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**Smartphones: The connection between application usage and  
purpose of use with a multicultural approach**

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**Dissertation**

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*“You can't connect the dots looking forward; you can only connect them looking backwards.  
So you have to trust that the dots will somehow connect in your future.” – Steve Jobs*

## **Smartphones: The connection between application usage and purpose of use with a multicultural approach**

### **Abstract**

Smartphones and mobile applications are one of today's hottest topics, either for markets or for investigation. We, as users, may already have noticed that the ways in which we communicate with other human beings by using these tools are changing, and that is happening on an absurdly fast pace, as this is also revolutionizing the communication paradigm.

After analysing the present literature it was noticed that people are usually categorized by the applications they use, so for example if a user plays games on a smartphone they are immediately classified as a hedonic user. But, this same person can use the smartphone for a complete different purpose, such as work, e.g. if the individual works for a gaming company.

This present work found out that not all the applications are directly related to the respective logical purposes, as they can be used in many different ways. Curious consumer patterns were also found as a result of using the cultural dimensions of Trompenaars (Trompenaars, 1997), as it was proven that these dimensions complement the development of smartphone applications to form a more comprehensive analysis, either for a developer or marketer. This aids professionals in a new way, so that they can better appropriate their products and services in a foreign and even a local market. It was also found out that people who don't have a smartphone, tend to adopt one in the near future on the condition that it provides them with functionality and productivity. In addition, ads in applications have been proven to influence a lot the propensity towards using smartphone apps, as people avoid them, but are also willing to view them at a cost.

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## **1. Introduction**

### **1.1 Framing of the topic**

Smartphones, a recent category of advanced mobile devices, have been creating a lot of buzz lately, as we are increasingly living on these devices (The Nielsen Company Report, 2014). According to a study led by the Nielsen Company in 2010, the prediction indicated that smartphones would overtake feature phones, or normal mobile phones, in the U.S. by 2011, which was later confirmed by the same company in another study (The Nielsen Company Report, 2014).

This report states that the penetration of smartphones in the United States of America is currently above 70%, which means that people are adopting these devices on a rampant scale.

In Portugal, in 2013, a study conducted by Marktest found out that a number of around 3,530 thousand individuals have smartphones and use them on a regular basis, and this accounts for 39,6% of mobile phone owners in Portugal (Grupo Marktest, 27 August 2013). More recently the International Data Corporation (IDC) in Portugal predicted that in 2014 around 2,5 million smartphones will be sold, which represents an evolution of 12% relating to the previous year (2013).

But why study the smartphone inside the technology realm? Simply because of the growing importance of this device in our lives and also for the industry.

### **1.2 Motivation**

According to Lee et al. (2014), these mobile devices are no longer cutting-edge technology, which purpose was to communicate, but instead they are regarded as a necessity, and this raises many queries regarding how, and for what purpose we are using these devices. Abeele & Roe (2013) also commented on this saying that we clearly need to understand how we are using smartphones in order to know how our society is evolving, which is an issue related to the side effects that smartphones can have in human advancement.

For all these reasons and the evolution of the smartphone presence in our daily lives, this device, the smartphone, has been chosen as the object of analysis for this dissertation.

In the studies about smartphone usage, in the scientific literature, we can find a wide variety of interesting ones focusing on a lot of different issues. For example, Head &

Ziolkowski (2012) try to understand, by means of different methodologies, how a specific group of people, in this case students, were using smartphones based on their actual usage. Some studies focus on themes like the impact of personality traits on smartphone use and ownership (Lane, 2011) of smartphone related habits, like checking habits (Oulasvirta *et al* 2011) and studies on adolescent's perspective on the smartphone as a "cool" object to own (Abeele & Roe, 2013).

Adolescent's and children's usage of smartphones, was also analysed in a cross-national study, named "Net Children Go Mobile", which involved children from 9 different European countries, from ages between 9 and 16. It was observed that there is a certain overdependence to smartphones in Portugal (Mascheroni & Ólafsson, 2014).

Relating to the state of research in Portugal little or almost nothing is known in this field of studies. For example, Barros *et al.* (2014) analyses technical aspects of the smartphone usage by older adults, but no study (from what was studied until now) specifically investigates the relation between user/consumer and smartphones, and therefore there is no comprehensive understanding about the different purposes that are being given to a smartphone by means of which applications.

### **1.3 Objective**

Most studies in this area try to understand how we are using smartphone applications in order to determine how we use the devices themselves. Whether on the go, home or work (Verkasalo, 2008) or by characterising types of application usage (Head & Ziolkowski, 2012; Rahmati & Zhong, 2013; Rahmati *et al.*, 2012), researchers have been trying to map consumers, but did not yet try to find the real purpose of usage by means of application usage. This present study tries to find out exactly that, or in other words how the chosen target, the students, are using applications by linking this to the real purpose of use, and therefore trying to find the linkage between application usage and the main purposes for using the smartphone.

With a secondary objective, this study also tries to observe if the cultural behaviour (according to Fons Trompenaars, 1997) affects the usage of smartphones.

### **1.4 Methodology**

For the methodology to use in this study, it was considered that almost 40% of the studies in this area rely on surveys (Boase & Ling, 2013), and if we were to measure the frequency and intensity of smartphone usage it would be interesting to use a log data study (De

Reuver *et al.*, 2012; Boase & Ling, 2013). But, given that this study tries to find out the connection between application usage and purpose of use, a survey, which follows an approach similar to the one used in the studies from Rahmati & Zhong (2013) and Rahmati *et al.*, (2012), can be applied and distributed electronically to all students of the previously mentioned faculties, as the required information can be collected from the specified targets. The survey is further explained in the methodology section.

A brief discussion also takes place concerning how the multicultural aspect is approached and the main related concepts are explained along the literature review, for the reader to have an overview about this complex topic.

Concerning the targets analysed by this study, and according to Hsiao & Chen (2015), students are labelled as the group that consumes the most mobile services and consequently have a great importance for mobile markets. As this specific group is characterized as extremely diverse (Rahmati *et al.*, 2012) it is also pertinent to choose these smartphone users for a more comprehensive analysis, since they are heavy and avid users (Kim *et al.*, 2014). Due to this being extant in the literature, two main targets were initially proposed for analysis: the students from the Faculty of Engineering and the Faculty of Economics from the University of Oporto. They were also chosen because this study was conducted in the same universities. In order to diversify the sample of respondents, and also to make sure that a certain amount of answers was collected so that the sample has a confident level of significance, other faculties from the University of Oporto were also included in the study.

### **1.5 Structure**

The structure of the dissertation is organized in 5 sections, with 10 attachments. Section 1 presents the introduction for this present work. Section 2 is dedicated to the literature review, where the main concepts and their evolution over time are analysed, in order to properly understand the evolution of the used concepts. The literature gap is also explored to further understand what is empirically missing or latent.

In section 3 the methodology and exploratory framework are explained in detail together with the data collection procedures. Section 4 is about the descriptive statistics and the obtained results for the four hypothesis. The last section, section 5, focuses then on the main findings that are summed up and the conclusions and limitations of the study, while referring the

Smartphones: The connection between application usage and purpose of use with a multicultural approach potential implications for the practice field. Some considerations for further research are likewise reported at the end of this study.

## 2. Literature review

### 2.1 Context

Nowadays we live in a world, which is becoming more and more of a conundrum, simply because of the fact that people now have more access to popular consumer goods such as the smartphone, instead of running water (Lee *et al.*, 2014). Everyone uses technology and mobile devices have never been so widespread as before (Bao *et al.*, 2011).

While the mobile phone has been around since the 80's, more specifically from the time when the Motorola DynaTac ([www.motorolasolutions.com](http://www.motorolasolutions.com)) first appeared in the market, more sophisticated hardware for mobile communication appeared from then on. Mobile phones have now evolved into a new breed of telecommunication tools that allow us to do a wide variety of things, such as listen to music and play games, and other entertainment uses in general (Shankar & Balasubramanian, 2009).

According to Portio Research (2013) "The smartphone business has been the single biggest revenue generating growth-story over the last 4 years as the rest of the tech sector suffers amid this seemingly endless recession" (Portio Research, 2013, pp.22), and the trend is consequently maintained until today as we see more and more handsets being sold (Marktest, 2013). In the same report it is also predicted that a number around a billion smartphones will be sold per year by 2016, with penetration rates constantly growing, no matter the financial crisis.

In terms of trends, properly said, the McKinsey & Company, Inc. released a report on the most actual trends in the market right now (McKinsey & Company, Inc, 2012). They say that these trends are focused around the following trends: displays with better quality in terms of sharpness and power efficient ones being available in the market; processors with low power consumption and compact size; embedded sensors that measure more variables like biometric and environmental sensors; batteries with more capacity and less bulky; materials, with graphene as a key resource for the construction of mobile devices, making these lighter and more resistant to impact; the convergence of operating systems, with the unified experience between desktop and mobile device; web centricity, with (web-)applications being processed on the web instead of the physical processor; innovation in user interfaces with context aware UIs; cloud services with better and faster services and networks being faster than ever with LTE network connection.

It's really interesting seeing these trends become true as advances in computation enable service providers in creating better experiences for the end users. But what does it mean for the practice landscape?

According to the Nielsen Company (2014) companies have now dedicated budgets to spend in mobile advertising and companies see this as the new frontier in the marketing practice. Media buyers and sellers are making mobile a priority, as they tend to spend more on mobile ads. But as the mobile advertising isn't still interesting enough, people are now interacting with smartphones, as they never did with any kind of device. For example they spend less time interacting with apps and when they do, they have the option to scroll through ads and therefore don't have the chance to see them in a proper way. In a result of a survey conducted by the same company, people said that mobile is the first screen they see every day, which gives a lot of importance to this matter.

## 2.2 Smartphone concept review

The basic definition for the smartphone, according to the Oxford Dictionary of English, is "a mobile phone that is able to perform many of the functions of a computer, typically having a relatively large screen and an operating system capable of running general-purpose applications" (Oxford English Dictionary, 2013).

In the year of 2008, Hannu Verkasalo (pp.332) presented us with the idea that smartphones should be the devices, which "*combine person-to-person services with computer-like applications such as document viewers, Internet browsing and multimedia*". Given this idea, he also pointed out that a more hedonic and utilitarian usage is being set on the smartphone, as they are now more versatile devices than ever before.

A smartphone is also considered to be the result of a convergence between a normal mobile phone and a personal digital assistant, also known as a PDA, and therefore updating the premise of Zheng & Ni (2006) as result from a clear evolution (Chang *et al.*, 2009).

Although we have a general definition of what a smartphone is, there seems to be no industry standard that clearly defines this type of mobile device (Peslak, 2011). This author also says that, from a general perspective, we can look at the mobile phone as a phone, which has features like a mobile operating system, information storage, the ability to browse the internet, check e-mail and install applications (Peslak, 2011). He gives us a more advanced point of view by explaining the concept in a more up-to-date way.

According to Hsiao & Chen (2015) the possibility of offering Internet access by means of a web browser is the decisive factor that distinguishes a smartphone from a regular

mobile phone. These researchers also say that most of the applications from a smartphone rely on network access, whether this is made via Wi-Fi or 3G networks. This implies that the handheld devices operate with a connection to the Internet, which means that a mobile service is needed. The concept of a mobile service for a smartphone is further described in the next sections to give the reader a better bird's-eye view over this context.

As we are focusing now more on the smartphone concept, and following the previously cited authors, smartphones, as a consumer object, normally have a long life-cycle of around 10 years, but as handset makers are now able to upgrade their products in a swift way, consumers want to change their handset more often due to the always improving market and marketing offers, the life span of a mobile device tends to be considerably shorter, up to 12-24 months.

In sum, we can say that many authors have their own concept of what a smartphone might be, or is, in its current state, but we have seen some patterns in their understandings. Most of the referred authors and researchers say that a smartphone has some features that seem to be common among all the definitions we have seen so far, like an operating system (Oxford English Dictionary), having the ability to browse the web and their reliance on mobile services (Hsiao and Chen, 2015).

### **2.3 Mobile service concept review**

After analysing the smartphone concept over the years, a reference to mobile services seems vital at this point. It is also important to remind that this dissertation focuses on smartphone usage, and without services, for example news services that provide us with real time content and information, a smartphone would be useless since they use network connection to access the contents provided by these.

First, to give the reader a basic notion of what a service is in its concept, Kotler and Armstrong (1996, pp.10) described that services are “activities or benefits offered for sale that are essentially intangible and do not result in the ownership of anything”. Assuming this definition, and with the help of the Internet and application services, which boost human-to-human connection (Verkasalo, 2008) we can already have an idea of what a mobile service is.

People can nowadays connect using amazing speed of wireless networks and work collaboratively in a way that they previously couldn't, and this is helping to enhance users productivity (Bao *et al.*, 2011), by accessing mobile services in a seamless way. To get a better notion of this concept, Hannu Verkasalo (2008) defined that these kinds of services are essentially services, which are consumed by the end-users with mobile handsets. As they

operate by the means of a mobile network it is explained that these networks are evolving by affording the service providers with the amount of users to extend the network capabilities (Camponovo *et al.*, 2003), hence being able to provide better services.

Mobile service is directly related to mobile commerce, which is defined as including activities such as transactions with monetary value by means of a mobile phone (Chang *et al.*, 2009). This author also determines the key drivers of mobile commerce, which are: ease of use, convenience, security, privacy and reliability.

According to Hsiao & Chen (2015), the main services that are present in all mobile phones are SMS and voice call and these are the ones that are still mostly used by consumers. However there has been a lack of understanding on how the demands from these consumers exactly work, and this brings us to the main point of this dissertation, which is linking the consumers usage of applications to the real purpose of use. As the marketplace is filled with different mobile services and is energetically changing, M. Reuver *et al.* (2012) stated that designing these mobile services might be an issue if we do not understand how people deal with mobile applications. Essentially, what we need to know is how users are using their apps in order to group them by different purposes of usage.

All in all, what we have learned about mobile services is that they simply work together with smartphones for achieving an ever-present connection. This brings us directly to the recent concept of ubiquitous computing, which will be contemplated in the next section.

#### **2.4 Ubiquitous & Cloud Computing concept review**

Given the previous theory overview of the concepts of smartphone and mobile services it is only logical that we come to mention the connection between these two.

According to the Oxford Dictionary of English (2013), the concept of ubiquity means being all present and everywhere. This brings us to the concept of ubiquitous computing. Verkasalo (2008, pp.331) defined this concept as “*computing in the mobile domain*” and point out the trend in which “*mobile services integrate with the environment, improving the contextual value through, e.g., entertainment, information or communication*”.

In 2006, Zheng & Ni (pp.1) referred and predicted the ubiquitous and cloud computing wave by saying that “*the rise of wireless-enabled computing devices empowered by ubiquitous, low-cost wireless data connections and open software standards.*”. This indicates that, as service networks are expanding, there is an upward need for personal computation and services that are available all the time, anywhere, which is being supported

by wireless networks, being these either 3G or Wi-Fi. This also brings us to the topic of mobile application use. With the rise of new services and networks, the purposes of usage of smartphones and their services are becoming more diverse, and therefore it is of crucial need to companies to bridge the actual usage with the purpose of usage in order to have better operational results.

Cloud computing reflects precisely what is ubiquitous about smartphones and it is referred to as a technical feature of smartphones in the context of measurement (Daponte *et al.*, 2013). This researcher furthermore explains that web technology will move to a state in which computing power will be transferred to the cloud, storing all the data from computers online and allowing data synchronization between different devices.

In a McKinsey Company report (2012) we are presented with a trend that specifically indicates the development of cloud services, which represent the concept of ubiquitous computing in mobile devices. They predict that cloud services would gain traction and that the computing power from devices is being moved to the cloud, hence making devices more efficient at processing information.

