing the completion of each task and taking notes of the behavior observed throughout the test.

Also, in the final part of the test, the test administrator was responsible for interviewing each user, in order to collect their opinion, highlights and insights towards the application.

6.4 The Test

The test administered to users was divided into three parts. The first part consisted of a pre-test questionnaire to characterize the participants. The purpose was to gather demographic information and information on the level of experience with the Andante system and Anda. Data on the name, email, phone number, age and sex were gathered. At the level of experience, familiarity with the Android operating system, knowledge about Andante, frequency of travel on public transport and experience and use of the Anda app were asked.

The second part consisted of asking users to perform a series of tasks in the application. They were asked to think and speak aloud while completing each task, in order to record their experience.

During the execution of the task, the time took to complete it was measured. In the end, participants were requested to rate the task in terms of difficulty and usefulness on a scale of 1 to 4, as shown in Table 3. The choice of a scale with an even number of options was to avoid neutral responses.

Scale	Difficulty	Usefulness
1	Very easy	Useless
2	Easy	Barely Useful
3	Difficult	Useful
4	Very Difficult	Very Useful

Table 3 – Scales of difficulty and usefulness of the usability test.

The tasks performed are those shown in Table 4. Although attempts were made to minimize the differences between first-time and regular user tests, there are differences that should be mentioned. In first-time users, the tests were not performed in a single day. Because of the tasks related to activating the payment method in the app took about 24 hours to happen, the tests had to be continued on another day. Thus, for these participants, the tasks of registering in the app, and inserting the payment method were performed on one day, and all the rest were performed on another. The tasks of registering in the app and inserting payment methods were not evaluated for regular users, because they've had already done so before.

	Tasks		Tasks		Tasks		Tasks
a	Start the app	e	Start a trip	i	Consult trip fares	m	Change password
b	Register in the app	f	Follow the trip	j	Consult travelling history	n	Simulate sending crash report
c	Insert payment method	g	Consult inspection screen (during the trip)	k	Consult inspection screen (after the trip)	o	Log out of the app
d	Consult payment details	h	Automatic trip end	l	Consult personal profile	p	Log in (with new registration data)

Table 4 - Usability test tasks.

The third part was of a post-test interview with focused questions and open-ended answers. The aim was to assess the overall perception of users regarding the app and its usability. Opinions were asked about the features they liked the most and the least. Likewise, suggestions for improvement and strategies that would be effective in acquiring new users were asked. It was also asked a question about the app's security and if they would suggest the app to someone who doesn't know it.

The complete form of the administered usability test is available in Appendix F.

6.5 Results of Usability Testing

The usability tests focused on evaluating the proposed tasks in terms of difficulty and usefulness. The results obtained can be seen in Figures 11 and 12 and are explained below in this section.

On average, the tests took around 30 minutes in their total. In first-time user tests, the first three tasks (open the app, register in the app and insert payment method) were performed in one day and the remaining 2 days later. All users were able to perform all tasks and in most of them, it took only a matter of seconds to complete them. There were no major difficulties when interacting with the application however, there are important observations to be pointed out for each task.

Start the app

The first task was to start the application in order to start using it.

All users found the task to be extremely easy and useful. Two of the first-time users mentioned that the fact that the app warns that it is necessary to turn on the location, Bluetooth and NFC is relevant because it avoids situations where users think the app is ready for validation when it actually isn't. Another user pointed out that the design is very simple and has no visually appealing elements.

Register in the app

The registration in the app consists of creating a user account. This task was performed only by first-time users.

The process was considered obvious and important. User comments were related to the fact that many pop-ups appear throughout the registration, making the process distracting and difficult to follow. Also, it was mentioned that it is inconvenient not to be possible to confirm the email directly through the app, but through a code sent by SMS message.

Insert payment method

This task consists of associating a payment method with the created user account. Once again, it was only performed by the first-time users.

Users felt that this function took too long, and it is not practical if they want to use the app right away. The fact that a bank reference is generated and must be activated in an ATM was pointed out as being an inconvenience.

One user also mentioned that if payment were activated immediately, Anda would become an interesting option for tourists in the city of Porto.

Consult payment details

This function complements the previous one and was performed by all participants after the payment method is working.

All users performed the task with great efficiency, however, in general, they consider that this function could be better exploited. One user noticed that this feature could show the

card number and the associated bank account instead of the information stating that the payment is active.

Start a trip

In this task, users were expected to validate the app to start a journey. This functionality was considered essential in the use of the app, though, the two types of users assigned different degrees of easiness.

Regular users found this task easy to perform but, they denoted that when validation fails, the app should indicate what is being done wrong. When the time to validate is short, and validation does not work on the first attempt, they feel it is more likely they will miss the bus, metro or train because they don't have any guidance to do the validation correctly.

In turn, first-time users rated this task as difficult because they felt they had no guidance at all while validating. Two of the novice users were unable to validate on the first attempt. One of these users - who performed the test on a bus - tried to validate the app on the validator furthest from the driver. Only after indications from the driver, the participant realized that only one of the bus validators works with the app, having failed to notice the sticker with the Anda logo that was on the validator that worked.

Follow the trip

This feature was based on tracking the app's events as the journey progressed.

Regular users did not find this function very valuable since they are used to following the route through the notifications that are generated. In turn, first-time users have attributed this function to a great utility. They said that it is very interesting when travelling in areas whose route is unknown and that allows a better perception of the time spent between each stop. Regarding this function, it was suggested to add a notification that warned about the proximity of the next stop.

Consult inspection screen (during the trip)

Consulting the inspection screen was related to accessing the information that should be presented if an inspector needs to confirm that the trip had been validated.

In this task, there were also differences between the types of participants. Regular users rated this function as easy and very useful. One user mentioned the fact that the design of this screen is not user friendly and has confusing information. First-time users found the function useful although they demonstrated difficulty in performing the task. Everyone considered that the icon was not explicit enough and that if it was accompanied by description it would be more intuitive. A user was inspected during the test and for that same reason needed help to present the screen to the inspector. All users found this screen relevant to the inspector but very little valuable to the user.

Automatic trip end

Having in mind that public transport in Porto has a check-in and be-out system, Anda had to be developed in order to automatically detect the end of each trip.

In this task, the users' opinion is cross-cutting to the two types under analysis. Everyone finds this feature very helpful, nevertheless, in none of the tests performed the application's behaviour was as expected. In all cases, the application took at least 10 minutes to assume the end of the trip after the participants left the vehicle. Users considered that it would be valuable to have a manual option to end the trip. In addition, two of the regular users reported events in which, because the trip did not end immediately after exiting the vehicle, the app continued to register stops when they continued the route by walk.

Consult trip fares

The purpose of this task was to consult the amount charged for the trip executed.

All users found this feature useful and easy to access because it allows greater control over monthly spending. The fact that the monthly fee of €0,10 is charged for a virtual card was mentioned by regular users as unreasonable and absurd since there are no expenses for a physical card.

Consult travelling history

The task of consulting the travel history was intended to check the list of all trips done with the app.

The assessment of the usefulness of this functionality varies according to the importance users attach to their own management. For those who like to control spending, travel times and areas travelled, this function is quite interesting. For those who just like to control the trip at the moment it takes place, this feature becomes unnecessary.

Consult inspection screen (after the trip)

Anda's main menu is static and as such all screens can be accessed whether in travelling or not.

The task of the consultation of inspection screen after the trip was intended to understand the relevance of this screen to users. All participants considered this display useless and insignificant. However, when performing this task, a user remembered that it might be helpful to have a tutorial on how to use the app and its main features when registering.

Consult personal profile

In this task, participants were asked to access information related to their user profile.

Everyone completed the task without any difficulty, yet they found this screen very useless in the normal use of the app. Users denoted that the information presented (name, email and phone number) is of no use to them since they know their own data. Regular users suggested the screen for the social profile should be merged with this one.

Change password

This feature was tested to understand how users navigate the app and interpret the pop-up messages that appear on it.

In this function, there were also differences in the behaviour of regular users and first-time users. While the experts did not attribute any difficulties to this task and considered it unusable, the novices made a different approach. For first-time users, this was one of the features in which they found more difficulty. The comments made have to do with the fact that it is not possible to see the characters as they are written. Users believe that there should be an icon that allows them to confirm the text entered. After confirming the password change, the participants brought up that the pop-up indicating the success of the operation is barely visible and appears for a short time on the screen. They think this message should be more visually appealing. Finally, a user noticed that changing the password is an insecure operation because it does not require any other confirmation mechanism. It was suggested to send an email as an alternative.

Simulate sending crash report

The task of sending a crash report was meant to understand how users can intuitively and autonomously make a complaint to the service through the app.

Again, the perception of regular users and first-time users is different. As mentioned above, two of the regular users selected are people who had already submitted complaints to Anda. This type of participants found this feature valuable but, they do not feel their feedback is valued. Some participants discussed that by not having an immediate response when they send a crash report makes them feel that they only will get an answer when they get in touch through another mean of communication. In turn, first-time users rated this feature as extremely relevant to the service, but very unclear. Two of the users said that they would not know how to use this feature if they wanted to make a complaint. In that sense, they suggested that there might be a section in the app which allow them to easily understand all the features. First-time users were also left with the perception that this means of communication with the TIP was inefficient and that the fact that an estimate of response time was not indicated conveyed the feeling that their feedback would not be analysed and considered.

Log out of the app

Again, the task of logging out the application was intended to assess how easily users navigate the system.

All users rated this task as very difficult. The fact that this function is presented within the section "Profile" is counterintuitive and makes it harder to close the app. Participants believe that this section should be displayed on the main screen. Regarding utility, first-time users feel that for security reasons, being able to easily log out of the app is important.

Log in (with new registration data)

The last task was logging in the app with the new registration data changed in one of the previous tasks.

