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MESTRADO EM ENGENHARIA DE SERVIÇOS E GESTÃO

Understanding the customer experience with home comfort and energy services

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Master Thesis

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To my family

Abstract

Electric power is essential to the life of every citizen. Considering the promotion of its development and efficiency, the electricity sector was liberalized. This fact, associated with the increasing environmental concerns and the increasing supply and demand for electrical power, gives rise to a whole new set of challenges and modifications on this sector, both to its players and the way it is operated.

The project – "Understanding the customer experience with home comfort and energy services" aims to study the experience of residential energy costumers and home comfort solutions of energy service providers that might be relevant for this project. To this aim it is included the activities that residential customers have related with home comfort and energy management, including the objectives and requirements related to each activity, as well as its contextual aspects such as the actors that relate with the customers and the physical artefacts and technological systems with which they interact. Based on this study, the EDP Commercial Customer Journey was characterized by mapping the most important activities performed by customers in order to reach their home and comfort expectations. This study identifies the stakeholders that support the customer activities and understand how they relate in this ecosystem. Moreover, this study aims to reach opportunities for the development of new services and possible improvements on the interaction between the customer and the company and on the already existent services. In order to create more value on the future service concepts, this study did not focus only on EDP Commercial, but also on the ecosystem that surrounds this company.

This study comprises two main phases: an initial study to understand how the energy ecosystem operates and the services delivered, and a study to understand the experience of the actors of the value constellation. This project was conducted using qualitative research supported on grounded theory methodology, in order to collect rich information and diversified outputs that enhance the potential for energy service innovation. To understand the customer experience this study involved semi-structured interviews to EDP Commercial customers. During the data analysis we used the software NVIVO to assist the coding process.

To conclude, this study identified the needs of customers and their expectations to reach the desirable level of home comfort with energy services, which consisted on lack of information and high prices. This enabled us to suggest implications for the development of future services for the energy service providers of this ecosystem.

Resumo

A energia e eletricidade é essencial para a vida de qualquer cidadão. Considerando a promoção do seu desenvolvimento e eficiência, o sector energético foi liberalizado. Este facto, associado ao aumento das preocupações ambientais e ao aumento da oferta e da procura por energia elétrica, deu origem a um novo conjunto de desafios e modificações neste sector, tanto para os intervenientes no ecossistema de serviços de energia quer pela forma como este funciona.

O projeto – "Understanding the customer experience with home comfort and energy services" – que significa a compreensão da experiência do cliente na energia e conforto em casa – tem como objectivo o estudo da experiencia residencial dos consumidores de energia e as soluções de serviços de energia fornecidos pelas empresas, que possam ser relevantes para este projeto. Para este objectivo ser cumprido, está incluído o estudo das atividades relacionadas com a gestão da energia e do conforto em casa, levadas a cabo pelos clientes residenciais, incluindo os requisitos e os objectivos associados a cada atividade, bem como o seu aspecto contextual como os atores que se relacionam com os clientes, os artefactos físicos, e os sistemas tecnológicos com o qual eles interagem. Baseado neste estudo, a jornada do cliente da EDP Comercial foi caracterizada através do mapeamento das principais atividades desenvolvidas pelos consumidores com o objetivo de atingirem o seu nível desejado de energia e conforto em casa. Este estudo identifica os stakeholders que suportam as atividades do cliente e a compreensão da forma de como se relacionam no ecossistema. Por conseguinte, este estudo tem como objectivo atingir potenciais oportunidades para o desenvolvimento de novos serviços e/ou possíveis melhorias na interação entre o consumidor e a empresa prestadora de serviços e também na possível melhoria dos atuais serviços oferecidos. Por forma a criar maior valor nos futuros conceitos de serviços, este estudo não se foca apenas na EDP Comercial, mas também no ecossistema que cerca esta empresa.

Este estudo comporta duas fases: um estudo inicial para a compreensão de como opera o ecossistema da energia e os serviços oferecidos; e o estudo da experiência dos atores inseridos na constelação de valor. Este projeto foi conduzido através de uma analise qualitativa suportada na metodologia de Grounded Theory, por forma a ser possível apurar informação mais rica e outputs diversificados para realçar o potencial de inovação dos serviços energéticos. Para compreender a experiencia do cliente, este estudo incluiu entrevistas semiestruturadas a clientes da EDP comercial. Durante a analise dos dados usamos o software NVIVO para ajudar no processo de codificação.

Para concluir, este estudo identificou as necessidades dos consumidores e as suas expectativas para atingirem o nível desejado de serviços de energia e conforto em casa, que consistiram na falta de informação e preços excessivamente altos. Estes resultados permitiram-nos sugerir implicações para o desenvolvimento de novos serviços ás empresas que operam neste ecossistema.

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List of abbreviations

CRM – Customer Relationship Management

CLV – Customer Lifetime Value

MSD – Multilevel Service Design

1. Introduction

The growth of the service sector has long been considered as an indicator of a country's economic progress. Energy services are nowadays passing through a process of a continuous energetic independence and for that reason there is a need to restructuring to introduce private capital and increase competition (Zhang, Parker, & Kirkpatrick, 2008). This leads this sector to rethink the customer relationship.

For all of this it is important to reinforce the importance of the customer experience and approach the Schmitt (1999) multidimensional view that identifies five types of experiences captured by the customer such as the sensory (sense), the affective (feel), cognitive (think), physical (act), and social-identity (relate) experiences and apply to the customers improvement of all this senses (Lemon & Verhoef, 2016).

This study has as its aim the understanding of the residential customer experiences regarding the energy services and home comfort solutions (gas, electricity, heating) of EDP Commercial and other relevant service providers. Based on this study the customer journey of these customers was characterized and the opportunities of new service developments were identified.

This project was developed on an understanding the customer experience basis, in an interactive process and creative centred on EDP Customers. This way it starts by the identification of the principal actors and state of art. Based on the results of the first phase, the second studied the customers, and more concretely the activities they perform, the context upon which they do them and the respective requirements of the experience.

In the second phase of this study qualitative methods were used for mapping the home comfort and energy services value constellation and the study of the systemization of the experience of the different actors.

1.1 Project background

The process of liberalization of the electrical sectors of most European countries was carried out in a phased way having started by including customers with higher consumption and higher voltage levels. Portugal followed an identical methodology with the opening of the market being carried out progressively between 1995 and 2006 (ERSE, 2009).

Since September 4, 2006, all consumers in mainland Portugal have been able to choose their electricity supplier. This date establishes that starting on July 1, 2007 all electricity customers were able to freely choose their electricity supplier (ERSE, 2009).

Associated with the liberalization and construction of the internal electricity market is an expected increase in competition, with price and quality of service implications, which should correspond to a bigger consumer satisfaction of electric power (ERSE, 2009).

Since this times the competition started to emerge. EDP lost its monopoly to companies such as Endesa, Goldenergy, Iberdrola and Galp (gas).

The energy service ecosystem entered in a new era of its history. EDP, leading brand in this ecosystem, represents a company with pride in its heritage that looks the future. The new brand tells stories, communicates clearly, engages people, moves countries closer, projects values, conveys emotions and innovates day by day. At the heart of EDP are five primary values: Confidence, Excellence, Initiative, Innovation and sustainability. These characteristics continue timeless and true, regardless of product innovations or competitive shifts (EDP, 2009)

António Vidigal, Chairman of the board of directors of EDP, stated that society has beheld many changes. Many people exchanged their privacy for more convenience and comfort. This allowed a new generation of services to be built. Comfort and efficiency at home increased and sustainability, one of EDP values, has become a major concerned. In this new era, many houses generate at least part of their energy (Vidigal, 2015).

Moreover, also according to the same source, there was a digital transformation of business and society. In order to better understand that, there is a scheme that represents the Challenges and Opportunities by 2020

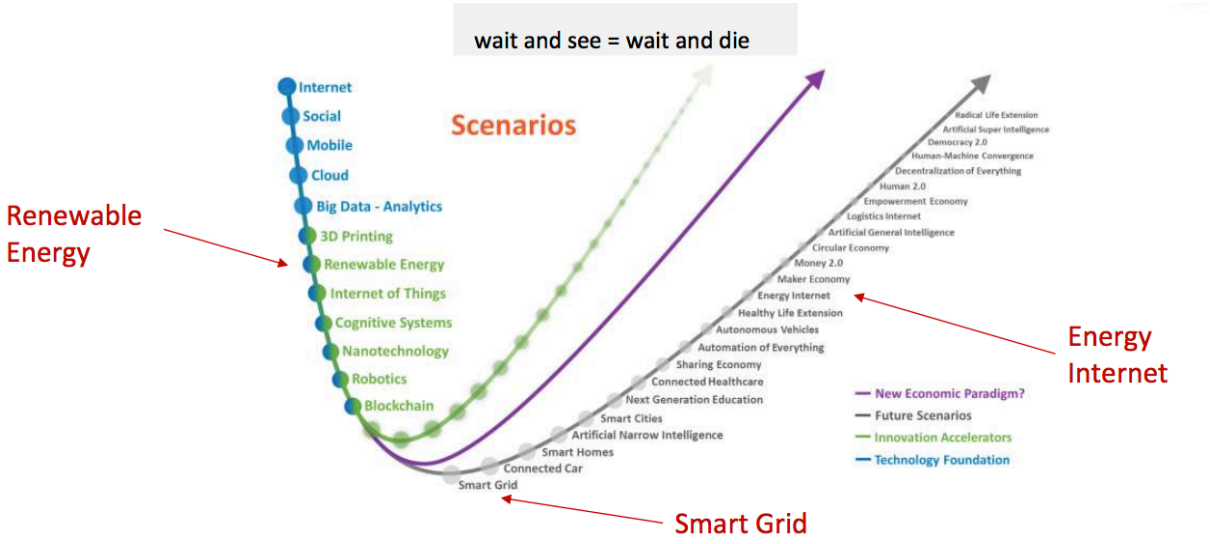

Figure 1 - Energy Scenarios, source: Vidigal (2015)

1.2 Problem Description

The energy ecosystem is very complex. Nowadays there is a huge trend for energetic independence. The traditional electric utility model would be upended, and, for that reason utilities would need to adjust their business models to be possible to operate and be competitive in a new energy future. Now, with the vanishing of prices for renewables and energy storage, the finalization of the nation's first carbon regulations, and the proliferation of distributed energy resources, changes are taking hold faster than many expected (Bade, 2015).

