*Department of Impresa & Management*

*Chair of Consumer Behaviour*

# CUSTOMERS AND SMART OBJECTS:

# PARTNERSHIP IN COMPARISON WITH USER-SERVICE PROVIDER AND MASTER-SERVANT RELATIONSHIPS

SUPERVISOR

*Prof. Simona Romani*

CANDIDATE
*Maria Azzarello*
*Matr. 699121*

CORRELATORE

*Prof. Maurizio Naldi*

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# ABSTRACT

While the IoT industry is experiencing an extraordinary growth, companies involving the smart devices in their offering are exposed to new threats and challenges. Thus, the analysis of the relationship between customers and smart devices is increasingly important at a managerial level, in order to understand their needs, wants and behaviour and consequently, to face those challenges in the best possible way. Specifically, the purpose of our qualitative analysis is to investigate how the partnership relationship is structured and developed in the customer/smart object experience and its differences with other types of relationships, namely the user/service provider and the master/servant relationships. Findings suggested that the efficacy is valued as the most important attribute of a smart device. Nevertheless, what emerged in our sample was a positive correlation between the mention of the interaction abilities as attribute of the smart objects, the fun purposes as the motives behind the use of the smart objects, the mention of positive emotions and thoughts and the presence of a virtual assistant in the customer's experience. In particular, our findings confirmed that virtual assistants, as conversational agents, are subjects to the humanization process, which is strictly related to the partnership relationship. Moreover, positive emotions and thoughts have been mentioned by customers in a partnership relationship with their devices, more than customers in other relationships.

# Introduction

The aim of this study is to analyze how the partnership relationship occurring between customers and smart objects is structured and developed, in comparison with the user/service provider and the master/servant ones.

In the first part of this analysis, we will offer an overview of what smart objects refer to and the reasons why the better understanding of the topic is relevant from a managerial perspective. Generally, two main definitions of smart objects have been provided by authors: while the first one is technical, the second one is extensive and strictly linked with the concept of "innovation". From the technical point of view, "the Internet of Things (IoT) consists of a network of billions of devices, the so-called smart objects, that are able to communicate with consumers and other systems, services, and devices through the Internet" (Novak & Hoffman, 2018). A further broader definition of the IoT devices has been provided by authors, and it related to the fact that those new connected and smart products and services "are revolutionizing consumers' lives, to the extent that they are considered as disruptive innovations" (Mani & Chouk, 2018). According to some authors, the IoT is considered the next phase in the Internet revolution since "it brought the intelligence of the Internet to physical products, with the potential for something new to emerge" (Hoffman & Novak, 2015). Moreover, in the first part we will explain how the two definitions of smart objects are two sides of the same coin; indeed, technical capacities do allow smart objects to perform their innovative activities.

Afterwards, in the second part of the chapter we will deal with the reasons why the analysis of the relationship between customers and smart objects is relevant. First, we will analyze the growth of the industry: the IoT industry is experiencing an extraordinary growth, to the extent that "it is expected to worth $3 trillion by 2025, with over 27 billion heterogeneous things connected to the Internet" (Meyer, 2016). Secondly, we will go more in depth in the challenges offered by the development of the industry, focusing on the reasons of the customers' *resistance* to the IoT innovation. We will mention how negative brand relationships are more common than positive ones; indeed, they can be damaging not only to consumers, but also to the companies involved; exposing companies to customers' activities such as boycotting, spreading negative word-of-mouth, or taking actions against companies. Finally, we will deal with two categories of "barriers" obstructing the adoption of the IoT technology, with different implications for the relationship between customers and smart objects. While the psychological/ethical barriers are due to consumer characteristics such as self-efficiency, technology vulnerability and privacy concerns, the functional barriers, mainly occurring when the consumer perceives a radical change during a new product adoption, are related to product characteristics, such as usefulness, novelty, price and device intrusiveness.

In the second chapter we will deal with the literature review related to the relationship between customers and possessions, which in general has been a topic of discussion in the marketing literature. Even if smart objects depart from conventional brands and products, and these differences will require further analysis about the nature

of relationships consumers have with them, various literatures across a wide variety of disciplines have established that consumers have meaningful relationships with inanimate objects. In the first section, we will go through the literature related to the relationship between customers and objects; we will explain how smart objects depart from the traditional ones since they are provided with the agency, the autonomy and the authority capabilities; and finally, we will take into consideration a particular kind of smart objects, consisting of the virtual assistants Siri, Google Home and Alexa. What these literatures have in common is that consumers can, and do, have relationships with objects that can be referenced to social relationships (Belk 1988; Fournier 1998; Fournier and Alvarez 2012; Novak & Hoffman, 2018).

In the second section, we will analyze different conceptual and consumer culture theory approaches showing that consumers' regular interactions with everyday objects, brands, and brand communities help develop meaning around those objects that transcends their functionality. In particular, we will describe two main opposite lines of thinking: theories based on the concept of anthropomorphization (HCI, HRI and CASA), and the so-called "theory assemblage", an approach considering human and non-human actors as ontologically equivalent. Generally, our analysis is based on the first line of thinking, the anthropomorphization theory.

Finally, in the third section, we will go through the literature review dealing with the practical application of the anthropomorphizing theory in the IoT context. Specifically, we will take into consideration analysis conducted on smart objects provided with the virtual assistants Alexa, Siri and Google Assistant. We will analyze studies related to the influence of personification on customer's satisfaction and trust. Finally, we will mention previous researches dealing with positive and negative emotions emerged from the relationship with the device partner.

Generally, researches have demonstrated how "customers are emotionally attached to brands supporting process similarities across brand and human relational spaces in different ways: displaying brand loyalties that resemble marriages in their passionate commitments; having flings with brands; deriving joy from childhood friendships; investing in enmities and rivalrous adversarial relationships; lamenting lament master–slave entrapments and struggling with abusive relations wrought at the hands of malicious brands" (Fournier and Alvarez, 2012). At a macrolevel, all the above-mentioned specific relations belong to three main broader categories of customers/smart objects relationship: user/service provider, master/servant and partnership. Specifically, the main focus of our analysis consists of the partnership relationship in comparison with the other kind of relationships. Specifically, the partnership relationship occurs when a customer and a smart device develop a relation by cooperating in order to achieve a goal, to perform a task or a daily activity. Moreover, the smart objects play the role of a friendly ally when, without the device, the achieving of the goal would be at risk. Therefore, the customer is enthusiastic to be part of the relationship, since the cooperation improved the management of his or her daily activities.

In the third chapter we are going to perform the qualitative analysis of our data, collecting through a survey, according to four relevant dimensions for the purpose of our analysis. We will distinguish between the object's

side and the subject's side. While on the object's side we will examine the attributes dimension, on the subject's side we will analyze the motives, the emotions and the thoughts dimensions. Based on each dimension, we have coded the text of the responses in order to emphasize different aspects of the specific dimension. Therefore, we will focus on the different aspects by providing the text of some interesting responses.

First, on the object's side we are going to analyze the attributes of the smart objects, investigating whether the respondent highlights the interaction abilities of the smart object, their efficacy, or both. Secondly, we will proceed our analysis by examining the subject's side dimensions: motives, emotions and thoughts. First, we will consider the reasons behind the use of smart objects, investigating whether the motives of the experience with the smart device are based on fun or functionality purposes, or both. For what concerns the subject's side emotions and thoughts dimension, we investigated whether the respondent expressed positive, negative or both emotions and thoughts. First, we will analyze the polarity of the emotions and the thoughts in the different relationship. Afterwards, we will report for each one the different aspects mentioned by the respondents and we will go more in depth in the most relevant ones. In particular, we decided to go more in depth in some aspects which emerged in the literature review: satisfaction and satisfactory results/simplification of daily activities; trust and privacy concerns; addiction and technology vulnerability; and finally we will take into account the price concerns.

In the conclusions, we will deal with our findings, limitations and direction for future researches.

# 1. SMART OBJECTS: DEFINITIONS AND RELEVANCE OF THE ANALYSIS

The aim of this study is to analyze how the partnership relationship occurring between customers and smart objects, is structured and developed, compared to other relationships. Before going more in the depth in the topic, we believe it would relevant to offer an overview of what smart objects refers to and the reasons why the better understanding of the topic is relevant from a managerial perspective. Consequently, the first part is dedicated to explaining two different definitions of smart objects provided by authors: while the first one is technical, the second one is extensive and strictly linked with the concept of "innovation". Moreover, in the first part we will explain how the two definitions of smart objects are two sides of the same coin; indeed, technical capacities do allow smart objects to perform their innovative activities.

Afterwards, in the second part of the chapter we will deal with the reasons why the analysis of the relationship between customers and smart objects is relevant. First, we will analyze the growth of the industry by providing interesting insights about the historical perspective; the exponential growth of the IoT industry; the major fields of application; and how companies incorporating this technology in their offering benefit from smart objects. Secondly, we will go more in depth in the challenges offered by the development of the industry, focusing on the reasons of the customers' *resistance* to the IoT innovation. We will mention how negative brand relationships are more common than positive ones; indeed, they can be damaging not only to consumers, but also to the companies involved; exposing companies to customers' activities such as boycotting, spreading negative word-of-mouth, or taking actions against companies. Finally, we will deal with two categories of "barriers" obstructing the adoption of the IoT technology, with different implications for the relationship between customers and smart objects. While the psychological/ethical barriers are due to consumer characteristics such as self-efficiency, technology vulnerability and privacy concerns, the functional barriers, mainly occurring when the consumer perceives a radical change during a new product adoption, are related to product characteristics, such as usefulness, novelty, price and device intrusiveness.

All of the above will contribute to a more in-depth analysis of the partnership relationships between customers and smart objects interacting with each other, exposed in the second chapter.

## 1.1 Smart objects: technical and extensive definitions

Two different definitions of smart objects have been provided by authors: while the first one is technical, the second one is extensive and strictly linked with the concept of "innovation". More specifically, the former definition is related to the presence in the Internet of Things (IoT) devices of the specific features - sensors, actuators and the network connectivity - which provide smart objects with the essential capacities to perform their activities. The latter definition is more extensive, and it is related to the smart objects intended as the next phase of the Internet revolution, since they are radically reshaping how products and services are offered and rendered. In this first part of the analysis, we will explain how the two definitions of smart objects are two sides of the same coin; indeed, technical capacities do allow smart objects to perform their innovative activities.

From the technical point of view, "the Internet of Things (IoT) consists of a network of billions of devices, the so-called smart objects, that are able to communicate with consumers and other systems, services, and devices through the Internet" (Novak & Hoffman, 2018). Going more in depth, "the smart objects are provided with three essential technical features: "sensors", which are able to detect different types of events occurring in an observed environment; "actuators", which are able to enact some actions determining a state change in the environment or in the IoT system itself; and finally, the "network connectivity", which is able to connect devices to the network through communication protocols, including Wi-Fi, Bluetooth, or RFID" (Hoffman & Novak, 2015; Mani & Chouk, 2017). In particular, the addition of the network connectivity allowed objects and products "which were previously unrelated, to work together as assemblages, through a process of ongoing interaction" (Novak & Hoffman, 2018).

According to authors, from these interactions, new properties and capacities emerge, "with the potential to vastly expand the range of what consumers—and objects—can do, and what can be done to and for them". Indeed, "both sensors that collect data, and actuators that transmit that data, are embedded into everyday objects and devices that can perform the three following activities: first, they collect, aggregate, and analyze a significant amount of data; secondly, they interact and communicate with each other—and with humans—on an ongoing basis; and finally, they activate actions with complete autonomy" (Hoffman & Novak, 2015).

A further broader definition of the IoT devices has been provided by authors, and it related to the fact that those new connected and smart products and services "are revolutionizing consumers' lives, to the extent that they are considered as disruptive innovations" (Mani & Chouk, 2018). According to some authors, the IoT is considered the next phase in the Internet revolution since "it brought the intelligence of the Internet to physical products, with the potential for something new to emerge" (Hoffman & Novak, 2015). Moreover, smart objects have been also defined as "service innovations", intended as "new or enhanced intangible offering that involves the firm's performance of a task/activity intended to benefit customers" (Ostrom, Parasuraman, Bowen, Patrício,

Christopher & Voss, 2015). It is related to the fact that the IoT devices, through technical capacities such as sensors, actuators and network connectivity, offer new opportunities that mark the transition to a new era of e-service, changing the way the service is configured and rendered. Smart objects represent a radically new context for providing and experiencing service, to the degree that authors define *smart services* the one that "benefit from the capacity of the IoT devices to collect, communicate, and exchange a great deal of data instantaneously and autonomously" (Wünderlich, Wangenheim & Bitner, 2013).

Consequently, smart objects' technical capacities are being increasingly incorporated in all manner of consumer objects commonly used in everyday life, which through connectivity are now able work together as assemblages through a process of ongoing interaction. Three main innovating aspects in such services have been identified: "*intelligence*, where the service experience becomes autonomous; *connectivity*, where devices communicate with each other; and *ubiquity*, where the consumer can access the service anytime, anywhere, and through any device" (Mani & Chouk, 2018). In particular, the 2017 Accenture Digital Consumer Survey for communications, media and technology companies (which polled 26,000 consumers in 26 countries on their use of consumer technology), explains how the last aspect of ubiquity has been considered the most important benefit of interacting with computer-based applications rather than human advisor.

The two above mentioned definitions of smart objects are two sides of the same coin. Features such as sensors, actuators and the network connectivity allow smart objects to perform their main activities, which are related to the collection, the aggregation and the analysis of data; the interaction between each other and with humans; and finally, the completion of action autonomously. The performing of those activities enable the IoT devices to reshape the way products and services are configured and rendered, providing them with features such as intelligence, connectivity and ubiquity. All the components of this ongoing process are contributing to the increasing opportunities of the industry, but also to the new threats companies incorporating the IoT in their offering have to take in consideration.

## 1.2 Growth and development potential

Some authors argue that "the IoT technology could be even considered the turning point of a new industrial revolution, due to new types of products which alter the industry structure and the nature of competition, exposing companies to new competitive opportunities and threats; reshaping industry boundaries; and creating entirely new industries" (Porter & Happelmann, 2014). From a historical perspective, how explained by Porter and Happelmann, a first wave of this industrial revolution could be located between 1960s and 1970s, when automated individual activities in the value chain made the productivity of activities dramatically increased, leading to the "standardization of processes across companies". The second one can be located between the 1980s and 1990s, coincident with the rise of the Internet, which enabled the "coordination and integration across individual activities; with outside suppliers, channels, and customers; and across geography". According to the authors, the first two waves gave rise to huge productivity gains and growth across the economy. Nevertheless, "while the value chain was transformed, products themselves were largely unaffected". Instead, in the third wave coinciding with the beginning of the IoT, the Internet has become an integral part of the product itself, with embedded sensors, processors and software in connected products, driving dramatic improvements in product functionality and performance.

Generally, the IoT industry is experiencing an extraordinary growth, to the extent that "it is expected to worth $3 trillion by 2025, with over 27 billion heterogeneous things connected to the Internet" (Meyer, 2016). The above-mentioned 2017 Accenture Digital Consumer Survey for communications, media and technology companies reports significant insights about how the Artificial Intelligence (AI) is taking a central role in consumers' lives. For what concerns the age of customers involved in this technology, "although an impressive 84 percent of 14-to-17-year old currently use or are interested in using the voice-enabled digital assistant in their smartphone, the interest is not limited to younger generations". Indeed, what emerges in the study is that about one-third of respondents in every age group are interested in these features. Other interesting insights are related to the kind of customers adopting smart objects, "which are non-surprisingly mainly the early adopters, which use them on a daily basis. Such pervasive usage, which is expected to lead to advocacy is a positive signal for this category as it represents a much more enthusiastic adoption pattern than many new product categories recently released".

Therefore, the smart objects, which were a fantastic idea for many years, are increasingly becoming an economic reality, with considerable future development potential. Smart objects' technical capacities "are being increasingly incorporated in all manner of consumer objects commonly used in everyday life, which through connectivity are now able work together as assemblages through a process of ongoing interaction" (Novak & Hoffman, 2018). As we mentioned before, thanks to these interactions, new properties and capacities are expected to emerge, with the

potential to vastly expand the range of what consumers—and objects—can do, and what can be done to and for them.

Firms benefit from the IoT devices in two main ways. On the one side they offer to their customers products embedded with devices to collect, communicate, and exchange a great deal of data instantaneously and autonomously, improving their functionality and performance; on the other side, companies can furtherly improve their products based on customer's needs, wants, and behaviours, thanks to better understanding provided by the collection and the analysis of data. For example, through the incorporation of the IoT technology, "now a connected car can analyze how we drive and automatically provide insurers with driving history information; a smart light bulb can detect an intrusion into the home and alert the user and his security company; and a smartwatch can analyze private data related to sports activities and offer training programs adapted to each user. These IoT devices inside cars, homes, or infrastructure objects will allow service companies to gain a better understanding of customer personas, identify their lifestyles, and work with external parties to deliver relevant and personal offers to clients" (Mani & Chouk, 2018).

As a matter of fact, several industries, such as automotive, smart home, healthcare, insurance and transports, are more and more involving IoT devices in their products. Some examples of smart products and services are connected cars, voice-controlled digital assistants and other smart home devices and appliances, VR headsets and wearables (Novak & Hoffman, 2018). Among them, we will go more in depth in the characteristics of the virtual assistants Alexa, Siri and Google Home in the second chapter. Generally, we believe that the Amazon Echo, increasingly referred to as Alexa, is the most effective example. The voice controlled IoT device, first released on November 2014, acts as a personal assistant that can be used in the home, through wearables, and in cars. It presents thousands of different skills and perform several activities: consumers can use it to control smart objects, set alarms, order products from the Amazon platform, play the news, and much more. It is quite self-explanatory the fact that one year after Alexa's release, "more than 500,000 consumers had said I love you to her, making it one of Amazon's most popular products" (Risley, 2017). In this sense, we will go more in depth in the relationship between customers and smart devices interacting with each other in the second chapter. Indeed, we believe it is relevant to analyse the relationship between customers and smart objects interacting with each other, since more the growth line of the IoT industry is experiencing an exponential improvement, the more it is necessary to analyze its evolutions for a better understanding of their implications for consumer behaviour.