All users found the function clear and useful and performed it without any issue. No further comments were made regarding this.
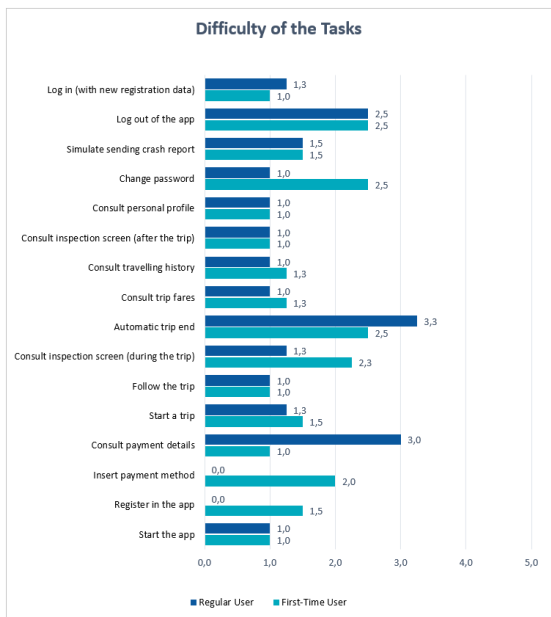
Figure 11 – Perceived difficulty of tasks performed.
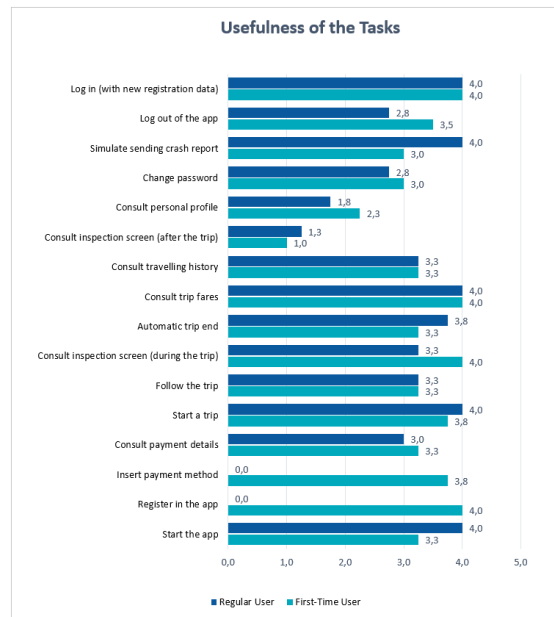
Figure 12– Perceived usefulness of tasks performed.

6.6   Relevant Factors of the Usability Test

After evaluating and analyzing in detail the results of the tests performed, it is clear that there are some concerns that must be addressed. Both regular users and first-time users have brought interesting insights to the table regarding the usability of Anda.

Through the performance of usability tests, the perception of a significant difference in the behavior of regular users and first-time users was clear. While the experts are very comfortable navigating the app and accessing the various screens available, consumers who had never been in contact with Anda felt more lost and insecure throughout the test. Behind this problem is the lack of guidance for users in the first interaction with the app. The necessity of a feature or a screen which explains how to use the app makes the entire user experience based on a long and time-consuming trial-and-error approach.

Another aspect mentioned by regular users as being inconvenient and unreasonable has to do with charging 0,10€/month for a virtual card. Since one of the great advantages of Anda is the possibility of optimizing fares and the amount charged at the end of each month, it doesn't make sense that there is an additional cost for a card that they actually do not use. The point is not related to the cost charged, but to the fact that regardless of how insignificant the value is, they are not given that benefit.

The technical problems resulting from the interaction with the app - whether it is the long activation time of the payment methods, the inability to end the trip automatically immediately, the difficulty in understanding whether the password has been changed, etc. - are concerns that must be addressed. The greater the number of usability problems that

users encounter, the greater their dissatisfaction with the app will become and consequently the greater the likelihood that they will churn the service.

The fact that users feel that sending a crash report will not be effective is also a problem that must be avoided. Complaints to the service are intended to understand the problems that arise during the use of Anda so that they can be resolved. When customers feel that their statements will not be analyzed and that their opinion is not relevant to the service, they can abandon the app.

Finally, in addition to the problems already stated, users said that the lack of exposure to the app is the main cause behind the little use of Anda. Regular users have reported that they commonly have to introduce and explain to other people travelling with them that it is possible to travel on TIP via a mobile ticketing app. In this sense, they consider that the execution of advertising campaigns directed to the different types of users - students, families, seniors, etc. - would be an asset.

7   Discussion and Research Contributions

In this section, the results of both the analysis of the complaints and usability tests to Anda are presented, analysed, and compared.

Based on the responses obtained, a series of factors for the adoption and churn of mobile ticketing applications were defined. A strategy for capturing and retaining customers was also proposed. Finally, recommendations for improvement were presented for Anda app.

7.1   Results Comparison and Analysis

The results of analysis of the customer complaints and the results obtained through the usability test open the ground for several reflections and sets the path for the future development of the mobile ticketing services.

Considering the behaviour observed in the usability tests of the first-time users, it can be stated that the feeling of uncertainty and confusion they experienced, did not allow them to enjoy great first use of the app. The fact that they did not have guiding instructions indicating the following steps, made the whole test based on a time-consuming approach in which the completion of the requested tasks was not carried out in a simple and intuitive way. There are users who complain without ever having used Anda to travel and that can be related to exactly a weak first interaction with Anda.

The better the first-time user experience (FTUX), the better the global perception of the service and the more quickly customers tend to carry out critical actions in the app. On the other hand, if the experience is poor and disappointing, the user tends to complain more and to stop using the app more easily.

Another point which is essential to be considered has to do with the strategies used to engage customers. Bearing in mind that a considerable percentage of complainers are known by stopping using the app after exposing a complaint, efforts should be made in order to motivate users to give the app a new opportunity. However, in the tests, regular users expressed displeasure with the fact that they were not given additional advantages for using Anda. As discussed in point 6.6 of this dissertation, the attitude of charging a negligible amount for a virtual card leaves them indignant.

When customers feel that they are not encouraged to continually use the app - whether through payment benefits or receiving individualized treatment - they can, once again, abandon the mobile app.

Customer dissatisfaction and the reasons behind it must also be a concern. The results obtained reflect that customers feel that the complaints presented to Anda have no effect and are not an element of analysis. The number of complaints by social profile proves just that. That is, in usability tests, it was perceived that, depending on the user's age, the hope that the service will function normally varies. While senior users submit complaints and wait for a response so they can continue to use the app, for younger users, if the complaints submitted by them do not have an immediate resolution, they become more likely to stop using the service.

In addition, dissatisfied customers can negatively influence potential new users. In order to create and establish a solid base of retained users, it is important to understand who the most displeased customers are and what aspects they complain about.

Finally, another concern that emerges from the results has to do with users who have stopped using the application because they feel that it does not match their needs and desires. These users should be given special attention because, as discussed above, behind their abandonment there can be several reasons. Noticing them can not only make it possible to recover lost customers, but also prevent other customers from churning the app for the same reason.

Customers, regardless of the service, need to feel that they are important. Upon receiving individual attention, such as through campaigns directed specifically at them - as suggested by users during the course of usability tests - it becomes possible to reverse the trend of churning and uninstalling the app.

7.2 Customer Adoption and Churn Factors

The main objective of this dissertation is to identify the factors that lead public transport customers to use mobile ticketing applications. In the same way, it is intended to identify the reasons that motivate the churn of the customers who're used to use them.

The analysis of complaints and usability tests gave rise to interesting inputs. Furthermore, the comparison of the results of the two chosen methods generated important reflections and made it possible to list a number of reasons for adoption and abandonment.

Therefore, the factors for adopting mobile ticketing are:

- The Accessibility of the Applications

Not only being able to travel but also paying for that using only a smartphone, is seen as a major trend in the future. Users consider that not needing a smartcard to travel and instead, being able to purchase the ticket, validating it and even presenting it for inspection on the mobile phone is an advantage.

- The Flexibility of the Apps

The fact that these applications are compatible with different transport operators and make it possible to travel on different means of transport - be it buses, subways, trains, etc. - with just the use of the smartphone it is extremely useful.

- It's Self-Service

Not having to go to a store or vending machines to purchase tickets is one of the main benefits of using these apps. Being able to avoid the queues to buy tickets is extremely convenient for users.

- The Sustainability of the Service

The fact that these apps are environmentally friendly and contrarily to traditional travelling methods do not require physical cards - in paper or in plastic - is also a reason why users choose these apps.

On the other hand, the factors that lead to the churn of mobile ticketing applications are:

- The Bad First-Time User Experience

The first contact with the application is essential. If at first users feel that the service provided does not meet their expectations, they will stop using it.

- The Recurrence of Usability and Technical Problems

The problems with mobile applications are normal to occur. However, if these problems have become recurrent and are not resolved soon enough, this is a reason for users to stop using the app.

- The Lack of Response to Customer Feedback

Following the usability problems that may arise, if users submit complaints to the service and therefore do not obtain a favorable response or resolution, it is possible that they will stop using the app.

- Depreciation of Customer Value

Customers of mobile ticketing applications like to feel that using these apps has some advantage over traditional methods. When m-ticketing customers feel that the app does not benefit them from traditional ticket customers, the first will stop using it.

- The Negative Influence of Lost Customers

Customers may abandon the service for several reasons. If the reasons for abandonment have to do with poor user experience, these lost users can communicate a wrong image of the app to current and potential customers leading them to abandon the service as well.

- The Lack of Advertising Campaigns

The lack of knowledge about the existence of m-ticketing apps is another problem that must be addressed. The discriminating factor towards people who use this type of apps in public transport in relation to a majority who use traditional tickets is a concern. Social pressure can lead users to abandon the service. The lack of mass and targeted advertising campaigns is at the root of the lack of consumers' awareness.