Electricity sectors are changing in the whole world. In both developed and developing countries they have been subject to reformation to introduce private capital and increase competition (Zhang et al., 2008).

The changes that were occurring on the energy sector result on a rapid growth in both grid and home energy technologies. These lead utilities to rethink the customer relationship (Payne & Frow, 2006). Whereas power companies are used to look at their customers simply as ratepayers, new home energy technologies and shifting customer expectations have make them focus on individual consumers. Gradually, utilities are beginning to market themselves to customers as something more than a utility company — a “trusted energy advisor” of sorts. The idea is for the utility to help customers better manage their energy use and set itself apart from what other energy companies do. Many utilities started to offer technologies like mobile apps that allow customers to monitor their energy usage, pay bills, report outages, and more (Bade, 2015).

We live in a world that is increasingly digital. Everyone is online, social networks play a crucial role in this digitizing pathway and Internet of things will allow for real-time everything. This lead digital customers to be more informed, more engaged and more involved.

Digital creates opportunities for business models with a huge impact and with a frequency and speed that has never been seen before. This way there is a need to think exponentially (Vidigal, 2015).

The Internet of Things (IoT) is an emerging global Internet-based information architecture facilitating the exchange of goods and services. The IoT has the potential to increase global welfare in various ways. Internet of Things has the purpose of providing an IT-infrastructure facilitating the exchange of "things" in a secure and reliable manner, for example, its function is to overcome the gap between objects in the physical world and their representation in information systems. The IoT will serve to increase transparency and enhance the efficiency of global supply chain networks (Rolf H. Weber & Weber, 2010).

Anecdotal evidence from one of the service providers says that on average an EDP customer spends 7 minutes per year on contact with EDP on their multiples ways of contact. This is not enough and utility customers find difficulties on accessing information, and sometimes they do not know how to use all the features of a service/product they are paying for. The main problem here is that energy service providers, as a whole, need to be more in contact with their customers and better manage the way they deal with them. Since the world we live in is becoming more and more competitive and also different in a way that its trend goes on the way to energetic independence and in a huge digital transformational business.

1.3 Research Questions

One question that this study addressed was the understanding of energy service ecosystem, and how customers perceive it. This research question refers to the necessity of understanding the customers point if view of the service provided by the companies that operate in this ecosystem, so that we can have better view and notion of what the customer wants, need, feel and also their main difficulties.

One other different question we aimed to answer in this study was how should the energy service providers address their priorities and be closer from what customer need and want

from them. This way this study focused on the implications that that the comprehension of the energy service ecosystem has on designing new services.

1.4 Study and Project Development

This study comprises two main phases, which are exploratory study and the study of the experience of the actors of the value constellation. It aims to understand the residential customer activities related with home comfort and energy management, including the objectives and requirements related to each activity, as well as its contextual aspects such as the actors that relate with the customers and the physical artefacts and technological systems upon which they interact. Also, this study mapped these customers' journey and identified the multiple stakeholders that support the customer activities and understand how they relate in this ecosystem. Moreover, this study aims to identify/propose opportunities for new possible services development for residential costumers and/or an improvement on the existent services.

This study followed a qualitative approach with the aim to understand the activities that customers take regarding the home comfort, energetic efficiency, their goals and the context in which they operate. The qualitative approach involves conducting semi-structured interviews that follows a theoretical sample. It was also covered a varied group of twelve customers in order to reach a richer and more complete picture of the customer experience. Also the sample being considered along this study is divided according to the more relevant typologies and more relevant customers.

1.5 Report outline

In order to attain the expected results this study comprises two main phases, the first one consisted on an initial study to understand the context in which EDP Commercial is inserted and the second phase includes de study of the experience of the actors. To attain the expected results we made a literature review regarding the customer experience, customer journey, Service Ecosystems and their implications for Service Design, Smart Services, and we made a review on the methodology, we analysed the results and finally we concluded with the analysis of the data and potential future service opportunities.

2. Literature Review

2.1 Customer Experience

Service offerings characteristics made firms recognize that marketing service is different than marketing goods. Service quality is as major concept on service marketing. One of the marketing that has gained importance in practice is the SERVQUAL model. In the marketing service area it is important to consider the development of service blueprinting as an initial attempt to map the customer experience (Lemon & Verhoef, 2016). The service quality is very important to consider because it brings to customer experience the focus on the context in which experiences arise and the journey mapping and measurement aspects of customer experience (Fisk et al., 2011). SERVQUAL is a tool that has been developed for assessing customer perceptions of service quality in service and retailing industries. The intensifying competition and rapid deregulation had led many service and retail industries to seek profitable ways to differentiate themselves and one strategy that has been related to success in these business is the delivery of high service quality (Parasuraman, Zeithaml, & Berry, 1988)

Understanding customer experience and consequently the customer journey over time is very important for firms. Customers nowadays even more interact with firms through multiple touch points in multiple channels and media and these changes require firms to integrate multiple business functions, in creating and delivering positive customer experiences (Verhoef, Kooge, & Walk, 2016).

A creation of a customer experience became now a leading management objective. Firms are day-by-day challenged with the accelerating media and channel fragmentation. Omni-channel management became today the new norm. The increasing potential customer touch points and the lack of control of the experience made firms integrate multiple business functions, as information technology (IT), service operations, logistics, marketing, human resources and even external partners, in creating and delivering positive customer experiences (Lemon & Verhoef, 2016).

"What people really desire are not products but satisfying experiences" (Katherine N. Lemon & Peter C. Verhoef 2016 c.f. Abbot 1995). Following this statement, theorists encouraged a broader view of human behaviour, giving a focus on recognizing the importance of decision-making and experience. Every time that a service is provided it immediately leads to a customer experience. This way it is important to consider that this incorporates the customer's

cognitive, emotional, sensory, social and spiritual responses to all interactions with a firm. Another definition of customer experience includes embracing every aspect of a company's offerings, the quality of care, advertising, packaging, product and service features, ease of use, and reliability. This consists on the internal and subjective response customers have to any direct or indirect contact with a firm (Meyer & Schwager, 2007)

One other important theme to consider in this topic is the customer satisfaction and loyalty. One key element of understanding and managing customer experience is the ability to measure and monitor customer reactions to firm offerings, especially customer attitudes and perceptions. Satisfaction may be considered as the contrast between delivered performances with customer expectations. The effects of satisfaction on customer behaviour and firm performance help identifying key drivers and consequences of satisfaction. Customer satisfaction is a very important approach that serves as additional critical building blocks to our overall understanding of customer experience and provides the basis for its measurement (Lemon & Verhoef, 2016).

As mentioned by (Lemon & Verhoef, 2016) after looking across the decades of research on customer experience it is possible to classify the research themes into three research areas; the first one is focused on process, behaviour, and resulting value: the early consumer buying behaviour process models, CRM and customer engagement; secondly the research focused on process outcomes: satisfaction, service quality, and relationship marketing; then the third customer-centricity research focused on the internal organizational aspects of customer experience. The first research stream, focused on process, provides a solid foundation for the idea that customer experience is created through the purchase journey. These managerial contributions provide emphasis to the importance of different touch points in the customer journey and the noted increasing complexity of managing the customer experience across all these touch points. From a customer engagement perspective, customers can also be cocreators of their customer experience. The second research stream mainly focuses on process outcomes and the measurement of these outcomes: satisfaction and service quality. Previous researches suggested that the customer's assessment of an experience influences key outcomes as customer satisfaction, customer loyalty, word of mouth, customer profitability, and CLV. The third, and last, research stream help identifying how firms can better manage the customer experience in both internally and externally ways with other stakeholders (Katherine N. Lemon & Peter C. Verhoef 2016).

The relationship with the customers no longer needs to end at the point of transaction. Relationships are now defined by experiences. Customers are empowered with more information and more choice then ever before. Companies that can provide the right price and the right promotion at the right time are providing a superior customer experience and winning the battle from mindshare and market share. Innovation is creating new opportunities for designing those exceptional customer experiences. Big data and real time analytics not only help anticipating what customer buys but also when, where, how and why, so traditional market segments disappeared living a market of one (Teixeira et al., 2012).

2.2 Customer Journey

The reappearance of customer experience and the recent focus on customer decision journeys suggest that firms are broadening their thinking about marketing and considering how to design and manage the entire process the customer goes through. Throughout this study the customer experience is going to be referred as a multidimensional construct and will refer to the customer purchase journey as the process a customer goes through, across all stages and touch points, that makes the customer experience (Lemon & Verhoef, 2016).