## **2.5 Empirical studies about Smartphone usage**

In the empirical studies about smartphone usage there have been many drawn conclusions, but the obtained results, so far, haven't been able to characterize exactly the true purpose of smartphone usage. Instead what the literature does is to provide an understanding on how people are using certain applications so that they can be grouped in segments that depict certain usage patterns (De Reuver *et al.*, 2012; Rahmati *et al.*, 2012; Head & Ziolkowski, 2012). This present work attempts to make the linkage between application usage and the purpose of use of smartphones, hence wants to achieve a more specific way to really understand the deep motivations for smartphone use, by exploring the different purposes and comparing these across different culture samples, and consequently also providing an understanding on how purpose of use varies within different cultures.

The existent literature provides us with lots of studies, which, using different methodologies, provide us with a lot of information regarding smartphone usage. These include research methods such as surveys (Abeele *et al.*, 2014; Abeele & Roe, 2013; Sek *et al.*, 2010; Lane & Manner, 2011; Head & Ziolkowski, 2012; Hsiao & Chen, 2013; Lee *et al.*, 2014).

Lane & Manner (2011) conducted a research by using the methodology of an online distributed survey and analysed the results from 448 participants and the impact of their personality traits on smartphone ownership and usage. They found out that extraverts were most likely to own smartphones, and that the texting function has a great importance for these people. People with higher education also were found to have a higher probability of having a smartphone, but more for the purpose of voice calling instead of gaming (Lane & Manner, 2011).

By also applying a survey, Abeele & Roe (2013) analyse a number of hypotheses relating to students' behaviour towards owning a smartphone, while comparing this to their status in school and society by means of the culture capital theory. From a sample of 1899 pupils (secondary school) from 9 different schools from Belgium, they found out that students with lower school-track (having lagged behind in school) have the necessity to compensate this by owning a smartphone and engaging in different social activities, such as listening to heavy metal music, for example. They also found out that boys find it more "cool" to have a mobile phone than girls, which points out to this as a small demographic difference. But in general this research has found out that the elite tends (high SES) to reject the smartphone as a popular consumer good, while the people in lower socio economic status tend to do the exact opposite to demonstrate integrity within the society and mastery over something (Abeele & Roe, 2013).

Head & Ziolkowski (2012) also used a similar methodology to conduct their research, by applying a survey to 188 participants in Canada. Their results indicate that there are two distinct groups of mobile phone users: the instant communicators and the communicators/information seekers. The first one has a more hedonic usage of SP's, while the second one values more functionality and diversity of SP applications, hence having a more utilitarian usage. These two groups also belong to different SES, as the latter is somehow associated to the elite (Abeele & Roe (2013)). In the literature it is also proven that psychological traits influence the usage of mobile phones (Lee et al., 2014), e.g. a hedonic usage is linked with instant satisfaction in SP usage and external locus of control leads to a compulsive use.

But how distinct are the usages in different cultures, if people have the same psychological traits (Lee *et al.*, 2014)? This brings us to one of the research questions of this study: how do SP usages vary across cultures and how do these influence purposes of use? In the next part of this review we will explore some models of multicultural analysis, in order to

approach the targets of this study, but first let us explore more findings about smartphone usage in different countries.

According to a recent study about mobile device usage of children, hence young students, from ages between 9 and 16, there are some patterns of usage that vary across cultures, like children from the UK that feel more close to their friends by using a smartphone, as the opposite of children in Portugal, who feel less close to their friends (Mascheroni and Ólafsson, 2014).

Moreover, and according to a very recent study, Hsiao & Chen (2015) had very interesting findings by analysing 296 SP users in Taiwan. They came to the conclusion that the usage of mobile phone services is not significantly influenced by how consumers buy handsets and choose the adequate mobile service. This points out to the possibility that peoples' choices regarding SP and services may be influenced by mass marketing and popular consumer culture.

In Malaysia, Sek et al. (2010, pp.2396) conducted a study that, by means of a survey using the dimensions of the TAM - Technology Adoption Model (Davis, 1985), unfolded that the predictor Behavioural Intention of Use (BI) was "*the strongest predictor of actual use*" of smartphones. The TAM (Davis, 1989) was a tool specifically developed for predicting computer usage behaviour by examining two dimensions/ variables: the perceived ease of use and perceived usefulness.

This model was also used by J. Pinho, *et al.* (2011), and in this study it was explored how people were using social networks and their intentions towards adopting them. The results were very interesting, given that behavioural intention (BI) was not supported in one of the hypotheses. Most of the surveyed students also stated that social networks also improve their social life performance, which is very thought-provoking. People actually feel that full-time access to their friends is one of the major opportunities of owning a smartphone (Mascheroni & Cuman, 2014).

In the context of analysing the antecedents of mobile app usage, the TAM model was adapted in a new version, with two new predictors: app user reviews and cost effectiveness of mobile applications (Kim *et al.*, 2014). The researchers found out that technology normally has a very low tendency to be adopted if the costs are superior to the actual benefits, and also that price likely constrains behavioural intention or the actual behaviour (Kim *et al.*, 2014), which is very understandable since applications have a very high sensitivity for prices because of the variety of free available apps.

For this present study, the Behavioural Intention to use is directly related to the purpose of use and will be considered for the analysis, because, according to Sek *et al.* (2010) BI is a good predictor for the use of SP. This brings us to the next research question: Do the purposes of use of people willing to use a SP (Behavioural Intention) match the most common purposes of use?

Researchers in this area are, of course, also acquainted with new technologies, which allow them to perform complete new state-of-the-art studies. They are able to track consumer activity by analysing their log data (Oulasvirta *et al.*, 2011; Rahmati *et al.*, 2012; Rahmati & Zhong, 2013; De Reuver *et al.*, 2012; Boase & Ling 2013) and this provided them with new interesting results.

By collecting log data from 136 participants from the U.S.A, Oulasvirta *et al.* (2011) studied how smartphones could form habits like quick checking in order to get instant rewards such as twitter messages. These checking habits can lead to a more usage of mobile/smartphones, which is understandable given that dynamic SP contents are quickly accessible. This represents a great contrast to general computer usage, where individuals spend much more time in front of the screen (Rahmati & Zhong, 2013). According to Rahmati & Zhong (2013) speed and mobility of smartphones are the two decisive factors for smartphone usage in comparison to computers. However, computers remain as the devices most suitable for producing contents and smartphones are still regarded as devices for reading with scarce low content creation (Bao *et al.*, 2011), hence preventing the SP to fully replace a PC.

People also use the mobile web browser as an extension of a computer browser (Rahmati *et al.*, 2012) and brief usage sessions are prevalent (Oulasvirta *et al.*, 2011) in smartphone usage. Also, both hedonic and utilitarian usage patterns are predominant (Rahmati *et al.*, 2012), which points out to the likelihood that we only have two types of distinct usage, but is this true? Can usage patterns be characterised in such a stringent way, or is there a probability that people have more diverse types of usage?

In 2013, Rahmati & Zhong tried to perceive application usage in three types: recreational, Internet & communication and work/educational. Their results, by analysing log data records, were very clear about the different needs of users, as these are extremely diverse. Therefore we can say that the usage of SP's is, most of the time, very context dependent. On the other hand, we can see that there exist all around services like SMS messaging and voice calling, which are present in all mobile phones and are always context

independent (Verkasalo, 2008). Messaging applications are also more related to a usage during free time rather than voice calling, which is also used for work purposes.

But by tracking user data researchers have forgotten that the statistical numbers not always fully represent what they are, since people might “cheat” in their self-reports (Boase & Ling, 2013). Researchers have found out that the collected log data does not entirely represent the actual usage of mobile devices, as other people tend to use the same SP, for example family members (Boase & Ling, 2013), and that there is a variance of about 38% between self-report measures (surveys, interviews) and collected data logs (De Reuver *et al.*, 2012). More specifically, males tend to under- or over-report their usage, depending on what they want to convey to interviewers and they “cheat” sometimes in order not to be seen, for example, as a person who has sent a very low amount of SMS messages or has made very few calls (Boase & Ling, 2013). Smartphone measurement was proven, in some way, to support survey procedures (De Reuver *et al.*, 2012), however this is only true when analysing frequency and intensity of SP usage (Boase & Ling, 2013), hence, it might not be very useful for this present work.

As this study also will have practical implications it is important to make a reference to the mobile market. According to a study from 2014, Kim *et al.* free applications are said to be influencing negatively the cost-effectiveness of paid mobile applications. That’s the reason why people are using free apps as a way to escape these trivial costs and opt for a free app, where they, most probably, have to watch some advertisement (Kim *et al.*, 2014).

In a review about this specific market, findings suggested that consumer receptivity to mobile ads is generally low, as people tend to spend their time on the SP scrolling and searching for content, or objectively looking for something, e.g. a contact or text message (Shankar & Balasubramanian, 2009). This study also revealed that, in the literature about mobile marketing, SMS typically has the highest response and conversion rates, as they don’t seem to be very intrusive or annoying, and also because texting is one of the major reasons for using a smartphone (Lee, 2014). An empirical statement such as this leads us to another research question: Does receptiveness to mobile ads significantly influence application usage?

To conclude this section, it can be said that we can use a SP for a variety of purposes, but these have been loosely identified in the present literature. What is common in this scientific area, is for people to be characterized according to the use they give to their smartphones (Rahmati *et al.*, 2012; Bao *et al.*, 2011; Abeele *et al.*, 2014), but not the true intention to use, hence the real purpose. For example, if we use a SP for gaming in the context

of work, e.g. if we work for a gaming company, according the literature we will be classified as people with a hedonic smartphone usage, instead of a utilitarian user for work purposes!

After going through researches in the area of smartphone usage, no study was found to have the same components of analysis as this present one. Consequently it was concluded that none of the previously reviewed studies will be used for comparison, since the final results of this study are very specific.

## 2.6 Multicultural elements

The secondary objective of this study is to find out how cultural behaviour/profile can influence the smartphone consumption. We know that mobile apps present new opportunities for marketers and markets (Kim *et al.*, 2014) and that the importance of these is growing on a fast pace (Hsiao & Chen, 2015), but we must also be aware of some constraints concerning the distribution and adaptation of these to different markets. If we consider that people in different countries have different ways of thinking, value systems and so on, it is clear that an effort must be placed on adapting smartphone applications to new cultures (Hofstede and Mooij, 2011).

To analyse how the patterns of usage differ from one culture to another, some multicultural models are taken into consideration in order to analyse this aspect. As a result, cultural dilemmas emerged as a way to explore multiculturalism amongst the respondents of the developed survey.

First, it is of major importance to determine the most relevant definitions of culture. As one of the most important figures in the area of multiculturalism we have Clyde Kluckhohn's definition that *"By culture we mean all those historically created designs for living, explicit and implicit, rational, irrational, and nonrational, which exist at any given time as potential guides for the behaviour of men"* (Kluckhohn and Kelly, 1945, pp.97).

Later on in 1952 and after working with A.L. Kroeber, the same author considered that *"Culture consists of patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, and on the other as conditioning elements of further action."* (Kluckhohn and Kroeber, 1952, pp.181).

Culture also represents a “connected system of meanings” (Trompenaars, 1997, pp.20), which is shared within members of a group. Each culture is distinguished by the ways that were chosen to resolve problems that are presented in the form of dilemmas (Schein, 1985, as cited in Oliveira, 2010). Cultures are also non-static, as they evolve along the years, but that takes a considerable amount of time to be noticed (Hofstede, 2001, as cited in Soares *et al.*, 2007).

Geert Hofstede, one of the most influential persons in the development of multicultural models, had a similar point of view as he considers that what defines culture is the collective programming of the mind that distinguishes members of a group from others from other groups (Hofstede, 2001, as cited in Oliveira, 2010).

Having discussed the main definitions of culture, it is now also important to cite the two main models of cultural analysis with basis on multicultural dimensions. These are the ones from Geert Hofstede (2010) and Fons Trompenaars and Charles Hampden-Turner (1997). These will form the basis for the multicultural analysis, as they are a very practical and simple way to integrate culture into studies (Soares *et al.*, 2007).

The first one is Hofstede’s cultural model (Hofstede, 2010) that integrates the following six values of cultural analysis:

- i. *Power distance* (how power is distributed in societies, from the point of view of the less powerful)
- ii. *Uncertainty avoidance* (society’s programming to deal with uncertainty)
- iii. *Individualism vs. collectivism* (“I” or “we”)
- iv. *Masculinity vs. Femininity* (achievements over relationships)
- v. *Long-term vs. short-term orientation* (efforts in modern education to assure preparation for the future vs. time-honoured traditions and norms)
- vi. *Indulgence vs. restrain* (free gratification of basic and natural human drives vs. strict social norms)

The second model was developed by Trompenaars and Hampden-Turner (1997). It has some similarities to the one used by Hofstede (2010), but it’s a more comprehensive one that understands culture beyond the nationality (national culture model used by Hofstede, 2010).

This model contains the following seven dimensions:

- 1) *Universalism vs. Particularism*: Cultures with a high level of universalism believe that their ideas and practices can be applied anywhere without any changes. Rules over relationships are more valued by particularistic cultures, and so the environments determine how a person should act (what behaviours to have).
- 2) *Individualism vs. Communitarianism*: The individual in front of a group or the group in front of the individual. Individualistic cultures take decisions on time and have a great sense of individual responsibility. Collectivistic cultures always resort to group decisions, and a group shares the responsibility.
- 3) *Specific vs. Diffuse*:  
Specific cultures have a very defined split-up to what concerns work and personal life, being the latter bigger and valued on a higher level. Diffuse cultures there's no barrier that separates work and personal life.
- 4) *Neutral versus emotional*:  
Neutral cultures stand for not showing emotions and thoughts, while individuals with a high emotional culture have an openness to express feelings and share what they are thinking.
- 5) *Achievement vs. ascription*:  
In cultures based on results a person's status is determined by the way he/she performs tasks. The respect is earned by one's capacity to show results. The status in cultures that value ascription is determined by what people have (possessions) or who a person is (age, contacts, past experiences).
- 6) *Sequential time vs. synchronous time*:  
This dimension is related to the way we face time flow. In cultures where sequential time is valued actions are done one at a time, meetings are scheduled in advance and punctuality is highly valued. In synchronous time cultures many tasks are done at the same time, timetables are tight and always susceptible to last minute changes.

7) *Internal direction vs. outer direction:*

A person with an internal direction believes that he/she is responsible and can control all aspects of his/her life. While on the other side, people with an outer direction believe that they don't have any control over his/her destiny, and so and has to adapt to surroundings.

The two presented models are quite good in explaining the cultural aspects and have received empirical support along the years (Soares *et al.*, 2007), but Hofstede has a little imperfection to be considered. He contemplates people according to country they belong to, or live in. It is important to refer that one's culture cannot simply be defined by one's nationality because people cannot be described according to one sole variable (Soares *et al.*, 2007).

To the extent that this concerns the world of the SP applications, the cyberspace, a space in which the digital interaction takes place, is a quite delicate landscape, as people consider it a neutral and pure space, in which people have no cultural values associated or involved in this process (Palomba, 2006). Thus, using the dimensions from Hofstede may result in only seeing a part of a person's culture and in that way a person may be wrongly categorized with a set of cultural attributes (Palomba, 2006). For this particular reason it was chosen that a simple question of nationality could not be used to determine a person's cultural background, and consequently the cultural dimensions from Fons Trompenaars (1997) were used instead in order to provide a better categorization of the respondents.

### 3 Methodology

#### 3.1 Exploratory Framework and research questions

As a result from the studying the literature the research questions, listed bellow, emerged and these were then used to form the hypotheses for the investigation.