Several other reasons may be the basis of the adoption and churn of mobile ticketing applications. Depending on the experience each individual has, the reasons may vary, but based on the results obtained, it is known that these are the main factors to be considered.

7.3 Customer Capture and Retention Strategy

After studying the effect of the comparison between the results of complaints' analysis and usability tests, as well as the main factors of adoption and abandonment of mobile ticketing applications, there is an imperative need for a strategy to capture, acquire and retain new customers.

In this sense, four fundamental steps were identified in the process of using mobile ticket applications: user onboarding, user engagement, user retention and user reinstall (See Figure 13). For each stage of the lifecycle, the main aspects to be taken into account were identified and a series of tactics were established to increase the value of the service for the customers. The different customer segments, as well as the appropriate channels to reach them, were also considered in the recommendations made.

In addition, the critical success factors were identified as essential to provide a better experience of using the apps. Key performance indicators (KPIs) of the main functionalities of each stage were defined, allowing the measurement of the tactic's effectiveness.
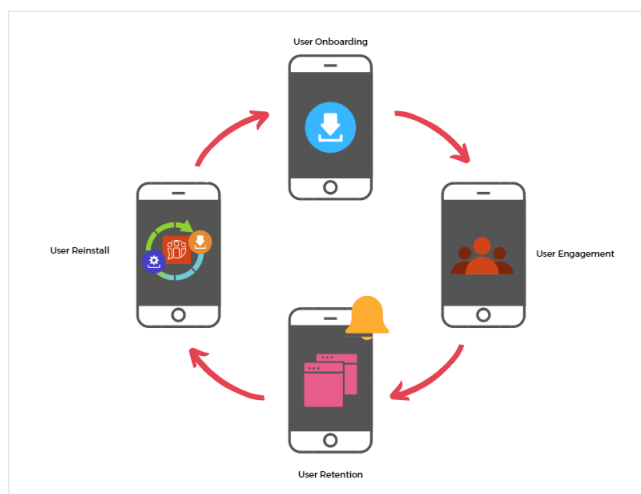
Figure 13 – Mobile ticketing applications usage lifecycle.

User Onboarding

One of the main questions that arises is the moment of the introduction of the service and the experience encountered by customers at that moment. The first perception of customers can be decisive in their adoption of the app. When a new user downloads an application and intends to use it immediately afterwards, it is crucial that all issues that may appear from the person-app interaction are covered. The global perception of the system will be better, the better the FTUX with the application. With a positive first understanding of the service, users tend to carry out critical actions more quickly, such as registering in the app, entering payment data, and effectively using the application to make and pay for trips.

To assess the efficiency and quality of the first interaction, Table 5 shows two examples of key performance indicators that can be measured at this stage.

KPIs	Description
Install to Registration Rate	Percentage of users who after installing the app create an account.
Average Time to Register	Average time that a new user takes to register and login.

Table 5 – User onboard KPIs.

Depending on the types of user, different tactics and channels must be considered.

Table 6 lists a series of tactics that can be put into practice. However, regardless of users, the application must present a welcome message on first use, encourage users to register by emphasizing the benefits of the service and display a brief demonstration of the app and its main features.

User Segment	Tactics	Channels
Installed but not registered	• Welcome users on the app and introduce the main features of the app. • Encourage the register in the first 24 hours. • Incentivize registration with rewards on the app (cashback, ticket discount).	• In-app Notifications • Push Notifications
Registered but not activated	• Welcome app users after the register. Incentivize them to complete the payment information. • Stimulate users to make their first travel using the app, with rewards (cashback, ticket discount).	• In-app Notifications • Push Notifications • SMS • Email • Reminders
Registered and activated	• Encourage greater use of the app with rewards (cashback, ticket discount).	• In-app Notifications • Push Notifications • SMS • Email • Reminders

Table 6 - Strategy to improve user onboard for different types of user segments.

Once fully integrated, users who immediately identify the value of the service are more likely to commit to it, use it more often and establish a long-term loyalty relationship. During the initial stage, it is essential that usage patterns and trends are identified, so that each customer appreciates a unique experience fully adjusted to their needs.

Some of the useful tactics promote the use of the systems by means of reward mechanisms - such as cashback (returning the customer a percentage of the amount he pays) - or by asking users about their preferences for using the service. Asking users to activate push notifications - which send personalized messages to each customer - expands access channels for potential customers. Sending special campaigns - for example, first-time usage discount - provides a more relevant experience, as users receive attractive offers of services that they regularly use.

User Engagement

After knowing the service and being familiar with its features, users of mobile ticketing apps need to be encouraged to start using them instead of the traditional mechanisms they are used to. Creating personalized campaigns to establish the involvement of customers makes them closer to the application and motivates their use. Thus, these customer engagement mechanisms are also the basis for their long-term retention.

The app may, for example, include special offers for the types of trips most often completed and updated information on monthly expenses through notifications in the app, as well as external channels such as push notifications, SMS, and emails.

At this stage of the process, the relevant metrics relate to the optimization of the campaigns created for each segment of users and to the most effective ways of addressing them. Table 7 suggests relevant KPIs.

KPIs	Description
Click-Through Rate - Push Notifications	Number of clicks made on the app, generated through a push notification.
Click-Through Rate – In-App Notifications	Number of clicks made on the app, generated through an in-app notification.
Click-Through Rate – Email	Number of clicks made on the app, generated through an email.
Average App Launch (per user, in a month)	Average number of times a user launches the app on their device, per month.

Table 7 – User engagement KPIs.

For a better and more proper acquisition of customers, different strategies must be directed to different users. Table 8 exhibits some examples. So, the service should encourage customers to complete actions in the app - whether they are entering payment information or making a trip - stimulating the commitment already established. Notifications with special offers are also useful to promote consistent use and inspire repeated interactions - for example, trips of the same type or with similar routes.

User Segment	Tactics	Channels
Onboarded but non-converted	• Urge users to make their first travel using the app – push different use cases at different times. • Create custom campaigns offering rewards for first-time users (cashback or travel discount).	• In-app Notifications • Push Notifications
First-time converted	• Confirm completion of first travel. Thank the choice of service, up to 5 min after it finishes. • Encourage users to keep using the app.	• Push Notifications • SMS • Email
Repeat converted	• Encourage continuous use through targeted personalized campaigns based on usage patterns. • Promote different services with rewards (cashback or travel discount).	• In-app Notifications • Push Notifications • SMS • Email

Users not completing actions (abandonment)	• Notify users 1 hour and 24 hours after they abandon a task.	• Push Notifications • SMS • Email • Reminders
No activity	• Remind users that have no activity in the app in the last 30 days.	• Push Notifications • SMS • Email

Table 8 - Strategy to improve user engagement for different types of user segments.

The growth of an application does not depend only on the acquisition of new users. Retaining current customers is equally crucial to the sustainability of any service.

Identifying users who do not launch the application for a long period of time and who do not complete actions on the app can be a way of identifying people who are about to churn the service. Thus, it becomes important to create a personalized and timely message strategy for each user, reminding them to use the app on their travels.

User Retention

It is known that in mobile ticketing applications, services tend to fail in retaining users. A consistent and constant customer base is the main foundation for the sustainable growth of any service. Bad interactions with the app and bad perceptions of the service reduce the retention rate. However, good user experiences can result in greater customer retention and the attraction of potential new customers.

The main indicators to consider in order to create a user base and drive continuous growth are related to the retention rate and the individual value that each customer has for the business. The KPIs for this step are shown in Table 9.

KPIs	Description
User Retention Rate	Percentage of users who installed the app and continue to use it actively.
Daily Active User Rate	Percentage of users who installed the app and actively use it every day.
Monthly Active User Rate	Percentage of users who installed the app and actively use it every month.
Estimated Customer Value	Estimated value of a customer's contribution to the business.

Table 9 - User retention KPIs.

With the purpose of optimizing retention, users can be motivated to repeat the same interactions with the application in exchange for discounts on regular trips or cashback of the amount to be paid monthly. Careful and attentive analysis to control the retention rates

of current and potential users must be carried out, as well as personalized promotional campaigns and a reminder of available offers. Table 10 shows the different strategies to be targeted at the different users in the retention stage.

User Segment	Tactics	Channels
Engaged but not loyal (hibernating)	• Communicate with the user and understand what's their perception of the app. Send messages to obtain an assessment of the service. • Send customized campaigns with "We miss you" messages.	• In-app Notifications • Push Notifications • Email
Engaged and loyal	• Ensure app rating and reviews. • Reward loyalty with travel discounts or cashback. • Notify users when new features are included in the app or when or service is unavailable.	• In-app Notifications • Push Notifications • Email

Table 10 - Strategy to improve user retention for different types of user segments.

There are several factors that can lead a customer to abandon service. However, this happens when users fail to see value in the application and therefore stop using it, in a short time. Data suggest that a decrease in activity and the existence of long periods of time without starting the app are early signs of churn and abandonment of the service.

The greater the user's inactivity, the greater the risk of uninstalling the app. By monitoring the churn of the app, following trends, and acting proactively with segments of users at risk, it is possible to reaffirm the value of the system and increase long-term retention. Re-engaging users who were inactive by sharing recent app offers or updating features can also be critical at this stage of the process.

User Reinstall

The reasons inherent to the uninstallation of a mobile application can be of the most varied types, from problems of interaction with the interface, inefficiency of functionalities, poor performance or disastrous user experience. It is difficult to know the exact reasons which lead a user to churn an app, but by monitoring uninstallation rates and seeking feedback from lost customers, it is possible to recover valuable information about the user's experience as a whole and thus prevent future uninstallations.