## 1.3 Resistance to the IoT innovation

As Ram very clearly explained in his study related to resistance in 1987, “adoption and resistance are strictly related and can coexist during the life of an innovation”. Due to the IoT growth, companies are exposed to both new competitive opportunities and threats: the more and more widespread adoption of the IoT devices is raising new significant challenges to the industry. In particular, psychological and/or functional factors have been proved to generate the consumers’ resistance to the innovation provided by IoT devices, with several managerial implications for companies incorporating the technology of smart objects in their offering.

We have identified mainly three reasons why it is important to going more in depth in the phenomenon consisting of the resistance to innovation. First, “negative brand relationships resulting from resistance can be damaging not only to consumers, but also to the companies involved” (Fournier, 2013). From a managerial perspective, “studying innovation using a resistance approach helps firms to reduce the probability of an innovation failure, providing opportunities for companies to change the attributes of the new product in order to reduce oppositional reactions and to boost the rate of adoption” (Mani and Chouk, 2017). Secondly, it has been demonstrated how negative brand relationships are more common than the positive ones, with an average split across categories of 55%/45% for negative and positive relationships, respectively. Hence, “without a formal accounting of negative relationships, our brand management frameworks can result as misleading and incomplete” (Fournier, 2013). Third, in a context where customers are increasingly empowered, they are provided with tools allowing them to express their resistance in different ways, and even influence other customers. Among the activities they can perform, “they can call for boycotts, spread negative word-of-mouth, or take actions against companies” (Mani & Chouk, 2018).

Going more in depth in the definition of *resistance to innovation*, it is intended as “a form of reaction or negative attitude to new products and services triggering change or upsetting the status quo” (Ram and Sheth, 1989). According to researchers, three forms of resistance response can be manifested: “*rejection,* when consumers may not accept the smart product; *postponement*, when consumers may not adopt smart products because the circumstances are not suitable; or *opposition*, when consumers may consider smart products to be a threat and act to resist their adoption” (Mani and Chouk, 2017).

### 1.3.1 Psychological and functional barriers

As we mentioned before, companies are exposed to the risk that they will encounter consumer resistance toward their new products, because of specific "barriers" obstructing the adoption of the IoT technology. The nature of the barriers could be psychological/ethical or functional, with different implications for the relationship between customers and smart objects.

*Psychological barriers*

The psychological/ethical barriers are due to consumer characteristics such as self-efficiency, technology vulnerability and privacy concerns. First, *self-efficacy* is defined as "consumers' perception of their ability to use a technological and innovative product" (Compeau & Higgins 1995). While increasing self-efficacy has been proved to positively affect the consumers adoption of innovations (Park & Chen, 2007), decreasing self-efficacy demonstrated to positively affect consumer resistance to technological innovations (Mani & Chouk, 2018).

Secondly, the *technology vulnerability* has a double valence: on the one side, "it refers to dependence for those who cannot control the use of technologies may develop a technological dependency"; on the other sides, "it is related to anxiety for consumers who are unprepared for technology". In both cases, people may experience "negative emotions, technostress and technophobia, potentially exposing customers to the resistance to innovation and in particular to smart services" (Mani & Chouk, 2018).

Third, since the smart objects are involved in the collection, the aggregation and the analysis of a significant amount of data, expose companies to *privacy* concerns. Privacy is defined as "the ability of an entity to determine whether, when, and to whom information about itself is to be released or disclosed" (Yan, Zhang & Vasilakos, 2014). Its protection is recognized in all legislations of civilized countries, and it is deeply rooted into our civilizations to the extent to which concerns about privacy's protection have proven to be a significant barrier against the diffusion of the technologies involved in the IoT. Recently, the European Union legislation has handled concerns related to privacy, through the General Data Protection Regulation (GDPR), with the aim to protect all EU citizens from privacy and data breaches in the increasingly data-driven world, setting the minimum standards for processing data in the EU. GDPR has significantly strengthen a number of rights, creating new security and privacy issues that are expected to have an effect on the IoT.

What emerged from the marketing literature review was that a mutual relationship does exist between privacy/security concerns and trust. Specifically, *trust* has proven to play an active role in reducing the uncertainty in an environment in which consumers feel especially vulnerable: because they know they can rely on the trusted brand, they "scale down" privacy and security concerns. (Yan, Zhang & Vasilakos, 2014; Chaudhuri, &

Holbrook, 2001). On the other side, researchers have demonstrated that privacy and security concerns, together with other factors, "massively contribute to the formation consumers' trust" (Kim, Ferrin & Rao, 2007), since a huge amount of data, including personal data and sensitive information, pass through the smart objects. Moreover, several studies have been conducted on the impact of trust on relevant variables such as purchase loyalty and purchase intention. In their analysis, Chauduri and Holbrook have demonstrated how trust affects brand loyalty, which in turn leads to greater market share when the same brand is repeatedly purchased by loyal consumers, irrespective of situational constraints (Chaudhuri & Holbrook, 2001). Other academics suggest that trust, together with other factors such as co-creation value, positively affect the ecommerce word-of-mouth, which in turn affects the purchase intention (See-To & Ho, 2014). As we will explain in the second chapter, companies have already adopted some tactics in order to handle this issue. Indeed, according to some authors, "the choice to provide the three most used virtual assistant – Alexa, Siri, and Google Home – by default with an algorithmically-amplified feminized persona, has the aim to scale down those concerns" (Woods, 2018).

*Functional barriers*

For what concerns the functional barriers, they mainly occur "when the consumer perceives a radical change during a new product adoption", or there is a concern related "to product characteristics, such as price, usefulness, novelty, and device intrusiveness" (Mani & Chouk, 2018). In the marketing literature, *perceived price* is related to "the feeling that consumers have about the price of a product" (Zeithaml, 1988) and it refers to "the price the consumer considers to be an appropriate monetary sacrifice for the product in question". It is known that technological innovations are generally expensive, and some consumers are reluctant to spend substantial amounts of money; therefore, perceived price seems to be one of the core reasons why consumers resist these products. The 2016 Accenture Digital Consumer Survey for communications, media and technology companies (which polled 28,000 consumers in 28 countries on their use of consumer technology) found that "62% of consumers believed that these devices are too expensive". However, findings demonstrated that if firms improve the perceived usefulness of their smart products, consumers will be more likely to accept the financial risk.

Going more in depth in *intrusiveness*, meaning "someone entering a consumer's life without permission", has proven to have a positive effect on consumer resistance to smart products (Mani & Chouk, 2017). Finally, *novelty*, referring to "consumers' perception of a radical change in a product concept or an attribute of the product" (Ram, 1987), has a significant negative impact of novelty on consumer resistance to smart products (Mani & Chouk, 2017).

All of the above will contribute to a more in-depth analysis of the relationships between customers and smart objects interacting with each other, occurring in the second chapter.

# 2. CONSUMERS AND SMART OBJECTS: PARTNERSHIP RELATIONSHIP

The relationship between customers and possessions in general has been a topic of discussion in the marketing literature. Even if smart objects depart from conventional brands and products, and these differences will require further analysis about the nature of relationships consumers have with them, various literatures across a wide variety of disciplines have established that consumers have meaningful relationships with inanimate objects. What these literatures have in common is that consumers can, and do, have relationships with objects that can be referenced to social relationships (Belk 1988; Fournier 1998; Fournier and Alvarez 2012; Novak & Hoffman, 2018). Generally, researches have demonstrated how "customers are emotionally attached to brands supporting process similarities across brand and human relational spaces in different ways: displaying brand loyalties that resemble marriages in their passionate commitments; having flings with brands; deriving joy from childhood friendships; investing in enmities and rivalrous adversarial relationships; lamenting lament master–slave entrapments and struggling with abusive relations wrought at the hands of malicious brands" (Fournier and Alvarez, 2012).

At a macrolevel, all the above-mentioned specific relations belong to three main broader categories of customers/smart objects relationship: user/service provider, master/servant and partnership. Specifically, the main focus of our analysis consists of the partnership relationship in comparison with the other kind of relationships. Specifically, the partnership relationship occurs when a customer and a smart device develop a relation by cooperating in order to achieve a goal, to perform a task or a daily activity. Moreover, the smart objects play the role of a friendly ally when, without the device, the achieving of the goal would be at risk. Therefore, the customer is enthusiastic to be part of the relationship, since the cooperation improved the management of his or her daily activities.

This chapter is divided in three parts. In the first part, we will go through the literature related to the relationship between customers and objects; we will explain how smart objects depart from the traditional ones since they are provided with the agency, the autonomy and the authority capabilities; and finally, we will take into consideration a particular kind of smart objects, consisting of the virtual assistants Siri, Google Assistant and Alexa. In the second part, we will analyze different conceptual and consumer culture theory approaches showing that consumers' regular interactions with everyday objects, brands, and brand communities help develop meaning around those objects that transcends their functionality. In particular, we will describe two main opposite lines of thinking: theories based on the concept of anthropomorphization (HCI, HRI and CASA), and the so-called "theory assemblage", an approach considering human and non-human actors as ontologically equivalent. Generally, our

analysis is based on the first line of thinking, the anthropomorphization theory. In the third part, we will go through the literature review dealing with the practical application of the anthropomorphizing theory in the IoT context. Specifically, we will take into consideration analysis conducted on smart objects provided with the virtual assistants Alexa, Siri and Google Assistant. We will analyze studies related to the influence of personification on customer's satisfaction and trust. Finally, we will mention previous researches dealing with positive and negative emotions emerged from the relationship with the device partner.

## 2.1 From objects to "smart" objects

In this part we will go through the analysis of the literature review dealing with the relationship between customers and inanimate objects. Before going more in depth in the way smart objects depart from conventional objects, we will briefly review previous researches explaining the role of possession in our life. In particular, we will focus on the concept of "extended self", related to the assumption that "we are the sum of our possessions". Moreover, we will summarily provide some insights related to the relationship between consumers and inanimate objects; first, we will analyze the concept of control over possessions and secondly, the importance of interdependence in the customers/ object's relationship.

Nevertheless, it is clear that smart objects are very different from conventional brands and products, and that these differences will require some expanded thinking about the nature of relationships consumers have with smart objects. In particular, we will go more in depth in how the capabilities embedded in smart objects - agency, autonomy, and authority - have an impact on their partner relationship with customers.

Finally, we will provide an overview on the three main virtual assistants in the IoT industry, belonging to three different smart devices: Alexa, Siri and Google Assistant, respectively included in the smart devices Amazon Echo, Google Home and Siri.

### 2.1.1 The customer/objects relationship: the extended self

Previous researches in the consumer behaviour and marketing literatures provides strong support for the idea that consumers form relationships with their possessions, explaining how "consumers' interactions with brands have meaning that extend beyond purchase and immediate consumption, and are embedded in a broader, socio-material network of interactions" (Fournier, 1998). The American business academic Russel W. Belk, in a famous research dated in 1988, studied the relationship between our possessions and our sense of self, basing the analysis on the assumption that "we are what we have and possess", considered by the author the most basic and powerful fact of consumer behaviour. Belk's line of thinking was supported by previous psychological studies; in particular, William James, the psychologist who laid the foundations for the modern conceptions of self, stated that "we are the sum of our possessions". In this sense, he elaborated the concept of "extended self", indicating "a part of the self which is not only seen as me, but also as mine". Going more in depth in his perspective of what our possessions include, he argued that "they are not only limited to external objects and personal possessions, such as our body, clothes and money, but they involve also people, places, and group possessions which contribute to the building of our self" (William, 1980). Generally, the incorporation of the above-mentioned possessions into our extended selves require different processes, such as the contamination and the habituation: "while in the former both good and bad aspects of objects are able to attach to us through physical contact or proximity; the latter is related to the maintenance of multiple levels of the self, through the habituation of viewing our family, city, and nation to be a part of who we are" (Belk, 1988).

Moreover, Belk analyzed the functions of the extension of our selves and what it actually means for us, defining the roles that the basic states of our existence - having, doing, and being - play in our lives and identities, since they are relevant to the way we define who we are. With this aim, four turning points of our life were identified: "first, the infant distinguishes self from environment; the infant distinguishes self from others; afterwards, possessions help adolescents and adults in managing their identities; and finally, possessions help the elders in achieving a sense of continuity and preparation for death". Going more in depth, findings suggested that "the identification with our possessions begins as the infant learns to distinguish self from environment and then from others, who may envy our possessions. Moreover, while emphasis on material possessions tends to decrease with age, it remains high throughout life as we employ them to express ourselves, to reach happiness, to remind ourselves of experiences, accomplishments, and other people in our lives, and even to create a sense of immortality after death. Finally, the sum of possessions we have accumulated, provides a sense of past and tells us a story of who we are, where we have come from, and perhaps where we are going" (Belk, 1988).

Moreover, various evidences were identified demonstrating that possessions are an important component of sense of self, considering as the most direct form of evidence is found in the nature of self-perceptions. In particular,

the control over the possession has been proved to be one of the most important variables influencing the extended self: McClelland in 1951 suggested that “external objects contribute to the building of our self when we are able to exercise power or control over them, just as we might control an arm or a leg”. Generally, “the greater the control we exercise, the more closely the object should become allied”. Based on this assumption, McClelland hypothesized the following hierarchy of most to least closely self-allied object categories: “me and my free will; my body and my conscience; my belongings; my friends; and finally, strangers and the physical universe” (McClelland, 1951).

Eight years later, Prelinger tested James's premise that possessions are viewed as parts of self and McClelland's hypothesis that control influences the strength of this linkage. Therefore, he elaborated the following hierarchy of categories, considering the mean "self' scores for the items within them in descending order: “body parts; psychological or intraorganismic processes; personal identifying characteristics and attributes; possessions and productions; abstract ideas; other people; objects within the close physical environment; and finally, distant physical environments”. Prelinger’s findings on the one side, supported James's argument that possessions are seen as part of self; on the other side, they also suggested an ordering of the "selfness" of these object categories that is parallel to the hierarchy suggested by McClelland. Moreover, he tested the influence of the control over objects on the item being part of self, and what emerged was that besides control over objects, control by objects may also contribute to an object being viewed as part of self. Thus, “we may impose our identities on possessions and possessions may impose their identities on us” (Prelinger, 1959).

In 1998, Susan Fournier proposed that “brand could be considered as active relationship partners, and not merely passive objects of marketing transactions”, because of the human activity of anthropomorphizing inanimate objects. Moreover, she referred to different core conditions, which need to be satisfied in order to qualify relationships in the interpersonal domain. The most important one is related to relationships involving reciprocal exchange between active and interdependent relationship partners. Indeed, “for a relationship to truly exist, interdependence between partners must be evident: that is, the partners must collectively affect, define, and redefine the relationship” (Fournier, 1998).

### 2.1.2 The customers/smart objects relationship: agency, autonomy and authority

Similarly, consumers' interactions with smart objects - those devices, services, and AI systems that have Internet connectivity and some level of intelligence - have been proved to be characterized by a relational nature. It is clear that smart objects are very different from conventional brands and products, and that these differences will require some expanded thinking about the nature of relationships consumers have with smart objects. In the recent years, authors have conducted several studies on the topic, explaining how smart objects depart from traditional products. As we have explained in the first chapter, they are provided "with properties, capacities and abilities, allowing them to be able to affect but also to be affected, and to interact with consumers as well as with other objects" (Novak & Hoffman, 2018; Hoffman & Novak, 2018). We have seen how, for example, the presence in the IoT devices of the specific features - sensors, actuators and the network connectivity - provide smart objects with the essential capacities to perform their activities.

In this part of the analysis we would like to go more in depth in how the capabilities embedded in smart objects have an impact on their partner relationship with customers. In particular, according to authors, the degree to which an object is "smart" corresponds to the extent of its capacity to exercise agency, autonomy, and authority, roles which have been recognized to characterized intelligent objects. These capabilities can be considered as "possibilities or potentials, which may be exercised when the smart object interacts with other entities" (DeLanda 2011), with several theoretical implications. Generally, smart objects' capacities for agency, autonomy, and authority are based on three assumption: "first, certain features characterizing the smart object such as embedded AI (deep learning models) and machine learning; secondly, the existence of other entities which these capacities affect and are affected by, consisting of both human or non-human actors; and finally, the interactions of the smart object with other entities as parts of assemblages" (Novak & Hoffman, 2018).

*Agency.* First, smart objects present the capability of agency to the extent "that they possess the ability for interaction, having the capacity to affect and be affected by other entities" (Franklin and Graesser 1996). Accordingly, the current definition of customers experience itself has been discussed; previously, authors agreed that a direct or indirect interaction was necessary for customer experience to occur through a holistic and multidimensional response and customer experience was defined as "comprised of the cognitive, emotional, physical, sensorial, and social elements that mark the customer's direct or indirect interaction with a (set of) market actor(s)" (De Keyser et al. 2015). Verhoef provided a similar definition: "The customer experience construct is holistic in nature and involves the customer's cognitive, affective, emotional, social, and physical responses to the retailer." Those definitions have been considered misleading since, with the introduction of the IoT technology, both consumers and smart objects have the capacity to take action and to respond to action taken

by the other. Therefore, authors realized the importance of explicitly considering the paired capacities exercised by both customers and smart objects during interaction, based on the assumption that "the capacities of one entity to affect must always be thought in relation to capacities of another entity to be affected" (DeLanda 2011, 2016). Secondly, through these capacities, smart objects are able to express their own roles in interaction, roles consumers are in turn readily able to perceive. The active role of the possession in the relationship with consumers has been emphasized in the marketing literature. In 1998, Susan Fournier proposed that "brand could be considered active relationship partners, and not merely passive objects of marketing transactions". In particular, she referred to four core conditions, which need to be satisfied in order to qualify relationships in the interpersonal domain. The first is related to the fact that relationships involve "reciprocal exchange between active and interdependent relationship partners". Indeed, "for a relationship to truly exist, interdependence between partners must be evident: that is, the partners must collectively affect, define, and redefine the relationship". According to the author, for the brand to serve as a legitimate partner in the relationship, "it must not only exceed in the personification qualification, but also behave as an active, contributing member of the dyad". Secondly, "relationships are purposive, involving at their core the provision of meanings to the persons who engage them"; third, "relationships are multiplex phenomena, ranging across several dimensions and take many forms, providing a range of possible benefits for their participants"; and finally, "relationships are process phenomena: they evolve and change over a series of interactions and in response to fluctuations in the contextual environment" (Hinde 1979; Hinde 1995; Fournier 1998).