1. What are the true purposes of usage by means of typical application usage (Rahmati & Zhong, 2013)?;
2. How do Smartphone usages vary across cultures and how do these influence purpose of use?;
3. Do the purposes of use of people willing to use a SP (Behavioural Intention) match the most common purposes of use? (Davis, 1985; Sek *et al.*, 2010);
4. Does receptiveness to mobile ads significantly influence application usage?;

#### 3.2 Hypotheses

H1: There are a wide variety of usage purposes, that don't necessarily reflect typical application usage (Rahmati & Zhong, 2013).

H2: Smartphones are used differently across cultures.

H3: The two main purposes of use for the majority of users that intend to use a SP matches the two main purposes of use for the people who use/own a SP (Davis, 1985; Sek *et al.*, 2010).

H4: App usage is very influenced by receptiveness to mobile ads.

All of the proposed hypotheses resulted in the creation of the structure of the flow chart presented in table 2. This chart presents all the questions that were asked in the distributed survey and the respective hypotheses these questions correspond to.

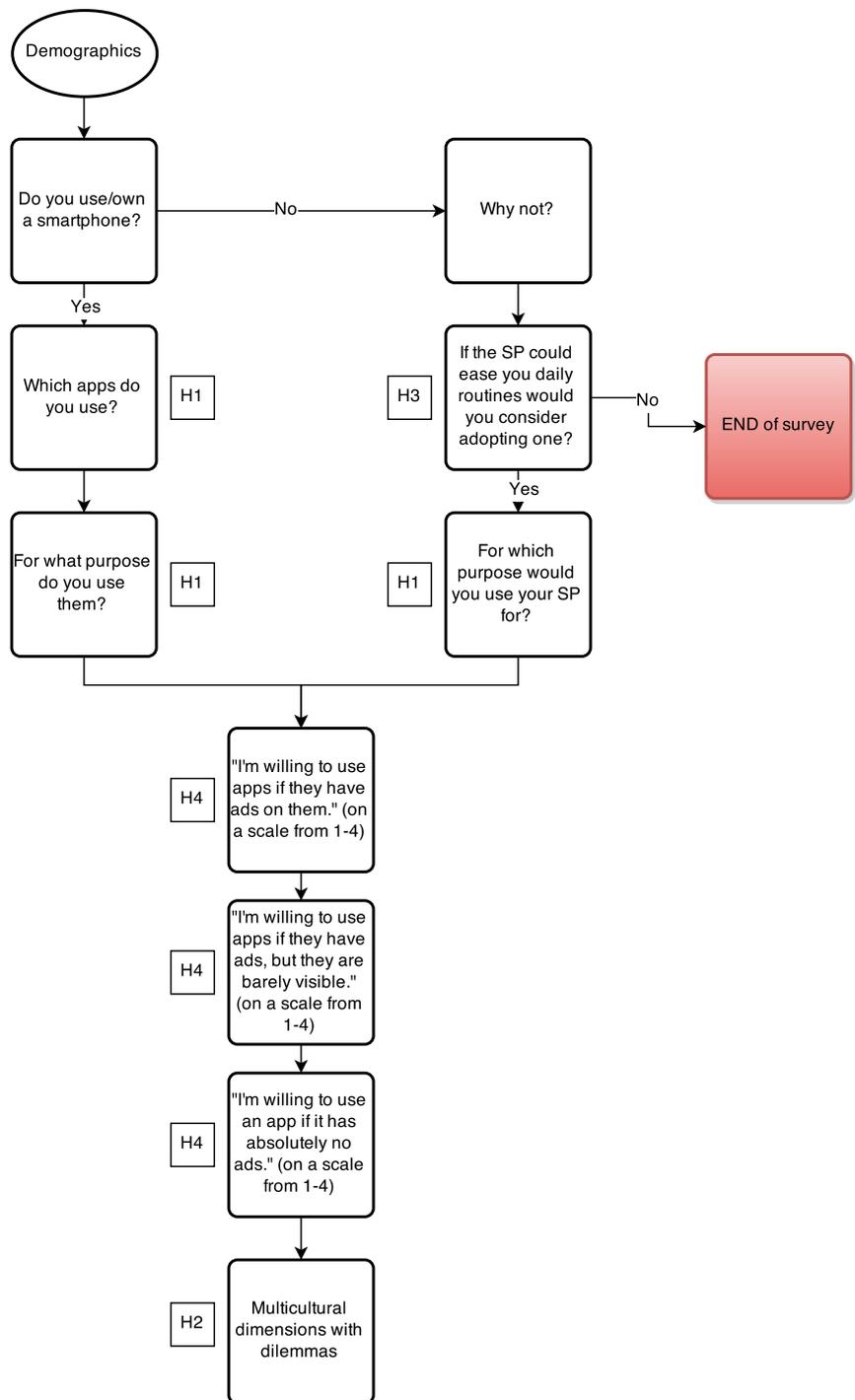


Figure 1 - Flow chart for survey

The first proposed hypothesis uses a smartphone app classification table to categorize typical applications usage types created by Rahmati & Zhong (2013). In Table 1 we can essentially see the main application types available in the Apple App Store in the left column. The table was adapted from these authors and helps to define what the most common types of application usage exist. These were then translated and adapted into the purposes of use that are present in the online distributed survey, as these are: Communication, Recreational, Work, Educational and Personal Information Management. Work and educational purposes were separated because of this study’s target, which are students, and some of them might not work in an industry/company, but can teach in a faculty instead.

Communication	Text messaging (SMS), Instant Messaging, Email
Recreational	Media Player, Games, Camera
Work/Educational	Word Mobile, Excel, PowerPoint, Acrobat reader
Personal Information Management	Address Book, Calendar, Task List

**Table 1 - Application types, adapted from Rahmati & Zhong (2013)**

For the second hypothesis the cultural dimensions from Trompenaars (Trompenaars, 1997) are going to be used due to the way these are able to characterize the respondent sample. By using these dimensions the results are expected to go beyond the nationality of a person and will understand how people that live in the same country can be different from one another in terms of culture.

The third proposed hypothesis was adapted from one of the elements presented in the survey applied by Sek *et al.* (2010), in order to analyse how the Behavioural intention to use relates to the purpose of use. These researchers represent this element in the following way (Sek *et al.*, 2010):

- I would adopt the smartphone in the future (B13);

This was adapted into the following element:

- If the smartphone could ease your daily routines would you consider adopting one?;

For the fourth proposed hypothesis the receptiveness do mobile ads was considered as having a direct impact on the use of mobile applications. In order to test this acceptance of

ads, some affirmations were developed to see in how many variants people are willing to accept, or not, that the apps they use have mobile ads.

The results of the survey will be then analysed with the help of the statistical software SPSS22 for a more detailed examination. In this step it is important to mention that this investigation will take profit from a regression analysis to test the casual relationships of the proposed framework.

### **3.3 Description of the applied survey**

Concerning the development of the survey some important aspects were considered. The survey consists of three sections: one that collects demographic data; the second that studies hypotheses H1, H3 and H4; and a final one where a classification of cultures takes place, therefore analysing H2 (see Figure 1).

In the first section there are five questions that address the age of the respondents, their professional occupation, education, gender and nationality, in this specific order. The age is measured on a scale from 17 until +45 years old, on steps of 9 years. This was done this way because this scale represents the natural ages in which people finish and start their academic studies in Portugal. The demographic question about professional occupation gives priority to occupation such as being a student and goes on with various degrees of professional occupation related to technology use. The third demographic question asks about the gender of the respondents. The options for the fourth one, education reflects the various levels of academic studies in the University of Oporto. As the last question about demographics we have a question concerning nationality. This is a particular one, since it was decided that a comparison between northern European and southern European countries was an interesting point to be observed because they both differ a lot in terms of culture. Also, as the study was conducted in Portugal, a lot of students come directly from Portuguese speaking countries, such as Brazil, Angola and Mozambique. This was the reason for these options to be available in the survey.

The second section focuses on knowing how people use their smartphones. The first question asks the respondents if they use or own a smartphone. Subsequently H1 is applied using the following questions:

- Which apps do you use?

- For what purpose do you use them? / For which purpose would you use your smartphone for? (In case someone did not own a smartphone, but were considering adopting one in the future);

Application types were used for sampling different apps and app categories were used as the purposes. As part of the third section of the survey, H2 was measured, as previously explained, by using cultural dimensions as dilemmas in order to test how respondents identify themselves with one of the two given options for each cultural dimension. All of the seven dimensions from Trompenaars (1997) were used in the process. In the next table we can have a more comprehensive look at the dimensions that were used and the respective questions (Table 2). Some dimensions were used more than once in order to test how respondents would respond to same dimensions but in different questions, and also to see if one dimension would be viewed by the respondents in the same way or not.

<b>Question</b>	<b>Dimension Analysed</b>
1. Apps developed globally vs. locally	Universalism vs. Particularism
2. Apps that are custom usage vs. general usage	Individualism vs. Collectivism
3. Apps that need personal information vs. don't need	Diffuse vs. Specific
4. Apps that don't involve emotional aspects vs. involve	Neutral vs. Emotional
5. Apps that start from the beginning vs. start from the previous state	Sequential vs. Synchronous
6. Apps created by developers with good products vs. good reputation	Achievement vs. Ascription
7. Apps that request my professional information vs. personal and professional information	Specific vs. Diffuse
8. Apps that look for only the most relevant information vs. all types of information	Specific vs. Diffuse
9. Apps that optimize resources vs. don't optimize	Outer Direction vs. Internal Direction
10. Apps that are more referenced vs. that have more prizes	Achievement vs. Ascription
11. Apps that are fashionable vs. have better performance for my activities	Ascription vs. Achievement
12. Apps that are more safe vs. more environment friendly	Internal Direction vs. Outer Direction
13. Apps that don't resort to forced labour vs. omit information about their development	Collectivism vs. Individualism

**Table 2 - Applied Cultural Dimensions**

The cultural dilemmas present in Attachment A had to be revised due to some of them having the possibility of being misinterpreted by respondents. The original 15 dilemmas (Figure 30, 31 and 32) were then edited and as a result 13 were then chosen to be used for this study (Table 2).

For testing the simple hypothesis H3 one simple question was applied “If the smartphone could ease your daily routine would you consider adopting one?”. This was asked in order to test if there is a match of purposes of use between people who consider adopting a SP and the people who own/use one.

At the end of the second section, H4 was tested by applying degrees of advertisement acceptance in smartphone applications. These are measured on a 1 to 4 scale, being 1 “Strongly Agree”, 2 “Agree”, 3 “Disagree” and 4 “Strongly Disagree” (see Attachment A).

### **3.4 Target population and respondent sample**

The targets analysed by this study are a group of people that consumes the most mobile services, hence has a very high importance for mobile markets. These are the students from the University of Oporto. Being this group a very diverse one (Rahmati *et al.*, 2012) and with great media skills (Kim *et al.*, 2014) it is appropriate to choose these smartphone users for a more comprehensive analysis, since they are very avid and use their phones very frequently.

Another reason to why the students from these faculties were chosen, is because this study was conducted in the same universities.

The criteria used for selecting the students’ sample was established according to the following:

- 17 to +45 years old;
- Being currently enrolled in a course, in order to receive and fill the survey electronically;

## **4 Empirical Results**

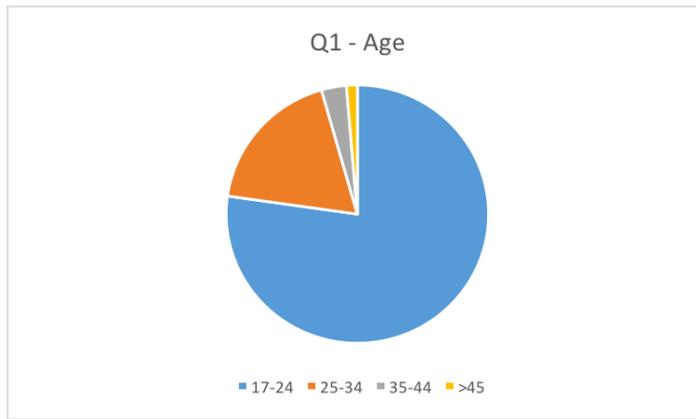
### **4.1 Data Collection Procedures**

The survey was distributed through a dynamic mail delivery system, which is available for students of the University of Oporto. This system allows students to send emails to every other student who's currently enrolled in a course at this university. By using this method, the survey was distributed electronically to students from the following nine faculties: Faculty of Engineering, Economics, Architecture, Fine Arts, Sports, Pharmacy, Medical, Sciences and Biomedical Sciences (all of them belong to UP). The reason why not all faculties from the UP were chosen was because not all of them have the same propensity towards adopting new technologies, theoretically speaking. Of course this is a matter of individual choice, but the ones that were chosen seemed more appropriate for the study. This matter was however considered in general terms as it is difficult to identify them on the individual level. The questionnaire was made available from 12<sup>th</sup> of March 2015, and answers stopped being gathered on 15<sup>th</sup> of April of the same year.

The total universe of respondents was of 29381 scholars, of which 747 completed the survey, hence representing a success rate of 2,54%. As two versions in two languages were developed, most people opted to answer it in the Portuguese version with an amount of answers of 90,2% from the total respondents. This is due to the obvious reason that the vast majority of respondents come from Portugal. The other 9,8% filled the version in English. It is however important to mention that some Portuguese speaking students answered the survey in the English language and the other way around. After finishing the collection of data both versions were aggregated for the data to be thoroughly analysed by the statistical software SPSS.

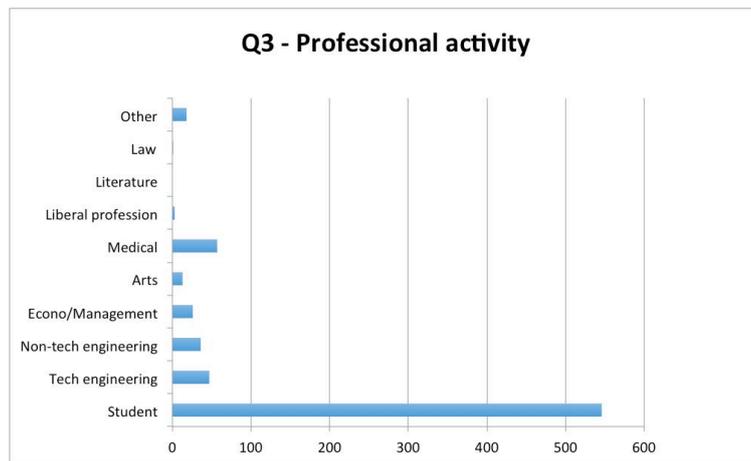
### **4.2 Descriptive Statistics**

The sample is characterized first through demographics, where respondents are mainly female, accounting for 58,5% of the total respondents. Males account for the rest of the sample along with only two people that described their gender as being "other".



**Figure 2 - Age of respondents**

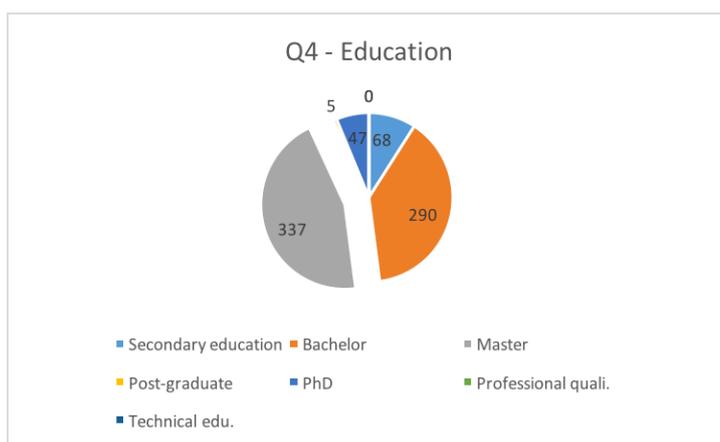
The respondents have ages mostly between 17 and 24, which represent the majority of the students. It is clear from the obtained results that the survey received more answers from the younger students, possibly still attending their bachelor or master course.