To recover users who uninstalled the app, sending promotional emails and creating remarketing campaigns to drive reinstallation can be valuable. In Table 11, metrics are associated with uninstallation and reinstallation rates.

KPIs	Description
Uninstall Rate	Percentage of users who uninstalled the app.
Reinstall Rate	Percentage of users who reinstalled the app.

Table 11 - User reinstall KPIs.

Recovering inactive or churned customers who uninstalled the app can be challenging, but there are some strategies that can be put in place to achieve this goal. Table 12 presents several examples. Carrying out an analysis of user behaviour, as well as requesting feedback from lost customers, enables the understanding of the friction points between them and the service and possibly eliminate them. To win back lost users targeted promotional offers can be put into action. In addition, the establishment of an exclusion policy avoids harassing users who do not wish to be contacted.

User Segment	Tactics	Channels
Converted but disengaged	• Run customized campaigns with the latest offers. • Update users' preferences. Suggestion on discounts based on new preferred routes. • Send reminding messages about the advantages of the service.	• Email
Churned	• Run personalized email survey seeking feedback to understand the reasons for app uninstall. • Run "We miss you" or "Check what your missing" campaigns, highlighting new promotions and cashback offers. • Run "We're just a click away" campaigns, following the suspension policy between 43rd to 50th days after uninstalling the app.	• Email
Re-acquired	• Run personalizes "Welcome back" campaigns, highlighting new promotions and cashback offers.	• In-app Notifications • Email

Table 12 - Strategy to improve user reinstall for different types of user segments.

7.4   Recommendations for Anda

The recommendations to Anda are essentially related to the recommendations made to mobile ticketing applications in general.

Understanding users is a fundamental aspect of any service. Whether through the analysis of complaints or usability tests, it is important to realize what perception customers have

of the service provided and thus use their inputs for continuous improvement of the service.

In order to rectify some of the failures in the complaints handling process carried out by LinhAndante, an Internal Complaints Handling Procedure was created. The objective was to create a set of good practices that regulate the way all elements of LinhAndante handle and manage complaints. In this way, problems of complaints without response are avoided and fixed. The full document is available on appendix G.

Other useful recommendations to Anda are:

- Restructure of marketing and advertising campaigns for the app.
- Identify the stages of the mobile ticketing app's lifecycle in which Anda is less efficient, through questionnaires and interviews.

7.5   Euro Working Group on Transportation 2020

Euro Working Group on Transportation (EWGT) is a conference which main targets concern "providing a forum to share research information and experience, encouraging joint research and the development of both theoretical methods and applications, promoting cooperation among the many institutions and organisations which are leaders at national level in the field of transportation, traffic and logistics" (EWGT 2020).

Within the scope of this dissertation, the opportunity to write and submit a paper for this conference arose.

The paper, entitled "Mobile Ticketing Customers: how to attract them and keep them loyal" was written by the author of this dissertation together with both supervisors, Professor Teresa Galvão Dias and Professor Marta Campos Ferreira.

In the document, customer churn factors of mobile ticketing services were studied, through the analysis of customer complaints data and usage history. A strategy was also proposed to capture and retain users, considering four stages of the lifecycle of mobile ticketing applications.

The paper was accepted in the first submission stage that had to do with the abstract and is currently pending acceptance of the final document. If accepted, the authors will have a chance to present and discuss it in Paphos, Cyprus, September 16-18, 2020.

8   Conclusion and Future Research

The main goal of the dissertation presented was to understand the churn factors of mobile ticketing services. To address this fundamental purpose, four research objectives were defined.

The first objective was concerned with understanding the data generated by the Anda mobile application. Through the results obtained it was expected to project the main findings in the remaining mobile ticketing applications for the public transport sector. The objective was achieved through the analysis of complaints made to Anda, during the period from September 2019 to February 2020.

This analysis, which consisted not only in the assessment of complaints made but in the crossing of this data with the data of the history of the app's use by the complainers. Through this study, it is clear that, in the context of Anda, the use of the app not only leads to complaints, but complaints negatively influence the use of the application itself. Thus, it was realized that the bilateral association between these two aspects is the basis of a series of reasons that lead customers to churn the service.

The second objective comprised the interpretation of Anda's lost, current and potential customers. Once again, the analysis of complaints, together with the performance of usability tests on four regular users of the app and four potential new users, made clear the perception customers have of the service.

Understanding customers is fundamental and essential in any service. By deepening the knowledge related to the image customers have of Anda, it was possible to identify a series of points for improvement. The analysis of complaints brought to the table the fact that there are customers complaining without ever having used the app to travel. In turn, usability tests contributed to making it clear that if the user experience is bad, the probability of customers not using the app is greater. The fact that complaints are not answered immediately, can also be decisive when abandoning the app.

The third objective had to do with the identification of the factors of adoption and churn of mobile ticketing services. The crossing of the results of the two analysis methods chosen allowed to discover that the reasons leading users to use mobile ticketing apps are: the accessibility of the applications; the flexibility of apps; being self-service; and being a sustainable service. On the other hand, the reasons that lead to the churn of these applications are: the poor first experience of use; the recurrence of usability and technical problems; the lack of response to customer feedback; the depreciation of customer value; the negative influence of lost customers; and the lack of advertising campaigns.

The fourth and final objective was to define a strategy proposal for capturing and retaining customers. The results consisted of identifying four fundamental stages in the process of using mobile ticketing applications: user onboarding, user engagement, user retention and user reinstall. For each of the stages of this lifecycle, the main concerns to be considered were listed, a series of tactics to reverse the abandonment trend and a series of KPIs to measure the efficiency of the strategies were used.

In general, all the proposed objectives were accomplished. At the end of the investigation, it became obvious that although the use of mobile applications in everyday services is a

trend in the future, it is necessary to establish a well-structured and adjusted to the sector business model so that its purposes are fulfilled.

From the point of view of the future, the methodology used, and the results generated open the door to further research. Applying this method to mobile ticketing applications in other cities or deepening the applicability of customer capture and retention strategy in a real context makes it possible to carry out other scientific work relevant to the areas of service design and management.

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APPENDIX A: Octopus App Description

Hong Kong has a comprehensive transportation system, which includes the Mass Transit Railway (MTR), trains, buses, and ferries.

Payment for public transport in Hong Kong is based on the Octopus card. This reusable card uses contactless technology and was launched to replace paper tickets. In addition to public transport services, this card is also used for other types of payments. The "pay as you go" system works on buses, ferry trains and minibuses.

Mobile payment was introduced in this system through an Octopus SIM card. In addition to the services of the mobile operator, the SIM card incorporates the Octopus card. It can only be used on smartphones with NFC and must coexist with an app where you can pay online.

Due to NFC technology, the iPhone and Apple Watch could not initially use this system. To fill this gap, a new application was later launched to complete the card technology. Thus, on iPhones, Octopus is now used, requiring a card reader device.

The application interface shows many types of payment, in addition to public transport, so the user experience is determined by much more than this service.

Positive aspects:

- Octopus is a well-established brand, with several services and widespread use.
- The service is perceived as easy, simple, and convenient. For example, just touching the smartphone opens the floodgates.
- The use of different widgets makes it easy to access relevant information.

Negative Aspects:

- Octopus' focus is not only on payment for public transport but payment for services in general.
- Impossibility to prepare trips in advance. Unavailability of schedules and information about the trips.
- The choice of colours does not positively influence user experience.
- NFC technology limits the service to users of high-end Android smartphones.
- The technology is perceived as unreliable, due to technical problems in the app and in the process of reading the SIM card by the smartphone and the reader in the floodgates.
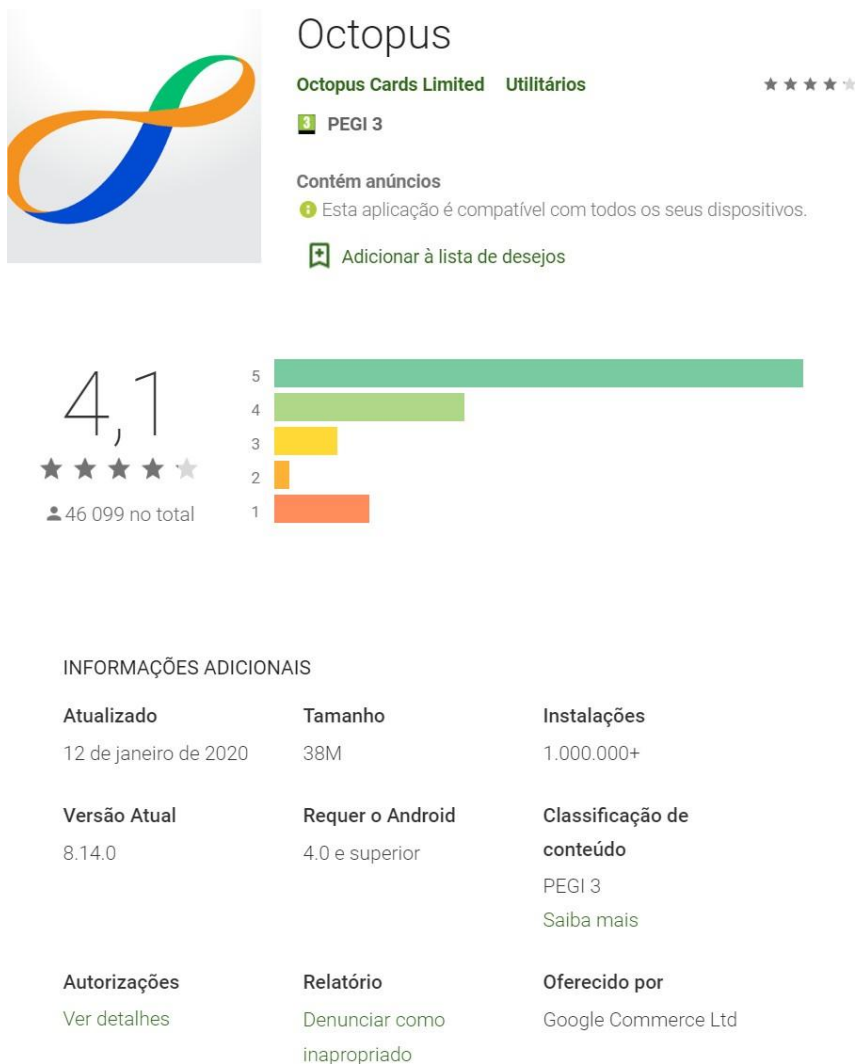
Figure 14 - Octopus App Information.