Thus, an important criterion which need to be satisfied in order to a brand to be considered as an active relationship partner is the activity one, meaning "the degree to which the brand achieve certain levels of performance". Nevertheless, specific marketing actions can be conducted by companies in order to perform interactive and addressable communication, with the aim to qualify the brand as a partner. Indeed, it is argued that "at a broader level of abstraction, the frequent accomplishment of marketing plans and tactics can contribute the behaviours performed by the brand acting in the relationship with customers". Specifically, we take into consideration the definition of marketing actions provided by Fournier, consisting of "a set of behavioural incidents from which trait inferences about the brand are made and through which the brand's personality is actualized". Accordingly, it is elaborated the theory according to which "the brand relationship plays an important role in the ways in which the brand, acting as active partner in the relationship, contributing to the initiation, maintenance and destruction of consumer-brand relationship bonds" (Fournier, 1998).

Moreover, the agency properties allow the IoT devices to affect and be affected in interaction with each other and with consumers, and to be "engaged in some kind of experience themselves" (Hoffman & Novak, 2018). Smart objects have been proved to be engaged in a form of experience themselves, in particular the first level of experience, which is the "basic" one. Nevertheless, this first level of experience may even constitute the raw

material for the second level of experience, the "aware" experience, which involves "how the brain or processing system recognizes, organizes, and attends to the input of basic experience". Controversial opinions are related to the third level, the "conscious" experience, which involves "how the awareness processes of input recognition, organization, and attention are integrated to produce subjective experience". Indeed, there are degrees to which "entities can be said to have conscious experience, and conscious experience is not the exclusive domain of humans" (Hoffman & Novak, 2018). According to authors, for a consumer–object relationships to be built, "there must first be an experience of the object, with the type of experience driving the form of the relationship" (Schmitt, 2013).

Thus, when evaluating consumer–smart object relationships, some way is needed to take into account not only the functional capacities of objects (what they do in an interaction), but also what these objects' capacities express (the meaning of the interaction).

*Autonomy and authority.* The IoT devices present the capability of autonomy to the degree "they can function independently without human intervention and interact independently with other entities, in pursuit of [their] own agenda" (Parasuraman et al. 2000). Finally, they have authority to the degree to which, with agency and autonomy, "they have the right to control how they respond to other entities and how other entities respond to them, making their own decisions" (Hansen et al. 2007). The degree of our control on the IoT devices is increasingly important the more they are provided with the capability of agency, autonomy and authority. For instance, some smart objects are capable of only the lowest level of automation, requiring human intervention at various points for action to succeed. Instead, "others have the capacity for the highest level of agency and autonomy and are able to behave authoritatively, making and executing decisions, independently without human intervention" (Parasuraman et al. 2000). For example, they can be involved in the so-called "non-consumer-centric" interactions, which never involve the consumer as one of the interacting entities (Hoffman & Novak, 2017). Consequently, it is these degrees of agency, autonomy, and authority that determine how smart an object is (Novak & Hoffman, 2018; Hoffman & Novak, 2018).

The above-mentioned assumptions are strictly related to the degree of control we are able to exercise on the IoT device, influencing our relationship with objects (McClelland, 1951; Prelinger, 1959). In this respect, researchers have inferred that such low-control dynamics may have an impact on costumers' acceptance. Indeed, customers prefer smart objects which allow them to have more control, through the use of Internet on their smartphone (Goudey & Bonnin, 2016). It is also known that activities of trust management can contribute in engaging user acceptance and consumption in IoT, helping customers to overcome perceptions of uncertainty and risk, and enhancing user privacy and information security (Yan, Zhang & Vasilakos, 2014; Chaudhuri & Holbrook, 2001).

In particular, researchers have demonstrated that privacy and security concerns, together with other factors, in turn have strong effects on Internet consumers' trust (Kim, Ferrin & Rao, 2007).

### 2.1.3 Virtual assistants: Alexa, Siri and Google Home

In the following paragraphs we are going to analyze the partnership relationship between customers and smart objects, mentioning previous researches and articles related to specific smart objects, in particular the ones provided with a virtual assistant. Indeed, the artificial intelligence takes advantage of virtual assistants in order to interact with customers (Smith, 2018). Generally, "the idea of digital personal assistants is not new and traces back to the 1980th concepts of Apple's Knowledge Navigator, AT&T's PersonaLinks, and to the 1990s production of devices such as IBM Simon and Apple Newton, aimed to assist users with managing calendars and notes, connecting to the network and other simple tasks". The current generation of IPAs, including Google Assistant, Apple Siri, and Amazon Alexa, is designed to perform similar tasks and more through the natural language voice-control interfaces. The ability to "speak" to people often leads to attribution of human-like properties to the IPA systems (Lopatovska & William, 2018).
Before going more in depth in the partner relationship, we believe it would be relevant to provide an overview on the three main virtual assistants in the IoT industry, belonging to three different smart devices: Alexa, Siri and Google Assistant, respectively included in the smart devices Amazon Echo, Google Home and iOS and respectively developed by Amazon, Apple and Google.

*Alexa.* It is a virtual assistant developed by Amazon and announced, alongside the brand of smart speaker Echo, in November 2014 (Etherington, 2014). How it is explained in the Alexa Voice Service Overview, the virtual assistant is provided with different skill, allowing to perform several functions. The list includes "voice interaction, music playback, making to-do lists, setting alarms, streaming podcasts, playing audiobooks, and providing weather, traffic, sports, and other real-time information, such as news". Moreover, "Alexa can control several smart devices using itself as a home automation system". Users are also able to extend the Alexa capabilities by installing "skills", additional functionality developed by third-party vendors, in other settings more commonly called apps such as weather programs and audio features.
Alexa can be included in different Amazon smart speakers: Amazon Echo, Amazon Echo Plus, Amazon Echo Spot and Amazon Dot. Based on the smart speaker it is included in, the smart object is able to perform different activities: in the Amazon Echo it is "voice-controlled and capable of voice interaction; plays music, podcasts, audiobooks, and games; provides news, weather, and real-time information to questions; maintains lists, calendar,

alarms, and timers". All the following smart speakers perform the functions of Amazon Echo, besides other additional ones we are going to mention. In the Amazon Echo Plus, Alexa is also smart home hub. In the Amazon Echo Look, it is provided a camera that can take full-length photos and 360-degree videos; it has artificial intelligence (AI) for fashion advice and outfit recommendations, rating the customers' look based on "machine learning algorithms with advice from fashion specialists. In the Amazon Echo Show, it has a tactile 7-inch LCD screen that can be used for laying media, making video calls, and other features. In the Amazon Echo Spot, it presents a hemispherical shape with a 2.5-inch circular screen; it looks like an alarm clock. In the Amazon Dot Alexa Functions of Echo, but cheaper because it plugs into your external speakers. Finally, the Amazon Tap is a smaller battery-powered, portable version of Echo (Smith, 2018).

Most devices with Alexa allow users to activate the device using a "wake-word" (such as Alexa); other devices (such as the Amazon mobile app on iOS or Android) require the user to push a button to activate Alexa's listening mode. Currently, interaction and communication with Alexa are only available in English, German, French, Italian, Spanish, and Japanese. Providing some data, in September 2017, Amazon had more than 5,000 employees working on Alexa and related products (Griswold, 2017), while in January 2019, Amazon's devices team announced that they had sold over 100 million Alexa-enabled devices (Al-Heeti, 2019). According to Amazon, one year after the release of the voice-controlled personal assistant Alexa, more than 500,000 consumers had said "I love you" to the virtual assistant, making it one of the company's most popular products (Risley, 2015).

*Google Assistant.* It is an artificial intelligence-powered virtual assistant developed by Google in 2016, available on mobile and smart home devices, mainly on the smart speaker Google Home. Unlike the company's previous virtual assistant, Google Now, Google Assistant can engage in two-way conversations. How it is explained in the Google Assistant website, is able "to surf the Internet, schedule events and alarms, adjust hardware settings on the user's device, and show information from the user's Google account". Google has also announced that the Assistant will be able to identify objects and gather visual information through the device's camera, and support purchasing products and sending money, as well as identifying songs. Users primarily interact with Google Assistant through natural voice pronouncing "Hey Google", though keyboard input is also supported. As well as Alexa, Google Assistant can be included in different devices: in Google Home, it is comparable to Echo, and it also purchase products through Google Express; Google Home Mini is a smaller version of Google Home, characterized by the same functionality; and finally, Google Home is a larger version of Google Home, with stereo speakers (Smith, 2018). In 2017, Google Assistant was installed on more than 400 million devices (Kinsella, 2018).

*Siri.* Siri is a virtual assistant developed by Apple and released as an app for iOS in February 2010, and then integrated into iPhone 4S in October 2011, when the app was removed from the iOS App Store, and the virtual assistant has since become an integral part of Apple's products. Afterward, Siri have been adapted into other hardware devices over the years, including the different iPhone models, as well as in other smart devices such as iPad, iPod Touch, Mac, AirPods, Apple TV, and HomePod. The assistant uses voice queries and a natural-language user interface to answer questions, adapting to users' individual language usages, searches, and preferences, with continuing use. How it is explained in the Apple website dedicated to Siri, the virtual assistant is able to "make recommendations, supporting a wide range of user commands, performing functions including phone actions, checking basic information, scheduling events and reminders, handling device settings, searching the Internet, navigating areas, finding information on entertainment, and is able to engage with iOS-integrated apps". With the release of iOS 10 in 2016, Apple opened up limited third-party access to Siri, including third-party messaging apps, as well as payments, ride-sharing, and Internet calling apps. With the release of iOS 11, Apple updated Siri's voices for more clear, human voices, started supporting follow-up questions and language translation, and additional third-party actions (Smith, 2018).

## 2.2 Theoretical approaches

Before going more in depth in the relationship between customers and smart objects, we believe it would be relevant to provide an overview on the main theoretical approaches used by researchers to explore the topic. Generally, we have identified two main opposite lines of thinking. First, we are going to analyze theories which are based on the concept of anthropomorphization, meaning the attachment of human characteristics to non-human subjects so that it is seen as a person with life, feeling and thought (Yangyi shi, 2017). We will go through those theories – HCI ("human-computer interaction"), HRI ("human-robot interaction") and CASA ("computers are social actors", - which are the most commonly cited in the literature. Instead, other theories are based on the so-called object-oriented ontology, which takes into account the two parts in the interaction, human and nonhuman actors, as ontologically equivalent. It is a most recent approach, which have been mainly developed through the theory assemblage theory (Novak & Hoffman, 2018). Afterwards, we will proceed our analysis of the partnership relationship between customers and smart objects mainly adopting an anthropomorphization approach.

### 2.2.1 Anthropomorphizing: CASA, HRI AND HCI

In 1998, Susan Fournier proposed that brand could be considered as active relationship partners, and not merely "passive objects of marketing transactions". The reason legitimizing the partnerships between brands and customers lies in the human activity of anthropomorphizing inanimate objects, consisting of "the ways in which brands are animated, humanized, or somehow personalized". In this sense, she cited the theory of animism, according to which "people feel the need to anthropomorphize objects in order to facilitate interactions with the nonmaterial world" (Fournier, 1998). Anthropomorphizing, also referred to as personification in the literature, can be defined as attribution of "humanlike properties, characteristics, or mental states to real or imagined nonhuman agents and objects". Research in the field of personification traces its roots in the works of Hume, Darwin, Feuerbach, and Freud and usually examines various forms of human interaction with animals, machinery and computers (Lopatovska & William, 2018).

According to these theories, "consumers would show no difficulty in consistently assigning personality qualities to inanimate brand objects, in thinking about brands as if they were human characters, or in assuming the perspective of the brand in order to articulate their own relationship views". Moreover, the theory of animism provides insight into the specific ways in which the vitality of the brand can be realized in the relationship; different mechanisms are implied in the process, each varying in the degree to which the human condition is approximated. The first mechanism is related to the brand/person association, involving "instances in which the brand is somehow possessed by the spirit of a past or present other". This mechanism is valuable for famous spokespeople in brands' advertising, but brand/person associations of a more personal nature are also common: for instance, "a particular brand of air freshener used by a grandmother could become strongly associated with the past-other and it is evoked reliably with each use" (Fournier, 1998). Additionally, the brand/association mechanism would be valuable for objects are received as a gift, which are likely to "recall the spirit of the giver as well, contributing to animate the brand as a vital entity in consumer's mind"; it is especially recognized in older people, which tend to consider possessions, and specifically, gifts, considered as symbols of others (Belk, 1988). Finally, another mechanism is related is related to the complete anthropomorphization of the brand objects, associated with human qualities of emotionality, thought, and volition. Indeed, researchers on consumer-object relations have demonstrated that people assig certain human properties to a range of consumer goods (Belk, 1988), most notable among them tools, food, drink, clothing, weaponry, and household technology (Fournier, 1988).

Since smart devices are very different from conventional brands and products because of the recent advances in technology, they will require some expanded thinking about the nature of relationships consumers have with smart objects. The IoT devices such as virtual assistants, provided researchers and designers with new opportunities to study how people perceive and respond to such conversational agents. Nevertheless, the widely used approached

to understand users' experiences and their social construction of the IoT technology, are not so far from Fourniers's assumptions. Indeed, in the literature that there is enormous intuitive appeal to the idea of humanizing an object in consumer–object relationships. Three main related paradigms have been identified: the CASA ("computers are social actors"), the HCI ("human–computer interaction") and HRI ("human–robot interaction"). In the communications discipline, the CASA paradigm is focused on how people tend to respond to computers as if computers were people. In the HCI and HRI literatures, researches are based on "cognitive science and engineering principles, with the aim to explain how the characteristics of smart objects like computers and robots are interpreted by users and influence their behaviour. The emphasis in these literatures is on design considerations that are likely to improve user experience" (Novak & Hoffman, 2018).

*HCI.* Human-computer interaction is defined as a kind of science that studies how to design, evaluate and implement the interactive computing system to improve the people use, and other related phenomena (Yangyi Shi, 2017). The topics involved in the human-computer interaction approach are different; specifically, we are going to take in consideration the importance of the functionality, psychology and anthropomorphism.

For what concerns the functionality, authors adopting this approach distinguish between two categories of IoT products. The first one is related to "person-centric products, primarily designed to gather data about the human body, concerning tracking and logging activities, such as tracking sleep, body, fitness and weight, and logging of events". The second category is related to "home-centric products, mainly designed to be located and function in the home. They gather data about their immediate environment, which may include people, objects within the house, or even the house itself. An example of an application that is centred on people is a home security system that monitors for intruders" (Koreshoff, Robertson, & Leong, 2013).

As explained Yangyi Shi in his study on the application of psychology in human-computer interaction, the HCI approach takes in account not only computer science and design, but also the psychological perspective, as a tool to understand the functional behaviour of people, and anthropomorphism, as a tool to interface more closely with customers.

First, this method takes advantage of psychology analyzing customers' needs through their behaviours, and then design and produce products in line with the needs of people. Accordingly, since the psychology in the human-computer interaction directly affects the results of human-computer interaction applications, argue that "only with a full understanding of the psychology of customers, we can understand their needs more clearly and make human-computer interaction flow more freely".

Secondly, because of the increasing development of science and technology, such as a variety of new robots, computer interface and lives of people are related more and more closely. Indeed, according to the HCI approach, anthropomorphism is considered to play and important role. It is related to provide nonhuman agents with human

characters, with the aim to make them viewed as human beings with sensations and thoughts. They have "the appearances of human beings or perform the human psychological abilities, so that they can interact with people to provide people with the necessary information to play their roles in various fields" (Yangyi Shi, 2017).

*HRI.* The human-robot interaction (HRI) approach has the primary goal to investigate "natural" means by which a human can interact and communicate with a robot. The research field is at the intersection of psychology, cognitive science, social sciences, artificial intelligence, computer science, robotics, engineering and human-computer interaction. Indeed, although it is strictly related to human-computer interaction (HCI) because of the specific embodied nature of this interaction, where robots and humans need to coordinate their activities in time and space in real-time, often 'face-to-face' (Dautenhahn, 2007).

*CASA.* This highly cited paradigm has given rise to a very large number of studies investigating how computers and other smart objects elicit relational responses from humans, with implications for many areas, including design, learning, and policy (Novak & Hoffman, 2018). According to the CASA paradigm, people respond to technologies as though they were human, despite knowing that they are interacting with a machine. Consequently, people ascribe personalities to computers and even apply politeness norms to these interactions.
In 1993, Nass presented five studies demonstrating that experienced computer users tend to apply social rules to their interaction with computers, even though they recognize that such attributions are inappropriate. The author stressed how those social responses were not related" to a function of deficiency, or of sociological or psychological dysfunction, but rather were natural responses to social situations. Furthermore, findings suggested that social responses were easy to generate, commonplace, and incurable" (Nass, Steuer, Tauber & Reeder, 1993). In this way, Nass showed how the human-computer relationship was fundamentally social, opening the way for further investigations. We will go more in depth in further researches adopting the CASA approach, when analyzing the literature related to the relationship between customers and virtual assistants, such as Siri, Alexa and Google Home. For instance, among them, Purington adopted the above-mentioned paradigm in his study on the conversional agent Alexa, showing how people "tend to use human scripts to interact with technologies that exhibit human-like social cues" (Purington, 2017).

### 2.2.2 Object-oriented ontology: assemblage theory

The above-mentioned assumption of anthropomorphization assume a different ontological status for persons and objects that privileges persons, relying on evaluating objects as humans, and asking how the object is like other humans, or like the self (MacInnis and Folkes 2017). Generally, it is clear from the literature that there is enormous intuitive appeal to the idea of humanizing an object in consumer–object relationships. Nevertheless, as smart objects possess varying degrees of agency, autonomy, and authority, some theories consider the object on its own terms, rather than on human terms. These theories challenge the concept of anthropomorphism; for instance, Goudey and Bonnin tested the impact of anatomical anthropomorphism on the acceptance of an autonomous product, measured by its perceived usefulness, ease of use, and use intentions. Results showed that, unlike previous marketing research on traditional product anthropomorphism, "the human appearance of a companion robot does not increase its acceptance by consumers". Indeed, while a partially anthropomorphic appearance improves acceptance by people with practical experience of similar technology, it reduces acceptance by other people (Goudey & Bonnin, 2016).