After understanding the customer view, we recognize that customer journey analysis is a major consideration when studying customer experience. It is an understanding of the customer journey. In a customer journey analysis, firms focus on how customers interact with multiple touch points, moving from consideration, search, and purchase to post purchase, consumption, and future engagement or repurchase. The goals of the analysis are to describe this journey and understand the customer's options and choices for touch points in multiple purchase phases (Verhoef et al., 2016)

2.3 Service Ecosystems and their implications for Service Design

Thinking about an ecosystem instead of thinking about a company can be far larger and richer than company's immediate network. Many executives do not naturally think of themselves as gardeners or foresters or wildlife managers working to shape the futures of ecosystems. Mainly managers see themselves as managers, companies as companies and the environment in which they compete as their markets or industries. It would be desirable if executives think of themselves as part of organisms participating in an ecosystem. Their focus should be on their entire business ecosystem. It can mean the difference between success and failure (Moore, 1996).

Business ecosystem can be defined as an economic community supported by a foundation of interacting organizations and individuals. This economic community produces goods and services that have value to customers that belong to the same ecosystem. The member organisms also include suppliers, lead producers, stakeholders, competitors, powerful species that may be relevant in a given situation as government agencies and regulators, and associations and standard bodies representing customers or suppliers. Actively they coevolve their capabilities and roles over time, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments, and to find mutually supportive roles (Moore, 1996).

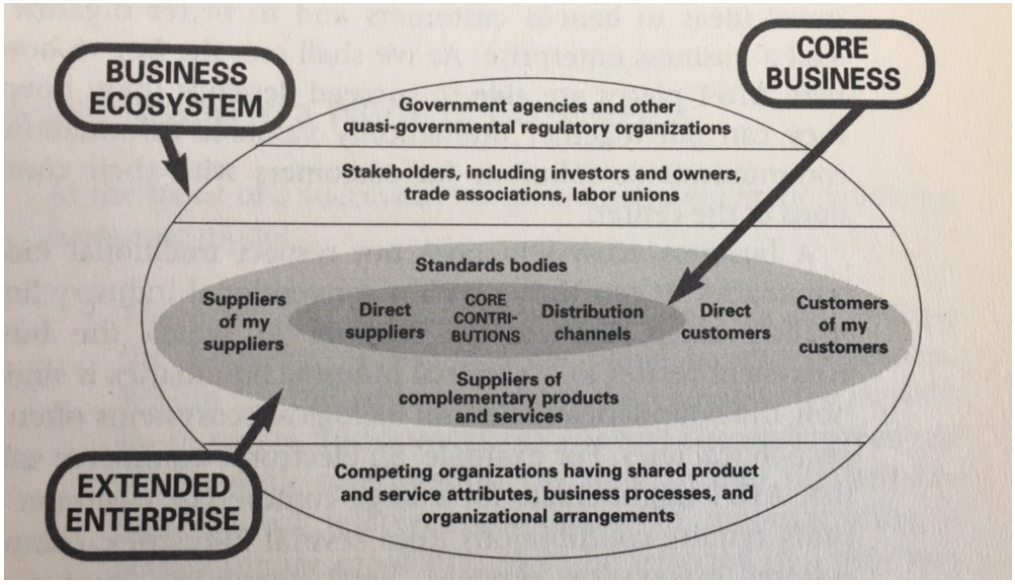

Figure 2 - Service Ecosystems, source: Moore (1996)

All across the service ecosystem, service organizations have long recognized the importance of the customer experience for customer satisfaction and loyalty. Thus, they increasingly place the customer experience at the core of service offering and deliver “experience-centric services”. These services require a continuous management and design of customer experiences through the careful planning of tangible and intangible service elements in the service delivery system (Zomerdijk & A.Voss, 2010).

According to Zomerdijk and A.Voss (2010), making a huge improvement of customer experience takes creativity to make a difference and service design is a very important concept to make this possible since it is all about creating a space to come up with new ideas.

In order to better study and analyse the service design exploration for service ecosystem, this study used one of the tools for service design – Multilevel Service Design. The MSD method comprises four steps. The first one consists on studying the three levels of customer experience (value constellation experience, service experience and service encounter experience), the second one on designing the service concept (after understanding what consumers need and want and the failures that exist on service ecosystem), the third step is designing the service system and the last one on designing the service encounter. Bellow there is figure that represents the MDS method.

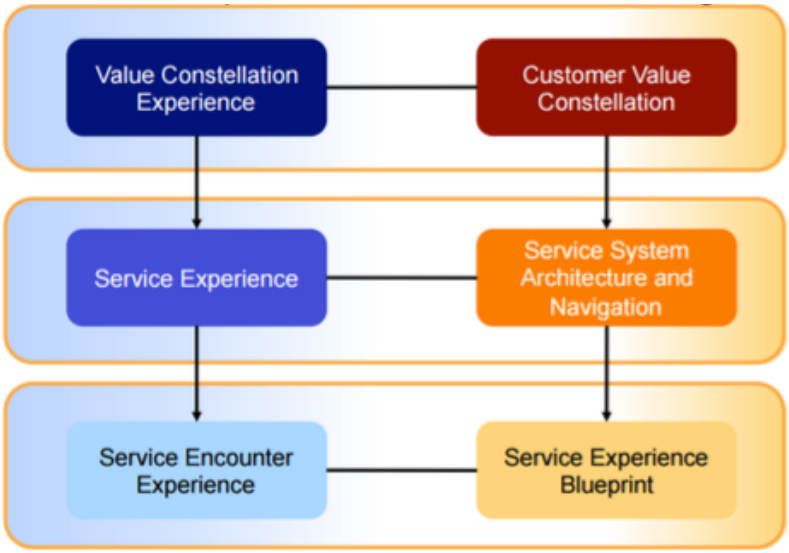

Figure 3 - Multilevel Service Design – MSD method, source: Patrício et. al (2012)

Considering the objectives of this study, the MSD method was not used in its entire dimension. Here we focused on the first phases of the study which consisted on understanding energy ecosystem and the context in which EDP is inserted that provided inputs to develop the second one that were understanding customer experience of the actors involved in this ecosystem.

On MSD first step –Studying the Customer Experience – MSD enables mapping the overall customer activity, service activities, and service tasks, which are related to the different levels of the customer experience. MSD also enables a better understanding of the desired experience at these different levels. This understanding provides the basis for designing the service offering at its different levels.

Regarding the second step– Designing the service concept – MSD defines the service concept as the firm's positioning in the customer value constellation including the services offered and the links and partnerships established with other organizations in the network to enhance the firm's value proposition (that is defined in the context of its the correspondent value

network). Designing the service concept precedes the following steps: Understanding the Value Constellation Experience and Designing the service concept through the value constellation.

In the first one, understanding the Value Constellation Experience, the value constellation experience is co-created through the interactions between the customer and all service organizations that enable a given customer activity. MSD's broader view is crucial for understanding customer experience beyond the narrower view of the service firm. This view helps service providers understand the broader context within which customers use their services, opening new possibilities for service Innovation.

The second one, designing the service concept through the Customer Value Constellation enables designing the service concept. By broadening the design space beyond the firm's boundaries with the CVC, the firm can analyse its current service offering and explore new alternatives for repositioning its service concept to enhance its contribution to the value constellation experience. The design of the service concept guides the subsequent levels of service design, as it defines the firm's positioning that needs to be supported by the service system and each service encounter.

With this multilevel perspective, MSD offers a holistic view, from the service concept level to the multi-interface service system level and to each service encounter. The different levels of MSD provide different views of the service offering that can be used by different members of the design team and different decision makers (Patrício, Fisk, Cunha, & Constantine, 2011).

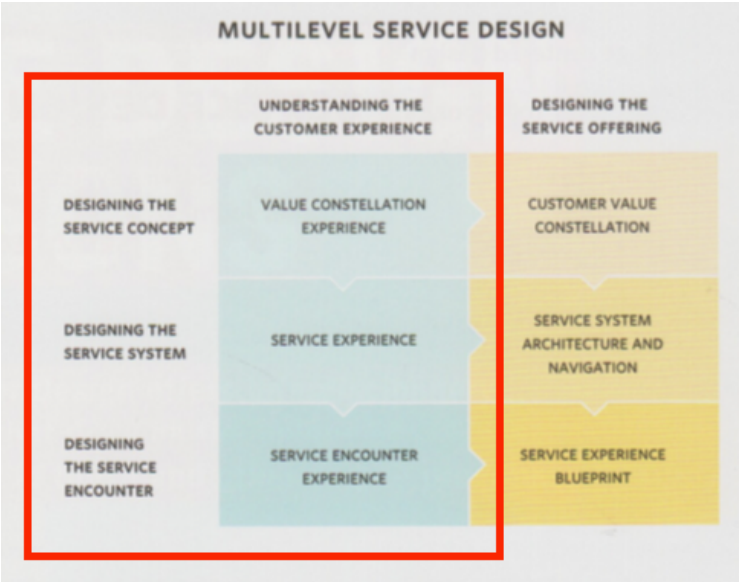

Figure 1 - MSD - Project Focus, source: Patrício et al. (2012)

Innovation can be viewed nowadays as the principal source of differentiation and competitive advantage and it is powered by a deep understanding through direct observation of what people want and need in their lives and what they like or dislike about the way particular products are made, packaged, marketed, sold and supported (Tim Brown, 2008). In order to be well succeed in the innovation process the leaders should incorporate design thinking on their processes and use the designers sensibility and methods to match people with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity.

Great designs satisfy both our needs and our desires and emotional connections engage us in the first instance. This way, service design focuses on the customer experience and service innovation develop new ways of value co-creation between customers and service organizations to improve wellbeing.