APPENDIX B: DB Navigator App Description

Deutsche Bahn AG (abbreviated DB, DB AG or DBAG) is a German railway company with an average of 1.8 billion passengers per year.

DB Navigator uses automatic ticketing for all DB rail services in Germany. The model consists of the free movement of users, through the use of tickets with QR code. Users can choose the ticket that suits them best in the application and pay later.

The application includes the pre-trip experience, providing complete maps, different forms of research and information in real-time (delays and cancellations). It is also possible to save favourite routes, places, and itineraries, which makes it easier to book tickets for frequent users. Based on favourites, the user can activate delay alarms. QR tickets do not need to be activated, they are only checked by an inspector on board. The application is available for iPhone, Apple Watch and Android smartphones.

In general, the service is evaluated positively by its users, but there are some considerations to be made.

Positive aspects:
- The app is supported on several Android and iOS devices, including Apple Watch.
- The travel planning process is seen as reliable. There is precision in schedules and information about stations.
- The use of widgets and shortcuts in the interface, allow users to manage the features according to their preferences.
- Easy access to information about the current trip, schedules, and stations.

Negative Aspects:
- Users expect "smart" features and reliable, accurate alerts in real-time.
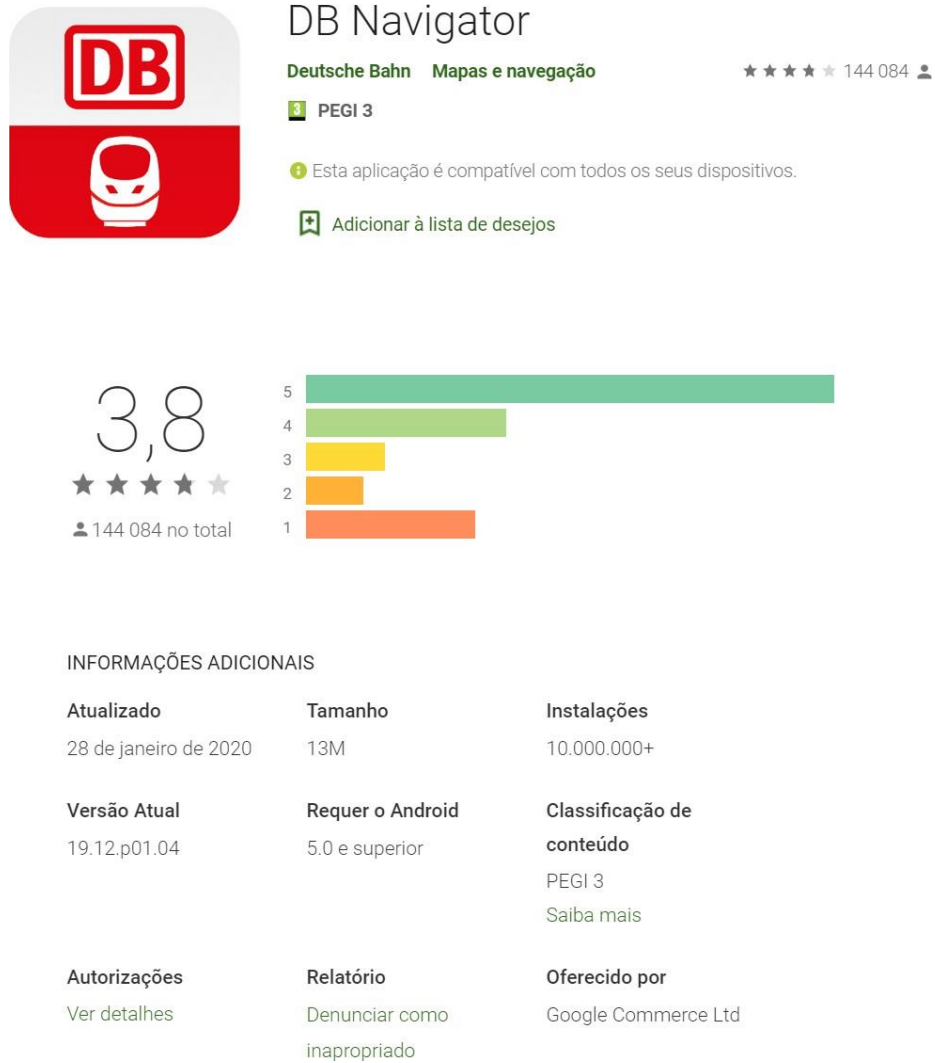- Frequent technical problems, especially during booking and research.

Figure 15 - DB Navigator App Information.

APPENDIX C: MBTA m TICKET App Description

The MBTA Commuter Rail system covers the Massachusetts Bay Transportation Authority transportation line that reaches the Boston region in the United States. The utilization rate in 2008 was an average of 143,700 passengers.

The mobile payment service consists of a model of automatic ticketing, with free passage. Payment is made through the MBTA mTicket application, which provides users with an electronic ticket with a QR code. The ticket must be activated before boarding the train so that the driver can easily check it.

The application uses the JustRide mobile ticketing platform, which includes cloud data management, the app's predefined design and QR technology to validate tickets. The system was implemented by Masabi.

The MBTA mTicket app is available for Android and iOS and includes extra services such as the map of the various lines and the time. From the point of view of the users of the app, there are positive and negative aspects that influence the user experience.

Positive aspects:
- Compared to paper tickets, mobile tickets are more convenient and practical.
- Buying is simpler and faster. No money is needed, and ticket purchase can happen at any stage of the trip.
- On the Android system, it has a rating of 4.2 points.

Negative Aspects:
- There are recurring technical problems and inaccuracy of the application. The application does not allow the user to redo an error (for example, through a refund option).
- The app does not predict for the user experience. It does not allow filters when searching for schedules or shortcuts. Always return to the home page, regardless of the stage of the trip and do not alert the user to the inactivity of monthly tickets.
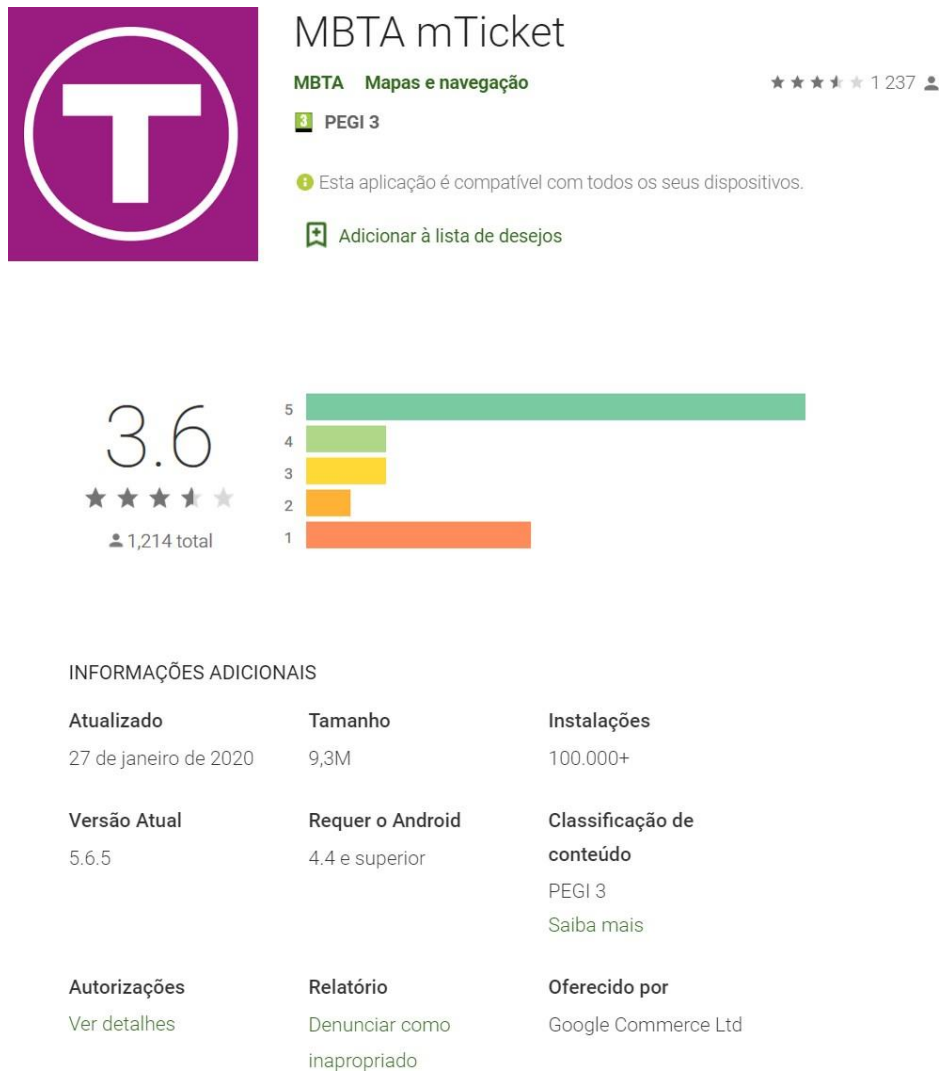
Figure 16 - MBTA mTICKET App Information.