**Figure 3 - Professional activity of respondents**

The success rate of the results was quite good, as 73,1% of the respondents are effectively students. As for the rest of the sample, these respondents have their main professional activity in various areas.

Bachelor and master degrees were the most common ones among the respondents. As we can see in Figure 4, no respondent has completed an academic degree of professional qualification or technical education, as courses for this type of technical qualification are not very common at the University of Porto, so possibly that's the reason for this result.

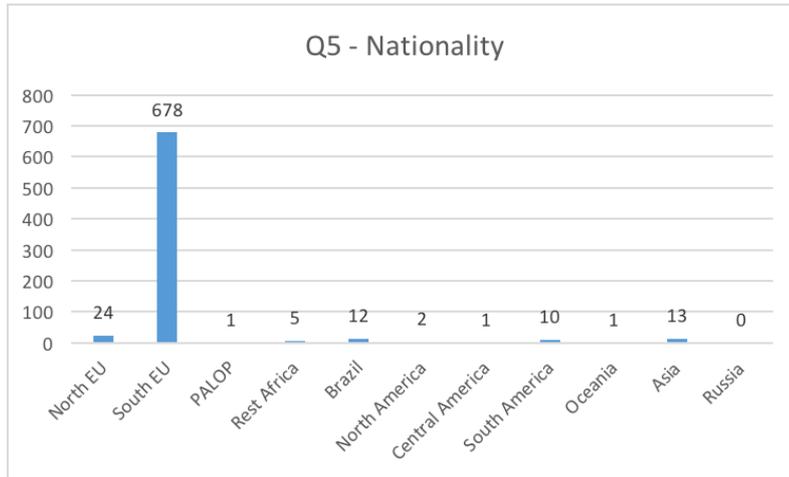


**Figure 4 - Education of respondents**

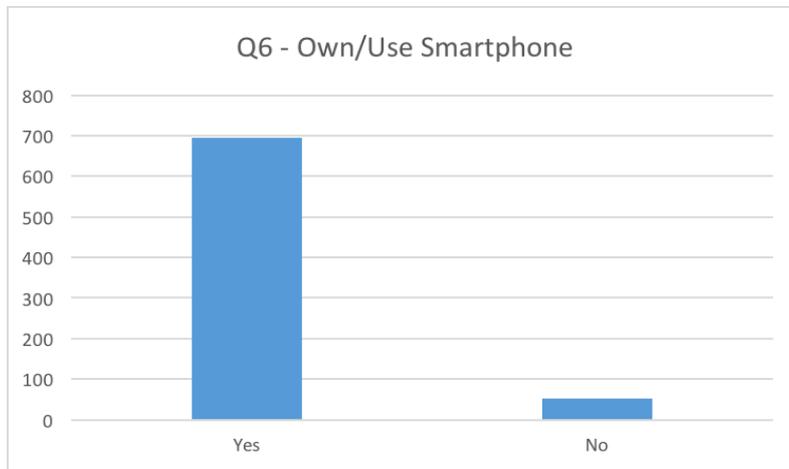
The vast majority of people come from southern European countries, as these are most probably students from Portugal. Comparing the responses with the numbers from the official report of mobility and internationalization from UP (Relatório de Internacionalização, 2013), we can see that the obtained distribution is not far distanced from the average numbers in this report (see Figure 5). Most of the respondents come from Europe and South America, due to agreements with universities in these continents (Relatório de Internacionalização, 2013).

Continent	Students/Recent graduates	IES	Countries
Europe	893	297	29
North America	16	2	1
South and Central America	854	63	7
Asia & Pacific	21	14	10
Africa	5	3	3
Total	1789	379	50

**Table 3 - Mobility of external students to UP (2012/13)**



**Figure 5 - Nationality of respondents**



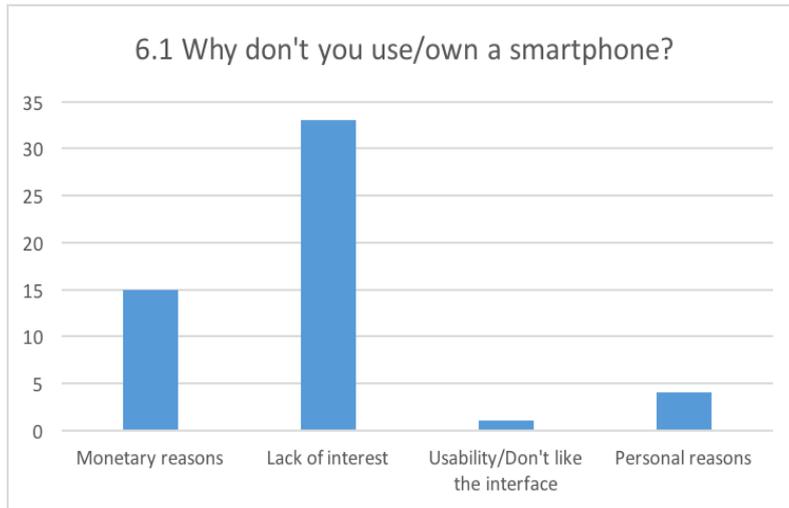
**Figure 6 - Smartphone usage among respondents**

As a sign of a massive adoption of the smartphone, the vast majority of the sample has or uses a smartphone. The very high percentage of smartphone owners indicates that these devices are proliferating on a rampant scale, just like the Nielsen Company reported in 2014 (The Nielsen Company Report, 2014).

For the sample characterization, or demographics, all provided data was used because there was no missing information. Unfortunately for the rest of the answers some cases had to be removed. In total 4 cases were considered invalid due to insufficient information provided by the respondents and could not be used for the rest of the analysis.

To study why people did not own/use a SP a question regarding this aspect was asked in the survey. The results show that the people who did not own one, did it mostly because of lack of interest, suggesting that they don't have a need for a device that helps them with productive tasks. The second reason was due to monetary reasons, as one could assume that

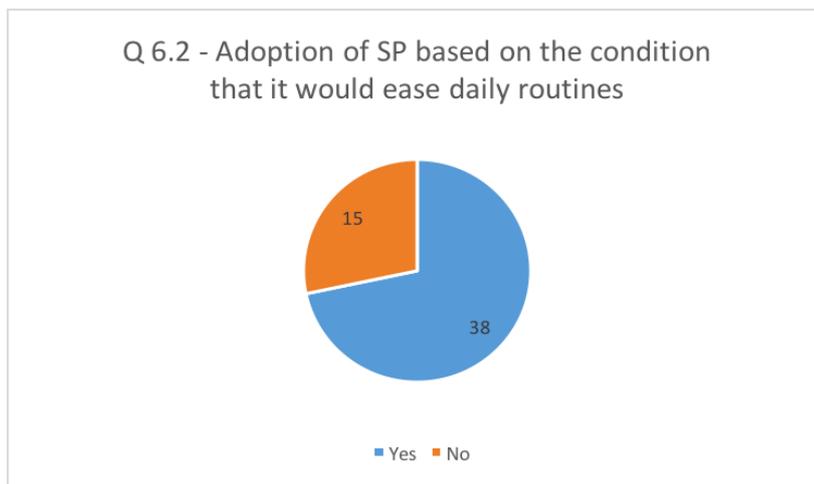
people don't have enough money or are not willing to spend money on these expensive devices.



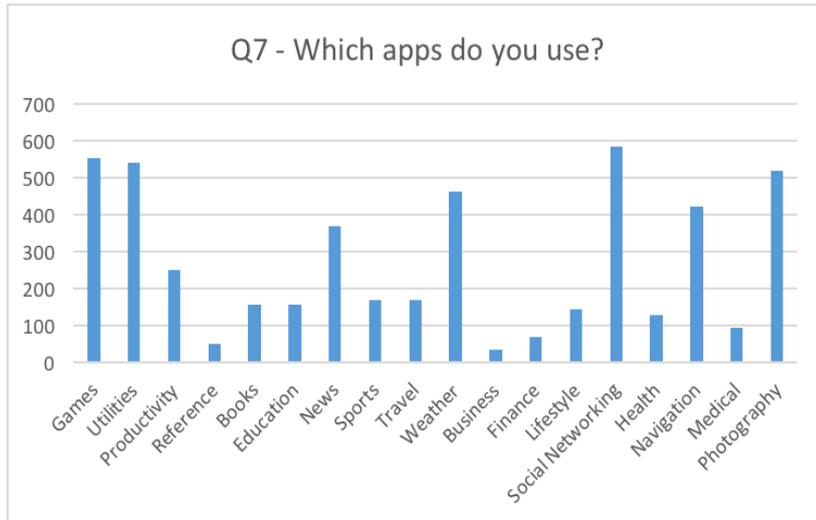
**Figure 7 - Reason not to adopt a SP**

Probably the problem for the majority of students, is that they don't have great financial resources, and it could also be one of the reasons why they don't adopt such a device.

A lot of people also showed that, if the SP could ease their daily routines/lives, they would consider the adoption of a smart device. The intention to use is therefore very high and shows that people are still receptive to this new experience.

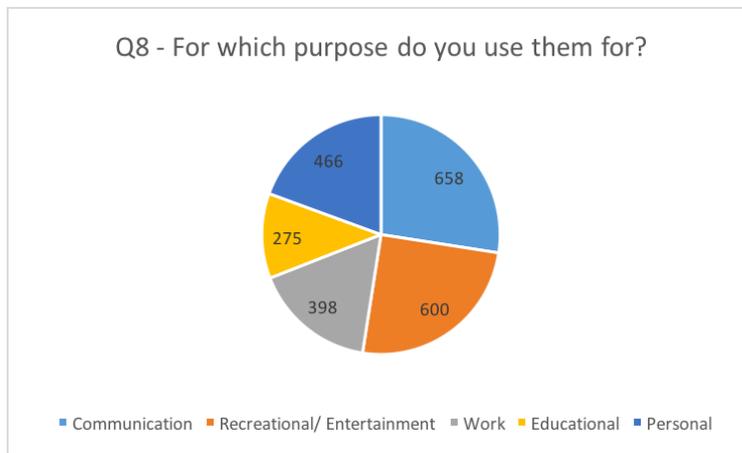


**Figure 8 - Behavioural Intention to Use**



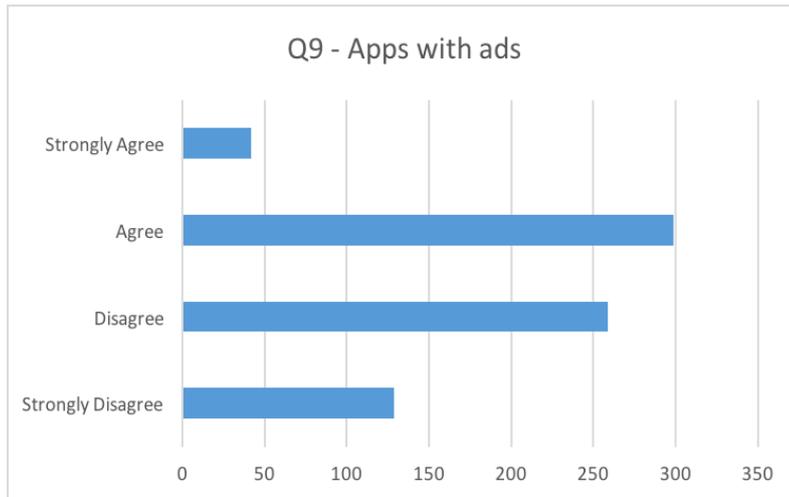
**Figure 9 - Application usage**

These apps show a certain degree of smartphone usage that corresponds to a more on the go use that is being given to smartphones (Verkasalo, 2008), with apps like weather, navigation and photography. It also shows that people use their devices for entertainment, as this set of apps is quickly accessible, doesn't require a long time of usage and also has/shows dynamic content. They also appear to be quite popular among students and the other respondents.



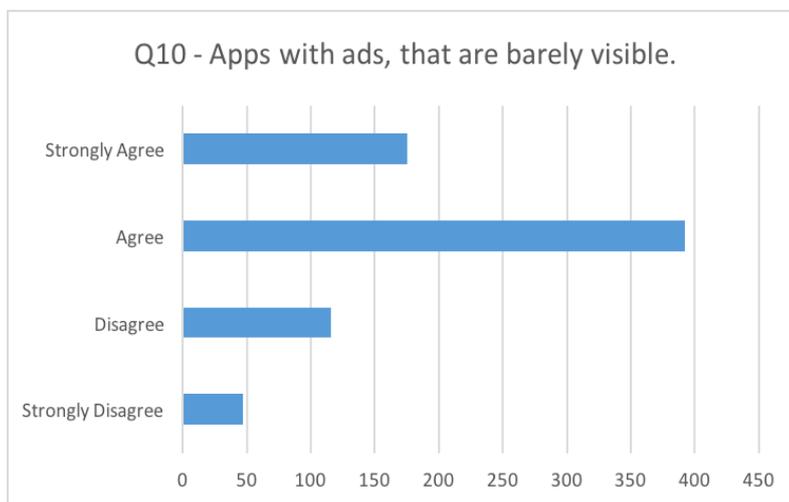
**Figure 10 - Purposes of use**

In Figure 10 the responses were quite clear as they showed that communication was the primary purpose of use. We can already see that there is a wide variety of purposes that is being given to the smartphone, but with the endless possibilities of usage offered by this type of device, it ends up being used more or less like a previous generation mobile phone, meaning that people still use this popular consumer object essentially for communication and recreation/entertainment (Shankar & Balasubramanian, 2009), therefore not much has changed but the possibilities offered.



**Figure 11 - Apps with ads**

Regarding the acceptance of the respondents to mobile ads, the outcomes showed a fairly predictable set of responses. The first results showed that a large part of the sample is willing to use apps even though they have ads in them, which is understandable, but they also show that a large counterpart of the sample is rejecting to use these if ads are present (Figure 11). The next statement showed that they are not interested in seeing the content displayed in these apps, so they prefer to use apps as long as they have ads that are not very intrusive (Figure 12).

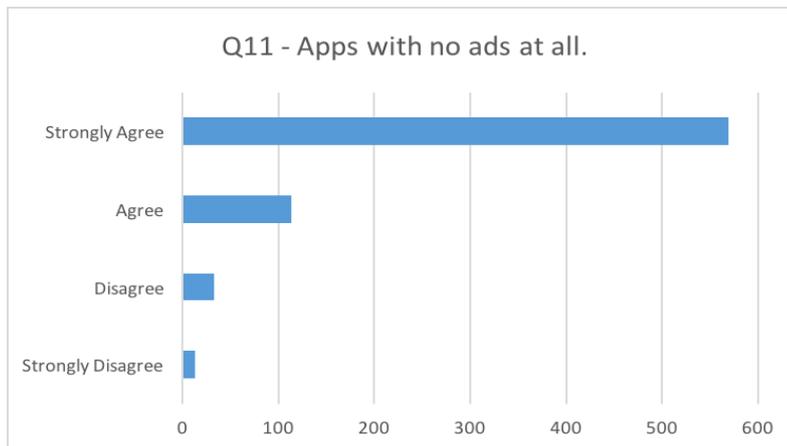


**Figure 12 - Apps with barely visible ads**

The last question about ads in applications shows us that the respondents had very predictable preferences, almost exactly as it would be expected. However there is a very small percentage of respondents that prefer to use apps with ads, and this shows that they might be interested in the contents they show and a certain level of affinity with certain brands (Figure 13). Also a possibility, is that that they are willing to see ads in applications simply because

these relate to free apps, that mostly show publicity in the form of banners in order to monetize their products more easily.