The introduction in the market of the IoT innovation challenged the assumption that objects are passive entities which we invest with meanings. The main reason lies in the fact that, as widely explained in the first chapter, smart objects are provided with features such as sensors, actuators and network connectivity, allowing them to perform their activities, interacting with humans as well as between each other. Summarizing, the above-mentioned properties and capabilities provide the IoT devices with characteristics allowing them to be more than consumers' perceptions or interactions with objects (DeLanda 2011, 2016, Hoffman & Novak, 2018). The capacities that objects exercise in their interactions have been also defined as "functional performance considerations", at the basis of the relationships between consumers and brand or objects. Since the capacities of smart objects can be exercised without the consumer being present, "smart objects could be understood participating in a broader assemblage that does not always necessarily involve direct interaction of the object with the consumer" (Keller, 2012). It is related to the idea that a part-whole interaction is possible as a consequence of the exteriority of relations, whereby a part can both exist by itself and as part of a larger assemblage, and also the expressive roles those parts play in interaction. In this regard, authors have introduced the concept of "flat ontology", considering "unique singular individuals, differing in spatio-temporal scale, but not in ontological status" (DeLanda 2011, 2016).

Consequently, the traditional anthropomorphic or human centric conceptualization in the relationship between consumers and objects has been discussed, and more object-oriented conceptualizations emerge in the recent marketing literature. New approaches considering the customers and smart objects as equal entities have been developed: such theories recognize that "objects present an ontological weight on their own and are irreducible to

their parts or relations, with properties and capacities that make them more than consumers' perceptions or interactions with them" (Hoffman & Novak, 2018).

Among other approaches, the customers and objects experience has been defined from the assemblage theory perspective, considering all entities on equal ontological footing, even as their effects may be unequal. The assemblage theory takes into account the two parts in the interaction, human and nonhuman actors, as ontologically equivalent, allowing to analyse how nonhuman objects might impact experiences of consumers and experience their own existence. Indeed, it is a particular relational ontological framework aimed to understand "things in the world" through their relations with other things, rather than possessing any essential substance (Hill, Canniford & Mol, 2014). Basically, consumer-object assemblage emerges from four types of interactions, occurring because of the combination on two main features: first, the type of interaction which can be customer-centric or non-customer centric; and whether a part or the whole is involved in the interaction. Accordingly, we distinguish the following four types of interaction: *consumer-centric part-part interactions* between consumers and objects and *consumer-centric part-whole interactions* between consumers and assemblages, where the consumer is one of the components of the assemblage and he or she is involved as one of the interacting entities; *nonconsumer-centric part-part interactions* between objects and objects, *nonconsumer-centric part-whole* interactions between objects and assemblages, where the object is one of the components of the assemblage and the consumer is never involved as one of the interacting entities. Consequently, different specific consumer experience assemblages emerge: "enabling experiences, comprising agentic self-extension and communal self-expansion that are generally paths to territorializing the consumer experience assemblage and stabilizing its identity"; instead, "constraining experiences, comprising agentic self-restriction and communal self-reduction are generally paths to deterritorializing, destabilizing, and reterritorializing the assemblage". For what concerns the role of the consumer, he/she will express agentic roles "when they enable or constrain the consumer-object assemblage, and communal roles when the consumer-object assemblage enables or constrains the consumer". In the self-extension, "the part (consumer) enables the whole (consumer-object assemblage), since the consumer exercises their capacities, adds components, and/or enables interactions in the assemblage". New capacities of the assemblage emerge as a result. In the self-expansion the whole (consumer-object assemblage) enables "the part (consumer), since the consumer treats the emergent capacities of the assemblage as if they are their own". The person has more capacities by being part of the assemblage. In the self-restriction the part (consumer) constrains "the whole (consumer-object assemblage), since the consumer removes components, limits capacities of components, and/or impedes interactions in the assemblage. Fewer capacities of the assemblage emerge as a result". Finally, in self-reduction "the whole (consumer-object assemblage) constrains the part (consumer), since the consumer capacities are constrained as a result of the emergent capacities of the assemblage". The person has fewer capacities by being part of the assemblage. Consequently, during interactions, smart objects are also

hypothesized to play agentic or communal expressive roles in their interactions with consumers and objects, depending on which capacities are exercised (Novak & Hoffman, 2018; Hoffman & Novak, 2018).

For what concerns the partnership relationship between customers and smart objects, according to this approach we should distinguish whether when agentic and communal expression is high and when it is low for both customers and objects. In the first case, both are seen as active and mutually dependent partners in the relationship. In 2013, Abele and Brack found that mutual dependence leads to a preference for agency in the other, suggesting that this particular partnership style is increasingly likely to become common as the smart home becomes essential. Moreover, these high communal/high agentic partner relationships could be very positive in consumer–object assemblages, where consumer and object interact with many other entities as part of the assemblage. The object may act as a type of surrogate for the consumer in these interactions, such as when it is an agentic robot partner. However, because agency of consumer and object is similar, enabling consumer experience may also be accompanied by constraining consumer experience.

In the second case, when both agentic and communal expression is low, "consumers and objects become detached interactors and consumers are likely to be disengaged". Other types of partner styles are possible, including "adversarial partners: when agentic expression is high and communality is low, self-extension and self-restriction experiences are likely; instead, when agentic expression is low and communality is high, we have a cooperative style absent agentic expression, so self-expansion and self-reduction experiences are likely (Abele and Brack, 2013; Novak & Hoffman, 2018).

## 2.3 Partnership relationship

Previously, we have provided an overview over the theories based on the assumption that people tend to be engaged in anthropomorphizing, also called personification, meaning the attribution of humanlike properties, characteristics, or mental states to real or imagined nonhuman agents and objects. In this part of the analysis, we will go through the literature review dealing with the practical application of the theory in the IoT context. Specifically, we will take into consideration analysis conducted on smart objects provided with the virtual assistants Alexa, Siri and Google Assistant, previously described. First, we will analyze studies related to the influence of personification on customer's satisfaction. Afterwards, we will investigate the role of personification on the trust relationship between customers and smart objects, a relevant tool to handle privacy concern. Finally, we will mention previous researches dealing with positive and negative emotions emerged from the relationship with the device partner.

### 2.3.1 Personification: influences on satisfaction and trust

Some authors classify technology based in four categories, based on the type of personification experience it elicits: socially evocative, social interface, socially receptive, and sociable. Socially evocative technology uses "to boost people to personify it and interact with it"; for example, the Tamagotchi toy that has features triggering children to nurture the toy. Social interface technology takes advantage of "human-like social cues" to interact with humans for the purpose of making the interaction easier for the human; for instance, "avatars that are designed to deliver information, understand the verbal message from a human and return the requested information or behaviour". Socially receptive technologies are able to "learn" from humans, "increasing its vocabulary or gestures by copying and predicting human behaviours in order to aid its users", e.g. machine learning. The highest level of social interaction is represented in sociable technology that aims to "read human cues, learn and expand in order to improve its own functioning; the most representative example is the virtual assistant" (Breazeal, 2003). Indeed, conversional agents present the ability to recognize verbal and non-verbal input; the ability to generate verbal and non-verbal output; and finally, support conversational norms (Lopatoska & William, 2018). In particular, for what concerns the verbal output, the VA's ability to "speak" to people often leads to attribution of human-like properties to them (Lopatovska & William, 2018). Moreover, the virtual assistant' quality the voice has been proved to matter when evoking anthropomorphism. Prior research suggests that "only humanlike speech with voices that naturalistically vary in pitch, amplitude, and rate of speech, can increase perceptions of humanization. Indeed, more monotone and robotic voices may be judged no differently from text" (Schroeder & Schroeder, 2018).

*Satisfaction.* The conversational nature of intelligent personal assistants, or virtual assistants, has the potential to trigger personification tendencies in users, which in turn can translate into consumer loyalty and satisfaction. (Lopatovska & William, 2018). In 2017, the researcher Purington adopted the CASA paradigm with the aim to analyze the user reviews of the Amazon's Echo product posted to Amazon.com: in particular, he studied the degree to which user reviews indicate personification of the device, sociability level of interactions, factors linked with personification, and influences on user satisfaction. Before going more in depth in the results achieved, it would be relevant to describe the four main essential features of the conversational agent Amazon, which Echo which have been identified in order to afford social functionalities and promote anthropomorphism. The first feature is related to the speech functionality, "enabling anthropomorphic interactions with assistive technologies, and encouraging socialization and perceptions of these devices as social actors. Indeed, since in order to operate the device users must interact with Alexa, the Echo can be defined a socially interactive device, requiring social interaction to function". The second feature of the conversional agent is related to the personification and the

integration of the device into social life. Alexa is personified to the degree to which "it is provided with a name, gender, and a personality, design choices encouraging users to anthropomorphize the device". Third, it is programmed with the "ability to interact in a playful way, making the device seem more engaging and intelligent". Authors have studied what we might otherwise call her personality: her humour, her gentle guidance, her calming effect (Woods, 2018). Finally, the Echo is embodied and is co-located with users, and can alter the dynamics of its surrounding environment (Purington, 2017).

Going more in depth into the findings of the research, results suggested that the extent of personification varies among users: analyzing how people refer to technology, with over half using the personified name Alexa, but most referencing the technology with object pronouns. Although people referring to the virtual assistant with object pronouns are likely to report having sociable interactions with the device, most descriptions of interactions with Echo/Alexa suggested low- to mid-level sociability. Specifically, most users described interacting with the technology for entertainment purposes, "such as playing music, or for functionality purposes, such as managing scheduling or shopping". Thus, a positive association between more sociable uses of the device and greater personification emerged. Moreover, findings suggested that "embodied conversational agents may become anthropomorphized when they are integrated into multi-member more than in single person households; thus, it may be more personified when situated within other social relationships, like families". Contrary, other studies suggest that people who are lonely are more likely to create relationships with pets or machines and that, in turn, a personified nonhuman agent can decrease the feeling of loneliness. Finally, personification of the device been proved to play a role, performing a positive impact, in user satisfaction, "regardless of technological problems or function of the device". Finally, the conversional agent Alexa is in line with the CASA paradigm, since people tend to use human scripts to interact with technologies that exhibit human-like social cues (Purington, 2017).

One year later, the researchers Lopatoska and William conducted a similar study on Alexa usage, investigating the manifestations and possible correlates of users' personification of Alexa. In this case, less than half of the participants reported personification behaviours. Most of the personification reports can be characterized as mindless politeness, for instance saying "thank you" and "please" to Alexa. Some authors call this behaviour "overlearned politeness", in particular Nass and Moon observed that "although people are politer in direct face-to-face interactions with other humans than indirect interactions, the same interaction tendencies towards computers are observed". Generally, despite people's universal denial that computers have "feelings" or warrant polite treatment, the social rule that dictates insincere responses (the 'politeness' rule) automatically came into play as soon as the computer asked about itself (Nass & Moon, 2000).

Morevorer, findings suggested that respondents seem to find it easier to interact with technology that simulate some of their characteristics, so it is not surprising that popularity and usability of many modern technologies, including virtual assistants, is based on their anthropomorphic characteristics and abilities to support social

interactions. Finally, only two participants out of nineteen expressed deeper personification by confessing their love and reprimanding Alexa. (Lopatoska & William, 2018)

*Trust.* As explained in the first chapter, since the smart objects are involved in the collection, the aggregation and the analysis of a significant amount of data, expose companies to *privacy* concerns, one of the main barriers to the IoT growth and development. What emerged from the marketing literature review is that a mutual relationship does exist between privacy/security concerns and trust. Specifically, *trust* plays an active role in reducing the uncertainty in an environment in which consumers feel especially vulnerable: because they know they can rely on the trusted brand, they "scale down" privacy and security concerns. (Yan, Zhang & Vasilakos, 2014; Chaudhuri, & Holbrook, 2001).

According to some authors, the choice to provide the three most used virtual assistant mentioned before – Alexa, Siri, and Google Home – by default with an algorithmically-amplified feminized persona, has the aim to scale down the above-mentioned concerns. The researcher Woods in 2018 conducted a study related to the choice of the feminine gender for the virtual assistants Siri and Alexa, investigating into this cultural ambivalence surrounding artificially intelligent virtual assistants, how they perform gender, and to what end. In particular, the author analyzed the rhetorical phenomenon of digital domesticity performed by artificial intelligent virtual assistants. The concept of "digital domesticity" has defined by scholars as "the re-articulation of "prototypical motherhood" in the blogosphere and, more generally, domesticity has served as a key organizing metaphor for the rise of smart homes" (Spigel, 2001). Indeed, virtual assistants perform stereotypically feminine roles which "mobilizes traditional, conservative values of homemaking, care-taking, and administrative "pink collar" labour". Alexa's persona as whole-person caretaker is further revealed in users' technological reviews of Alexa. According to some users, Alexa's care competencies make her a near perfect wife. One Echo user opined, "Alexa, my love. Thy name is inflexible, but thou art otherwise a nearly perfect spouse" (Foner, 2015). According to the author, providing this technology with a feminine persona is a specific choice aimed to works to decrease anxieties about intimate data exchange (Woods, 2018), which has been proved to be one of the main barriers against the growth and development of the IoT technology (Mani & Chouk, 2018). Thus, performing digital domesticity, is considered "a rhetorical strategy connecting the familiar technological past/present to an anxiety-producing surveillant future" (Woods, 2018)

Moreover, a study conducted in 2018 on the willingness to trust a machine, tested how two modes of interaction—expression modality, whether the person is talking or typing to a machine, and response modality, whether the machine is talking or typing back. Results revealed that talking made people more willing to "share their personal information (e.g., their location, credit card information) than texting, and this was robust to participants' self-

reported comfort with technology, age, gender, and conversation characteristics. But listening to the application's voice did not affect anthropomorphism or trust compared to reading its text".

Several studies have been conducted on the impact of trust on relevant variables such as purchase loyalty and purchase intention. In their analysis, Chauduri and Holbrook have demonstrated how trust affects brand loyalty, which in turn leads to greater market share when the same brand is repeatedly purchased by loyal consumers, irrespective of situational constraints (Chaudhuri & Holbrook, 2001). Other academics suggest that trust, together with other factors such as co-creation value, positively affect the ecommerce word-of-mouth, which in turn affects the purchase intention (See-To & Ho, 2014).

### 2.3.2 Emotions

A study recently conducted on users' sentiments towards virtual assistants identified a number of factors that are related to positive and negative attitudes. First, "the positive emotions were largely associated with aspects of convenience, the hands-free interface design, the informational and entertainment value. Instead, negative emotions were mostly related to performance issues, the conversational quality and privacy. Some features were mentioned in both positive and negative contexts, such as ease-of-use and quality of information. The higher amount of negative responses compared to the positive ones have been interpreted by authors suggesting that the following factors did have an impact novelty and "bugginess" of technology; unclear or heightened expectations that might lead to disappointment; and people's tendencies to spend more time discussing negative feelings. However, the negative comments about IPAs should not be ignored as they can lead to improvements in conversational interfaces, customizability, privacy, and other IPA features that currently cause negative responses in users" (Lopatovska, Velazquez, Richardson, Lai, Liao & Constantine, 2019).

Another study explored how human emotions are linked with mind perceptions. In particular, what emerged was a list of most common emotions including surprise, amazement, happiness, disappointment, amusement, unease, and confusion, linked with mind perception under three broad conditions. The first one is related to customers' expectation, "meaning that when VA's produce – in most of the cases - outcomes that respondents perceive as extraordinary, they feel surprise; instead, when they underperform or even fail, customers feel disappointment". The second condition regards the previously described social role performed by artificial intelligence, "leading humans to feel surprise, amazement, and disappointment, yet in these cases often the human simply observed them in a such a role; indeed, customers and IoT devices in reciprocal social roles often produced both the most extreme mind perception and emotions. Finally, as we have widely explained, virtual assistants inserted themselves into adversarial social roles through interrupting, monitoring, and accessing private information

leaving respondents uneasy, worried, and frightened". Overall, "discovering this human element in a nonhuman machine caused extreme reactions: based on the context a very understandable amazement or surprise could easily be turned to paranoia and fear. Whether or not these conditions are separate and distinct processes, their implications for causing specific types of mind attributions are fruitful avenues for future research" (Shank, Graves, Gott, Gamez & Rodriguez, 2019).

# 3. RESEARCH

The focal point of our analysis consists of the comparison between the partnership relationship and other two types of relationships occurring between customers and smart objects, namely the user/service provider and the master/servant relationships. In particular, the partner relationship is developed when a customer and a smart device experience a relationship by cooperating in order to achieve a goal, to perform a task or a daily activity. Moreover, the smart object plays the role of a friendly ally when, without the device, the achieving of the goal would be at risk; in addition, the customer is enthusiastic to be part of the relationship, since the cooperation improved the management of his or her daily activities.

Generally, the aim of our research is to investigate how the partnership relationship is structured and developed in the customer/smart object experience and its differences with other types of relationships. Specifically, based on the previous literature review, we would expect findings showing that consumers' regular interactions with smart devices transcend their functionality. On the subject's side, we would like to understand the implications on three main factors: first, the reasons the customer takes advantage of the smart object; secondly, the emotions he or she feels; and finally, his or her thoughts. On the object's side, we would like to go more in depth in the smart device attributes, which are mentioned by customers.

The relevance of the research question lies on two main reasons, in-depth explained in the first chapter. The first one is related to the exponential growth of the IoT industry; indeed, with the increasing number of companies incorporating this technology in their offering, it is more and more relevant to go more in depth in the consumer behaviours, needs and wants. Secondly, as the industry experiences its growth, several challenges to the IoT development are emerging, such as the customers' *resistance* to the IoT innovation, because of psychological or functional barriers. It is known that negative brand relationships are more common than positive ones, with an impact not only to consumers, but also to the companies involved, which are exposed to customers' activities such as boycotting, spreading negative word-of-mouth, or taking actions against companies.

In this last part of the analysis we will exposed the methodology adopted to conduct our qualitative analysis, how we collected the data through a survey and how we proceeded with the coding process. Afterwards, before going more in depth in the analysis of data. First, we will provide the description of our sample, in terms of gender, age, and education level. Finally, we will go through the different relevant dimensions for the purpose of the analysis: the objects' attributes and the subjects' emotions, thoughts and motives. Based on each dimension, we have coded the text of the responses in order to emphasize different aspects of the specific dimension. Therefore, we will focus on the different aspects by providing the text of some interesting responses.