APPENDIX D: TFL Oyster and contactless App Description

Transport for London (TfL) is London's transport system. Of all the services used daily, the metro is by far the most used service, with an average number of passengers of 4.8 million per day.

TfL uses a zone-based tariff system to calculate tariffs and variations between peak and off-peak times. Payment for travel can be made through the contactless payment system. This system includes not only contactless payment cards but also Apple Pay, Android Pay and Barclaycard.

Users have no need to buy tickets in advance and can still buy daily or weekly passes (the price of which is fixed, regardless of the number of trips made). Mobile payments are made mainly through Apple Pay and Android Pay. Both provide a mobile wallet, associated with a bank card. Once the system is configured for payment, it is possible to check-in and check-out only with the smartphone. The service is however restricted only to banks that have an agreement with Apple and Android. It is essential to always use the same payment method (smartphone or card).

Another possible problem is related to the smartphone battery. Once without a battery, the floodgates cannot recognize the payment device, and the app assumes that the user has incomplete travel history, charging extra fees for them.

The mobile wallet can be connected with a contactless device and with the Oyster account, allowing the user to check trips, receive email alerts and request ticket refunds.

The user experience can be affected by the mobile wallet service as a whole and not just for public transport payments.

Positive aspects:
- Both Apple Pay and Android Pay are easy to set up and use. The configuration and purchase steps are short, as well as checking in and out.
- The novelty of technology positively influences the user experience.

Negative Aspects
- The service is limited to high-end smartphones.
- The technology may fail in the floodgates for different reasons (NFC or poor readers).
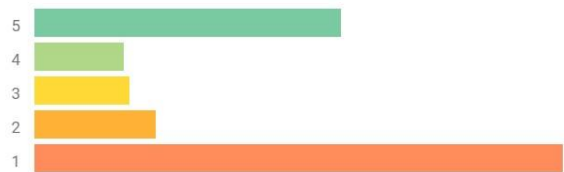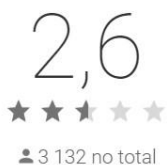- Verifying the e-ticket takes longer than verifying Oyster cards.

Figure 17 - TfL Oyster and contactless App Information.

APPENDIX E: Usability Test Pictures
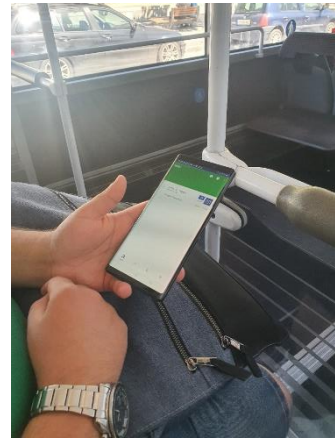
APPENDIX F: Usability Test Form

Teste de Usabilidade – Aplicação Móvel *Anda*

1. Identificação do/a Participante:

Nome:_____

Email: _____

Nº Telemóvel:_____

Idade: ☐ 18 a 29 ☐ 30 a 44 ☐ 45 a 59 ☐ 60 ou mais

Sexo:

☐ Feminino ☐ Masculino

Nível de experiência:

1. Há quanto tempo utiliza um *smartphone* de sistema operacional *Android*?

☐ Nunca utilizou ☐ Até 3 meses ☐ Entre 3 e 12 meses ☐ Mais de 01 ano

2. Quão bem sente conhecer o sistema *Andante* (sistema de zonas, duração de viagens, tipos de tarifas, etc.)?

☐ Não conheço ☐ Pouco ☐ Razoável ☐ Bem ☐ Muito Bem

3. Com que frequência viaja de transportes públicos*?*

☐ Nunca ☐ 1 a 10 vezes/ ano ☐ 1 a 5 vez/ mês ☐ 1 a 5 vez/ semana

4. Há quanto tempo conhece a aplicação *Anda*?

☐ Não Conheço ☐ Há 3 meses ☐ Entre 3 e 12 meses ☐ Há mais de 1 ano

5. Há quanto tempo utiliza a aplicação *Anda*?

☐ Nunca Utilizei ☐ Há 3 meses ☐ Entre 3 e 12 meses ☐ Há mais de 1 ano

2. Tarefas:

As tarefas devem ser lidas em voz alta. Enquanto as resolve, deve também pensar alto.

No final de cada tarefa deve classificar de 1 a 4 a **dificuldade** e **utilidade** da função da aplicação utilizada,

Assim,

Dificuldade: 1- Muito fácil; 2- Fácil; 3- Difícil; 4- Muito difícil;

Utilidade: 1- Não é útil; 2- Pouco útil; 3- Útil; 4- Muito útil;

a. Abra a aplicação *Anda*.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

b. Crie um registo na aplicação.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

c. Insira seus dados para pagamento.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	

Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

d. Consulte seus dados para pagamento.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

e. Inicie uma viagem na aplicação.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

f. Acompanhe a sua viagem na aplicação.

O que entende por esta informação das paragens que surgem no decorrer da viagem?

Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

g. Consulte o ecrã de fiscalização (durante a viagem). O que pensa das informações apresentadas?

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

h. Após chegar ao seu destino, ao afastar-se da estação, a aplicação deve encerrar a viagem automaticamente. O que acha desta funcionalidade?

Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

i. Consulte o valor que tem a pagar pela viagem que acabou de realizar. Como interpreta esta informação? (ex.: "**1x** Título de Viagem Z2").

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

j. Consultar o histórico de viagens.

Descreva a informação apresentada e como a percebe.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

k. Consulte o ecrã de fiscalização (fora de viagem). O que acha da informação apresentada?

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

l.   Consulte seu perfil

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

m. Altere a sua palavra-passe.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

n. Simule o envio de um relatório de falhas na aplicação. O que pensa desta funcionalidade?

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

o. Faça *logout* da aplicação.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

p. Faça *login* na aplicação utilizando os dados registados anteriormente definidos.

Tempo (segundos)	
Dificuldade (1 a 4)	
Utilidade (1 a 4)	
Comentários (comentários verbais do utilizador, erros de seleção de menus, dificuldades, …)	

Entrevista:

a. O que achou da aplicação móvel *Anda*? Útil, com pouca utilidade? Porquê?

R:

b. O que mais gostou na aplicação? E o que menos gostou?

R:

c. O que achou confuso ou difícil no uso da aplicação?

R:

d. O que acha da segurança da aplicação?

R:

e. O que sugere para melhorar a aplicação?

R:

f. Que opções gostaria de ter disponíveis que a aplicação não tem?

R:

g. Recomendaria a aplicação a alguém?

R:

h. Que estratégias julga serem pertinentes para adquirir novos utilizadores?

R:

Formulário de Consentimento

Testes de Usabilidade – Aplicação Móvel Anda

Com este consentimento, eu _____, dou permissão para a gravação (áudio e vídeo) da realização do teste de usabilidade e posterior análise todos os dados que daí resultarem. O áudio e o vídeo serão utilizados apenas durante o período de análise. O nome e o contato de cada participante serão utilizados apenas para posterior comunicação entre a administradora do teste e os participantes, sendo que a identidade do participante permanecerá anónima.

Data: ____/_____/_____

Assinatura: _____

APPENDIX G: Internal Complaints Handling Procedure

Faculdade de Engenharia
da Universiade do Porto

Transportes Intermodais
do Porto

Maio 2020

Autores

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INTRODUÇÃO

Objetivo

Este procedimento define os princípios de boas práticas e formas de atuação que devem reger o tratamento de reclamações recebidas pela LinhAndante. Visa:

- Fornecer um procedimento interno de tratamento de reclamações eficaz, eficiente, equitativo e acessível.
- Fornecer à LinhAndante uma estrutura clara para o tratamento de reclamações de acordo com as suas obrigações legais e morais.
- Reconhecer, aperfeiçoar e proteger os interesses dos clientes da LinhAndante, bem como gerir as necessidades e expectativas.
- Identificar, por meio de análise, avaliar e rever reclamações, oportunidades de melhoria da qualidade do serviço, bem como do processo de tratamento de reclamações.
- Aumentar o nível de satisfação dos clientes com o serviço, promovendo um relacionamento de mutuo benefício.

Âmbito de Aplicação

O documento deve ser utilizado por todos os colaboradores da LinhAndante responsáveis pelo processo de tratamento de reclamações de clientes. Aplica-se a todas as reclamações adjacentes aos serviços prestados pela LinhAndante, incluindo serviços da aplicação móvel Anda.

Documentos Associados

A este documento devem estar associados todos os documentos internos que definam o procedimento de atuação na prestação de serviços da LinhAndante.

O Manual de Instruções das Lojas Andante e o Manual de Instruções do Anda devem também ser consultados neste âmbito.

CONDIÇÕES GERAIS

Política de Gestão de Reclamações

A LinhAndante compromete-se a promover a satisfação dos seus clientes, encorajando todo e qualquer feedback da sua parte. As reclamações devem ser interpretadas como oportunidades de melhoria da qualidade do serviço, através das quais facilmente se poderão identificar e atingir as necessidade e expectativas dos utilizadores.

O procedimento interno de tratamento de reclamações reconhece a necessidade de equitabilidade, objetividade e imparcialidade para o indivíduo que reclama e para a organização contra quem a reclamação é feita. Desta forma, a LinhAndante deve garantir a resolução das reclamações recebidas, assim como reconhecer o direito de que estas sejam tratadas de forma diligente, justa, eficaz e eficiente.