As shown by the collected data from the three last questions, it was interesting to see that even though there is a quite predictable set of obtained information about the receptiveness of ads in SP apps, a very small set of answers still showed a very different opinion. There are still respondents that are very keen on using applications while visualizing ads. As we could see, app usage is in fact very influenced by the receptiveness to mobile ads, hence confirming the fourth proposed hypothesis H4, as opinions change drastically from the first scenario to the third one, where apps with no ads at all are massively favoured in comparison to apps with ads. The receptiveness to mobile ads is far greater when people are asked if they are willing to use apps with ads, then when people have to decide if they want to use apps with no ads at all.



**Figure 13 - Apps with no ads at all**

The last section of the survey focuses on the multicultural analysis by using the dimensions from Trompenaars (1997). The target sample had sometimes different opinions about some cultural dimensions formulated in different ways, but this only expressed that they have special and unique types of preferences when SP apps are concerned (see Attachment C). As a result from the analysis to the cultural dimensions it was found out that respondents prefer globally developed apps that don't need personal info and request only professional information. These apps should only display the most relevant material, should not involve emotional aspects and ought to start from the previous state every time they are launched.

They also showed a high preference for apps that are created by developers with good products, that are more referenced and have better performance for their activities. The SP apps that are preferred also optimize resources and are more safe instead of environmentally

friendly. It is also important to mention that the ideal apps for the majority of the respondents are also customizable and don't resort to forced labour.

All the answers are summed up in Table 4 for a better overview, where the column 1 and 2 represent the number of times the sample population preferred one dimension over the other, or had ambiguous answers.

Dimension	Question Nr.	Results	1	2
1.Universalism vs. 2.Particularism	1	66,9% vs. 33,1%	I	-
1.Collectivism vs. 2.Individualism	2, 13	17,3% vs. 82,7%, 87,1% vs. 12,9%	I	I
1.Specific vs. 2.Diffuse	3, 7, 8	89,1% vs. 10,9%, 67,7% vs. 32,3%, 79,3% vs. 20,7%	III	-
1.Neutral vs. 2.Emotional	4	81,2% vs. 18,8%	I	-
1.Sequential time vs. 2.Synchronous time	5	9,2% vs. 90,8%	-	I
1.Achievement vs. 2.Ascription	6, 10, 11	80,9% vs. 19,1%, 80,9% vs. 19,1%, 92,5% vs. 7,55%	III	-
1.Internal direction vs. 2.Outer direction	9, 12	3,16% vs. 96,8% 77,6% vs. 22,4%	I	I

**Table 4 - Multicultural Analysis results**

#### 4.3 Data/respondent segmentation

In order to have a better glance at how different the smartphone usages are among different groups of respondents, a specific function was used to split the data into segments. This function is used by splitting the file cases into groups that allow for a better characterization by looking more carefully at the homogenous cases inside subdivisions. Two segments, which are based on the collected demographics of the respondents, were used for the following analysis. These are based on age and gender. Later on, a segment based on the variable nationality is also used for the analysis of H2.

#### 4.3.1 AGE SEGMENTATION

First, application usage is compared across age groups by exploring which are the four most used applications and the two least used ones. In the group of people with 17-24 years old (77,4% of the total cases), respondents had a clear preference for recreational applications.

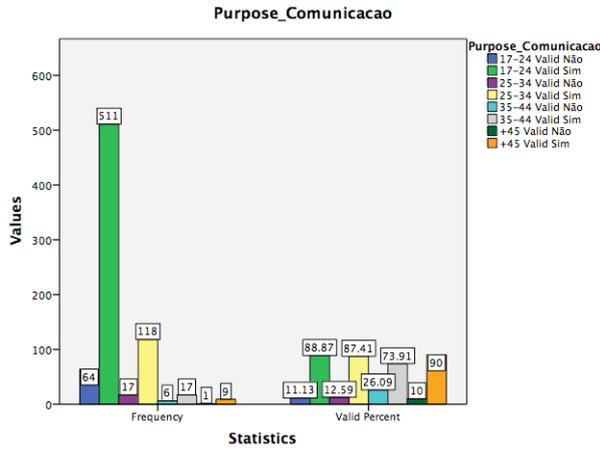
Ages	Most used apps	Least used apps
17-24	Soc. Networks (77,3%), games (76,8%), utilities (71,4%) and photography (70%)	Business (3,1%), reference (6%)
25-34	Soc. Networks (83,7%), utilities (78,5%), photography (71,1%) and weather (69,6%)	Business (5,9%), reference (8,1%)
35-44	Soc. Networks (76,2%), utilities (65,2%), weather (60,86%) and navigation (52,2%)	Lifestyle (8,7%), medical (8,7%)
+45	Weather (80%), utilities (70%), games (60%), photography (60%)/productivity (60%)	Health (20%), finance (20%)

**Table 5 - Most and least used apps for age segment**

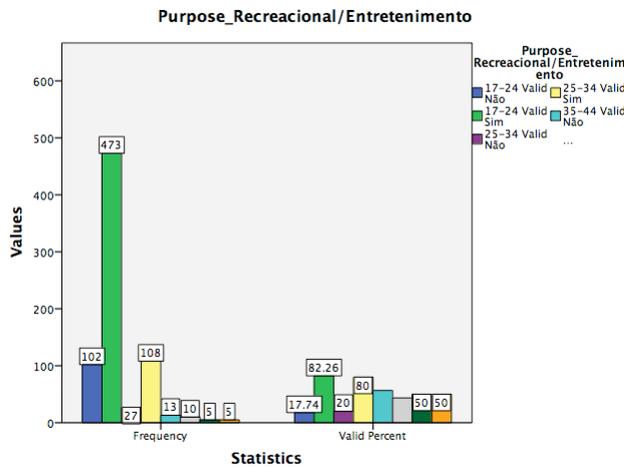
The segment of people with ages comprehended between 25 and 34 (18,2% of the total cases) had somewhat very similar preferences. This indicates that people are using their smart devices in a comparable way, in this case by using mostly recreational/entertainment applications. Also, the most used apps of the last two groups are very comparable to the usage of apps of the third group, which leads us into thinking that people have similar app usages independently of age until older ages (+45).

The last segment (1,3% of the total respondents) of the respondents with ages of 45 or more years and has similar preferences to the other groups, but they use more apps related to personal productivity.

In the same way as previously observed, purpose of use had a lot of similarities with the usage of applications. Most respondents use their smartphones for communication (Figure 14) and entertainment (Figure 15), as it is also reflected on the most used apps.

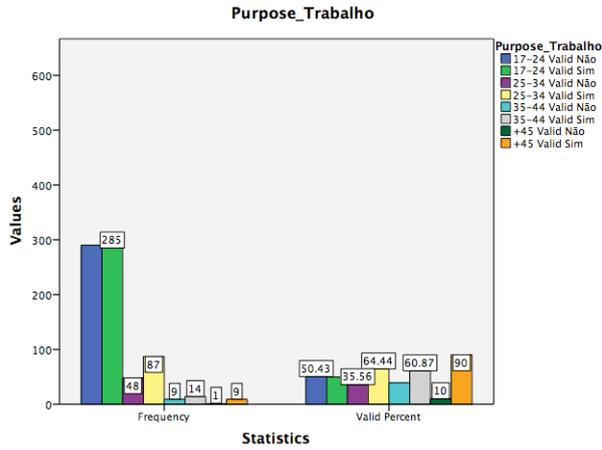


**Figure 14 - Purpose Communication (Age segment)**

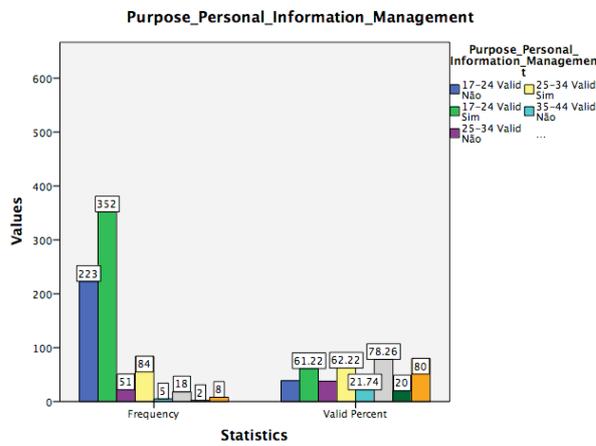


**Figure 15 - Purpose Entertainment (Age segment)**

The group of people with ages between 25 and more than 45 years old have specific usages for their smartphones. They use more for work and communication (Figure 16), but also use a lot for managing personal information (Figure 17). These results indicate a higher degree of responsibility, which is reflected on a more specific purpose of use being given to SP's, since the higher the age, the more responsible people tend to be. Also, because the test sample is constituted by respondents who attend the university, more meaningful purposes are given to the smartphone as they evolve in their careers. Older people use the smartphone as a real working tool to manage not only aspects related to their careers (Figure 16) but also their personal lives (Figure 17).

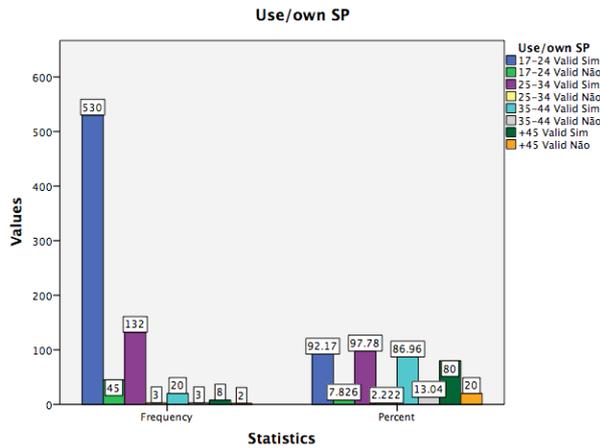


**Figure 16 - Purpose Work (Age segment)**



**Figure 17 - Purpose PIM (Age segment)**

The next analysed question in this segment addresses the issue of having a smartphone. Possibly due to better financial possibilities of the older respondents, the percentages increase from the youngest until the group with ages comprehended between 25 and 34 years of age, but decrease for the following two sub segments, indicating that older people have less SP's but use them in a more meaningful way (for work and PIM).

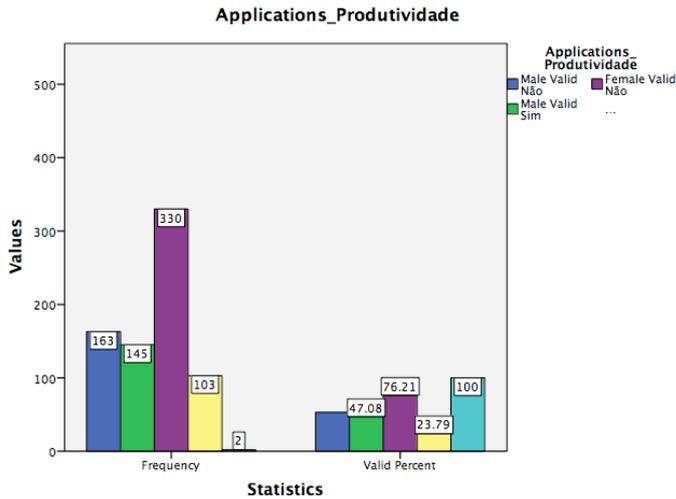


**Figure 18 - Ownership of SP (Age segment)**

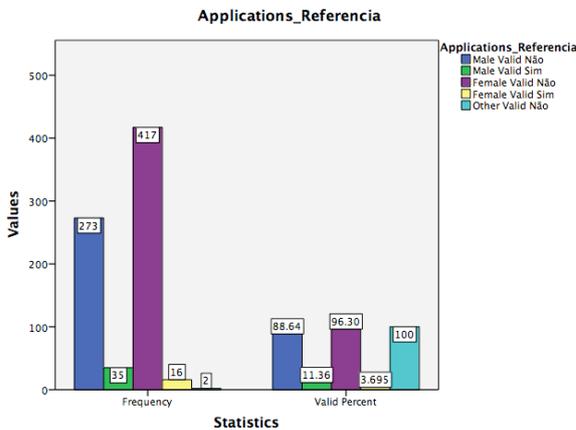
Regarding the acceptance of ads in applications, all age groups showed a similar degree of receptiveness, but respondents with younger ages are overall more intolerant concerning apps with ads than other age groups (Table 10 to 12). The majority of the respondents tended to dislike ads in SP applications, but there is however a small percentage of people, no matter the age group, that is very susceptible to information showed in ads, and therefore being interested in viewing in-app advertising (see Attachment D).

**4.3.2 GENDER SEGMENTATION**

First it is important to notice that the gender “Other” only had 3 respondents and so there is no statistical significance, therefore the results cannot be treated with statistical methods because the number of cases is not relevant enough. These cases were removed from this particular analysis due to this reason. When analysing the application usage among individuals from different genders, some interesting differences were noticed. Productivity apps are more used by men than by women (Figure 18) and reference apps too (Figure 19).



**Figure 19 - Productivity apps (gender segment)**



**Figure 20 - Reference apps (gender segment)**

Another interesting difference could be observed, as men tend to use more apps related to information viewing (Figure 20) and work (Figure 19). Other apps more related to entertainment are more predominant in usage among women than men.

A conclusion that can be withdrawn from this is simply that males use more apps in terms of quantity comparing to women, that seem to be more focused on a special set of applications.

For the purpose of use that is being given to smartphones, men are using their smart devices more for work than women as it can be seen in Table 6. For the rest of the purposes no significant differences were found (Attachment E).

Purpose Work			Frequency	Percent
Male	Valid	No	124	40.3
		Yes	184	59.7
		Total	308	100.0
Female	Valid	No	222	51.3
		Yes	211	48.7
		Total	433	100.0

**Table 6 - Distribution of the Purpose of Use among genders**

To what concerns the ownership of smartphones, the results by gender indicated that males give more importance to owning such a device, even though there is only a slight difference (Figure 47).

The respondents who didn't own/use a smartphone were afterwards asked about their intention to adopt one if this device improved their daily lives. These results indicate that women are more open to adopting new technologies (Figure 48).

#### 4.4 Hypothesis

##### 4.4.1 H1: THE LINKAGE BETWEEN APPS AND PU

The results of this analysis were conducted by applying a multiple regression between the apps used by the respondents and the purposes of use in order to verify which apps were related to each one of five purposes of use. A multiple regression was performed with each one of the PU used as the independent variable and the apps used as the dependant variables. Tables 7, 8 and Attachment I (Table 20,24 and 26) summarize the findings for each of the steps taken.

For the first PU, communication, the predictors that were chosen according to the model, and most linked to this purpose were social networks, navigation and games, as these explain 13,1% of the variance (Table 7). The probability that the results occurred randomly is 0% (Sig=0,000,  $p < 0,05$ ), therefore the null hypothesis is rejected, as the model 3 was found to have a certain predictive power.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
3	.362 <sup>c</sup>	.131	.128	.30202

c. Predictors: (Constant), Applications\_Social\_Networks, Applications\_Navigation, Applications\_Games

**Table 7 - Model 3 PU Communication**

For the PU entertainment it was found that the main predictors, in this case apps, are games, photography, travel, news and social networks. The results of this regression show that five models were created. These predictors explained 22,4% of the variance (Table 8), and are the ones most linked to this PU. The null hypothesis was rejected once again, because the probability of these results having occurred randomly is 0% (Sig=0,000,  $p < 0,05$ ).

The third regression with PU work showed that the apps that are mostly connected are productivity, books, weather, medical, sports, business and health apps. These results showed that seven models were created. The predictors in this case explained 17,4% of the variance (Table 8). The null hypothesis was rejected again, because the probability of these results having occurred randomly is 0% (Sig=0,000,  $p < 0,05$ ).