First, on the object's side we are going to analyze the attributes of the smart objects, investigating whether the respondent highlighted the interaction abilities of the smart object, their efficacy, or both. Secondly, we will

analyze the subject's side dimensions: motives, emotions and thoughts. First, we will examine the reasons behind the use of smart objects, investigating whether the motive of the experience with the smart device was based on fun or functionality purposes, or both. For what concerns the subject's side emotions and thoughts dimension, we investigated whether the respondent expressed positive, negative or both emotions and thoughts. First, we will analyze the polarity of the emotions and the thoughts in the different relationship. Afterwards, we will report for each one the different aspects mentioned by the respondents and we will go more in depth in the most relevant ones. In particular, we decided to go more in depth in some aspects which emerged in the literature review: satisfaction and satisfactory results/simplification of daily activities; trust and privacy concerns; addiction and technology vulnerability; and finally we will take into account the price concerns.

## 3.1 Methodology

Our purpose is to understand how the partnership relationship, compared to other kind of relationships occurring between people and smart devices, impact on customers' emotions, thoughts and motives, given some particular attributes of the smart product.

With this aim, we designed a qualitative analysis conducted through a survey, conducted in the Italian language through Qualtrics. It allowed us to collect data related to the respondents' relationship with smart objects. Afterwards, we coded the text according to the dimensions we were interested in: objects' attributes and subjects' emotions, thoughts and motives.

### 3.1.1. Collection of data

In order to collect the data we were interested in, designed a qualitative analysis conducted through a survey, conducted in the Italian language through Qualtrics. In particular, we adopted the convenience sampling method, characterized by a non-systematic approach to recruiting respondents that often allows a potential respondent to self-select into the sample (Schonlau, Fricker & Elliott, 2002).

The survey was structured in the following way. First, respondents were informed that the survey was conducted by a student attending the Luiss Guido Carli University, for final thesis purposes. In this phase, they were also asked to carefully understand the definitions provided and to answer some open questions. They were also informed that the duration of the survey would have been around ten minutes.

In the next step, respondents were informed about the main topic of the survey, consisting of smart devices and the relationships occurring between them and people. In this step, they were provided with the following definition

of smart device: “The smart devices are electronic devices, generally connected to other devices or to a network through different wireless protocols (for instance, Bluetooth, NFC, Wi-Fi, Li-Fi, 3G), which may work in both an interactive or autonomous way. They are designed to be responsive to basic commands and to help people in the management of daily activities (such as working, work-out, health monitoring and housekeeping). In this phase, they were informed that customers and smart devices can interact establishing different kind of relationships, and that one of them consist of the partner relationship. They were advised that they would have been able to see the related definition only once; moreover, they were asked to read it carefully and to answer the following questions. Afterwards, they were exposed to the following definition of the partner relationship: “A customer and a smart device develop a partner relationship when they cooperate in order to achieve a goal, with the aim to perform a task or a daily activity. Moreover, the smart objects play the role of a friendly ally when, without the device, the achieving of the goal would be at risk. Therefore, the customer is enthusiastic to be part of the relationship, since the cooperation improved the management of his or her daily activities”.

Afterwards, they were asked whether they have experienced that kind of relationship with the device. In this phase, the survey was structured in the following way. If the respondents answered YES, they were asked to answer some specific questions related to the partnership relationship with the device. Instead, if they answered NO, they were exposed to the definition of another type of relationship occurring between people and smart devices, namely the master/servant relationship. The definition provided was the following: “The master/servant relationship occurs when a person plays the role of the master, while the object is the servant. The person (master) is the authoritarian owner giving orders to the smart object (servant), and he or she expects the object to fulfil his or her requests. The smart object is submissive and not able to autonomously act, it tries to obey as well as it can, but it is not always able to accomplish the request. When it manages to do that, both the person and the smart objects feel positive emotions (such as happiness, satisfaction, pride…), creating a lasting subsidiary relationship; when it does not manage to accomplish the request, both the person and the smart object feel negative emotions (for instance, the person could feel anger and disappointment, while the smart objects could feel a sense of frustration and sadness), damaging or breaking, in this case, the trust relationship previously created”.

Similarly, if the respondents answered YES, they were asked to answer some specific questions related to the master/servant relationship with the device. Instead, if they answered NO, they were exposed to the definition of another type of relationship occurring between people and smart devices, namely the user /service provider relationship. The definition provided was the following: “The user/service provider relationship occurs when a person plays the role of the user, while the smart object plays the role of the service provider. Specifically, the person (user) explicitly asks for help from the smart object (service provider), asking to perform the activities it was purchased for, and the user trusts its functionalities. Beyond the economic value of the purchase, the user

assigns a value in terms of the quality of the service. The smart object (service provider) accomplishes the requests of the subject in a simple and correct way, based on the functions it was designed for".

Finally, if the respondents answered YES, they were asked to answer some specific questions related to the user/service provider relationship with the device. Instead, if they answered NO, the respondent was asked to describe the relationship he or she has with his or her favourite smart objects; in particular, the respondent had to describe the reason he or she uses the smart object for, his or her feelings and thoughts when he or she uses it. If they did not own any smart object, they were asked to refer to their smartphone.

If the respondent chose one of the three main relationship – partnership, master/servant and user/service provider -, they were asked to describe in details a recent episode representing the relationship with the smart device; how long ago it happened; what feelings the respondent had when the episode occurred; what thoughts the respondent had; the kind of the specific smart object and how long he or she owns the device. In the following step, respondents answered to questions related to the numbers of smart objects they own and the specific kind of their device, such as smartphone, tablet, smartwatch (such as Apple Watch or Fitbit), smart band, virtual assistants (such as Alexa and Google Home), Smart TV, or others. Finally, some personal data were recorded, specifically the gender, the age, the occupation and the level of education.

### 3.1.2 Coding process

Once we collected 213 responses, we closed the survey on Qualtrics and we imported data in Excel, where we operated the cleaning operations. Indeed, we deleted some columns which were not useful for the purpose of our analysis, such as 'Start Date', 'End Date', 'IP Address', 'Response Type', 'Response Id' and 'Recorded Date. Moreover, after deleting the not completed responses, we reached the number of 175 total responses to be analysed.

We proceeded by dividing the responses in different sheets in Excel, based on the kind of relationship chosen by the respondent: user/service provider, master/servant, partnership, and none of the relationship, respectively with 84, 12, 17 and 62 responses.

| RELATION | N. RESPONSES |
|---|---|
| USER/SERVICE PROVIDER | 84 |
| MASTER/SERVANT | 12 |
| PARTNERSHIP | 17 |
| None of the above | 62 |
| Total | 175 |

*Table 1 – N. of responses*

In particular, among the total responses we decided to go more in depth in the responses which are related to the respondents who identified their relationship with smart objects with one of the studied relations, partnership, user/service provider and master/servant. For what concerns the respondents who stated that the three studied relations do not describe their relationship with smart objects, we have decided to analyse them from the point of view of the segmentation analysis.

As mentioned before, in order to perform the comparison analysis between the studied relations, we identified some specific dimensions which would have been useful for our aim. In this sense, we distinguished between the subject's side and the object's side. In the subject's side, we were interested in understanding the implications on three main dimensions: first, the reasons the customer takes advantage of the smart object (motives); secondly, the emotions he or she feels; and finally, his or her thoughts. On the object's side, we went more in depth in the smart device attributes, which are mentioned by customers.

With this aim, we performed a qualitative analysis by examining in detail all the responses. Specifically, we coded the text, based on the content of the responses and according to the identified dimensions. For each response we determined whether the emotion was positive, negative or neutral and the type of emotion expressed; whether the thoughts were positive, negative or neutral and the type of the thoughts exposed; whether the motives behind the use of the smart object were fun or functionality related (or both) and its specific field of application; and, finally, whether the attributes of the smart objects were related to their interaction abilities or efficacy (or both).

In particular, our effort was double. One the one side, we wanted to take advantage of the manually human analysis to capture all the shades behind a dimension; indeed, it was usual in the responses to find both negative and positive emotions (i.e. I was surprised because the GPS managed to direct me in the right, but I mistrust it). On the other side, for analysis purposed we tried to "standardize" the coding of the text, assigning a limited number of dimension's categories to the responses. For example, two different responses "I would have been not able to perform the activity in a simple way without the smart object" and "Before I owned this smart object was not easy to perform the task", have been both coded with the positive thoughts dimension labelled "simplification of daily

activities". All the dimensions' categories, emerged from the reading of the content of the responses, will be analysed more in depth in the following paragraphs.

## 3.2 Analysis of data

With the aim to conduct a qualitative analysis on the relationship between people and smart objects, we designed a survey through the Qualtrics software, in the Italian language. First, we will provide the description of our sample, in terms of gender, age, and education level. Finally, we will go through the different relevant dimensions for the purpose of the analysis: the objects' attributes and the subjects' emotions, thoughts and motives.

### 3.2.1 Description of the sample

Generally, the user service/provider relationship with 84 responses has been proved to be the most common relation in the relationship experience between the respondents and their smart devices. It is followed by partnership, with 17 responses, and finally, master/ servant, with 12 responses. Moreover, 62 respondents declared the above-mentioned relations as not describing their experience with smart objects. Before going more in depth in the contents of the responses, we believed it would be relevant to describe our sample. As mentioned before, we adopted the convenience sampling method, characterized by a non-systematic approach to recruiting respondents that often allows a potential respondent to self-select into the sample (Schonlau, Fricker & Elliott, 2002). Nevertheless, we put our effort in directing the survey to distinct groups, in order to segment the target audience via a range of demographics.

*By relationship*

First, we performed the analysis of the segments contained in the total amount of responses, and in each relationship, in order to identify the characteristics of our respondents.

In particular, we considered the gender, the age, the education level. Specifically, we collected 175 responses belonging to 72 women and 103 men. For what concerns the age, 75 of them are under 25 years old, 59 are between 25 and 45 years old and 12 are over 45 years old. Finally, concerning the education level, we have received 51 responses belonging to respondents with a Middle school certificate; 42 responses belonging to

respondents with a High school certificate: 58 responses belonging to respondent with a Bachelor's degree; and finally, 23 responses belonging to respondents with a Master Degree.

Afterwards, we proceeded looking at the characteristics of the subsample belonging to each relationship (user/service provider and master/servant and partnership,), with the aim to investigate how our segments have been divided among the various relations. Specifically, the sample of respondents identifying their relationship with smart objects with the user/service provider relationship, presents the following characteristics. For what concerns the gender, we collected 28 responses belonging to women and 56 responses belonging to men, For what concerns the age, we collected 49 responses belonging to respondents below 25 years old, 28 responses belonging to the ones between 25 and 45 years old, and 7 responses belonging to respondents over 45 years old. For what concerns the education level, we have collected 16 responses belonging to respondents with a Middle school certificate; 17 responses belonging to respondents with a High school certificate: 33 responses belonging to respondent with a Bachelor's degree; and finally, 18 responses belonging to respondents with a Master Degree.

For what concerns the responses belonging to the master/servant group, the gender was perfectly divided in half; indeed, we collected 6 responses belonging to women and 6 responses belonging to man. Concerning the age, we collected 8 responses belonging to respondents below 25 years old, 4 responses belonging to the ones between 25 and 45 years old, and 0 responses belonging to respondents over 45 years old. Finally, for what concerns the education level, we have collected 3 responses belonging to respondents with a Middle school certificate; 2 responses belonging to respondents with a High school certificate: 3 responses belonging to respondent with a Bachelor's degree; and finally, 4 responses belonging to respondents with a Master Degree.

Finally, the sample of respondents identifying their relationship with smart objects with the partner relationship, presents the following characteristics. For what concerns the gender, in this case the gender was perfectly divided in half; indeed, we collected 6 responses belonging to women and 11 responses belonging to men. For what concerns the age, we collected 6 responses belonging to respondents below 25 years old, 8 responses belonging to the ones between 25 and 45 years old, and 3 responses belonging to respondents over 45 years old. For what concerns the education level, we have collected 5 responses belonging to respondents with a Middle school certificate; 5 responses belonging to respondents with a High school certificate: 4 responses belonging to respondent with a Bachelor's degree; and finally, 3 responses belonging to respondents with a Master Degree.

*By gender, age and education level*

For what concerns the gender, men were mostly likely to choose the user/service provider relation, although a consistent part of them did not identify their relationship with smart objects with the studied relationships,

followed by partnership and master/servant. Women were mostly likely to choose the user/service provider relation, although a consistent part of them did not identify their relationship with smart objects with the studies relationship, followed by partnership and master/servant.

For what concerns the age, respondents under 25 years old preferred the user/service provider relationship, followed by master/servant relationship and partnership; respondents between 25 and 45 years old chose user/service provider, followed by partnership and master/servant; respondents over 45 years old preferred user/service provider as well, followed by partnership and none of them identified with master/servant. It would be interesting to highlight the fact that in our sample, while a consistent part of the young respondents stated that the above-mentioned relations do not describe their experience with smart objects (52%), the number is considerably lower for the older respondents (33% for the range 25-45 and 17% for over 45). In this sense, we could infer two hypothesis which could be tested in a further research. They are related to the fact that the younger generation, as opposed to the older one, is exposed to the development their relationship with smart devices since their childhood, and the younger they are, the more it is true. Therefore, we could infer that the youngest respondents do not present a "critical spirit" when thinking about their relationship with this kind of technology, because of reasons of age, they have no material of comparison with times in which this kind of experience was not possible. Nevertheless, we could as well infer that the young generation is developing a new type of relation with smart objects, which is no more represented by the ones proposed by the literature. Such considerations could be useful for customers to perform a segmentation analysis. Generally, the market segmentation "is a crucial marketing strategy, aimed to identify and delineate market segments or "sets of buyers" which would then become targets for the company's marketing plans. The advantage to marketing management is that this technique divides total demand into relatively homogeneous segments which are identified by some common characteristics. These characteristics are relevant in explaining and in predicting the response of consumers, in a given segment, to marketing stimuli" (Tynan & Drayton, 2010).

Finally, we have analysed how the segments performed their choice based on their education level:

respondents with a Middle school and a High school certificate identified with user/service provider, followed by master/servant and partnership; respondent with a Bachelor's degree and a Master's degree chose user/provider, followed by partnership and master/servant. The results confirm the above-mentioned consideration, if we assume that because of the compulsory education which is in force in Italy, respondents with a Middle school certificate or a High school certificate, potentially belong to the young generation.

## 3.3 Results

In this part we are going to analyze our data according to four relevant dimensions for the purpose of our analysis. As mentioned above, we will distinguish between the object's side and the subject's side. While on the object's side we will examine the attributes dimension, on the subject's side we will analyze the motives, the emotions and the thoughts dimensions. Based on each dimension, we have coded the text of the responses in order to emphasize different aspects of the specific dimension. Therefore, we will focus on the different aspects by providing the text of some interesting responses.

First, on the object's side we are going to analyze the attributes of the smart objects, investigating whether the respondent highlighted the interaction abilities of the smart object, their efficacy, or both. Secondly, we proceeded our analysis by analysing the subject's side dimensions: motives, emotions and thoughts. First, we will examine the reasons behind the use of smart objects, investigating whether the motive of the experience with the smart device was based on fun or functionality purposes, or both. For what concerns the subject's side emotions and thoughts dimension, we investigated whether the respondent expressed positive, negative or both emotions and thoughts. First, we will analyze the polarity of the emotions and the thoughts in the different relationship. Afterwards, we will report for each one the different aspects mentioned by the respondents and we will go more in depth in the most relevant ones. In particular, we decided to go more in depth in some aspects which emerged in the literature review: satisfaction and satisfactory results/simplification of daily activities; trust and privacy concerns; addiction and technology vulnerability; and finally we will take into account the price concerns.

### 3.3.1 Object side: the 'attribute' dimension

As expected, the most owned smart object has been proved to be the smartphone. It is followed, on a gradually decreasing basis, by the tablet, the smart TV, the smartwatch, and virtual assistants. Some of other mentioned smart objects, collected in the category "other", have been the PC (in most of the cases indicated specifically as MacBook); the pacemaker; the eBook; the headphones (in most of the cases specifically indicated as Air Pods); the home automation; the PlayStation; the air conditioning; the fridge. We have noticed that this hierarchy is common for all the relations, with some discrepancies between the prevalence of smartwatch or virtual assistants.

| ATTRIBUTES | INTERACTION ABILITIES |
|---|---|
| | EFFICACY |

*Table 2 - Attributes*

In order to analyze this dimension, we decided to investigate whether the respondent highlighted the interaction abilities of the smart object, their efficacy, or both. Our expectations, based on the literature review, were that the interaction abilities positively affect the relationship experience.

What emerged was that the attribute related to the *interaction abilities* was never mentioned alone, but always accompanied by the attribute *efficacy.* Thus, in line with previous researches, the performance of the smart object is a crucial point for customers in the definition of their relationship experience.

*"I am not sure the episode could be represented by the partner relationship or to the user/service provider. Nevertheless, I bought the Amazon Alexa during the summer. I loved it in my friend's house, the price was proportionate, and I wanted to try it. Mainly, I use Alexa as a music box, I am obsessed with always listening to background music in every situation ad home, and the fact I like the fact I can activate it through the voice recognition. Anyway, it's like a pet, and owning something with its own life to interact with makes me happy. I see it in some way as a partner I cannot do without, but always as a service provider since it is a house object"*

34 years old freelancer in a partnership relationship with the virtual assistant Alexa

The above-mentioned response belongs to a 34 years old respondent which identified her relationship with the Amazon Alexa with the partner relationship. In this case, both the interaction abilities and the efficacy emerged as particular attributes of the smart device. One the one side, the efficacy attribute emerged from the fact that she successfully can listen to music through the smart object, which acts as a service provider "since it is a house object". On the other side, she stressed the interaction abilities of the smart object since she likes the facts she can activate it through the voice recognition; moreover, she is happy to own a smart object "with its own life" to interact with. This statement confirms the assumption that the partnership relation between people and smart objects is strictly related to the concept of humanization, defined as attribution of "humanlike properties, characteristics, or mental states to real or imagined nonhuman agents and objects" (Fournier, 1998).

*"I bought Amazon Echo, a smart device which is connected with Alexa, the voice assistant people with Amazon Echo can communicate with. I bought it to perform different activities which are relevant to me; therefore, I am*

*satisfied by its performance. The price is adequate for a useful and long lasting good. I use it to listen to music, set the alarm, ask for information and calendar activities. It can even look for restaurants near my home and it is really good to me since I study far from my city and I want comfort."*

24 years old student with a user/service provider relationship with Alexa

The above-mentioned episode belongs to a 24 years old respondent which identified her relationship with the Amazon Alexa with the user/service provider relationship. Instead, in this case, although the respondent recognizes the Alexa's ability of communication, her relationship with smart objects are merely related to the performance of the smart device and thus, its efficacy.