As reclamações, sejam elas apresentadas sob a forma verbal, escrita, ou por meio da aplicação, devem ser sujeitas a uma análise e categorização detalhadas, resolvidas dentro dos limites temporais estabelecidos e preceder sempre uma resposta formal escrita ao utilizador. Devem ainda conter, no seu registo, toda a informação necessária para a prestação de esclarecimentos aos cliente, em qualquer etapa do processo.

Todos os colaboradores responsáveis por receber, tratar e responder às reclamações têm o dever de estar a par do presente documento que regula e normaliza o seu papel e responsabilidade perante qualquer reclamação.

Um desenho do fluxo do processo de tratamento de reclamações, independentemente da via por que chegam, é possível de ser visualizado no Anexo A deste documento.

Responsabilidades

A LinhAndante está encarregue pela receção, tratamento, monitorização e resposta a todas as reclamações do serviço prestado.

Todas as tarefas relacionadas com as reclamações da LinhAndante são geridas por toda a equipa, desde o momento de receção até ao encerramento. Nesta equipa a distribuição de tarefas ocorre de forma rotativa - mensal, ou bimensalmente – pelo que a pessoa encarregue de gerir as reclamações nem sempre é a mesma.

Assim, cabe ao recetor de uma reclamação efetuar o seu registo no Portal, de modo a que qualquer pessoa possa dar o devido seguimento a uma dada reclamação. Da mesma forma, o cliente deve ser imediatamente informado de que a sua exposição se encontra sob análise. Após esta estar solucionada, o recetor deve comunicar ao cliente – com linguagem clara e acessível – o sucedido, lamentando a situação e agradecendo-lhe por contribuir para uma melhoria contínua do serviço. Ainda que não seja sempre responsável pelas reclamações, um recetor de um registo é sempre o principal interessado na sua resolução. O fluxo do processo termina quando o recetor altera o registo da reclamação no Portal para "fechado".

Caso uma reclamação não possa ser resolvida no momento da sua receção, deve ser reencaminhada para as equipas respetivas. Se o problema mencionado estiver relacionado com equipas técnicas, a reclamação deve ser encaminhada para a Card4B e/ou OPT. Por sua vez, estas devem investigar as causas de origem e, se necessário, solucionar o problema. Uma vez resolvido, o problema deve ser monitorizado durante um intervalo de tempo adequado a cada situação. Caso a falha não se volte a manifestar, as equipas técnicas devem comunicar ao recetor da reclamação a resolução das reclamação, assim como as medidas corretivas que foram necessárias tomar.

Ao Supervisor da LinhAndante cabe a promoção de um debate frequente sobre os principais temas reclamados. Uma discussão com todos os elementos deve ser agendada mensalmente, para que os principais motivos na origem das reclamações, bem como as suas propostas soluções, possam ser discutidos. O objetivo é a identificação de pontos claros de melhoria do serviço que possam ser comunicados ao grau hierárquico superior, e consequentemente ser posto em prática.
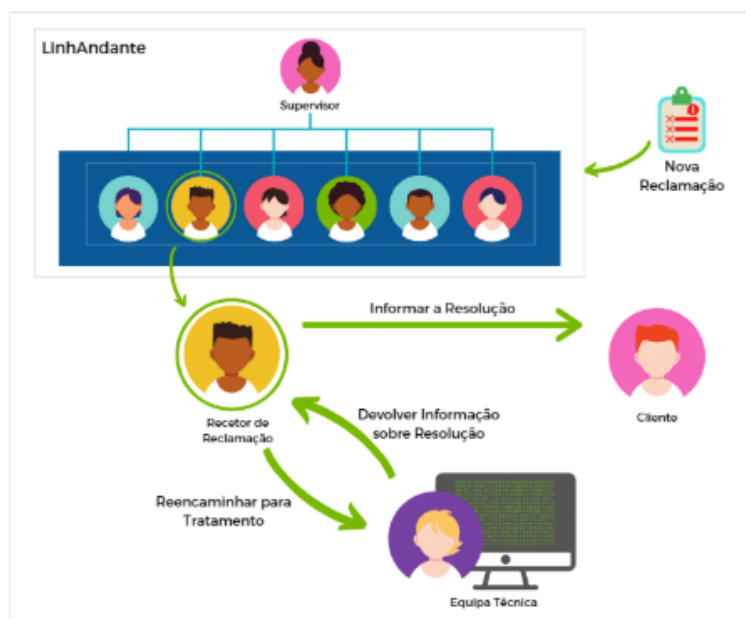
Figura 1: Responsabilidades perante as reclamações

Formas de Contacto com a LinhAndante

As reclamações verbais podem ser apresentadas por via da linha telefónica, através dos números de telefone 808 200 444 e 226 158 151. O horário de atendimento é: Dias úteis entre as 8h às 19h; Sábado entre as 9h-13h.

As reclamações escritas podem ser apresentadas sob a forma de:
- Folhetos de reclamação
- Livro de reclamações;
- Email:
cliente@linhandante.com e Anda@linhandante.com
- Facebook oficial:
https://www.facebook.com/Andante-313649548837422/

- Google PlayStore:
https://play.google.com/store/apps/details?Id=pt.opt.anda

As reclamações por meio da aplicação podem ser enviadas por meio de um relatório de falhas da aplicação Anda.

Todos os clientes que tenham efetuado uma reclamação podem a qualquer momento pedir esclarecimento sobre o estado em que esta se encontra.

Figura 2: Meios através dos quais se recebem reclamações na LinhAndante

MODO DE ATUAÇÃO

Reclamações Verbais

Uma reclamação verbal deve ter seguimento imediato, ou no máximo no dia seguinte, sendo particularmente urgente a resolução de um conflito relativo a situações ainda em decurso. Idealmente esta resolução deve envolver a ação ou orientação do Supervisor.

Sempre que sejam solicitadas deverão ser fornecidas ao utilizador indicações para que a reclamação possa ser formalizada por escrito. Esta prática deverá ser preferida nos casos de particular complexidade.

As reclamações verbais devem ser sempre registadas, para efeitos estatísticos de modo a que mais facilmente se verifiquem ocorrências sucessivas relativamente a determinada matéria.
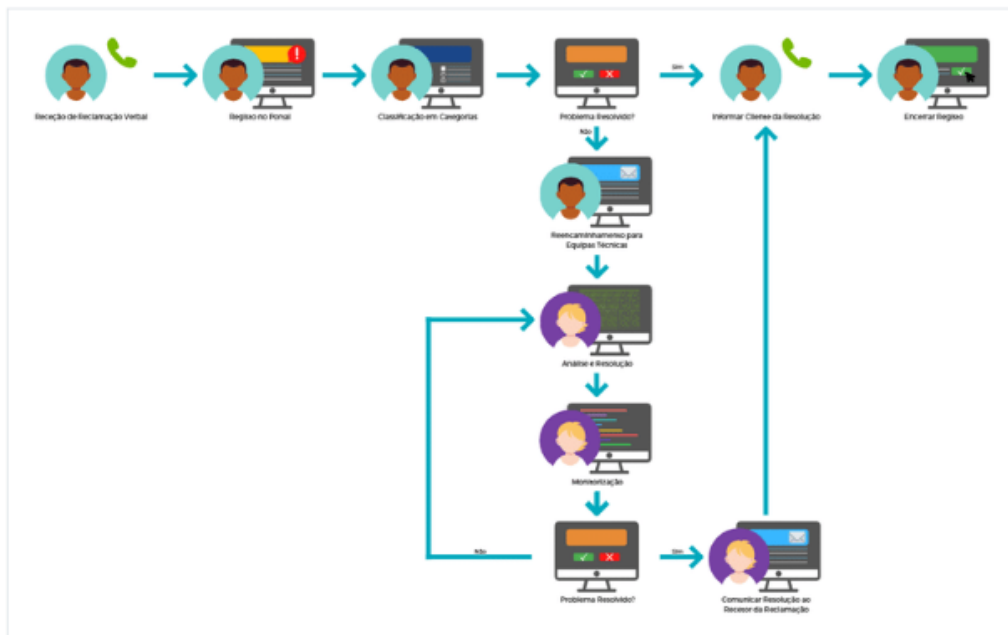

Figura 3: Tratamento de Reclamações Verbais

Reclamações Escritas

A LinhAndante pode receber reclamações escritas por meio de folhetos de reclamação, livro de reclamações, email, Facebook oficial e Google PlayStore. Imediatamente a seguir à entrada de uma nova exposição, o cliente deve ser informado de que a sua reclamação se encontra sob avaliação.

Posteriormente, o colaborador da LinhAndante designado para o tratamento das reclamações deve efetuar o registo no Portal, classificando-o de acordo com as categorias com que se relaciona. A primeira análise deve seguir-se de uma de duas ações: o cliente é informado da resolução do seu problema e a reclamação é fechada; a reclamação é reencaminhada para as equipas técnicas que analisarão em detalhe o problema, resolvê-lo-ão e monitorizarão o seu comportamento, devolvendo ao recetor da reclamação a informação sobre as ações corretivas aplicadas, caso a falha já não se manifeste. O recetor deve, uma vez mais, informar o cliente da resolução da sua exposição e assinalar o registo como encerrado.