2.4 Smart Services

According to Wünderlich et al. (2015), academics and business practitioners agree that technology is a major driving force behind the progress of today's service world. Electronic commerce is an increasingly popular business model with a wide range of tools available to firms. An application that is increasingly more common is the use of self-service technologies whereby customers produce services for themselves without assistance from firm employees (Meuter, Bitner, Ostrom, & Brown, 2005).

Driven by advancements in communication technologies, sensors, power efficiency and Internet of Things, the possibility to remotely connect to objects and products has given rise to the emergence of smart services (Wünderlich, Wangenheim, & Bitner, 2013).

Smart Services are a special service type that is delivered to or, via an intelligent object, that is able to sense its own condition and its surroundings and thus allows for real-time data collection, continuous communication and interactive feedback (Allmendinger & Lombreglia, 2005).

Smart technologies have great potential, however, their success requires an in-depth understanding of customer perceptions and behaviours (Wünderlich et al., 2015).

The bestseller author Donald A. Norman, defends a consumer-oriented theory of natural human-machine interaction that can be put into practice by the engineers and industrial designers of tomorrow's thinking machines. Moreover, its is important to understand how we

can design and innovate services and business models to move from smart technologies to smart services that add value to customers (Norman, 2007).

Research has identified technology characteristics, customer characteristics and context-specific perceptions such as privacy concerns as factors affecting the perception and adoption of smart services (Wünderlich et al., 2013). Consumers' perception of smart service may relate to how deeply smart technologies are embedded in their lives. Perceived embeddedness may also relate to how visible the smart technology is or how consistently intelligent objects monitor and affect consumer's behaviour. Different levels of perceived embeddedness might trigger different emotional responses in consumers. Customer concerns about smart services dramatically increase with increasing embeddedness of the technology in their lives and bodies (Wünderlich et al., 2015).

One other important aspect to consider in this topic is the exploration of consumers' co-creation of value of smart service. The invisibility of smart services not only affects how consumers perceive risk and control options, it also sets the boundaries of how value can be co-created. The importance of a consumer's co-creation of value has been emphasized repeatedly. Consumers appreciate co-creating and interacting with the service providers in the service process (Prahaland & Ramaswamy, 2004)

According to Viana and Patrício (2012), In a smart service context, however, the consumer's co-creation might be challenging and requires skills and effort. Considering, for example, the energy industry the potential of smart grid technology to increase energy system flexibility and create value for consumers is very promising. But this would require active participation of consumers connected to the grid to smoothen demand in situations/times with large variations in the energy supply (e.g. from renewable energy sources). By exploring a smart metering infrastructure, it will be possible to have real-time information about capacity usage and renewable energy production, which enables the development of new smart services for customers. Consumers may be requested to dynamically reduce their consumption in exchange for some incentives (price reduction, sustainability outcomes), and may define their responses in an automatic way (e.g. turning on and off appliances according to those incentives). The success of the innovation is dependent on the value consumers see in smart services and in how much they value their own active participation. In the energy smart services example, it may not be enough for the consumer to receive a reduced monthly bill to attach value to smart services (Viana & Patrício, 2012). Service managers have to integrate smart services into an overall solution that consumers are aware of and find valuable.

Companies across industries increasingly acknowledge the importance of services to their business models. The core technologies of smart services that enable remote monitoring have been used in B2B services for some years. However, it is only recently that the broader use of smart services has led to major organizational change in companies that provide higher value product related services. To accelerate the development of smart service offerings it is important that researchers and managers collaborate in identifying profitable business models, internal cost structures and their product/service offerings to accommodate the new smart service business models (Wünderlich et al., 2015).

Smart Services are gaining importance in B2B and B2C environments and have attracted much attention by service managers and researchers alike (Wünderlich et al., 2015).

3. Problem Characterization

Energy services are nowadays passing through a process of a continuous energetic independence. Electricity sectors are changing in the whole world. The traditional electric utility model would be upended, and, for that reason utilities would need to adjust their business models to be possible to operate and be competitive in a new energy future. This way the need to rethink the customer relationship becomes very important.

This led us to the importance of the customer experience, to the need of hearing what customers expect and need from energy service providers. This project studied the customer experience on the energy sector framed in a service ecosystem perspective.

Beyond the primordial services provided by EDP they offer now different services that were launched in order to facilitate costumers lives, face todays expectations of informatization and to be abreast of energy services developments and changes. But the problem here is that it seems to have a disagreement between the service the company is offering to the customer and the way customer receives the service specifications, how they find them useful to their daily lives and the capacity of customers to perceive all the service requirements to make them possible to use them in its fullness.

Considering the complexity of the energy sector, its impact in everyone's life and the increasingly importance of smart services, we developed a study for understanding customer experience on the energy service ecosystems. The understanding of the customer experience of this ecosystems allows for a smoother integration of technology in this context and improved customer experience and journeys, leading to more satisfied customers and improving their attachment to a company's offering.

4. Methodology

In order to achieve the expected results, this study was conducted using a qualitative research supported on grounded theory methodology. To perceive the customer experience, this study involved semi-structured and recorded interviews to relevant actors and EDP customers. During the data analysis, we used the software NVIVO to assist the coding process.

4.1 Comparative analysis of existing approaches and reasons for the choice of adopted approach

Gathering rich data provides solid material for building a significant analysis. Rich data are detailed, focused, and full. It reveals participants' views, feelings, intentions and actions as well as the contexts and structures of their lives. Researchers generate strong-grounded theories with rich data. Seeing research participants' lives from the inside gives researcher unobtainable views. It is possible to learn that what outsiders assume about the world studied may be limited, imprecise, mistaken, or egregiously wrong (Charmaz, 2006).

According to the same source we understood that qualitative researchers have some benefits for this study over the quantitative ones. The first ones can add new pieces to the research puzzle or conjure entire new puzzles – while gathering data- and that can even occur late in the analysis. The flexibility of qualitative research permits the researcher to follow leads that emerge. Grounded theory methods increase this flexibility and simultaneously gives more focus than other methods. Used well, grounded theory quickens the speed of gaining a clear focus on what is happening with the data without sacrificing the detail of enacted scenes (Charmaz, 2006).

The methods used alone do not generate good research or wise analysis but the way researchers use methods matters. A keen eye, open mind, discerning ear, and steady hand can bring the researcher closer to what its been studied and are more important than developing methodological tools. Grounded theory methods offer sharp tools for generating, mining, and making sense of data. Grounded theory can give flexible guidelines rather than rigid prescriptions. With flexible guidelines, the study is directed but the imagination flows(Charmaz, 2006).

Although methods are considered tools, they do have consequences. How data is collected affects the phenomena seen, how, where and when the researcher will view them and what sense he will make of them (Charmaz, 2006).

Following Katy Charmaz (2006) perspective, qualitative research of all sorts relies on those who conduct it. Researchers are not scientific observers who can dismiss scrutiny of our values by claiming scientific neutrality and authority. Neither observer nor observed come to a scene untouched by the world. Researchers and research participants make assumptions about what is real, possess stocks of knowledge, occupy social statuses, and pursue proposes that influence their perspective views and actions in the presence of each other. Nevertheless, researchers, not participants, are obligated to be reflexive about what they bring to the scene, what they see, and how they see it.

Qualitative interview is one of the most important data gathering tools in qualitative research, yet it has remained an unexamined craft in IS research and is used in qualitative research of all kinds, whether positivist, interpretive or critical. The qualitative interview is the most common and one of the most important data gathering tools in qualitative research (Myers & Newman, 2007).

Given the different types of qualitative interviews: structured interview, unstructured or semi-structured interview and group interview, as it was previously mentioned in this study the chosen type in this project is second one – semi-structured interview- because is the one that is more appropriately for the results aimed to reach in this study. In a semi-structured interview there is an incomplete script. The researcher may have prepared some questions beforehand, but there is a need for improvisation. The interviewer is the researcher or is one of the team (Myers & Newman, 2007).

According to the same source, Erving Goffman developed a general theory of face-to-face interaction, a theory that can be used to interpret any social exchange. This theory uses the metaphor of the theatre to explore social life (Goffman, 1959). Social interactions are seen as drama where there are actors (individuals and groups) who perform on a stage (a variety of settings and social situations) using a script (norms, rituals, expectations of how one should behave). During the performance, the actor's appearance, manner and props are very important (Manning, 1996). M.D Myers and M. Newman (Myers & Newman, 2007) believe that this theory is especially applicable to one particular type of social interaction: the qualitative interview. The interview is a social interaction. Goffman defines interaction, as "the reciprocal influence of individuals upon one and other's actions when in one another's

immediate physical presence.” He defines a performance as “ all the activity of a given participant on a given occasion which serves to influence in any way any of the other participants” (Goffman, 1959).

Recording data alone confers interpretation because researchers place a conceptual frame on them through our use of language and understanding about the world. Scrutinizing how a researcher collects data and which data is obtained it helps to locate them. Such scrutiny also helps when coding and categorizing because the researcher becomes able to place their emerging analysis in its social context. Then it is possible to make more precise comparisons when coding data.

Coding means categorizing segments of data with a short name that simultaneously summarizes and accounts for each peace of data. The codes show how data is selected, separated and sorted, to begin an analytical accounting of them. Ground theory coding generates the bones of the analysis (Charmaz, 2006).

4.2 Method used in the project

This study followed a qualitative approach that comprises two main phases, the first one consisted on an initial study to understand the context in which EDP Commercial is inserted and the second phase includes de study of the experience of the actors.