The total number of respondents mentioning the role of the interaction abilities in their relationship with smart devices is 29. Specifically, they are 21 in the user/service provider group (25%); 4 in the master/servant group (33%) and 4 in the partnership group (23%).

Generally, it is interesting to highlight that a positive correlation emerged between the mention of the interaction abilities in the responses and the presence of a virtual assistant in the episode of the respondent. Indeed 20 responses, out of 29, were related to the Google Assistant, Siri and Alexa, in line with previous research.

Our expectation was that attribute of the smart object to be able to interact positively affects the relationship between customers and the smart devices. Indeed, most of the above-mentioned responses in which the interaction abilities are mentioned are accompanied with positive emotions and thoughts. Nevertheless, if we make a comparison between the polarity of emotions and thoughts related to the mention of only the efficacy attribute, and the one related to the mention of both the efficacy and the interaction abilities attributes, there is no a consistent difference.

Hereby, based on our data, we cannot state that the interaction abilities have a positive impact on the relationship between consumers and smart objects. Nevertheless, our findings suggest a positive correlation between the mention of the interaction abilities in the responses and the presence of a virtual assistant in the episode of the respondent. In addition, in our sample, in the 85% of the cases in which the interaction abilities are linked to a virtual assistant, respondents have expressed positive emotions and thoughts.

### 3.3.2 Subject side: the 'motives' the 'emotions', the 'thoughts' dimensions

We proceeded our analysis by analysing the subject's side dimensions: motives, emotions and thoughts. First, we examined the reasons behind the use of smart objects, investigating whether the motive of the experience with the smart device was based on fun or functionality purposes, or both. For what concerns the subject's side emotions and thoughts dimension, we investigated whether the respondent expressed positive, negative or both emotions and thoughts. First, we will analyze the polarity of the emotions and the thoughts in the different relationship. Afterwards, we will report for each one the different aspects mentioned by the respondents and we will go more in depth in the most relevant ones. In particular, we decided to go more in depth in some aspects which emerged in the literature review: satisfaction and satisfactory results/simplification of daily activities; trust and privacy concerns; addiction and technology vulnerability; and finally we will take into account the price concerns.

#### *Motives*

We proceeded our analysis by going one step further compared to the analysis of the interaction abilities attribute. Indeed, in this case we examined whether the customer, proactively look for the interaction between him or her and the smart objects, not only for *functionality* reasons but also for *fun* purposes.

Thus, we investigated the reasons behind the use of smart objects, investigating whether the motive of the experience with the smart device was based on fun or functionality purposes, or both.

Similarly, what emerged was that the motive *fun* never emerged alone, but always accompanied by the *functionality* purposes. Again, in line with previous researches, the ability of the smart object in performing activities is a crucial point for customers in the definition of their relationship experience. We report below a response in which the functionality purposes are stressed:

*When I go running I use a Smart Watch which reports, at the end of the activity, information about my performance (km, kcal, time, slope…). Generally, I like to use it because I can track my activities and improvements. I really appreciate the activities are recorded through maps, so that I can double check the itineraries and I can recall when I had training during a travel. I have this Smart Watch for two years now, with all the maps recalling many of the beautiful experience of this period!*

24 years old student in a user/service provider relationship with her Smart Watch

The above mentioned below belongs to a 24 years old respondent which identified her relationship with the Smart Watch with the user/service provider relationship. In this case the reason behind the use of the Smart Watch is functional, since it has the function to provide her statistics during her training. She expresses also an emotional component, since the device help her to remind beautiful moments.

Nevertheless, our expectations, based on previous literature, were related to the fact that the relationship between customers and smart objects goes beyond mere functionality reasons. We have already reported a response which is in line with the hypothesis, when the 34 years old said that her smart object "*it's like a pet"* and that *"owning something with its own life to interact with"* makes her happy. Another response indicating the fun component in the relationship with the smart device is reported below:

*"I was in my car and I started to try the Google Assistant. I asked for directions and different information I was interested in at that moment. The device always answered in a satisfactory way when I had simple requests; nevertheless, for example, when I asked to text someone it made some mistakes o it just crashed. I did that because I was driving, and I had my hand busy. It was really useful the fact I could access the basic functionalities of the smartphone without touching it. I had fun, I felt curiosity and surprise because of the technology development in this field".*

24 years old student in a partner relationship with the Google Assistant

The above mentioned below belongs to a 24 years old respondent which identified her relationship with the Google Assistant with the partner relationship. On the one side, the functionality purposes emerge from the response because of the performing of different activities such as asking for directions or asking to text someone. On the other side, the fun purposes emerged, since the respondent started to try the virtual assistant in a way to test its interaction abilities and performance. At the end, he had fun, he was curious and surprised.

Again, in this case a virtual assistant is involved in the episode. Indeed, in this phase of the analysis we started to infer a positive correlation between the presence of the virtual assistant in the episode customer experience, the mention of the interaction abilities as an important attribute of the smart device and the fun purposes behind the reason of the smart object's use.

Generally, our hypothesis according to which the relationship between customers and smart objects goes beyond mere functionality reasons is true. Indeed, we have counted 20 cases out of 113, the 18%, in which the reason behind the use of the smart device goes beyond functionality reasons.

| | | |
|---|---|---|
| MOTIVES | FUN | Academic purpose<br>Asking for a recipe<br>Asking for directions<br>Asking for general information<br>Asking to call or text someone<br>Asking to print a file<br>Asking weather conditions<br>Banking operations<br>Basic operations<br>Calendar activities<br>Health monitoring/ Work out<br>House keeping<br>Listening to music<br>Playing a game<br>Reading<br>Reading texts and mails<br>Reading the news<br>Shopping<br>Testing the smart object abilities<br>Watching a movie |
| | FUNCTIONALITY | |

*Table 3 – Motives*

Moreover, we have categorized the fields of application of smart objects, mentioned by the respondents, in order to provide managerial insights about the most appreciated activities performed by smart objects. Between the activities reported in the Table 3, the most mentioned have been asking for direction/to call or text someone/for general information. It is followed by basic operations, listening to music, housekeeping, health monitoring/ work out, calendar activities and shopping.

| | |
|---|---|
| asking for direction/to call or text someone/for general information | *"I asked for directions and different information I was interested in at that moment"*<br>*"I had to call my mother and instead of using the phone book I opened Siri and asked to call my mother"*<br>*"My mother needed help, so I opened my device and I looked for a recipe"* |
| basic operations | *"It is difficult to think of a single episode in which this device turned out to be a partner as I use it consistently for many daily activities, such as to set the alarm"* |
| listening to music | *"Mainly, I use Alexa as a music box, I am obsessed with always listening to background music in every situation ad home"* |
| Housekeeping | *"Nest gives me a sense of peace because I can get it to adapt to my favorite temperature"* |
| health monitoring/ work out | *"With this smart watch I can track activities such as steps, km, heart beats I receives some advices about my activities"* |
| calendar activities | *"Without my smartphone and in particular the app 'notes', I could not have well-defined programs, in fact I use it as a calendar and a list of things to remember"* |
| Shopping | *"In our family we use an app that allows us to keep an eye on the shopping list"* |

*Table 4 - The most mentioned motives*

*Emotions and thoughts*

For what concerns the subject's side emotions and thoughts dimension, we investigated whether the respondent expressed positive, negative or both emotions and thoughts. First, we will analyze the polarity of the emotions and the thoughts in the different relationship. Afterwards, we will report for each one the different aspects mentioned by the respondents and we will go more in depth in the most relevant ones.

What emerged was that respondents in the user/service provider group exposed mainly positive emotions related to their relationship experience with the smart device, followed by negative emotions, neutral emotions and a mix of both positive and negative emotions. Instead, in the master/servant we have noticed a clear split between positive and negative emotions; moreover, respondents have expressed a large percentage of negative emotions compared to the other relations. Finally, in the group of respondents identified with the partner relationship, any negative emotion emerged, while the percentage of positive emotion was larger compared to the other relations, accompanied by a percentage of neutral emotions.

Thus, our findings suggest that customers which are involved in the user/service provider relationship tend to feel conflicting emotions related to their experience with the smart device. Moreover, respondents involved a

master/servant relationship are more likely to feel a larger percentage of negative emotions rather than respondent involved in other relationship. Finally, the interviewed people in the partnership group, are more likely to feel positive emotions, in line with previous research.

For what concerns the subject's side thoughts dimension, we investigated whether the respondent expressed positive, negative or both thoughts. What emerged was that respondents in the user/service provider group exposed mainly positive thoughts related to their relationship experience with the smart device, followed by negative emotions, neutral emotions and a mix of both positive and negative emotions.

Moreover, on the contrary of the emotions' analysis, in the master/servant we have not noticed a clear split between positive and negative emotions; indeed, respondents have expressed a large percentage of negative emotions compared to the other relations, still large percentage of positive thoughts, but it presented also a percentage of neutral and a mix of both positive and negative thoughts.

Finally, in the group of respondents identified with the partner relationship, any negative thoughts emerged, while the percentage of positive thoughts was larger compared to the other relations, accompanied by a percentage of neutral thoughts.

In the table below, we summarized the most common emotions mentioned by respondents. Among positive emotions we reported curiosity, fun, happiness, interest, relax, satisfaction, surprise, and trust. The negative emotions concerned anger, fear, frustration, helplessness, anxiety, mistrust, and addiction. Finally, we labelled the emotion as neutral if it was not specified or just if the respondent stated he or she felt "nothing".

| | | | |
|---|---|---|---|
| EMOTIONS | POSITIVE | Curiosity | 7 |
| | | Fun | 6 |
| | | Happiness | 31 |
| | | Interest | 1 |
| | | Relax | 13 |
| | | Satisfaction | 27 |
| | | Surprise | 13 |
| | | Trust | 4 |
| | NEGATIVE | Anger | 2 |
| | | Fear | 1 |
| | | Frustration | 1 |
| | | Helplessness | 1 |
| | | Anxiety | 2 |
| | | Mistrust | 2 |
| | | Addiction | 2 |
| | NEUTRAL | Not specified | 7 |
| | | Nothing | 4 |

*Table 5 - Emotions*

Moreover, in the table below we summarized the most common thoughts mentioned by respondents. Among the positive ones we reported being a partner; gamification of daily activities; general positive thoughts; identification with the smart object; improvement of performance; satisfactory results; simplification of daily activities; technology development; willing to discover more functionalities. The negative thoughts concerned obsolete old technology; price concerns; privacy concerns; technology does not answer a real need; technology is not efficient; technology is not trustworthy; technology could cause addiction. Finally, we labelled the emotion as neutral if it was not specified, if the respondents had no thoughts because the relationship is a part of his or her routine, or just if the respondent stated he or she felt "nothing".

| | | |
|---|---|---|
| THOUGHTS | POSITIVE | Being a partner<br>Gamification of daily activities<br>General positive<br>Identification with the smart object<br>Improvement of performance<br>Satisfactory results<br>Simplification of daily activities<br>Technology development<br>Willing to discover more functionalities |
| | NEGATIVE | Old technology is obsolete<br>Price concerns<br>Privacy concerns<br>Technology does not answer a real need<br>Technology is not efficient<br>Technology is not trustworthy<br>Technology could cause addiction |
| | NEUTRAL | The relationship is part of the routine<br>Not specified<br>Nothing |

*Table 6 – Thoughts*

In this case, with the aim to have a more complete picture, we performed a qualitative analysis taking into account both emotions and thoughts. In particular, we decided to go more in depth in some aspects which emerged from the literature review, considering some pairs of emotions and thoughts: satisfaction and satisfactory results/simplification of daily activities; trust and privacy concerns; addiction and technology vulnerability; and finally we will take into account the price concern.

*Satisfaction.* The satisfaction variable has emerged in the literature review when we analyzed researches dealing with the influence of personification on customer's satisfaction.

First, concerning satisfaction, the literature suggested that the personification of the device have been proved to play a role, performing a positive impact, in user satisfaction, regardless of technological problems or function of the device (Purington, 2017). Morevorer, findings suggested that respondents seem to find it easier to interact with technology that simulate some of their characteristics, so it is not surprising that popularity and usability of many modern technologies, including virtual assistants, is based on their anthropomorphic characteristics and abilities to support social interactions (Lopatoska & William, 2018).

We took in consideration the responses of our sample and we investigated how the relationship between respondents and smart objects influence their satisfaction. Generally, satisfaction has been the most mentioned emotion (27 times out of the 103 responses). In the three explanatory examples reported below, when asked to indicate the emotion they felt during the experience, respondents mentioned satisfaction.

*My home is provided with a home automation system which I usually use to turn off the lights, set the alarm, turn on or turn off the air conditioning. In addition, we have the possibility to use some electricity supplies and one of them is connected to the electric blanket. When the nights are really cold, I turn on the electric blanket remotely. Once, in a particularly cold night I was coming home after a dinner. I opened the app and I activated the plug of my room. When I came home, fifteen minutes later, my bed was warm, and I slept without suffering the cold.*
*(thought: simplification of daily activities)*

25 years old student in a user/service provider relationship with her home automation system.

*Through the Apple Watch I asked Siri to send a message to my mother about the time of return home that night and what I would rather eat. So, I used the function of the app watch that allowed me to connect to Siri and through a voice message I described what I wanted to do.*
*(thought: simplification of daily activities)*

23 years old students in the master/servant relation with the virtual assistant Siri

*The last time I left for a trip, I didn't have the opportunity to print the boarding card and after checking in online via the app, I saved it on the smartphone wallet application. Once at the airport I was able to access the gate area by launching the wallet application containing all my digital boarding cards and displaying the card for that trip on the screen. During the security checks I didn't have to worry about not losing the press and, once on the plane, I was able to find my place faster. In short, a great comfort.*
*(thought: satisfactory results)*

33 years old employee in the partnership relationship with her smartphone

Generally, we have mentioned researches dealing with the conversational nature of virtual assistants, which present "the potential to trigger personification tendencies in users and in turn can translate into consumer loyalty and satisfaction" (Lopatovska & William, 2018). Nevertheless, in this case we have not noticed a correlation between virtual assistant and the mention of satisfaction in the responses. Indeed, different smart objects have been part of an episode linked to this particular positive emotion: the smartphone, tablet, smart TV, virtual assistant and others. Instead, findings suggest a positive correlation between satisfaction and the efficacy attribute, more than the interaction abilities and the personification which characterize virtual assistants. In particular, the presence of a virtual assistant in the episode is related to emotions such as curiosity, surprise, relax and fun.
For what concern the thoughts, respondents who mentioned satisfaction as the felt emotion, were likely to mention also positive thoughts such as satisfactory results, the simplification of daily activities thanks to the use of smart object, the recognize the technology development or they stress the improvement of their performance because of their experience with the smart device.

*Trust and privacy concerns.* As we have explained in the previous chapters, trust and privacy concerns are two strictly related variables. While privacy concerns have been proved to be psychological/ethical barriers to the customers adoption (Mani & Chouk, 2018), trust has been proven to play an active role in reducing the uncertainty in an environment in which consumers feel especially vulnerable: because they know they can rely on the trusted brand, they "scale down" privacy and security concerns (Yan, Zhang & Vasilakos, 2014; Chaudhuri, & Holbrook, 2001). On the other side, researchers have demonstrated that privacy and security concerns, together with other factors, "massively contribute to the formation consumers' trust" (Kim, Ferrin & Rao, 2007), since a huge amount of data, including personal data and sensitive information, pass through the smart objects. In the two explanatory examples reported below, respondents mentioned their trust toward the product related to product or some privacy concern considerations.

*"Possibility to make payments at any time, without having to go to the bank or the post office; monitor transactions at any time; resolution of problems in a short time, allowing certain deadlines to be met despite daily commitments; I trust this tool because it allows you to access the dashboard only by checking your specific fingerprint, so even if you were the victim of a smartphone theft I wouldn't be afraid to expose myself to the risk of a banking fraud".*

23 years old student in a user/service provider relationship with her smartphone bank app

*"Yesterday afternoon I was in a supermarket. After taking everything, I go to the cashier and realize I have forgotten my wallet. Fortunately, I had my smartphone with me, which allows me to pay by credit card without having a physical card. The service is called Apple Pay, present in Apple devices. Although I use it almost every day, if I had not had my smartphone yesterday, or had never used this technology, I would have had to go home to get my wallet and go back to the supermarket again".*

24 years old student in a user/service provider relationship with Apple Pay

*"From the description of the master servant relationship I think the Smart device I can remember most easily is the iPhone. In particular I think of the Siri app, when I ask her to do some work to make me happy and she completes the action, so that we say thank you or we feel sorry when she can't look for what I wanted. Furthermore, it cannot act without me, so I consider it a "slave" and if it were to do research without my consent I would be afraid of privacy violation or similar things".*

30 years old employee in a master/servant relationship with Siri

The first two above-mentioned responses are related to episodes involving the device access to sensitive information, namely the bank account. The respondents demonstrate to feel trust toward the service/provider, and any doubts would be balanced by the simplification of some time-consuming activities. Instead, the last respondent highlights two important analyzed aspect: first, the respondent adopts in the first part of the response the human pronoun "she", indicating the humanization of the virtual assistant. We have noticed how the personification of the IoT devices, which is mainly characterizing the partnership relationship, is also present in episodes belonging to the user/service provider or the master/servant relationship. Thus, we could infer that a relationship between customers and their smart objects could involve shades of all the three relationship, with one of them emerging.

Secondly, the customer expresses some doubts related not only to the privacy violation related to the activation of the device without its permission. We have seen in the second chapter how the degree of our control on the IoT devices is increasingly important the more they are provided with the capability of agency, autonomy and authority. Indeed, while some smart objects are capable of only the lowest level of automation, requiring human intervention at various points for action to succeed, "others have the capacity for the highest level of agency and autonomy and are able to behave authoritatively, making and executing decisions, independently without human intervention" (Parasuraman et al. 2000). For example, they can be involved in the so-called "non-consumer-centric" interactions, which never involve the consumer as one of the interacting entities (Hoffman & Novak, 2017), and impacts customers' acceptance of the IoT technology.

*Addiction and technology vulnerability.* Moreover, we proceeded analyzing how another barrier negatively impacting the customers' adoption of the IoT technology were perceived by the respondents. The following response is provided by a 24 years old student in a user/service provider relationship with her smartphone. Indeed, when the respondent asked what kind of emotions she felt, she answered "I felt lost".