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
7	.417 <sup>g</sup>	.174	.166	.45601

g. Predictors: (Constant), Applications\_Productivity, Applications\_Books, Applications\_Weather, Applications\_Medical, Applications\_Sports, Applications\_Business, Applications\_Health

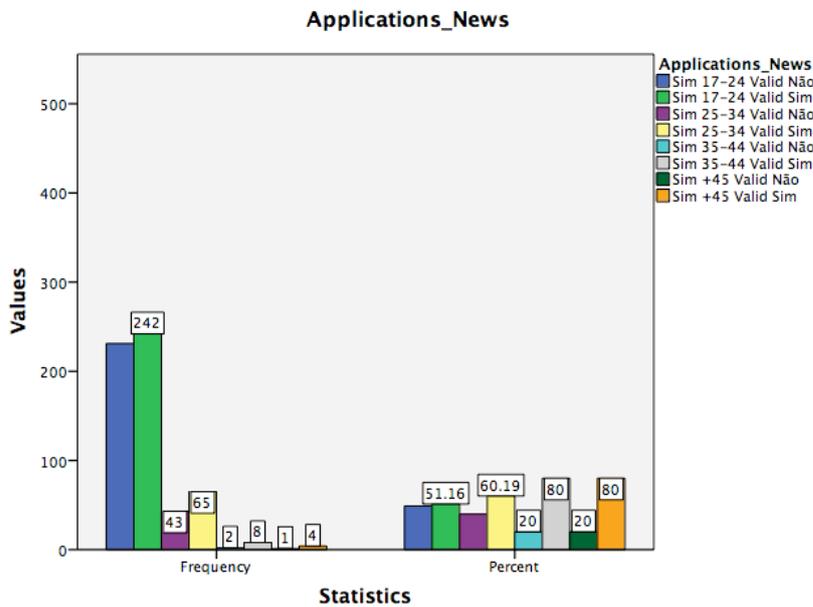
**Table 8 - Model 7 PU Work**

In the case of the PU education the apps (predictors) that are most related to it are education, medical, health, productivity, books, navigation and games. The model summary showed that 23,4% of the variance is described by the model (Table 24). Once again, the null hypothesis was rejected as the probability of the results having occurred randomly is 0%, as present in Table 25 (Sig=0,000,  $p < 0,05$ ).

The fifth and last regression showed similar results, as the model showed that 14% of the variance is described by the predictors productivity, navigation, utilities, weather and lifestyle, and that the null hypothesis was also rejected (Sig=0,000,  $p < 0,05$ ), as seen in table 26 and 27.

The main objective of this multiple regression was to observe which apps would relate more to the different purposes, and we could see that some of the linkages were quite normal. On the other hand it was observed that some apps don't really reflect the PU. This way H1 was confirmed, as in all sets of predictors there were some apps that theoretically would not correlate with the respective PU. For example, the PU Communication had games as predictor, which could mean that today's games are used as means of communication, because they are increasingly social and played over the web. Navigation is also a predictor of the PU communication. They could be related to the way that people are communicating using SP apps such as Facebook Messenger and Whatsapp Messenger, because these allow users to send their current location as these apps track geolocation.

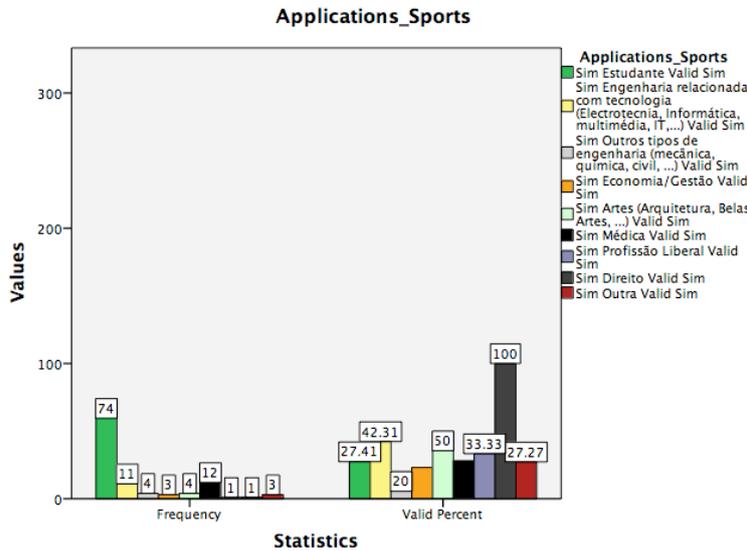
For the PU entertainment news apps were a predictor that didn't entirely reflect this specific purpose, but by crossing this data with age it was discovered that people with ages between 25 and more than 45 (the numbers rise as age goes up) are the ones who use this app the most for entertainment (Figure 21). This might be due to them using their smartphones to catch on news during their work breaks and therefore classified as entertainment.



**Figure 21 - PU Entertainment vs. news apps by age**

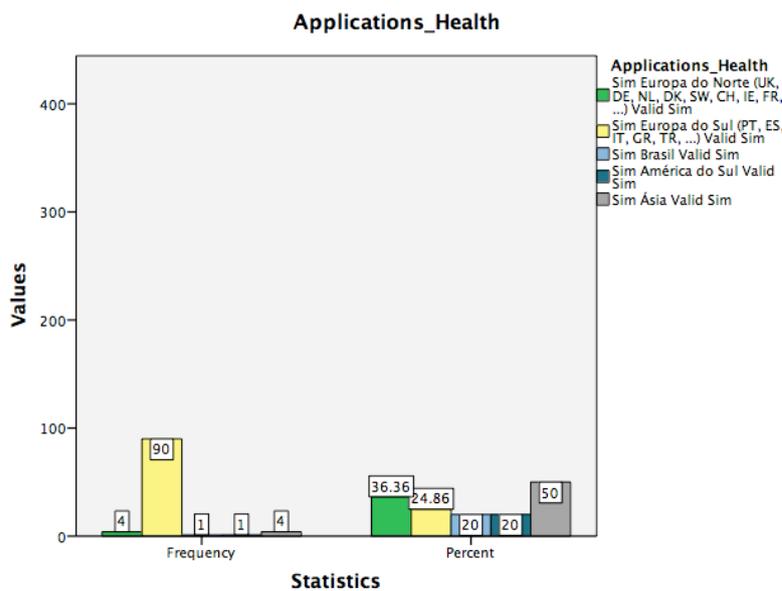
Weather apps were identified as a predictor for the PU work, maybe because some daily work tasks are dependent on weather conditions. As sports apps also were predictors for PU work it was found out that technology related engineering professionals are the ones that use the most these apps for work. It could mean that these professionals are developing

wearable technologies for sports, as these represent an actual trend. Law and arts were also areas with high scores, but these are not significant due to the low number of respondents with these preferences (Figure 22).



**Figure 22 - PU work vs. sports apps by professional area**

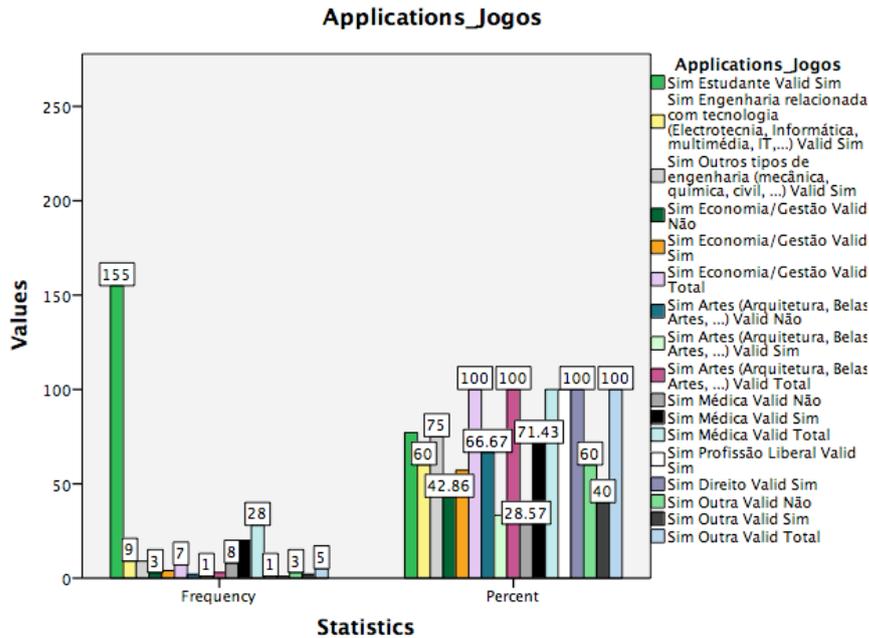
Health apps are also one of the predictors for PU work, and by crossing data with the nationality variable it was found out that Asians and people from north European countries may value work-life balance and healthy conditions at work (food and healthy routines for example) a lot more than respondents from other regions (Figure 23).



**Figure 23 - PU work vs. news apps divided by regions**

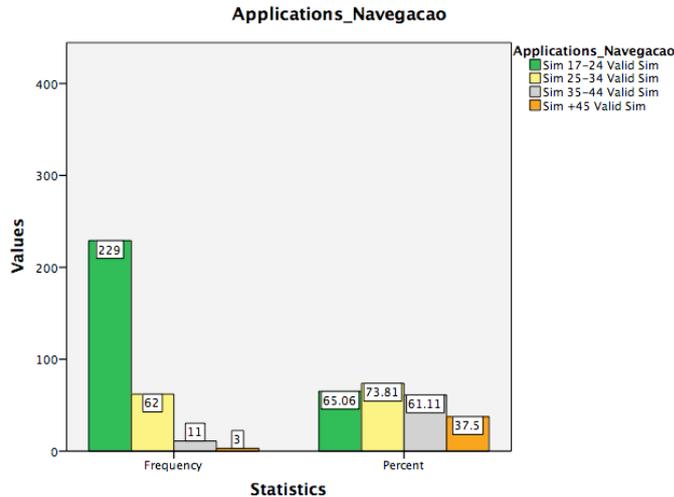
In the case of PU education, for the predictor navigation apps no interpretation was

found, so people might be using this kind of apps to accomplish certain tasks or using them for specific daily routines. The predictor games apps was not very clear, as when data was crossed interesting relations were noted. Students are the ones who use the most for this purpose, possibly because they are learning to develop games during their courses (Figure 24).



**Figure 24 - PU Education vs. professional areas**

The last PU was Personal Information Management, had an unusual predictor, navigation. One can assume that travel apps serve to manage all information related to personal and professional travels, as these type of apps can be quite handy. When crossing this data with the age variable it was discovered that people aged between 25 and 34 are the ones who consume travel apps the most (Figure 25). This segment could be interpreted as, having more purchasing power and the young age to travel, hence using these apps to track their travels in a more efficient way.



**Figure 25 - PU PIM vs. navigation apps by age**

To conclude this section it can be said that application usage is a relative and stringent way to interpret what a person’s routines might be, because as we have seen application use not always corresponds to the PU. However there is still a percentage of apps that are completely aligned with the PU of the user, as these can be used to describe some user behaviours. In order to fully understand the true intentions of a SP user it is more interesting also to look at the PU to better understand what a consumer does when using a certain application in a determinate context. This way an enhanced characterization can be achieved.

#### 4.4.2 H2: INFLUENCE OF CULTURE

##### 4.4.2.1 Nationality segmentation

It was clear after analysing this segment, that there is a specific cultural dimension appropriated to the digital world. Of course the collected sample didn’t allow for a more comprehensive analysis concerning other regions besides south Europe, because of the targeted sample, which are students from the University of Porto, and the number of respondents from other regions. But, no matter the region where respondents came from, the cultural traits were distinguished as specific for the way people consume applications on their smartphones, meaning that there is a singular dimension of digital culture applied to this particular type of consumption, as the cyberspace itself has a particular culture (Palomba, 2006). With this said, it is clear that nationality itself is not a major determinant for the appropriation of cultural sensitive SP apps. There were however some interesting differences that are noteworthy, which are present in the Attachment F.

Asians have a clear distinction among respondents mainly because of the big cultural differences between their culture and the rest of the world. They use more education and health apps than respondents from other areas and don't use utilities as much as other respondents. This can mean, for example, that they use SP's a lot more in schools/institutes and worry more about their personal health.

Some other differences were found between people that come from northern Europe and southern Europe, as the latter seem to use more games, utilities and books than the first group. Southern Europeans are also the ones who use less travel and finance apps, as this might be a consequence of the economic crisis felt particularly in these regions, which may have affected the overall economic power and as a consequence inhibited the people to travel more and live better lives in their respective regions. Brazilians use more weather and social networking apps in terms of relative percentage, as they live in a very large tropical country with regions that vary a lot in terms of temperature. They are also extremely social, hence the accentuated use of social networks. South Americans use more business apps, possibly because most emergent businesses are making more use of apps for daily work routines.

Having again demonstrated a distinct set of preferences, Asians are the group of respondents that use their devices the most for work and PIM (Attachment F). This characteristic usage by this set of respondents reflects their discipline and orientation towards results. In case of entertainment, northern Europeans are the group who use their devices the less for this particular purpose, possibly because of their culture also being result oriented, so not many distractions are used on smartphones in general (Attachment F). The PU education had a very interesting set of responses, as the users from other African countries are the ones who use the most for this purpose in terms of relative percentage. This can only mean that new tools for education in new schools are being increasingly used and emerging education systems are on the rise in this particular region (Attachment F).

#### **4.4.2.2 Cultural dimensions**

As stated before, nationality itself isn't enough to describe the culture of a person (Palomba, 2006) and is not a major determinant for the appropriation of cultural sensitive SP apps. In this case a closer look is taken at the dimensions with the most disparity in terms of user preference (Table 4). The dimensions specific, achievement, neutral, synchronous time and universalism were used to assess how respondents use their smartphones (app usage and PU).

It was discovered that the respondents categorized in the dimension specific vs. diffuse are not that different from the rest of the sample in general, as they follow a very similar distribution in terms of apps used and PU, but there are some differences within this dimension. Diffuse respondents, for example, use more apps for lifestyle, navigation, sports and news than specific respondents, which means that they have a higher propensity to sharing personal information (Figure 49-51). These apps also showed that diffuse persons are more susceptible to adopting apps directed to personal data usage compared to specific persons. These people are therefore less worried about the treatment, which is going to be given to their personal data, as this shows a clear integration of a persons various roles.

Regarding the achievement/ascription dimension it was clear that respondents characterized by the achievement aspect value self-realization a lot more than the latter. They choose to use their smartphones more for work and PIM, as this reflects exactly their choice of this dimension. These respondents are also mostly students and possibly teachers that want to succeed in their academic careers. In the case of travel apps used by the achievement dimension respondents (Figure 54) these have their objectives well fixed because they want to visit precise locations as part of their personal objectives.

The gaming apps are most used by ascription dimension respondents, as this points out that students are dedicated to finding good games that have received prizes (Figure 53), and this reveals that they invest their personal time by doing so. They also prefer news apps that have good reputation because they present the user with relevant up-to-date information, which is important since there is a wide variety of news apps available (Figure 52).

While observing the neutral/emotional dimension it was found out that sports apps had a higher preference by respondents that chose to be emotionally involved in their app usage (Figure 55). This preference shows that they are willing to share their emotions in the apps themselves like, for example, apps that play a random song depending on your mood and type of activity. Productivity apps are mostly used the most by emotional dimension respondents (Figure 55) and was predominant in people with ages comprehended between 17-24 (Table 17) in the area of other types of engineering (chemical, mechanical, etc.). In the case of the PU work this was more prevalent among the emotional dimension respondents in terms of relative percentage (Figure 55). In this case respondents from the medical area were the ones who use more for this PU (Table 18), therefore getting in touch with the patients through the apps related to working purposes. This can be interpreted as the patient's emotional being

involved in such apps and so that doctors can provide them with not only medical treatment but also psychological help.