The first phase comprises the research and study of the energy ecosystem as a whole, actors involved and the services these companies offer. Here we studied the actors that may be considered relevant for the study development; the research and analysis on actual services offers and the multiples ways of contact with the customer (website, app, call centres) in order to better understand the customer; and the initial design of the customer journey and the customer value constellation in terms of key actors, service providers and performed activities.

The second phase involves the experience of the actors involved in EDP Commercial value constellation. Here the experience of energy service customers was studied, considering their role and objectives, activities, interactions with other actors and services in the value constellation, systems utilized; and requirements of experience regarding the home comfort and energy services.

To conclude, this study comprises a presentation and discussion of the study results and their implications to the design of new services for the energy ecosystem. In order to better study

the customer experience these study-approached customers with semi-structured interviews and then analyse the data gathered through the software NVIVO. Also the sample being considered along this study is divided according to the more relevant typologies and more relevant customers.

The sample used in this study consisted of twelve people and its specifications are explicit on the table bellow.

Table 1 - Study Sample

Sample (n=12)				
Gender				**12**
	Male			6
	Female			6
Age (Average = 45)				**12**
	30's			6
	40's			2
	50's			2
	60's			2
Education				**12**
	Superior Education			10
	Basic Education			8
Habitation Type				**12**
	Apartment			9
	Particular House			3
Location				**12**
	Porto			9
	Other Locations			3
Smartphone				**12**
	Have Smartphone			10
		Internet Access		9
			Use Internet	8
			Do not use Internet	1
		No Internet Access		1
	Do not have smartphone			2

The process of results collection started with choosing the sample that might provide richer conclusions. This way twelve people were interviewed about their homer comfort and energy services. The duration of the interviews varied according to the customer experiences, some have more information to provide than others but the average were around 25 minutes. The interview to the customers was attached on Appendix B.

After having the interviews stage concluded, the coding process began. This study followed the Grounded Theory principles of coding. The first level of coding – Initial Coding – grounded theorists conduct initial coding when we remain open to exploring whatever theoretical possibilities we can discern in the data. This initial step in coding moves us toward later decisions about defining our core conceptual categories. The second level – Focused coding – here, we used the most significant and frequent earlier codes to sift through big amount of data. This phase required decisions about which initial codes make the most analytic sense to categorize the data. The last coding level – Axial coding – related categories to subcategories specifies the properties and dimensions of a category, and reassembles the data you have fractured during initial coding to give coherence to the emerging analysis (Charmaz, 2006).

This study aims the comprehension of the residential customer experiences regarding the energy services and home comfort solutions (gas, electricity, heating) of energy services ecosystem, and based on that this study is going to characterized the customer journey of this customers and identified suggestions of opportunities for new service developments as with the improvement of the interaction between the company and the customer.

5. Results

In this section we consider the objectives of this study connected with main findings obtained during the interviews and coding. We begin by presenting the study results of the first phase of the study, namely the analysis of current services offered by energy companies to their customers, the way they are presented, the competition and the channels chosen by the company to communicate with their customers. This phase, allowed an initial understanding of the service ecosystem that was paramount to the second phase of the study. Afterwards we present the results of the second phase, showing the interview results, including customers activities, artefacts, energy and comfort perceptions and concerns, energy sources, actors and channels needs and want considering their feedback through the interviews by presenting a detailed table with coding results.

5.1 First Phase Research Results (Energy Service Ecosystem Research)

Several services are provided and delivered to customers on the energy sector and energy ecosystem. We understood that, until recently, we had only one company operating on this market, and that this monopoly belonged to EDP. Nowadays we have other companies that are trying day by day to enter in this market and trying to gain customers credibility and conquer them even knowing the difficulties that are presented since people are accustomed to one company service and seem to be loyal to that provider.

EDP is the biggest company operating on the market of energy services. Although some competitive companies are emerging on this service ecosystem they still have the biggest percentage of customers and the company that have more influence on the energy sector and this happens because customers did not have any other choice until recent times and seem to have lack of acknowledgement about this theme which makes them afraid of a change.

During this initial phase of the study, we set out to understand the different EDP Commercial service offerings for residential customers. Service “Funciona” (3,95€ per month) ensures security and assistance at reduced costs. The advantages consist on urgent services with a response for assistance 24/7 with immediate intervention, electric and gas security and annual maintenance of gas boiler and air conditioning. Service “Fatura Segura” which means secure invoice (1,40€ per month) that ensures the energy payment on difficult moments offering annual protection to when it is needed, credit until 800€ and security coverage on electricity, gas and other services. Service “Bombas de Calor” or Heat Pumps (30€ per month) for

customers to make savings on electricity and water consumptions by replacing their water heaters or thermostat for a heat pump that consists on a more efficient solution to warm the used water with the same technology as air conditioning.

Another service offered by this company is “Energia Solar” or solar energy. In this one EDP offers a free simulation to determine the ideal solution and for the customer to know how much they can save. It consists on production and consumption of costumers own solar energy and have a cost of 20€ per month (36 monthly instalments with no upfront payment). “Auditoria Energética” or energy audit which consists on service that provides a specialist to make an analysis and inform customers about their consumptions and ways make savings and to increase their energetic efficiency. This service does not have information about costs. EDP Commercial requires customers to schedule a visit then they collect the data they need, make a diagnosis and then requires the customer to make the payment of this service, and then they send the report with the results. Finally re:dy, which consists on acquiring an intelligent house. This service provides a system that allows customers to connect and control their houses through a mobile application from wherever and whenever they want. This service contains multiple kits with different prices.

Beyond all of this services EDP offers to provide to his customers there are also different possible ways to make the monthly payment. The first one consists on the regular one receive the invoice at home and make the bank transference or the other option id the direct debit which allows customer to charged monthly on their bank account without having the preoccupation of deadlines and the need to live their houses to make the transfers. Beyond this service there are more like “clients with special necessities” in which EDP distribution guarantee, in the case of electric failures, an obligation to inform this customers 36 hours before they happen and priorities on the energetic reestablishment. To have these service customers just need to register themselves with the marketers with whom they celebrate their energetic contract with medical certificate. Electronic invoice gives a way for customers to collaborate on a more green world by sending the invoices through e-mail instead of mailing paper. These services do not have any costs associated to customers, they consist only on options and advantages to them.

This leading company has multiple channels to communicate with their customers and even more different services to offer to their customers but all of this seems to be disconnected to what customers perceive, need and want. In this first phase of the study we analysed the channels used by EDP to communicate with customers.

The telephone, most of the times people speak only with the machine and spend a lot of time waiting for answers. The stores operate with good professionals, but with the increasing importance of smart services this is increasingly an option that is not primordial and the app seems to have the same problems as the website.

Considering the energy sector changes occurring nowadays, the liberalization of this sector and the increasing emergence of new competitors it is important to find regular customers of energy services and hear them to understood what they expect from companies what they feel, what they need and what they want. For this we found a group of twelve people from different ages, education and locations to try to understand their experience as customers of energy and comfort services, in order to draw implications for the development of future services in this ecosystem.

This will also support the alignment between energy service provider's services to what customers need.

5.2 Second Phase Research Results

Following the coding phase and continuing to use the fundamentals of Grounded Theory methodology, namely open, axial and selective coding, we defined several categories grounded in the data provided. These categories result from the interview analysis. When explaining the categories we also provide customers quotes to add further detail.

5.2.1 Activities

The first category defined was “Activities” which consists on the activities customers perform in order to increase their energy efficiency at home. The activities mentioned by the customers are explicit on the table below.

Inside this category there is the customer journey mapped according to the information provided by the sample chosen while describing the activities performed for home comfort and energy services.

Table 2 - Coded Activities (n=12)

Reduction of energy expenditure		**12**
	Turn Down the Lights	8
	Turn Off the Standbys’	5
	Close the Fridge	4
	Warming up only one room	3
	Use equipment’s at less cost hours	2
	Heater Control	1
	Take Advantage of Sunlight	1
Buying New Equipment / Service		**8**
	Choosing New Equipment	8
	Change Lamps for LED	6
	Installing Solar Panels	2
	Bi Hour Rate	1
Routine interaction with the company		**9**
	Counter Reading	8
	Pay attention to competitors offers	2
	Pay attention to the invoices	1
Maintenance Activities		**3**
	Asked For Technical Inspection	2
	Increase Counter Power Rating	1

The first top-level node presented on the coding process of this study interviews consisted on the activities that customers perform in order to reach their comfort and comfort expectations. The first sub top-level node consisted on the Potentialization of Energy – Reduction of energy expenditure and this one was the most referenced category by the interviewed people (21 times). In order to reach the expected levels of energy expenditure people try to increase their savings.

"I try to save the most I can without compromising the comfort of everyday life"

(Female, electricity and gas customer, 40 years old)

In this section the most used activity is turning down the lights when they do not need them and be always attentive to that, the second one is turning down the standbys by totally switching off the equipment's. After these two activities, it comes closing the fridge since it is one of the most expenditure actions mentioned by the interviewed people. In this one people try to always close the fridge when it is not being used. Also, in order to reduce energy expenditures people try to use the equipment's at less cost hours by, organizing their daily routine in a way possible to turn on the machines in more profitable hours.

"I put the washing machine on at lunchtime"

(Male, electricity customer, 35 years old),

Other activity mentioned here was controlling the heater when it's cold by having it the less time possible switched on. The last activity mentioned was taking advantage of sunlight when the position of the house allows to it, this way there is no need for turning the lights on and the house is naturally warmed.

The second sub top-level node activity with more importance for the interviewees was "Buying New Equipment" because obsolete equipment may cause a considerable increase on monthly invoice. In this, people stated that:

"Choosing new equipment is more efficient that keep the old ones. This way I know that I make long term savings"

(Male, electricity and gas customer, 50 years old)

Also, changing lamps for LED is an activity that is increasingly taken by people because they entail low energy expenditures. Installing solar panels and bi hour rates are also activities taken by people but are not that much used.