*I left my smartphone in a restaurant a few days ago. I immediately called them through a friend's phone, saying that I absolutely needed to take it back that evening. I was lost, I needed it to go home, to set the alarm, to call my father the next morning, to go to work and to work itself. I insisted a lot, as the place was closing, but I finally returned to the restaurant and retrieved it. Once I got my phone back, I booked Uber and went home.*

24 years old student in a user/service provider with her smartphone

We have seen as one of the barriers to the customers' adoption of the IoT technology consists of the technology vulnerability, which has a double valence: on the one side, "it refers to dependence for those who cannot control the use of technologies may develop a technological dependency"; on the other sides, "it is related to anxiety for consumers who are unprepared for technology". In both cases, people may experience "negative emotions, technostress and technophobia, potentially exposing customers to the resistance to innovation and in particular to smart services" (Mani & Chouk, 2018). Accordingly, we labelled some responses with the negative emotion addiction, since it could be assimilated to the technology dependency.

*Price concerns.* As previously explained perceived price is related to "the feeling that consumers have about the price of a product" and it refers to "the price the consumer considers to be an appropriate monetary sacrifice for the product in question" (Zeithaml, 1988).

We have seen in responses already reported below, how the respondents specify that they decided to buy the smart device because they valued the price as adequate for the purchase. It is a relevant information, since the perceived price is one of functional barriers impacting the customers adoption of the IoT technology (Mani & Chouk, 2018).

*"Let me first say that I am not a very enthusiastic person about these technologies, I started using an iPhone in recent times and I mainly use it to surf the web. Recently, I bought the Apple watch, its features are endless. I was convinced by an enthusiastic friend, the price was high but, in the end, it was fair considering the services it offers. It helps me in everything, thanks to the notifications I receive, and it is useful for reading emails and messages. The watch also matches with many sports outfits that I wear for doing household chores or for going out with friends. Also, I usually use it when I go for a run and it counts the steps and the calories."*

61 years old freelancer in a user/service provider relationship with his Apple Watch

The above-mentioned response belongs to a 61 years old freelancer in a user/service provider relationship with his Apple Watch, which considers how "*the price was high but, in the end, it was fair considering the services it offers"*. When asked what thoughts he had at the moment of the episode, he stated: *"I was afraid I had thrown money"*. Our findings confirm that price is an important concern for customers when evaluating the purchase of a smart device; in particular, customers have in their minds price thresholds above which the cost is "adequate" and "proportionate". Moreover, the price, even if considered high, has to be balanced by the services offered to the customers.

# CONCLUSIONS

Generally, the aim of our research was to investigate how the partnership relationship was structured and developed in the customer/smart object experience and its differences with other types of relationships, namely the user/service provider and the master/servant relationships.
With is aim, we conducted a qualitative analysis through a survey conducted on Qualtrics. We distinguished between the object's side and the subject's side. While on the object's side we examined the attributes dimension, on the subject's side we analyzed the motives, the emotions and the thoughts dimensions.

*Findings.* Generally, the ability of the smart object in performing activities is a crucial point for customers in the definition of their relationship experience. Nevertheless, it is interesting to highlight that a positive correlation emerged in our sample between the mention of the interaction abilities as attribute of the smart objects, the fun purposes as the motives behind the use of the smart objects, the mention of positive emotions and thoughts and the presence of a virtual assistant in the episode of the respondent. In particular, our findings confirmed that virtual assistants, as conversational agents, are subjects to the humanization process, defined as attribution of "humanlike properties, characteristics, or mental states to real or imagined nonhuman agents and objects" (Fournier, 1998). Since the personification is strictly related to the partnership relationship, we have noticed how it is also present in episodes belonging to the user/service provider or the master/servant relationship. Thus, we inferred that a relationship between customers and their smart objects could involve shades of all the three relationship, with one of them emerging more than the others.
In addition, our findings suggested that customers which are involved in the user/service provider relationship tend to feel conflicting emotions related to their experience with the smart device, even if presenting the majority of positive ones; respondents involved a master/servant relationship are more likely to feel a larger percentage of negative emotions and thoughts rather than respondent involved in other relationship, presenting particular conflicting thoughts; finally, the interviewed people in the partnership group, were more likely to feel positive emotions and thoughts, in line with previous research.
Moreover, some insights related to some relevant aspects emerged in the literature review were collected. For what concerns the satisfaction, the literature suggested that the personification of the virtual assistant have been proved to play a role, performing a positive impact, in user satisfaction, regardless of technological problems or function of the device (Purington, 2017). Nevertheless, we did not notice a correlation between virtual assistant and the mention of satisfaction in the responses. Instead, findings suggest a positive correlation between satisfaction and the efficacy attribute, more than the interaction abilities and the personification which characterize

virtual assistants. In particular, the presence of a virtual assistant in the episode was related to emotions such as curiosity, surprise, relax and fun.

For what concerns trust and privacy concerns, what emerged was that in some cases, respondents demonstrated to feel trust toward the smart object and any doubts would have been balanced by the simplification of some time-consuming activities. Instead, in other cases customers expressed some doubts related to the privacy violation related to the activation of the device without its permission, confirming that the degree of our control on the IoT devices is increasingly important the more they are provided with the capability of agency, autonomy and authority.

Moreover, we confirmed the barrier of the technology vulnerability to the customers adoption of the IoT technology. Finally, our findings confirmed that price is an important concern for customers when evaluating the purchase of a smart device; in particular, customers have in their minds price thresholds above which the cost is "adequate" and "proportionate". In addition, the price, even if considered high, has to be balanced by the services offered to the customers.

*Limitations.* In our collection of data, respondents chose the relationship which was more in line with their experience with a smart object, based on the reading of some definitions. It did not allow us to immediately understand the shades of all the three relations which could be present in the same relationship, with one of them emerging more than the others.

*Directions for future researches.* We noticed how the younger generation, as opposed to the older one, were more likely to not identify their relationship with their smart devices with the three analyzed. In this sense, we could infer two hypothesis which could be tested in a further research. They are related to the fact that the younger generation, as opposed to the older one, is exposed to the development their relationship with smart devices since their childhood, and the younger they are, the more it is true. Therefore, we could infer that the youngest respondents do not present a "critical spirit" when thinking about their relationship with this kind of technology, because of reasons of age, they have no material of comparison with times in which this kind of experience was not possible. Nevertheless, we could as well infer that the young generation is developing a new type of relation with smart objects, which is no more represented by the ones proposed by the literature. The topic could be analyzed in future researches.

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# Summary



## Introduction

The aim of this study is to analyze the partnership relationship occurring between customers and smart objects is structured and developed, in comparison with the user/service provider and the master/servant ones.

In the first part of this analysis, we will offer an overview of what smart objects refers to and the reasons why the better understanding of the topic is relevant from a managerial perspective. Generally, two main complementary definitions of smart objects provided by authors: while the first one is technical, the second one is extensive and strictly linked with the concept of "innovation". Afterwards, in the second part of the chapter we will deal with the reasons why the analysis of the relationship between customers and smart objects is relevant. First, we will analyze the growth of the industry; secondly, we will go more in depth in the challenges offered by the development of the industry, focusing on the reasons of the customers' *resistance* to the IoT innovation due to two categories of "barriers": the psychological/ethical and the functional barriers.

In the second chapter we will deal with the literature review related to the relationship between customers and possessions. In the first part, we will go through the literature related to the relationship between customers and

objects; we will explain how smart objects depart from the traditional ones since they are provided with the agency, the autonomy and the authority capabilities; and finally, we will take into consideration a particular kind of smart objects, consisting of the virtual assistants Siri, Google Home and Alexa. In the second part, we will analyze different conceptual and consumer culture theory approaches; we will describe two main opposite lines of thinking: theories based on the concept of anthropomorphization (HCI, HRI and CASA), and the so-called "theory assemblage", an approach considering human and non-human actors as ontologically equivalent. Generally, our analysis is based on the first line of thinking, the anthropomorphization theory. Finally, in the third part, we will go through the literature review dealing with the practical application of the anthropomorphizing theory in the IoT context. Specifically, we will take into consideration analysis conducted on smart objects provided with the virtual assistants Alexa, Siri and Google Assistant. We will analyze studies related to the influence of personification on customer's satisfaction, trust, and other emotions.

At a macrolevel, all the above-mentioned specific relations belong to three main broader categories of customers/smart objects relationship: user/service provider, master/servant and partnership. Specifically, the main focus of our analysis consists of the partnership relationship in comparison with the other kind of relationships. With this aim, in the third chapter we are going to analyze our data according to four relevant dimensions for the purpose of our analysis. While on the object's side we will examine the attributes dimension, on the subject's side we will analyze the motives, the emotions and the thoughts dimensions. Based on each dimension, we have coded the text of the responses in order to emphasize different aspects of the specific dimension. Therefore, we will focus on the different aspects by providing the text of some interesting responses.

In the conclusions, we will deal with our findings.

# 1. SMART OBJECTS: DEFINITIONS AND RELEVANCE OF THE ANALYSIS

## 1.1 Smart objects: technical and extensive definitions

Two different definitions of smart objects are provided by authors: while the first one is technical, the second one is extensive and strictly linked with the concept of "innovation". From the technical point of view, "the Internet of Things (IoT) consists of a network of billions of devices, the so-called smart objects, that are able to communicate with consumers and other systems, services, and devices through the Internet" (Novak & Hoffman, 2018). Going more in depth, "the smart objects are provided with three essential technical features: "sensors", "actuators", and finally, the "network connectivity" (Hoffman & Novak, 2015; Mani & Chouk, 2017). Thanks to the above-mentioned features, they can perform three main activities: first, they collect, aggregate, and analyze a significant amount of data; secondly, they interact and communicate with each other—and with humans—on an ongoing basis; and finally, they activate actions with complete autonomy" (Hoffman & Novak, 2015).

A further broader definition of the IoT devices has been provided by authors, and it related to the fact that those new connected and smart products and services "are revolutionizing consumers' lives, to the extent that they are considered as disruptive innovations" (Mani & Chouk, 2018). According to some authors, the IoT is considered the next phase in the Internet revolution since "it brought the intelligence of the Internet to physical products, with the potential for something new to emerge" (Hoffman & Novak, 2015). Moreover, smart objects have been also defined as "service innovations", intended as "new or enhanced intangible offering that involves the firm's performance of a task/activity intended to benefit customers" (Ostrom, Parasuraman, Bowen, Patrício, Christopher & Voss, 2015), changing the way the service is configured and rendered.

The two above mentioned definitions of smart objects are two sides of the same coin. Features such as sensors, actuators and the network connectivity allow smart objects to perform their main activities. In turn, the performing of those activities enable the IoT devices to reshape the way products and services are configured and rendered.

## 1.2 Growth and development potential

Generally, the IoT industry is experiencing an extraordinary growth, to the extent that "it is expected to worth $3 trillion by 2025, with over 27 billion heterogeneous things connected to the Internet" (Meyer, 2016). Smart objects' technical capacities "are being increasingly incorporated in all manner of consumer objects commonly used in everyday life, which through connectivity are now able work together as assemblages through a process of ongoing interaction" (Novak & Hoffman, 2018). Thanks to these interactions, new properties and capacities are expected to emerge, with the potential to vastly expand the range of what consumers—and objects—can do, and what can be done to and for them. Firms benefit from the IoT devices in two main ways. On the one side they offer to their customers products embedded with devices to collect, communicate, and exchange a great deal of data instantaneously and autonomously, improving their functionality and performance; on the other side, companies can furtherly improve their products based on customer's needs, wants, and behaviours, thanks to better understanding provided by the collection and the analysis of data (Mani & Chouk, 2018). As a matter of fact, several industries, such as automotive, smart home, healthcare, insurance and transports, are more and more involving IoT devices in their products. Some examples of smart products and services are connected cars, voice-controlled digital assistants and other smart home devices and appliances, VR headsets and wearables (Novak & Hoffman, 2018). Among them, we will go more in depth in the characteristics of the virtual assistants Alexa, Siri and Google Home in the second chapter.

## 1.3 Resistance to the IoT innovation

As Ram very clearly explained in his study related to resistance in 1987, "adoption and resistance are strictly related and can coexist during the life of an innovation". Indeed, the more and more widespread adoption of the

IoT devices is raising new significant challenges to the industry. Going more in depth in the definition of *resistance to innovation*, it is intended as "a form of reaction or negative attitude to new products and services triggering change or upsetting the status quo" (Ram and Sheth, 1989). It could be caused by specific "barriers" obstructing the adoption of the IoT technology. In particular, psychological and/or functional factors have been proved to generate the consumers' resistance to the innovation provided by IoT devices, with several managerial implications for companies incorporating the technology of smart objects in their offering.

*Psychological/ethical barriers.* The psychological/ethical barriers are due to consumer characteristics such as self-efficiency, technology vulnerability and privacy concerns. First, *self-efficacy* is defined as "consumers' perception of their ability to use a technological and innovative product" (Compeau & Higgins 1995). While increasing self-efficacy has been proved to positively affect the consumers adoption of innovations (Park & Chen, 2007), decreasing self-efficacy demonstrated to positively affect consumer resistance to technological innovations (Mani & Chouk, 2018). Secondly, the *technology vulnerability* has a double valence: on the one side, "it refers to dependence for those who cannot control the use of technologies may develop a technological dependency"; on the other sides, "it is related to anxiety for consumers who are unprepared for technology". In both cases, people may experience "negative emotions, technostress and technophobia, potentially exposing customers to the resistance to innovation and in particular to smart services" (Mani & Chouk, 2018). Third, since the smart objects are involved in the collection, the aggregation and the analysis of a significant amount of data, expose companies to *privacy* concerns. Privacy is defined as "the ability of an entity to determine whether, when, and to whom information about itself is to be released or disclosed" (Yan, Zhang & Vasilakos, 2014). Its protection is recognized in all legislations of civilized countries, and it is deeply rooted into our civilizations to the extent to which concerns about privacy's protection have proven to be a significant barrier against the diffusion of the technologies involved in the IoT. Recently, the European Union legislation has handled concerns related to privacy, through the General Data Protection Regulation (GDPR), with the aim to protect all EU citizens from privacy and data breaches in the increasingly data-driven world, setting the minimum standards for processing data in the EU. Trust management has been proved to "scale down" privacy concerns.

*Functional barriers.* For what concerns the functional barriers, they mainly occur "when the consumer perceives a radical change during a new product adoption", or there is a concern related "to product characteristics, such as price, usefulness, novelty, and device intrusiveness" (Mani & Chouk, 2018). In the marketing literature, *perceived price* is related to "the feeling that consumers have about the price of a product" (Zeithaml, 1988) and it refers to "the price the consumer considers to be an appropriate monetary sacrifice for the product in question". It is known that technological innovations are generally expensive, and some consumers are reluctant to spend substantial

amounts of money; therefore, perceived price seems to be one of the core reasons why consumers resist these products. However, findings demonstrated that if firms improve the perceived usefulness of their smart products, consumers will be more likely to accept the financial risk. Going more in depth in *intrusiveness*, meaning "someone entering a consumer's life without permission", has proven to have a positive effect on consumer resistance to smart products (Mani & Chouk, 2017). Finally, *novelty*, referring to "consumers' perception of a radical change in a product concept or an attribute of the product" (Ram, 1987), has a significant negative impact of novelty on consumer resistance to smart products (Mani & Chouk, 2017).

# 2. CONSUMERS AND SMART OBJECTS: PARTNERSHIP RELATIONSHIP

## 2.1 From objects to "smart" objects

Previous researches in the consumer behavior and marketing literatures provides strong support for the idea that consumers form relationships with their possessions, explaining how "consumers' interactions with brands have meaning that extend beyond purchase and immediate consumption, and are embedded in a broader, socio-material network of interactions" (Fournier, 1998). The American business academic Russel W. Belk, in a famous research dated in 1988, studied the relationship between our possessions and our sense of self, basing the analysis on the assumption that "we are what we have and possess". Belk's line of thinking was supported by previous psychological studies; in particular, William James, the psychologist who laid the foundations for the modern conceptions of self, stated that "we are the sum of our possessions". In this sense, he elaborated the concept of "extended self", indicating "a part of the self which is not only seen as me, but also as mine". Going more in depth in his perspective of what our possessions include, he argued that "they are not only limited to external objects and personal possessions, such as our body, clothes and money, but they involve also people, places, and group possessions which contribute to the building of our self" (William, 1980). Moreover, the control over the possession has been proved to be one of the most important variables influencing the extended self: McClelland in 1951 suggested that "external objects contribute to the building of our self when we are able to exercise power or control over them, just as we might control an arm or a leg". Generally, "the greater the control we exercise, the more closely the object should become allied" (McClelland, 1951). Eight years later, Prelinger's tested the influence of the control over objects on the item being part of self, and what emerged was that besides control over objects, control by objects may also contribute to an object being viewed as part of self (Prelinger, 1959). In 1998, Susan Fournier proposed that "brand could be considered as active relationship partners, and not merely passive objects of marketing transactions", because of the human activity of anthropomorphizing inanimate objects. Moreover, she referred to different core conditions, which need to be satisfied in order to qualify relationships in the interpersonal domain. The most important one is related to relationships involving reciprocal

exchange between active and interdependent relationship partners. Indeed, “for a relationship to truly exist, interdependence between partners must be evident: that is, the partners must collectively affect, define, and redefine the relationship” (Fournier, 1998).

Similarly, consumers’ interactions with smart objects - those devices, services, and AI systems that have Internet connectivity and some level of intelligence - have been proved to be characterized by a relational nature. As we have explained in the first chapter, they are provided “with properties, capacities and abilities, allowing them to be able to affect but also to be affected, and to interact with consumers as well as with other objects” (Novak & Hoffman, 2018; Hoffman & Novak, 2018. In particular, according to authors, the degree to which an object is “smart” corresponds to the extent of its capacity to exercise agency, autonomy, and authority, roles which have been recognized to characterized intelligent objects. These capabilities can be considered as “possibilities or potentials, which may be exercised when the smart object interacts with other entities” (DeLanda 2011), with several theoretical implications.