The sequential time versus the synchronous time showed that respondents like games and entertainment in general to start from the previous state every time they opens these apps (Figure 56). It's only natural that they do so, because in the case of gaming apps people like to start from the last saved point. The purpose work for the sequential time dimension showed that respondents like to complete tasks each time they use their smartphones for working, as they use apps that start from the beginning every time.

In the last case of the dimension universalism/particularism the results showed that people want globally accessible content, and photography apps that show the user a global feed of photos instead of a locally available one (Figure 57).

Additionally the cultural dimension results were crossed with the nationality of the respondents and in the end no significant differences were found.

These results confirm the second hypothesis (H2), since the results of app usage and purpose of use tell us that smartphones are, in fact, used differently across different countries and cultures. However it is also important to notice that some numbers of respondents that come from other regions, apart from Europe, were not sufficient enough to consider the sample statistically significant, so the results from these respondents cannot be extrapolated to the general population of certain regions. Nevertheless these outcomes are sure to provide an indication of a cultural behaviour concerning the usage of smartphones. Fundamentally, H2 concluded that nationality alone is not able to fully explain the variance of app usage and PU.

Cultural dimension	Nr. of dimension	Model 2	Model 3	Model 4	Model 5	General
Specific vs Diffuse	7.				60,5/39,5	67,7/32,3
	8.			57,7/42,3		79,3/20,7
Achievement vs. Ascription	10.		88,6/11,4			80,9/19,1
	11.	98,2/1,8				92,4/7,6
Universalism vs. Particularism	1.			76,9/23,1		66,9/33,1

**Table 9 - Cultural dimensions vs. regression model results**

Additionally, and in order to find out how cultural dimensions change according to the models developed in H1, the original data was split into groups, according to the PU and related apps of each model and the distributions were compared with Table 4 for the purpose

of discovering how the cultural dimensions would influence the obtained regression models. These results can be seen in Table 9. For the first model (PU communication) created in H1, no cultural differences were found. In case of the second model (PU entertainment) respondents had a higher preference for the achievement dimension. This means that they value more apps with the best performance for their activities (Figure 58). In the case of the third model for PU work (PU work) people have a higher preference for achievement (Figure 59), references over prizes, although the difference is very low. This suggests that in the context of work, a good reference could be more important than a prize earned. For the fourth model (PU education) people had a less unequal distribution in the case of the specific/diffuse dimension (Figure 60), where all types of information were important for the user. They also liked more globally accessible content. For education this means that people value not only the most relevant type of information, but also all types of it. The respondents are also more interested in global information rather than just local.

In case of the last model (PU PIM) it showed that respondents value more the diffuse dimension, apps that request personal and professional information (Figure 61). This is only logic, since for personal information management people are more interested in storing all kinds of information in apps like Google Keep or To Do lists for example.

#### **4.4.3 H3: ADOPTION OF SP'S AND BI**

In order to confirm if there is a match between purposes of use of the people who would consider adopting a SP in the near future and the people who actually use/own one, relative percentages were compared to see if there was a coherence between the two sets of respondents.

The large majority of the respondents who own SP's use them for communication and entertainment (Figure 10), whereas the majority of people who consider adopting a device as such will also use it mainly for communication, but instead of using it for entertainment as the second PU they prefer to use it for PIM. (Attachment G).

It was also noticed that there is a high diversity of purposes of use that respondents are willing to give to the SP, as a lot of respondents also would use one for entertainment, work and education. This may be due to the fact that people who consider adopting one have a higher need of efficiency in their lives, hence having the real need of owning a SP in order to help them with certain tasks. This way the SP provides them with a higher degree of functionality, which seems to be a requirement for these respondents.

The part of the sample that didn't have/own a SP and use it for the two most chosen purposes, in this case communication and PIM, are characterized by having ages comprehended between 17 and 24 years. These respondents also chose not to use/buy a SP due to mainly monetary reasons, but also lack of interest (Table 17 and 18). It can be inferred that this fraction of the sample does not have a very strong financial power, due to them being students with young ages and not wanting to buy a SP primarily due to monetary reasons (Table 17 and 18).

However, upon being asked if they are willing to use a SP, on the condition that it would provide ease to their daily routines, they agreed on doing so, which means that they are willing to invest their money in buying such a device. It would provide them, with increased productivity in this sense.

With these results H3 was not confirmed, because the choices differ from one segment to another. However, the number of people who did not own a SP was low and therefore not enough to make this comparison significant at a statistical level. This could be used as a reference nevertheless.

#### **4.4.4 H4: INFLUENCE OF ADS IN APP USAGE**

As previously stated, H4 was confirmed, as apps are greatly influenced by the receptivity to ads. There's an obvious reason behind this that relates to free apps available in the common application stores for smartphones. These are free, and just this fact tends to attract more curious and eager customers.

The youngest set of respondents is more willing to try out new apps, and these include free apps that show ads in them, but their general preference shows that they don't like ads at all. One way to make ads a little subtler, in order to maximise their potential to get clicked, is to create a special tab in an app's menus where offers and related apps appear. To accomplish this, certain apps that belong to certain categories should be related in some way to similar ones or at least in the same context through classification or context aware algorithms, in order to generate more curiosity among free app users.

This would be worth to try out, in order to reduce and avoid the low levels of ad acceptance in apps, with the annoying, as well as intrusive ads that exist nowadays. Respondents generally preferred to have apps with barely visible ads in them, which is a sign that they could be receptive to other forms of communication in apps. This way other formats

of in-app advertising should be researched to try to find a better and more effective way to maximise ads present in applications. Of course ads need to have a great impact at first sight, but by what the results showed, these can influence app usage to the point where people have a very clear preference for apps with no ads at all, and refusing to use ones that have these means of communication in them (Figure 13).

When cultural dimensions were crossed with the three levels of ads acceptance in apps not many differences were found in the distribution of ad acceptance. All of the dimensions had a similar distribution to the ad acceptance in Figure 11, 12 and 13. There was however a slight difference in the case of the ascription dimension. For the first case of app acceptance, where respondents had to give their opinion about apps with ads, the eleventh cultural dilemma showed that people who value fashionable apps had a more divided opinion than other respondents (Table 30), which means that when people are characterized by the ascription dimension they tend to be more indifferent to ads towards this form of communication.

For the third level of acceptance, in this case apps without any ads, it was discovered that in the tenth dilemma people that value apps with more prizes (ascription) disagree more about having ads in apps (Table 31). This means that as long as the apps are good in terms of prizes won, these respondents don't care as much as others if these have ads. However, this difference is very low and cannot be extrapolated to general population.

## 5 Conclusions

### 5.1 Main conclusions

Along this study four hypothesis were first proposed and then tested. The first one, H1 hypothesized that there is a wide variety of usage purposes that don't necessarily reflect typical application use. It was confirmed that specific purposes of use of use don't essentially reflect applications of the same category, as these can be used in many diverse ways. For example message applications, in this case the PU communication, can be used for navigation. It was very surprising seeing how apps and PU could match in different ways. For application developers this simply means that they should be aware of these specific app usages before creating an app (for a purpose), therefore being able to maximise the efficiency in the respective app stores and trying to find new business and market opportunities.

In case of the second hypothesis, H2, which was also confirmed, it was discovered that application and SP usage are both influenced, not only by nationality, but also by Trompenaars's cultural dimensions (Trompenaars, 1997). This helps to tackle an important marketing problem that is cultural adaptation of products and services. This way to analyse patterns of use has proven to be useful in discovering important behaviours that are essential for a product or service, in this case smartphone applications, to survive in a foreign market.

H3 was the only hypothesis which was not confirmed. It revealed that people that tend to adopt a SP in the near future tend to give a more meaningful use to it, in this case by using this device for work and information management instead of entertainment and a hedonic usage, for example. Because they are willing to adopt a SP and investing their private capital they end up seeing it more as a utilitarian tool than people who already own one. Regarding H4, it was noticed that ads influence app usage, as people tend to dislike them. However, respondents are willing to use apps if they have ads in them because of the quantity of free apps available that offer free contents, but also in-app ad viewing. New forms of advertising within SP applications are clearly needed, since people tend to find the existing ones intrusive and annoying.

## **5.2 Main difficulties and limitations of the study**

During this present study the main limitation was the low number of international respondents. To obtain more significant data, in order to classify other cultures, a higher level of responses for other countries and cultures would be very important. This way the data could be extrapolated to the respective populations and some very interesting results could be discovered. However, the obtained numbers allowed for a slight comprehension of the intercultural differences, and this data, although not being fully representative, already suggested some curious observable behaviours.

## **5.3 Implications for practitioners and the practice field**

For practitioners in the field of marketing and technology this study presents a new way of analysing consumer patterns through specific methods, by investigating how cultural dimensions affect these patterns. This variable is very important in order to maximise the local and global marketing efforts & campaigns. The online world sure has its own dimension but by taking this variable into consideration when creating or internationalizing an app, the chances of succeeding should be higher since they can be better adapted. Cultural aspects are able to characterize the preferences of a target population, as they have proven to be effective in uncovering consumer patterns. For marketers it is also critical to analyse the various uses that people give to SP applications, since these not always reflect the most logical PU.

New forms of in-app advertising are also imperative to research and test at this point, since the ones we have nowadays have a very residual effectiveness, which could be quickly improved.

## **5.4 Considerations for future research**

As this research could not obtain very comprehensive data about multicultural aspects from other regions of the world it's important to say that nationwide studies in other countries are needed to find more unique consumer patterns and to help marketers make better decisions. Studies with more international respondents are urgently needed in order to try to comprehend how people behave in the digital world. Also, different targets are needed for a more broad-spectrum analysis with an in-depth take on this topic. Regarding the receptiveness of ads, it should be taken into consideration that different targets also react in different ways, therefore this study should be conducted among other SP users than students.

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### **Abbreviation, acronym and anagram list**

BI – Behavioural Intention

ICT – International Data Corporation

LTE – Long-term Evolution (4G networks)

PC – Personal Computer

PIM – Personal Information Management

PU – Purpose of Use

SES – Socioeconomic Status

SMS – Short Message Service

SP - Smartphone

TAM – Technology Adoption Model (Davis, 1989)

UI – User Interface

UP – University of Porto

## ATTACHMENT A: Survey distributed in Portuguese and English

Survey about Smartphone usage

19/05/15 13:16

[Edit this form](#)

### Survey about Smartphone usage

Hello.  
I'm currently doing an investigation in the area of technological innovation about smartphone usage in the University of Porto. For this reason your help is essential. The topic I chose is focused specifically on making the connection between the apps that we use and the purpose of usage for the device itself. Keep in mind that this is a brief survey that takes about 5 minutes to complete. Thank you a lot for participating and wish you all the best!

**\* Required**

**How old are you? \***

  
**Gender \***  
**In which of the following areas is your main professional occupation? \***  
Please choose your main area of occupation  
**Education \***  
Please choose the highest degree that you have completed or the one that you are attending right now.  
**Where do you come from? \***  
**Do you use/own a smartphone? \***  

[Continue »](#)

<https://docs.google.com/forms/d/10nCXplNvnbB7cQ2AkrDmC3BkeK8T7UcOiQypQgJnK7Q/viewform>

Page 1 of 2

**Figure 26 - Survey in English, part 1**

[Edit this form](#)

## Survey about Smartphone usage

### Survey about Smartphone usage II

**Which apps do you use?**

- Games (Games, entertainment, media)
- Utilities
- Productivity
- Reference
- Books
- Education
- News
- Sports
- Travel
- Weather
- Business
- Finance
- Lifestyle (e.g. shopping)
- Social Networking
- Health
- Navigation
- Medical
- Photography

**Figure 27 - Survey in English, part 2**

[Edit this form](#)

## Survey about Smartphone usage

\* Required

### Survey about Smartphone usage

**For which purpose(s) do/would you use them for? \***

- Communication (text messaging, email, etc.)
- Recreational/ Entertainment (Media player, games, camera, etc.)
- Work (company apps, google drive, word, excel, etc.)
- Educational (reference apps, books, etc.)
- Personal Information Management (address book, calendar, task list, etc.)

**Smartphone apps and ads**

Please choose your position based on your opinion

	Strongly disagree	Disagree	Agree	Strongly agree
"I'm willing to use apps if they have ads in them."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"I'm willing to use apps if they have ads in them, but they are barely visible."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"I'm willing to use apps, if they have absolutely no ads in them."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

« Back
Continue »

**Figure 28 - Survey in English, part 3**

[Edit this form](#)

## Survey about Smartphone usage

Survey about Smartphone usage

Why not?

If the Smartphone could ease your daily routines would you consider adopting one?

[« Back](#)   [Continue »](#)

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**Figure 29 - Survey in English, part 1.1**

[Edit this form](#)

## Survey about Smartphone usage

\* Required

### Survey about Smartphones usage - Cultural Dilemmas

In this section you will be faced with some statements, that even if you don't identify yourself with any of the presented pairs, you should choose the one you feel most comfortable with or the one that best fits your opinion.

**The most interesting smartphone apps are the ones that... \***

1 2

---

...are developed globally (considering the global situation)   ...are developed locally (considering local aspects)

---

**2. \***

1 2

---

...are for custom use (adapt to personal characteristics)   ...are for general use (all the users)

---

**3. \***

1 2

---

...need personal information (including identity, photos, personal data or other personal/professional life details)   ...don't need you to provide personal/professional information

---

**4. \***

1 2

---

...don't involve/require my emotional aspects in the      ...the interaction/performance is based

**Figure 30 - Survey in English, part 4.1**

interaction/performance   on my emotional state

---

5. \*

1 2

...whose sequence of actions must be made without interruptions (each app access starts from the beginning)   ...whose sequence of actions can be interrupted and returned to whenever useful to the user

---

6. \*

1 2

...are developed by operators with good performing products   ...are developed by operators with good reputation

---

7. \*

1 2

...only ask for your professional information   ...need your professional and personal information

---

8. \*

1 2

...allow me to classify them   ...don't allow me to classify them

---

9. \*

1 2

...need me to follow a set of pre-established set of rules   ...allow me to follow a sequence of steps

---

10. \*

1 2

...look only to get the most relevant information   ...look for all types of information

---

11. \*

1 2

Figure 31 - Survey in English, part 4.2

Survey about Smartphone usage 19/05/15 13:22

---

...optimize resource usage   ...don't care about resource usage

---

12. \* 1 2

---

...the most referenced   ...have more developer prizes

---

13. \* 1 2

---

...are fashionable   ...have the best performance in my activities

---

14. \* 1 2

---

...are the safest in terms of security   ...are environmentally friendly

---

15. \* 1 2

---

...don't use forced labour for their development   ...omit information about their development (that allow author information to be tracked)

---

If you wish to be notified once the results are available please write down your email so we can contact you. Thank you a lot for your interest!