On their daily routines, in order to increase their energy and comfort at home, interviewees considered valuable for themselves to ask their companies for the counter reading, using heaters to warming up the rooms instead of central heating, pay attention to competitors offers to see if it's worth for them to change and be attentive to the invoices to make sure that everything they pay for is used by them.

Finally, but not less important, people mentioned the maintenance activities that, although they were mentioned less times compared to the others before they are taken in order to reach activities that are done or desired to be done for most of the interviewees. The first one "Ask for technical inspection" is used in order to investigate the equipment's that are obsolete and the activities they may take in order to reduce their monthly invoice. One other activity stated by an interviewee was increasing counter power rate.

5.2.1.1 CUSTOMER JOURNEY

The customer journey was mapped according to what customers described as being the activities performed in order to reach their expected level of home comfort and energy at home.

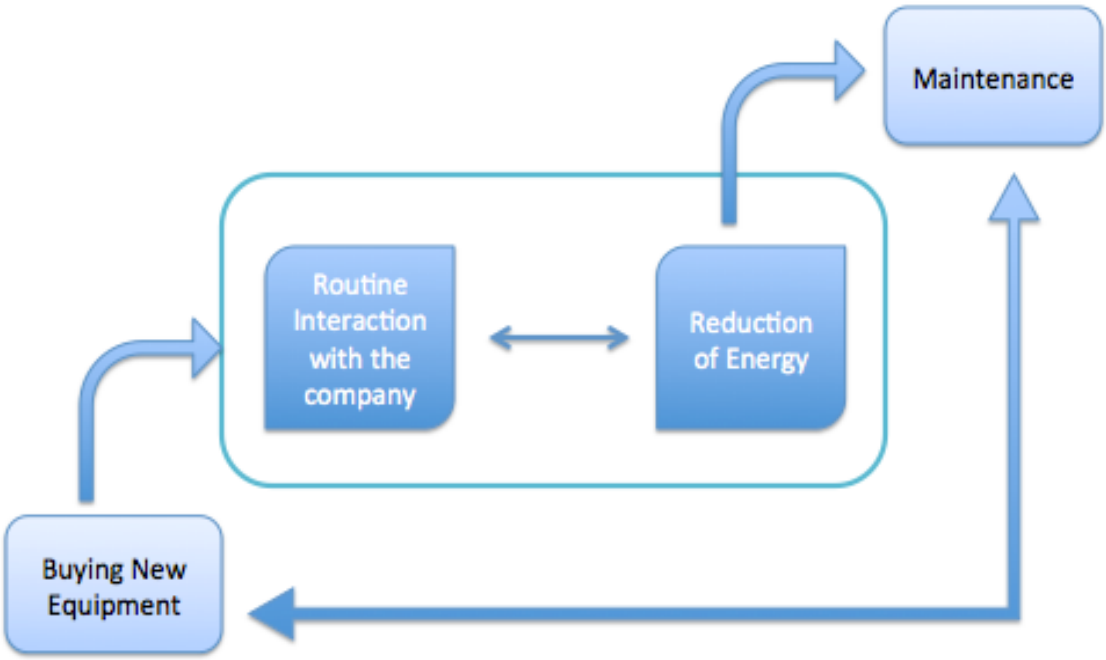

Figure 5 - Customer Journey for home confort and energy services

5.2.2 Artefacts

The second top-level node is named Artefacts and consists on the equipment's chosen by the interviewees as a solution to increase their energy and comfort at home. The most used one, mentioned seven times was the water heater, followed by the central heating that people who have it do not use because of the high costs that this equipment has.

Table 3 - Coded Artefacts (n=12)

Equipment's		**12**
Water Heater		7
Central Heating		3
Air Conditioning		2
Fridge		4
Cylinder		2
Solar Panels		2
Halogen Heater		1
Oil Heater		1
Electric Resistance		1
Heat Recover		1
Ceramic Hob		1
Pellets Boiler		1
Radiator		1
Three Phase Meter		1
Electric Oven		1

The interviewees that have central heating explained that they only have it because when they bought their houses it was included in the construction. They do not use it because it increases they monthly invoice. So in order to fill this situation they substitute the use of central heating for other equipment's such as heaters (oil and/or halogen).

"I use another equipment to warm the house. In my living room I put one halogen heater and in my room I use an oil heater. This way I just turn them on when I go to this parts of the house and I don't make an exaggerated use of energy"

(Female, electricity and gas customer, 39 years old)

Air conditioning, cylinder and solar panels were defined by this customers as high cost equipment with gains in the future in terms of energy expenditures, which means that they consider them a long term saving and a good investment. Solar panels were cited as an essential equipment to have in recently constructed houses,

"Nowadays, I think that it makes perfect sense to install solar panels in pre build houses"

(Male, electricity, gas, pellets and solar customer, 33 years old).

Electric resistance, heat recover, ceramic hob, pellets boiler, radiator, three phase meter and electric oven were all stated by the interviewees and chosen because they consider this equipment's as high efficient home appliances,

In what concerns to home automation there are more people that knows about this concept than the ones who don't, but beside the fact that all the participants in the interviews cited it, it is only used by one of them that opted to use it because he understands a lot about automation and build his own concept for his home.

" I know EDP offers home automation services but include extra monthly fees and I do not want to be stuck with this"

(Male, electricity, gas, pellets and solar customer, 33 years old).

Table 4 - Coded Home Automation (n=12)

Home Automation	**12**
Know About it	**8**
Don't Know About It	**4**

Other interviewees that have heard about home automation refer to this service as a high potential service that needs to be more advertised and disclosed.

"There is an huge lack of information. This needs to be solved urgently."

(Female, electricity and gas customer, 61 years old)

Four people out of twelve do not know anything about home automation.

5.2.3 Energy and Comfort Perceptions and Concerns

Energy and comfort perception and concerns were one of he most important top-level nodes coded to canvass the way customers perceive the quality of energy services provided nowadays and how they keep up with their expectations and needs.

Table 5 - Coded Energy and Comfort Perceptions and Concerns

Cost Savings		**10**
	Increase Savings (Monthly invoice)	9
	EDP Costs (prices opinion)	8
	Spends too much	6
	Central Heating	4
Relationship with the provider – Global Evaluation		**12**
	Good Company Perception	11
	Bad Company Perception	3
	Good Service But Too Expensive	3
	Is Not Proactive	2
Relationship with the provider		**12**
	Good Workers - Employee Service	5
	Long-Time Experience	5
	No Perceived Value	2
	Neutral	2
	Increase Service Quality	1
	Lack of Offer	1
	Too Much Burocratic Do Not Work Very Well	1
Want to increase energy efficiency		11
Nobody uses Apps for energy efficiency		9
Lack of information about energy services offerings		6
Lack of interest about energy services		6
Big variety of market offers and difficult to access information		1
Difficult to understand the energy topic and how this ecosystem works		1
Stable and easy to access to energy		1

The most popular sub top-level node among the sample chosen to participate in this study was cost savings, mentioned for nine interviewees. In this category people emphasize the importance of making savings as their primordial need to reach the expected levels of comfort at home.

"I really wanted to make an use of energy in a sustained way, reducing consumption rationally adapted to the needs of energy comfort at home"

(Male, electricity and gas customer, 58 years old)

"In what concerns to energy and comfort at home the most important thing is to have the less costs possible making the most of the equipment's"

(Female, electricity and gas customer, 61 years old).

This category followed the same logic as the subsequent sub top-level nodes as EDP costs (prices opinion) where people do not hesitate to enhance the exaggeration of the taxes practiced in Portugal.

"I think the company EDP has been also focused on providing new services but in my opinion it would be a lot more important to focus on how to reduce the cost of electricity, considering on one hand the low monetary capacity of the general average of Portuguese people, and on the other hand the fact that Portugal is one of the European countries with the highest cost of electricity compared to the average. In my opinion the prices are highly unrealistic given the Return On Investment (ROI)".

(Male, electricity customer, 37 years old)

The general opinion followed the same perspective as this interviewee and in what concerns to the category "spends too much" interviewees affirmed that they do not understand how is it possible to spend so much money on energy services. They consider the service good but thinks the costs are excessively high. Still, living up to this top-level node, people always express the same opinion about the central heating as an equipment that they do not use even having it installed in their houses because the usage of this equipment always translates into an increase in the monthly energy bill.

Following the savings top-level node people expressed their desire to increase their energy efficiency in order to achieve their expected level of home comfort and energy services. Also, we understood that people do not use apps for energy efficiency. This may look contradictory because they are always looking for solutions to increase their energy efficiency but people gave reasons such as difficulty on understanding the topic (energy) or, in other words, lack of

knowledge about energy that makes them feel more insecure and more dependants on the service providers

"Last month I had a problem with a service provided by EDP and my boyfriend call them to try to understand the matter. I asked him to do it because, despite the fact that he does not understand that much about energy, at least he can do it better than me. I feel insecure about the theme so I feel very dependent to others to solve this for me. Also, this is the reason why I don't explore about their offers because I don't understand so I keep using the basic services"

(Female, electricity and gas customer, 39 years old).

This fact justifies the reason why people do not use apps or new emergent energy services. Because of this insecurity, people in general reveal lack of interest on looking for new service offerings from the providers. Customers are in need for more information from them and wish for a stable and easy way to access to energy.