*Agency*. First, smart objects present the capability of agency to the extent “that they possess the ability for interaction, having the capacity to affect and be affected by other entities” (Franklin and Graesser 1996). Through these capacities, smart objects are able to express their own active roles in interaction, roles consumers are in turn readily able to perceive. The active role of the possession in the relationship with consumers has been emphasized in the marketing literature. In 1998, Susan Fournier proposed that “brand could be considered active relationship partners, and not merely passive objects of marketing transactions”. Indeed, “for a relationship to truly exist, interdependence between partners must be evident: that is, the partners must collectively affect, define, and redefine the relationship”. Thus, an important criterion which need to be satisfied in order to a brand to be considered as an active relationship partner is the activity one, meaning “the degree to which the brand achieve certain levels of performance” (Fournier, 1998). Moreover, these properties allow the IoT devices to affect and be affected in interaction with each other and with consumers, and to be “engaged in some kind of experience themselves” (Hoffman & Novak, 2018). Smart objects have been proved to be engaged in a form of experience themselves, in particular the first level of experience, which is the “basic” one. Nevertheless, this first level of experience may even constitute the raw material for the second level of experience, the “aware” experience, which involves how the brain or processing system recognizes, organizes, and attends to the input of basic experience. Controversial opinions are related to the third level, the “conscious” experience, which involves how the awareness processes of input recognition, organization, and attention are integrated to produce subjective experience.

*Autonomy and authority.* The IoT devices present the capability of autonomy to the degree "they can function independently without human intervention and interact independently with other entities, in pursuit of [their] own agenda" (Parasuraman et al. 2000). Finally, they have authority to the degree to which, with agency and autonomy, "they have the right to control how they respond to other entities and how other entities respond to them, making their own decisions" (Hansen et al. 2007). The degree of our control on the IoT devices is increasingly important the more they are provided with the capability of agency, autonomy and authority. For instance, some smart objects are capable of only the lowest level of automation, requiring human intervention at various points for action to succeed. Instead, "others have the capacity for the highest level of agency and autonomy and are able to behave authoritatively, making and executing decisions, independently without human intervention" (Parasuraman et al. 2000). For example, they can be involved in the so-called "non-consumer-centric" interactions, which never involve the consumer as one of the interacting entities (Hoffman & Novak, 2017). Consequently, it is these degrees of agency, autonomy, and authority that determine how smart an object is (Novak & Hoffman, 2018; Hoffman & Novak, 2018).

In particular, the artificial intelligence takes advantage of virtual assistants in order to interact with customers (Smith, 2018). Generally, the idea of digital personal assistants is not new and traces back to the 1980$^{th}$, with the difference that the current generation of IPAs, including Google Assistant, Apple Siri, and Amazon Alexa, is designed to perform similar tasks and more through the natural language voice-control interfaces. The ability to "speak" to people often leads to attribution of human-like properties to the IPA systems (Lopatovska & William, 2018).

## 2.2 Theoretical approaches

Generally, we have identified two main opposite lines of thinking. First, the most common theories are based on the concept of anthropomorphization, meaning the attachment of human characteristics to non-human subjects so that it is seen as a person with life, feeling and thought (Yangyi shi, 2017). Three main related paradigms have been identified: the CASA ("computers are social actors"), the HCI ("human–computer interaction") and HRI ("human–robot interaction"). In the communications discipline, the CASA paradigm is focused on how people tend to respond to computers as if computers were people. In the HCI and HRI literatures, researches are based on cognitive science and engineering principles, with the aim to explain how the characteristics of smart objects like computers and robots are interpreted by users and influence their behavior. The emphasis in these literatures is on design considerations that are likely to improve user experience (Novak & Hoffman, 2018).

Instead, other theories are based on the so-called object-oriented ontology, which takes into account the two parts in the interaction, human and nonhuman actors, as ontologically equivalent. It is a most recent approach, which have been mainly developed through the theory assemblage theory (Novak & Hoffman, 2018). As smart objects

possess varying degrees of agency, autonomy, and authority, some theories consider the object on its own terms, rather than on human terms. Consequently, the traditional anthropomorphic or human centric conceptualization in the relationship between consumers and objects has been discussed, and more object-oriented conceptualizations emerge in the recent marketing literature. Among other approaches, the customers and objects experience has been defined from the assemblage theory perspective, taking into account the two parts in the interaction, human and nonhuman actors, as ontologically equivalent, allowing to analyse how nonhuman objects might impact experiences of consumers and experience their own existence. Indeed, it is a particular relational ontological framework aimed to understand "things in the world" through their relations with other things, rather than possessing any essential substance (Hill, Canniford & Mol, 2014).

## 2.3 Partnership relationship

In this part of the analysis, we will go through the literature review dealing with the practical application of the theory in the IoT context. Specifically, we will take into consideration analysis conducted on smart objects provided with the virtual assistants Alexa, Siri and Google Assistant, previously described. First, we will analyze studies related to the influence of personification on customer's satisfaction. Afterwards, we will investigate the role of personification on the trust relationship between customers and smart objects, a relevant tool to handle privacy concern. Finally, we will mention previous researches dealing with positive and negative emotions emerged from the relationship with the device partner.

*Satisfaction.* The conversational nature of intelligent personal assistants, or virtual assistants, has the potential to trigger personification tendencies in users, which in turn can translate into consumer loyalty and satisfaction. (Lopatovska & William, 2018). In 2017, the researcher Purington adopted the CASA paradigm with the aim to analyze the user reviews of the Amazon's Echo product posted to Amazon.com: in particular, he studied the degree to which user reviews indicate personification of the device, sociability level of interactions, factors linked with personification, and influences on user satisfaction. Generally, personification of the device been proved to play a role, performing a positive impact, in user satisfaction, regardless of technological problems or function of the device. Finally, the conversional agent Alexa is in line with the CASA paradigm, since people tend to use human scripts to interact with technologies that exhibit human-like social cues (Purington, 2017).

*Trust.* As explained in the first chapter, since the smart objects are involved in the collection, the aggregation and the analysis of a significant amount of data, expose companies to *privacy* concerns, one of the main barriers to the IoT growth and development. What emerged from the marketing literature review is that a mutual relationship does exist between privacy/security concerns and trust. Specifically, *trust* plays an active role in reducing the

uncertainty in an environment in which consumers feel especially vulnerable: because they know they can rely on the trusted brand, they "scale down" privacy and security concerns. (Yan, Zhang & Vasilakos, 2014; Chaudhuri, & Holbrook, 2001). According to some authors, the choice to provide the three most used virtual assistant mentioned before – Alexa, Siri, and Google Home – by default with "an algorithmically-amplified feminized persona", has the aim to scale down the above-mentioned concerns (Woods, 2018). In particular, the author analyzed the rhetorical phenomenon of digital domesticity performed by artificial intelligent virtual assistants. The concept of "digital domesticity" has defined by scholars as the re-articulation of "prototypical motherhood" in the blogosphere and, more generally, domesticity has served as a key organizing metaphor for the rise of "smart homes" (Spigel, 2001). Several studies have been conducted on the impact of trust on relevant variables such as purchase loyalty and purchase intention. In their analysis, Chauduri and Holbrook have demonstrated how trust affects brand loyalty, which in turn leads to greater market share when the same brand is repeatedly purchased by loyal consumers, irrespective of situational constraints (Chaudhuri & Holbrook, 2001). Other academics suggest that trust, together with other factors such as co-creation value, positively affect the ecommerce word-of-mouth, which in turn affects the purchase intention (See-To & Ho, 2014).

*Other emotions.* A study recently conducted on users' sentiments towards virtual assistants identified a number of factors that are related to positive and negative attitudes. First, the positive emotions were largely associated with aspects of convenience, the hands-free interface design, the informational and entertainment value. Instead, negative emotions were mostly related to performance issues, the conversational quality and privacy. Some features were mentioned in both positive and negative contexts, such as ease-of-use and quality of information (Lopatovska, Velazquez, Richardson, Lai, Liao & Constantine, 2019). Another study explored how human emotions are linked with mind perceptions. In particular, what emerged was a list of most common emotions including surprise, amazement, happiness, disappointment, amusement, unease, and confusion (Shank, Graves, Gott, Gamez & Rodriguez, 2019).

## 3. RESEARCH

The aim of our research is to investigate how the partnership relationship is structured and developed in the customer/smart object experience and its differences with other types of relationships, the user/service provider and the master/servant ones. The relevance of the research question lies on two main reasons, while the first one is related to the exponential growth of the IoT industry, the second one is related to the challenges to the IoT development are emerging, such as the customers' *resistance* to the IoT innovation, because of psychological or functional barriers.

## 3.1 Methodology

With this aim, we conducted a qualitative analysis, collecting data through a survey designed on Qualtrics, and we proceeded with the coding process. In particular, we coded the text according to four relevant dimensions. On the subject's side, we investigated the implications related to three main factors: first, the reasons the customer takes advantage of the smart object; secondly, the emotions he or she feels; and finally, his or her thoughts. On the object's side, we would like to go more in depth in the smart device attributes, which are mentioned by customers.

## 3.2 Analysis of data

Before going more in depth in the analysis of data, we have provided the description of our sample, in terms of gender, age, and education level.

## 3.3 Results

Afterwards, we went through the different relevant dimensions for the purpose of the analysis: the objects' attributes and the subjects' emotions, thoughts and motives. Based on each dimension, we have coded the text of the responses in order to emphasize different aspects of the specific dimension. Therefore, we focused the different aspects by providing the text of some interesting responses.

*Attributes.* First, on the object's side we analyzed the attributes of the smart objects, investigating whether the respondent highlighted the interaction abilities of the smart object, their efficacy, or both.

| ATTRIBUTES | INTERACTION ABILITIES |
|---|---|
| | EFFICACY |

*Table 2 - Attributes*

What emerged was that the attribute related to the *interaction abilities* was never mentioned alone, but always accompanied by the attribute *efficacy.* Thus, in line with previous researches, the performance of the smart object is a crucial point for customers in the definition of their relationship experience. In this respect, we mentioned a response in which the respondent stressed the interaction abilities of the smart object which can be activated through the voice recognition; moreover, she is happy to own a smart object "with its own life" to interact with. This statement confirms the assumption that the partnership relation between people and smart objects is strictly related to the concept of humanization (Fournier, 1998). Instead, in another case, although the respondent recognizes the Alexa's ability of communication, the respondents' relationship with smart objects is merely related to the performance of the smart device and thus, its efficacy. Generally, the total number of respondents

mentioning the role of the interaction abilities in their relationship with smart devices was considerably high. It was interesting to highlight that a positive correlation emerging between the mention of the interaction abilities in the responses and the presence of a virtual assistant in the episode of the respondent. Our expectation was that attribute of the smart object to be able to interact positively affects the relationship between customers and the smart devices. Indeed, most of the above-mentioned responses in which the interaction abilities are mentioned are accompanied with positive emotions and thoughts.

*Motives.* First, we examined the reasons behind the use of smart objects, investigating whether the motive of the experience with the smart device was based on fun or functionality purposes, or both. Similarly, what emerged was that the motive *fun* never emerged alone, but always accompanied by the *functionality* purposes. Again, in line with previous researches, the ability of the smart object in performing activities is a crucial point for customers in the definition of their relationship experience. The expectations that the relationship between customers and smart objects goes beyond mere functionality reasons, were confirmed by responses indicating the fun component in the relationship with the smart device. We mentioned a response in which while the functionality purposes emerged from the response because of the performing of different activities such as asking for directions or asking to text someone, the fun purposes also emerged, since the respondent started to try the virtual assistant in a way to test its interaction abilities and performance. Again, in this case a virtual assistant is involved in the episode. Indeed, in this phase of the analysis we started to infer a positive correlation in our sample between the presence of the virtual assistant in the episode customer experience, the mention of the interaction abilities as an important attribute of the smart device and the fun purposes behind the reason of the smart object's use. Generally, our hypothesis according to which the relationship between customers and smart objects goes beyond mere functionality reasons is true.

| | | |
|---|---|---|
| MOTIVES | FUN | Academic purpose<br>Asking for a recipe<br>Asking for directions<br>Asking for general information<br>Asking to call or text someone<br>Asking to print a file<br>Asking weather conditions<br>Banking operations<br>Basic operations<br>Calendar activities<br>Health monitoring/ Work out<br>House keeping<br>Listening to music<br>Playing a game<br>Reading<br>Reading texts and mails<br>Reading the news<br>Shopping<br>Testing the smart object abilities<br>Watching a movie |
| | FUNCTIONALITY | |

*Table 3 – Motives*

*Emotions and thoughts.* For what concerns the subject's side emotions and thoughts dimension, we investigated whether the respondent expressed positive, negative or both emotions and thoughts. Our findings suggested that customers which are involved in the user/service provider relationship tend to feel conflicting emotions related to their experience with the smart device, even if presenting the majority of positive ones. Moreover, respondents involved a master/servant relationship are more likely to feel a larger percentage of negative emotions and thoughts rather than respondent involved in other relationship, presenting particular conflicting thoughts. Finally, the interviewed people in the partnership group, were more likely to feel positive emotions and thoughts, in line with previous research. Afterwards, we reported for each one the different aspects mentioned by the respondents and we will go more in depth in the most relevant ones. In particular, we decided to go more in depth in some aspects which emerged in the literature review: satisfaction and satisfactory results/simplification of daily activities; trust and privacy concerns; addiction and technology vulnerability; and finally we will take into account the price concerns.

| | | | |
|---|---|---|---|
| EMOTIONS | POSITIVE | Curiosity<br>Fun<br>Happiness<br>Interest<br>Relax<br>Satisfaction<br>Surprise<br>Trust | 7<br>6<br>31<br>1<br>13<br>27<br>13<br>4 |
| | NEGATIVE | Anger<br>Fear<br>Frustration<br>Helplessness<br>Anxiety<br>Mistrust<br>Addiction | 2<br>1<br>1<br>1<br>2<br>2<br>2 |
| | NEUTRAL | Not specified<br>Nothing | 7<br>4 |

*Table 5 - Emotions*

| | | |
|---|---|---|
| THOUGHTS | POSITIVE | Being a partner<br>Gamification of daily activities<br>General positive<br>Identification with the smart object<br>Improvement of performance<br>Satisfactory results<br>Simplification of daily activities<br>Technology development<br>Willing to discover more functionalities |
| | NEGATIVE | Old technology is obsolete<br>Price concerns<br>Privacy concerns<br>Technology does not answer a real need<br>Technology is not efficient<br>Technology is not trustworthy<br>Technology could cause addiction |
| | NEUTRAL | The relationship is part of the routine<br>Not specified<br>Nothing |

*Table 6 – Thoughts*

In this case, with the aim to have a more complete picture, we performed a qualitative analysis taking into account both emotions and thoughts. In particular, we decided to go more in depth in some aspects which emerged from the literature review.

*Satisfaction.* The literature related to satisfaction suggested that the personification of the virtual assistant have been proved to play a role, performing a positive impact, in user satisfaction, regardless of technological problems or function of the device (Purington, 2017). Nevertheless, in this case we did not noticed a correlation between virtual assistant and the mention of satisfaction in the responses. Instead, findings suggest a positive correlation between satisfaction and the efficacy attribute, more than the interaction abilities and the personification which characterize virtual assistants. In particular, the presence of a virtual assistant in the episode was related to emotions such as curiosity, surprise, relax and fun.

*Trust and privacy concerns.* Trust and privacy concerns are two strictly related variables. What emerged was that in some cases, respondents demonstrated to feel trust toward the service/provider, and any doubts would be balanced by the simplification of some time-consuming activities. Instead, another respondent highlighted two important analyzed aspects: first, he adopted in the first part of the response the human pronoun "she", indicating the humanization of the virtual assistant. We have noticed how the personification of the IoT devices, which is mainly characterizing the partnership relationship, is also present in episodes belonging to the user/service provider or the master/servant relationship. Secondly, the customer expressed some doubts related not only to the privacy violation related to the activation of the device without its permission. The degree of our control on the IoT devices is increasingly important the more they are provided with the capability of agency, autonomy and authority. *Addiction and technology vulnerability.* We have seen as one of the barriers to the customers' adoption of the IoT technology consists of the technology vulnerability. Accordingly, we labelled some responses with the negative emotion addiction, since it could be assimilated to the technology dependency. In particular, we have reported an episode in which a respondent who left her smartphone in a restaurant said, "she felt lost".
*Price concerns.* We have seen how the respondents specify that they decided to buy the smart device because they valued the price as adequate for the purchase. Our findings confirm that price is an important concern for customers when evaluating the purchase of a smart device; in particular, customers have in their minds price thresholds above which the cost is "adequate" and "proportionate". Moreover, the price, even if considered high, has to be balanced by the services offered to the customers.

## Conclusion

Generally, the aim of our research was to investigate how the partnership relationship was structured and developed in the customer/smart object experience and its differences with other types of relationships, namely the user/service provider and the master/servant relationships.

*Findings.* Generally, the ability of the smart object in performing activities is a crucial point for customers in the definition of their relationship experience. Nevertheless, it is interesting to highlight that a positive correlation emerged between the mention of the interaction abilities as attribute of the smart objects, the fun purposes as the motives behind the use of the smart objects, the mention of positive emotions and thoughts and the presence of a virtual assistant in the episode of the respondent. In particular, our findings confirmed that virtual assistants, as conversational agents, are subjects to the humanization process, defined as attribution of "humanlike properties, characteristics, or mental states to real or imagined nonhuman agents and objects" (Fournier, 1998). Since the personification is strictly related to the partnership relationship, we have noticed how it is also present in episodes belonging to the user/service provider or the master/servant relationship. Thus, we inferred that a relationship between customers and their smart objects could involve shades of all the three relationship, with one of them emerging more than the others. In addition, our findings suggested that the interviewed people in the partnership group, were more likely to feel positive emotions and thoughts, in line with previous research.

Moreover, some insights related to some relevant aspects emerged in the literature review were collected. For what concerns the satisfaction, findings suggest a positive correlation between satisfaction and the efficacy attribute, more than the interaction abilities and the personification which characterize virtual assistants. In particular, the presence of a virtual assistant in the episode was related to emotions such as curiosity, surprise, relax and fun. For what concerns trust and privacy concerns, what emerged was that in some cases, respondents demonstrated to feel trust toward the service/provider, and any doubts would be balanced by the simplification of some time-consuming activities. Instead, in other cases customers expressed some doubts related to the privacy violation related to the activation of the device without its permission, confirming that the degree of our control on the IoT devices is increasingly important the more they are provided with the capability of agency, autonomy and authority. Finally, we confirmed the barriers of the technology vulnerability and price concerns to the customers adoption of the IoT technology.

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