Etapa	Decrição	Responsabilidade	Input/Output
1. Receção da Reclamação	A Reclamação é efetuada pelo cliente sob forma verbal, escrita ou através da aplicação.	LinhAndante	Nova Reclamação
2. Informar o Cliente do Tratamento da Reclamação	Informar o cliente de que a Reclamação se encontra sob análise.	Recetor da Reclamação	Resposta ao Cliente
3. Registo e Classificação da Reclamação	A Reclamação é registada no Portal e classificada por motivo, operador e meio de receção.	Recetor da Reclamação	Registo Portal
4.Reencaminhamento para Equipa Responsável (se aplicável)	Se for necessário ação das Equipas Técnicas, a Reclamação é reencaminhada.	Recetor da Reclamação Equipas Técnicas	Email com Informações da Reclamação

| Etapa	Decrição	Responsabilidade	Input/Output
5. Investigação e Resolução da Reclamação (se aplicável)	A causa que motivou a reclamação é investigada e resolvida.	Equipas Técnicas	Reclamação Resolvida
6. Monitorização das Ações Corretivas (se aplicável)	O problema deve ser monitorizado, após resolução. Se se manifestar, deve ser efetuada a etapa 5.	Equipas Técnicas	Reclamação Resolvida
7. Resposta ao Cliente	O Cliente deve ser informado da resolução do seu problema e das ações tomadas.	Recetor da Reclamação	Resposta ao Cliente
8. Encerramento da Reclamação	O registo da Reclamação no Portal deve ser encerrado.	Recetor da Reclamação	Registo no Portal Resolvido
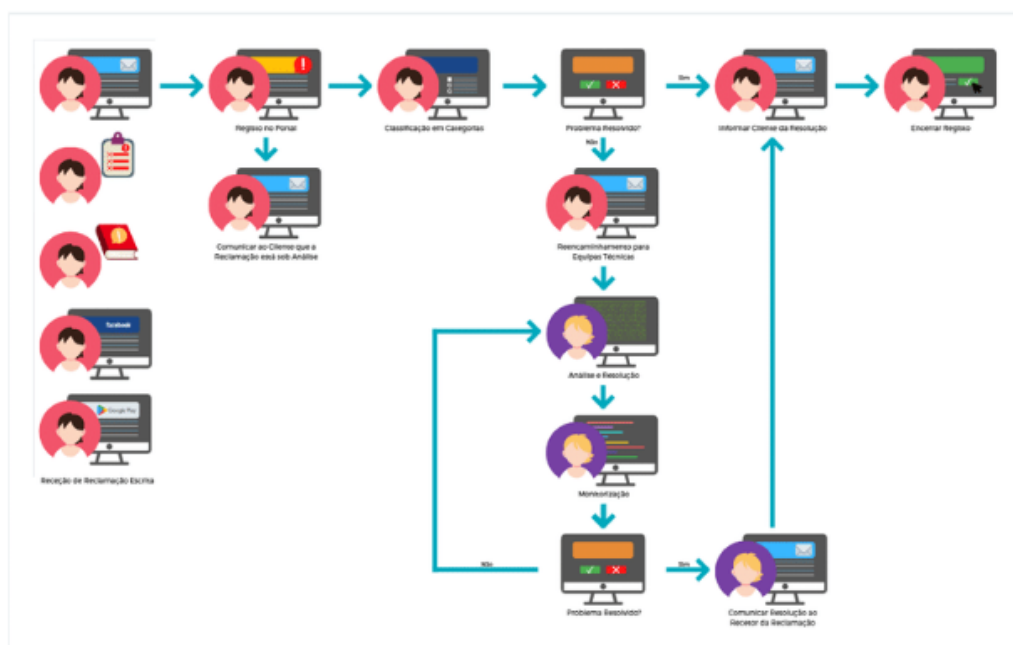
Figura 4: Tratamento de Reclamações Escritas

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Reclamações Por Meio da Aplicação

As reclamações por meio da aplicação Anda ocorrem quando os utilizadores selecionam a opção "Enviar Relatório" no menu de Definições da app. O sistema gera automaticamente um documento predefinido com informações relevantes acerca do tipo de dispositivo e do histórico de utilização. O utilizador pode ainda adicionar um comentário acerca do problema.

O relatório é enviado sob a forma de um email para a LinhAndante que deve dar-lhe o mesmo tratamento das Reclamações Escritas.
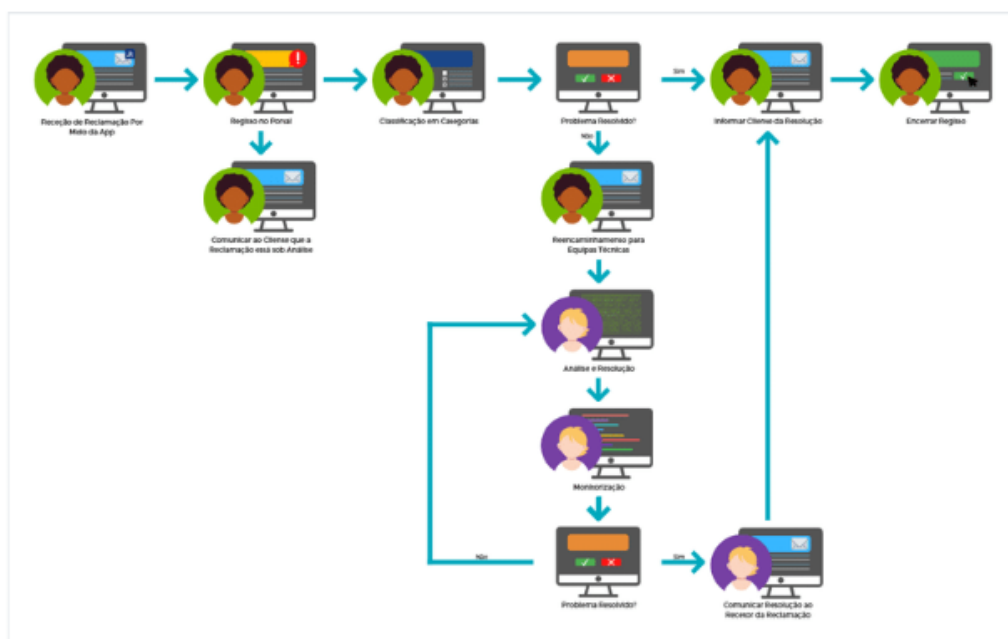

Figura 5: Tratamento de Reclamações Por Meio da App

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REGISTO E ANÁLISE

Classificação das Reclamações

Todas as reclamações recebidas pela LinhAndante devem ser registadas no Portal de reclamações existente. As reclamações que dizem respeito ao Anda devem ser inseridas no Portal do Anda – que por sua vez comunica com o Portal genérico.

Quando um novo registo é criado, o Recetor da Reclamação deve analisar a exposição do cliente e classificá-la tendo em conta o motivo, operador e meio de receção. Deve ainda adicionar um comentário com toda a informação relevante na resolução do problema, para que qualquer pessoa possa dar seguimento ao seu tratamento.

As reclamações efetuadas por telefone que consistam em pedidos de esclarecimentos, não devem ser registadas como uma nova reclamação. Devem contudo ser registadas como pedidos de informação para efeitos estatísticos.

Quando uma reclamação é resolvida, no encerramento do seu registo no Portal deve constar a descrição de todas as ações tomadas ao longo do processo. Todas as comunicações efetuadas com o cliente devem também ser mantidas.

A análise das reclamações deve ser feita de acordo com os restantes procedimentos internos da LinhAndante que regulam o modo de atuação em cada situação particular.

RECURSOS

Elementos a Solicitar ao Cliente

Devem ser sempre solicitados ao cliente os seguintes elementos:

- Identificação;
- Informações de Contacto;
- Informações de Cliente
  (Tipo de Assinatura, Dados de Faturação);
- Descrição das razões que motivaram a reclamação.

Tempos de Resposta

As reclamações verbais devem ser alvo de resposta imediata, ou no máximo no dia seguinte.

As reclamações escritas ou por meio da aplicação, devem obter uma resposta a todos os pontos reclamados num prazo máximo de 10 dias após a receção pela Linha Andante. Este prazo pode ser prorrogado para 15 dias nos casos que envolvam especial complexidade. Entende-se como um caso de especial complexidade todo aquele que envolva partes terceiras, nomeadamente equipas técnicas.

Em qualquer dos casos, deve ser enviada ao cliente uma primeira resposta, informando-o da receção da reclamação, no próprio dia da receção.

Internamente:
- Os pedidos de esclarecimento das equipas técnicas à Linha Andante devem ser respondidos no prazo de 10 dias.
- A resposta da Linha Andante ao cliente, deve ser dada imediatamente após as recomendações das equipas técnicas.
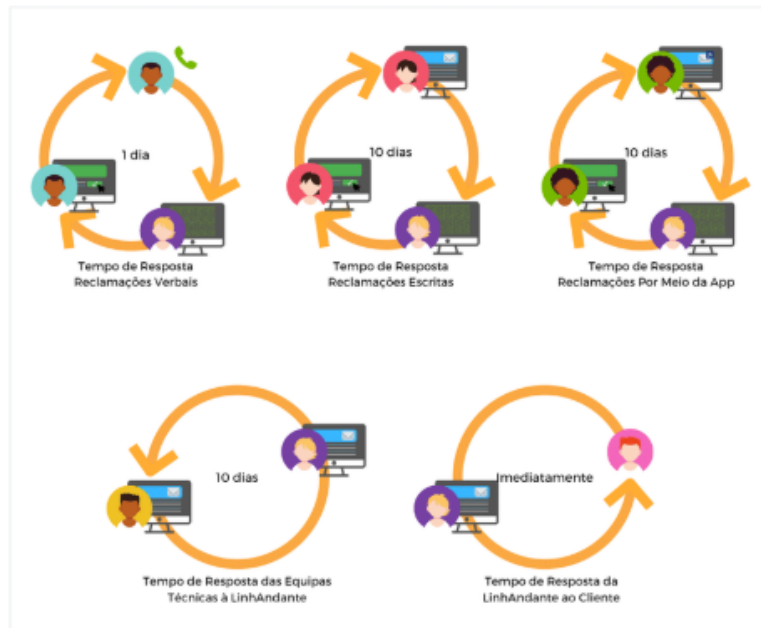
Figura 6: Tempos de Resposta no Tratamento de Reclamações

ANEXO A

Processo de Tratamento de Reclamações