Regarding the relationship with the provider and considering that all the participants on this study interviews are EDP customers this feedback came mostly related to this company. The global evaluation of the energy provider were mostly "good" people manifested themselves satisfied with the service stating that the quality of workers-service is very good and that it is a trustable company. On the other hand three people manifested some displeasure with the company and justified it with the lack of communication and organization inside the company, which ends up causing a bad experience to the customer.

"For me it is extraordinary how it is that within a single company they discarded from one department to the other in front of the customer"

(Male, electricity, gas, pellets and solar customer, 33 years old)

Also, it was mentioned the delay in providing services and the inability to meet deadlines from the leading company.

"I have a negative opinion about the electricity, voice and net contract remodelling because the deadline was not fulfilled and the quality of the service provided was not good"

(Male, electricity customer, 35 years old)

Beside the fact that ones are more satisfied than others, it was common the opinion among the interviewees that the service provider is too expensive and that there is a lack of proactivity from the company to communicate and look for customers.

"It seems that we have to look for them instead of being them the interested part to communicate new offers and advertise their services. EDP should heavily bet on consumer information"

(Male, electricity and gas customer, 50 years old).

The good workers employee service, the long time experience of the company, the opinion of no reaching perceived value in this company, the critique to the company for being neutral (not good and not bad, just a service provider), the necessity to ask them to increase their service quality, their lack of offer and the fact the excess of companies bureaucratization lead customers to its final conclusions of the global evaluation.

To conclude this topic it is important to mention the customer's view regarding the market offers. In this section the opinion was consensual in the difficulty to access information.

"I consider myself not just a proactive person but also an expert in technologies and I still found it very complicated to browse through all the energy service offers"

(Male, electricity, gas, pellets and solar customer, 33 years old)

5.2.4 Energy Sources

The increasing renewable energy world is occurring nowadays but energy and gas still be the most acquired energy sources at people houses considering the sample used in this study.

Table 6 - Coded Energy Sources (n=12)

Energy Sources	**12**
Electricity	12
Gas	7
Pellets	1
Sun	1

Eight people out of twelve use electric system (integrated or not with other energy sources) and seven gas, pellets and sun (solar panels) are only used by one person. Beside the fact that people consider solar panel a long-term profitable decision, they still not implement this energy source because of the initial high costs of this equipment.

Also, it is important to give emphasize that one of interviewees made regarding the lack of offer existent on energy services.

"In what concerns to equipment's the offer is very diversified but the offer of energy sources services provider is very poor or at least I find it very difficult to browse through all the information about that"

(*Male, electricity, gas, pellets and solar customer, 33 years old*).

This lead us to the conclusion that even the people that look for information and different services to install in their houses find it difficult to find. Thus, the problem here is not only the prices (mentioned by all the interviewees) but also the amount of available services and the poor advertising adopted by the companies.

5.2.5 Actors

One other important category to emphasize in this work is the actors that people add to their energy service journeys when they have a problem, when they make interventions or even to updated if there is other ways to increase their expected level of efficiency.

Table 7 - Coded Actors (n=12)

Actors	**12**
Contractor	7
EDP	6
Carpentry	3
Electricity subcontractors	3
Specialized companies	3
Locksmith	2
Plumber	2
Inspector Entity	2
CMP	1
Specialized Technicians	1
EDP Gás	1

The most refereed actor was the contractor. This one was cited every time the interviewees confessed to having made interventions at home and most of the times they leave all the other services needed (locksmith, plumber, specialized technicians, electricity subcontractors, etc.) in the contractor hands in order to decrease their loss of time and preoccupations.

"When I bought my house it was in a project/design phase so I did not waste much time on this. I trusted in the contractor and he guided the whole work"

(Male, electricity and gas customer, 58 years old)

The interviewees that look for the other specialists themselves (CMP, inspector entity and others) did it mostly because the interventions was more complicated than others and they need to be more precise to look for the technicians (mainly on the Internet or attended to friends' recommendations).

EDP was the second most referenced actor. Considering the sample used to this study, this company was the preferred service provider and when they plan to do any intervention they require the company help to do that. More than one person asked EDP for an inspection in order to check what are the equipment's that are generating more expenditures (service "Auditoria Energética" that EDP provides).

5.2.6 Channels

Although we live in an increasing world of smart services and people are more and more accustomed to do everything through their smartphones and computers, the traditional methods of interacting with the company are still the most used channels.

Table 8 - Coded Channels (n=12)

Channels	**12**
Telephone	10
Store	8
Website	3
App	2
E-mail	1

Nine people out of twelve use telephone as the primary channel to communicate with the company when they need. Eight people use the stores. The website is used only for three people and these ones used it to look for information about services, but because of the lack of knowledge about electricity in general people feel more comfortable and more informed if they speak to someone.

"Sometimes I visit the website, but very rarely."

(Male, electricity and gas customer, 50 years old)

The app is still not a very used method, but the customers that use it said it was just to give the counter reading. The e-mail was only mentioned by one person and it was because its energy provider company sends a feedback request form by e-mail.

Next, we provide some potential improvements as well as customer proposals and the implications of the study.

6 Discussion

The first research question addressed by this study was the understanding of energy services ecosystem and how customers perceive it. We aimed to understand how companies operate in this ecosystem, how the service is provided and how these services go along with customer's claims, in order to be possible to answer the second question that consists on drawing implications for new service designs that follows customers expectations.

Bearing in mind this study results and its research questions we understood that customers of the energy service ecosystem are attached to one single company: EDP. EDP was a monopoly until recent times and, for this reason, they gained the customers loyalty. This loyalty and the lack of knowledge about the theme (energy and comfort) by the customers lead to a sense of dependence to this company and an unwillingness to change.

Although this seems to be a positive sign to EDP, we understood, through the interviews made, that EDP seems to care more about themselves than its customers since customers, even being proactive people and searching for information, find it difficult to browse through the offers provided by this company. This lead us to the conclusion that their apparently lack of sensibility to give attention to its customers left some space for new companies to have a possibility to enter in this market. Nevertheless, these companies still need to make customers believe in them and convince them to make the decision to abdicate the services provided by a company that served them during their entire lives. What people need is more information from the company. They need energy providers to look for them, explain the services they have for new service offerings, maybe more door to door actions or an improvement on advertising, or even publicity and information through channels, telephone in this case since is the most used by it's customer's.

In order to reach more conclusions we analysed the channels used by EDP to communicate with customers and we conclude that the fact that this company, based on anecdotal evidence, only communicates with each customer 7 minutes per year, it is not the only, or either the biggest problem, of their relationship with their clients. Customers referred to EDP's website as difficult to access information, that it does not provide detailed information about the services, that it is not clear (or user friendly), is confusing and is not easy to access by everyone. People do not manifest interest on browsing on their website because they do not find value on doing that. Customers should be able to access companies website and be able

to browse through all the service offers, to be informed and have enough information to make them feel capable to make the best decisions by themselves. Energy service provider's customers use mainly the traditional channels, such as telephone and stores, to communicate with the company. This led us to the conclusion that the website needs to be more helpful and appealing for people to feel the desire to browse and use it. In this case, it is necessary to make the site richer in information and more appealing and advertise it more.

One other important thing to add is that, although we live in an increasing world of technologies, where people use their phones to access several services the interviewed customers still use more the traditional methods to communicate with their service provider. Customer's also mentioned the lack of information about the service. As such, while customers feel insecure about the acknowledgement underlying the service provided they will continue to look for more traditional ways to communicate and keep preferring basic services. More information could lead customers to be more confident with their energy service provider, leading them to develop more frequent and more evolved interactions, such as using other more advanced channels (app) and services (e.g. re:dy da EDP). If such information is not provided, customers will probably continue with their weak interaction with the energy service ecosystem and its innovations.

People are seeking from attention from energy service providers. This service ecosystem is still focused on developing new energy methods and innovation to facilitate customer's lives. For this, these companies be aware with the energies services providers around the world but they still missing the most important part that is be in agreement with their costumers.

Energy service ecosystem customers look for more accessible and fair prices. Across all the interviews customers mentioned the prices practiced by energy service providers is not in agreement with Portugal cost of living. They want to be efficient. In the first part of the study research results we found a service that is provided by the leading company in the energy service ecosystem, EDP, named "Auditoria Energética" that means energetic audit, that corresponds very good in order to help customers increasing their potentialization of energy at home and reducing their expenditures, but somehow this service still not being very used. They need to put more efforts on the advertising or in did reduce the prices/taxes).

Customers want to be more informed and feel more confortable and secure with the energy theme. Customers need to know how to operate in its entirety with the services and equipment's they buy to their energy service providers and this ways feel free to choose and

opt for new different services that they are capable to understand that are more profitable and fill better with their home comfort.

There are significant opportunities in this ecosystem for the desires and needs of customers and energy services providers to happen. There is just a need for the companies that operate in this ecosystem to hear first their customers and meet their primary needs. After this concordance happens we believe that customers will adhere in a very satisfied way to these companies service innovations.

7 Conclusion and future research

The process of liberalization of the electrical sector in Portugal led to the emergence of competition and made electricity customers able to freely choose their electricity supplier. With this liberalization it was expected an increase in competition with implications on prices and service quality that should beneficiate the customers by increasing their consumer satisfaction of electric power. Since this times the competition started to emerge. EDP lost its monopoly to companies such as Endesa, Goldenergy, Iberdrola and Galp (gas).

In this new era of energy service it is very important to study and understand the complexity of this service ecosystem. Business ecosystems, defined as an economic community supported by a foundation of interacting organizations and individuals, produces goods and services that have value to customers that belong to the same ecosystem (Moore, 1996). The member organisms also include suppliers, lead producers, stakeholders, competitors, powerful species that may be relevant in a given situation as government agencies and regulators, and associations and standard bodies representing customers or suppliers (Moore, 1996). All across the service ecosystem, service organizations have long recognized the importance of the customer experience for customer satisfaction and loyalty. Thus, they increasingly place the customer experience at the core of service offering and deliver "experience-centric services"(Zomerdijk & A.Voss, 2010).

Nowadays, the creation of a customer experience is a leading management objective and we understand why because customers play a crucial role on the service ecosystems. People look more for satisfying experiences than for products so we have to understand what makes them satisfied, what are their expectations from companies, what they need and even what they want and this was one primordial objective of this study to understand.

We live in the era of technology and for this reason companies are focusing their service innovations in that way but, although smart technologies have great potential, their success requires an in-depth understanding of customer perceptions and behaviours (Wünderlich et al., 2015). So, we always reach the same conclusion: understanding the customer experience is essential to be successful in every business and to win the battle from mindshare and market share.

In order to understand the customer experience with home comfort and energy services, this study started to make a research about the energy theme its ecosystem, how it works and their

specifications. After this part completed we made a research based on literature review on the themes that were addressed to this study.

In the second phase of this study we started by making a research of the offers made by Portuguese energy service providers and the channels used to make that offer. Secondly, we made a qualitative study based on interviews that enabled us to understand the customer experience. This interview was previous prepared with the aim to reach important and specific categories essential to respond to what are customer's intentions regarding their home comfort and energy services. After the interviews concluded it started the coding process in all its phases until the last phase that were organize the information to start reporting the results.

The research questions addressed to this study relates to the understanding of costumers experience with home comfort and energy services, how energy services ecosystem work and how customers perceive it and based on the results of the first answer the second by drawing implications for new service designs that follows customer's expectations. According to data collected from interviews, we understood that people's biggest necessities are a reduction of prices and the necessity for more information coming from energy service providers. As implications from this study we we found that companies should start looking more for the customer, and increase the information they provide to them through door-to-door actions, or telephone, to inform them about new service offerings. Companies should also provide services or advertise better the existing ones for customers to reach their expected levels of efficiency at home and reduce their expenditures. Also, since customers that belong to this ecosystem still use the traditional methods and feel a certain level of reluctance regarding the more innovative ones, we recommend service providers to finish with customers insecurities and make website and app with more complete, easy accessed information and advertise it more.

One important aspect to refer are the limitations of this study. First, the sample chosen for this study consist on twelve people and this study results were entirely based on these people opinions. Secondly, all of the interviews were EDP customers and not from other service providers. Another limitation to be considered is that this study approached exclusively the Portuguese context. Also, it would be interesting to interview more customers, namely "early adopters" that are customers that use more services e are open to innovation.

In conclusion, despite the limitations and need for future work, namely filling the limitations previous referred. It would be important to increase the sample chosen and have more diversity; we have met the goals set for this research. This study is the beginning for a process

of service design. Here we used MSD the first part of MSD but for a future work it would be very interesting to finish the others. The qualitative research based on Grounded Theory methods used along the project provided valuable insights in order to understand the customer experience and their needs.

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APPENDIX A: Informed Consent

Consentimento Informado

Estamos a solicitar a sua participação para um estudo no âmbito de um estudo da experiencia do cliente estabelecido entre a Faculdade de Engenharia da Universidade do Porto e a EDP Energias de Portugal.

Este estudo tem como objectivo avaliar a gestão da energia e conforto em casa e a experiencia do cliente da EDP Energias de Portugal. Neste sentido estamos a realizar entrevistas com diferentes clientes relevantes para o projeto.

Estas entrevistas serão gravadas para possibilitar a sua transcrição e análise aprofundada. Só iniciaremos a gravação após a sua concordância, expressa através da assinatura deste consentimento informado.

A informação recolhida é estritamente confidencial e será apenas utilizada no âmbito deste estudo. Os resultados serão reportados de forma agregada, sem identificar individualmente os entrevistados. A informação poderá ser usada para relatórios, artigos, apresentações ou artigos científicos, mas o seu nome não será usado sem o consentimento explícito por escrito.

A sua participação neste estudo é voluntária, pelo que a poderá interromper a qualquer momento. Nesse caso toda a informação recolhida até ao momento será inutilizada.

Este estudo é conduzido por Patrícia Mota, estudante do Mestrado de Engenharia de Serviços e Gestão da Faculdade de Engenharia da Universidade do Porto, (up201500027@fe.up.pt), sobre a orientação do Dr. Jorge Teixeira (Jorge.grenha@fe.up.pt) e da Professora Lia Patrício, Faculdade de Engenharia e Universidade do Porto, Rua Dr. Roberto Frias, s/n 4200-465 Porto, telefone 225083437.

O Investigador:

Nome:_____

_____

Assinatura:_____

_____

O participante.

Declaro ter lido e compreendido este documento, bem como as informações verbais fornecidas e aceito participar nesta investigação. Permito a utilização dos dados que forneço de forma voluntária, confiando em que apenas serão utilizados para investigação e com as garantias de confidencialidade e anonimato que me são dadas pelo investigador. Autorizo a comunicação de dados de forma anónima a outras entidades que estabeleçam parceria com a Faculdade de Engenharia da Universidade do Porto para fins académicos e de investigação científica..

Nome: _____

_____

Assinatura: _____ Data: _____

APPENDIX B: Interview to the customers

Guião de entrevista para estudo da experiencia do cliente

Dados Sociodemográficos:

a. Idade, Género
b. Grau de Escolaridade e profissão?
c. Área/zona de habitação?
d. Moradia/Apartamento?
e. Usa telemóvel? Internet no telemóvel? Tem Smartphone?

Entrevista:

A. Fale-me sobre a forma como gere a energia e o conforto em casa

1. O que é importante para si na gestão da energia e do conforto da casa
2. Que atividades é que desenvolve para a gestão da energia e do conforto em casa?

B. Fase 1: Pode contar-me a história desde que se mudou para a casa ou fez um grande intervenção?

3. Que atividades levou a cabo (desde o início: Construção/ mudança/renovação de casa? Mudança de plano energético?
4. Que serviços utilizou (eletricista, entidade inspetora, etc.)?
    a. Como descobriu a existência desses serviços? Procurou pela internet, através de amigos, vizinhos ou conhecidos?
    b. Como foi a sua experiência com estes serviços? (telefonemas, trato na resposta, eficiência na prestação do serviço e no esclarecimento de duvidas)
    c. O que lhe fez falta ou gostaria de ver melhorado para se sentir melhor servido?
5. Que equipamentos/soluções escolheu: Para aquecimento de águas, aquecimento ambiente, cozinhar, electricidade, sistema de gestão de equipamentos e consumos?
6. Que critérios foram importantes na sua escolha
7. Como gostaria de ver melhorado este processo?
8. Ainda durante a implementação do serviço em sua casa com quem interagiu durante todo o processo?
    a. De que forma interagiu (loja, telefone, site, app)? O que lhe fez falta ou gostaria de ver melhorado para se sentir melhor servido?
    b. Que mais valias lhe trouxe o contacto com estas pessoas?

C. Fase 2: Pode falar-me sobre a sua gestão de energia e conforto em casa no dia a dia?

9. Que atividades leva a cabo (nenhuma, controlo, leitura do contador, monitorização dos standby...?
10. O que é importante para si na gestão de energia e conforto no dia a dia.
11. Que serviços, apps e equipamentos usa mais para esta atividade

D. Fase 3 (opcional): já reavaliou alguma vez a solução de energia e conforto que tem em casa?

12. Como fez?
13. Que serviços e equipamentos utilizou?
14. Que critérios foram importantes para a sua escolha.

E. E qual foi a(s) empresa(s) que escolheu para a prestação de serviços de energia?

1. EDP, Endesa, Galp, Iberdrola, Goldernergy. O que o levou a optar pela escolha desses recursos/serviços e não outros? (convencido pelo site, explicação por parte de um colaborador, preço)
2. Há quanto tempo utiliza este serviço?
3. Podia-me falar como tem sido a sua experiência enquanto cliente desta empresa?
4. Podia-me descrever os diversos passos/pontos de contacto da sua experiência? Como interage com a empresa? (site, loja, etc...)
5. Que outros serviços e equipamentos usa em complemento com os serviços da empresa. Estes diferentes serviços estão bem integrados?
6. Em que medida é que esta solução vai ao encontro das suas necessidade de energia e conforto?
7. Como avalia o serviço da empresa? E como avalia a solução global de energia e conforto oferecida pelo conjunto de serviços/empresas que utiliza?
8. (Fale-me sobre as emoções e sentimentos pelos quais se viu passar ao longo de toda esta jornada)
    a. Que melhorias gostava de ter visto ao longo deste processo?

F. Diga-me como a sua visão mudou desde que deu inicio a todo este processo

    a. Já considerou mudar de prestador de serviço? Porquê e se sim, como o fez?
    b. Depois de passar por toda esta experiencia que conselho daria a alguém seu conhecido em vésperas de iniciar esta mesma jornada?

G. Já ouviu falar de outros serviços do seu prestador relacionados com produção de energia para autoconsumo, ou manutenção/garantia de electrodomésticos, eficiência energética, gestão de equipamentos e consumos (domótica)?

a. Como vê a oferta deste tipo de serviços? (preço, acesso, informação)

H. Há alguma informação extra que considera interessante acrescentar para aumentar o interesse deste estudo?

I. Há alguma questão que gostaria de me fazer?