*Never submit passwords through Google Forms.*

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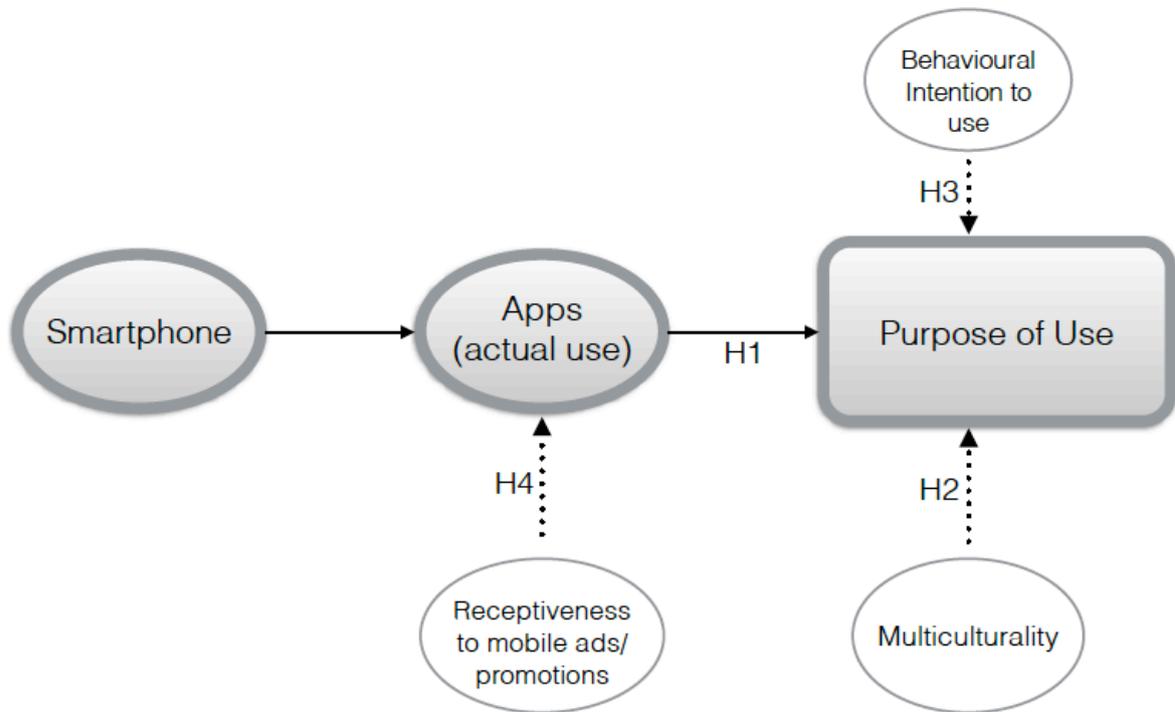
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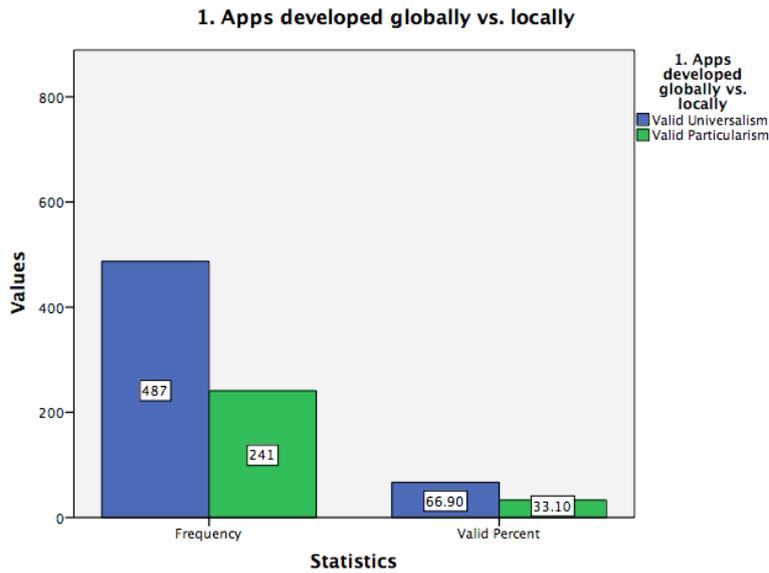
Figure 32 - Survey in English, part 4.3

**ATTACHMENT B: Exploratory Framework**

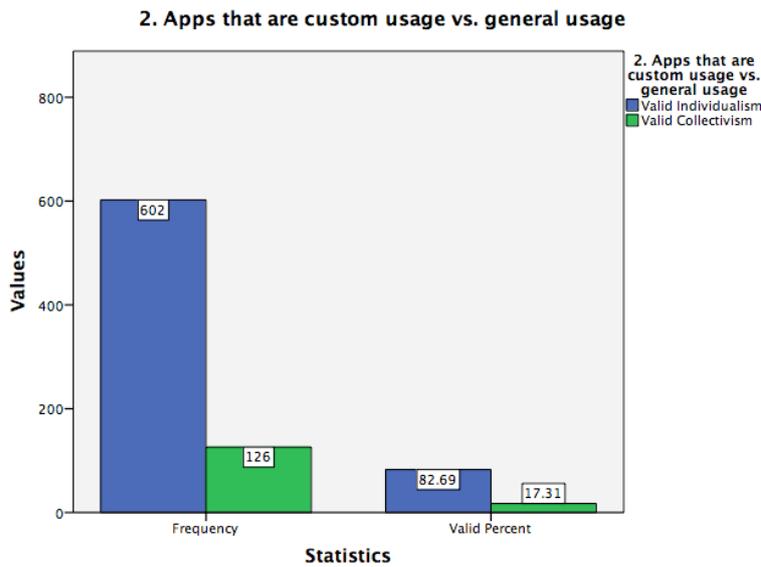


**Figure 33 - Exploratory Framework**

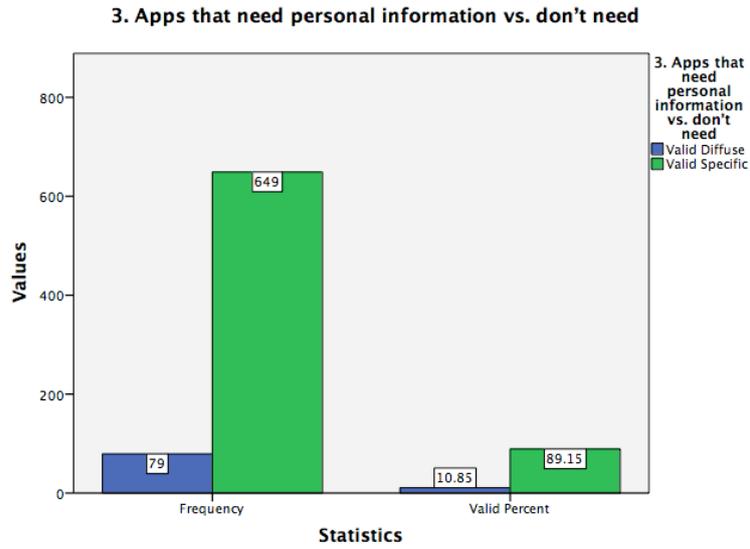
**ATTACHMENT C: Cultural dimensions answers**



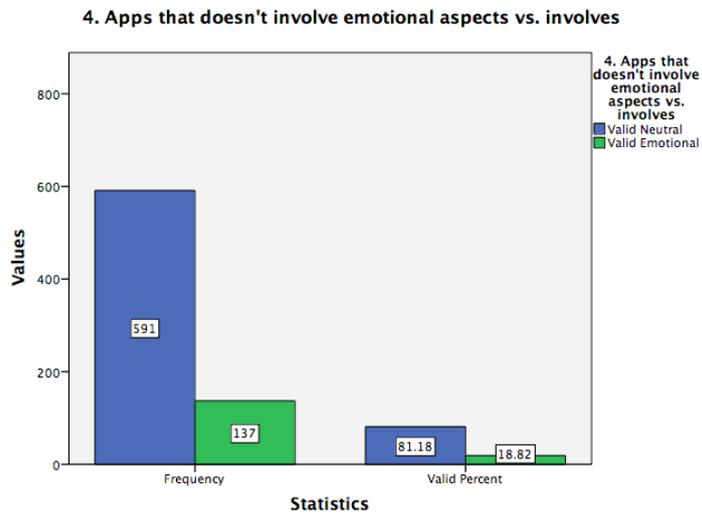
**Figure 34 - Universalism vs. Particularism**



**Figure 35 - Individualism vs. Collectivism (1)**

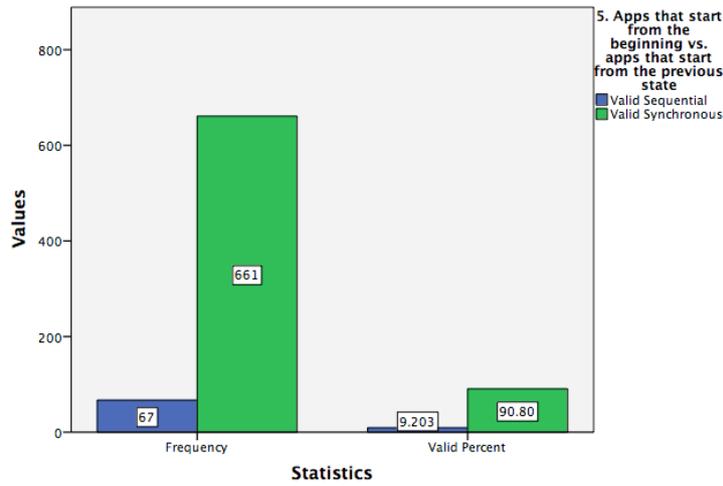


**Figure 36 – Diffuse vs. Specific (1)**



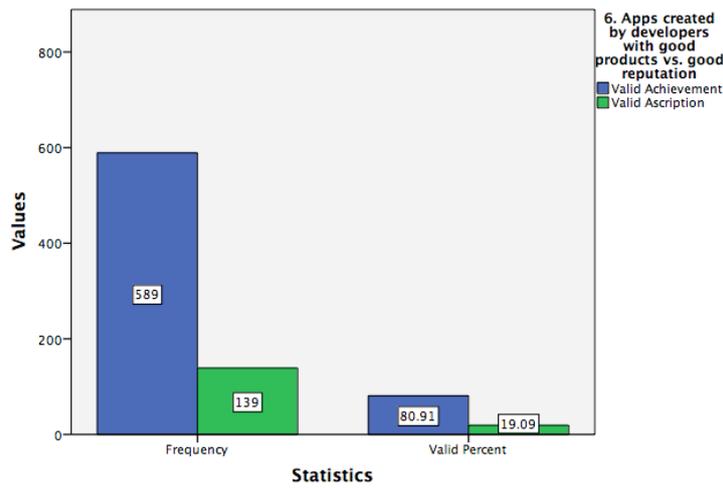
**Figure 37 - Neutral vs. Emotional**

**5. Apps that start from the beginning vs. apps that start from the previous state**



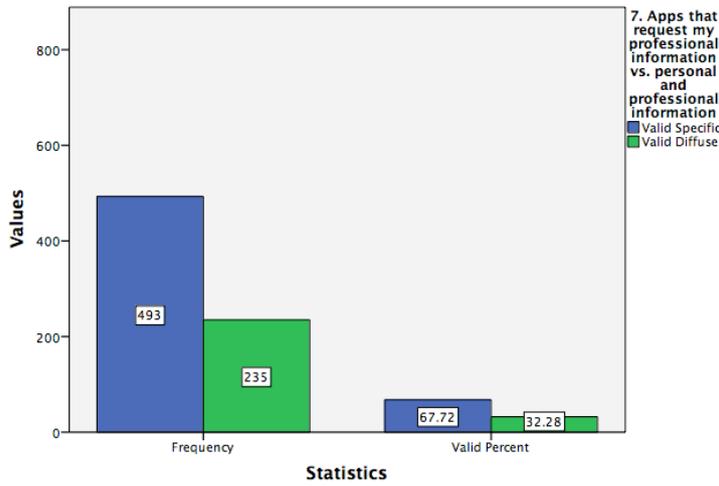
**Figure 38 - Sequential time vs. Synchronous time**

**6. Apps created by developers with good products vs. good reputation**



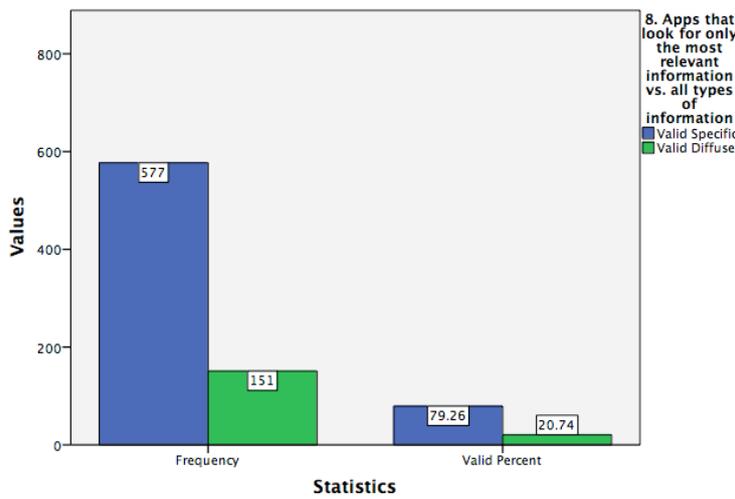
**Figure 39 - Achievement vs. Ascription (1)**

**7. Apps that request my professional information vs. personal and professional information**

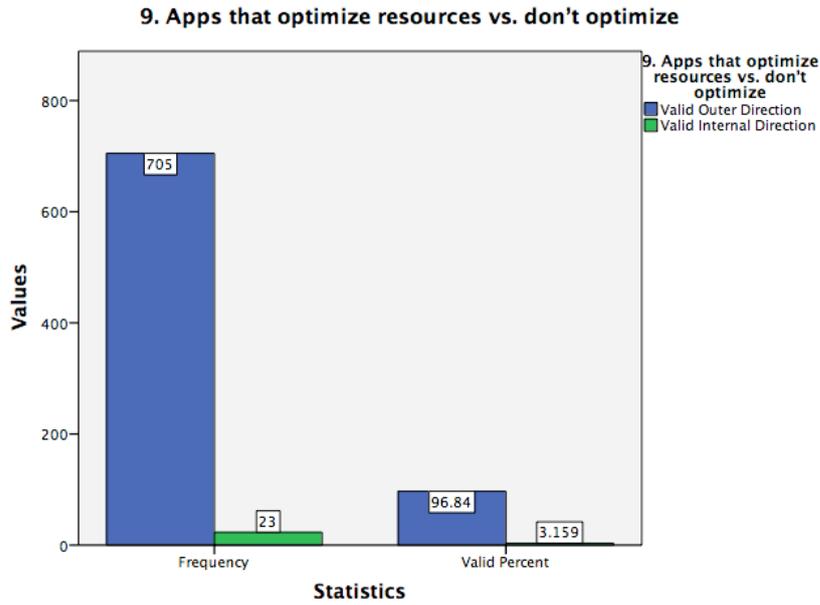


**Figure 40 - Specific vs. Diffuse (2)**

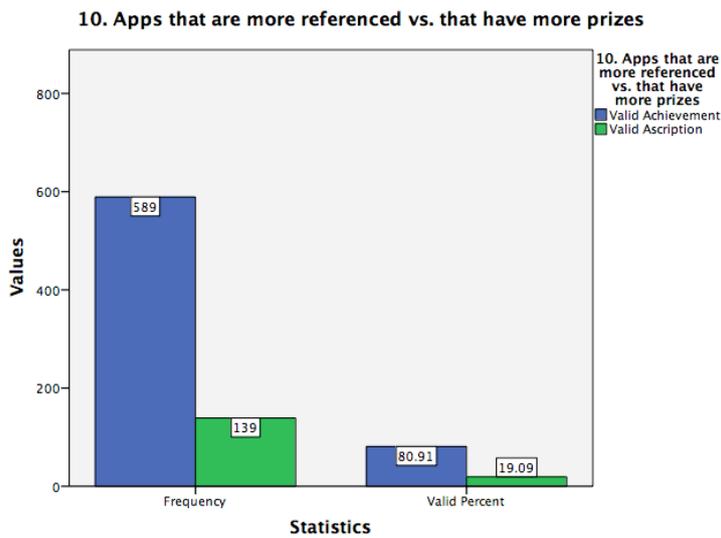
**8. Apps that look for only the most relevant information vs. all types of information**



**Figure 41 - Specific vs. Diffuse (3)**

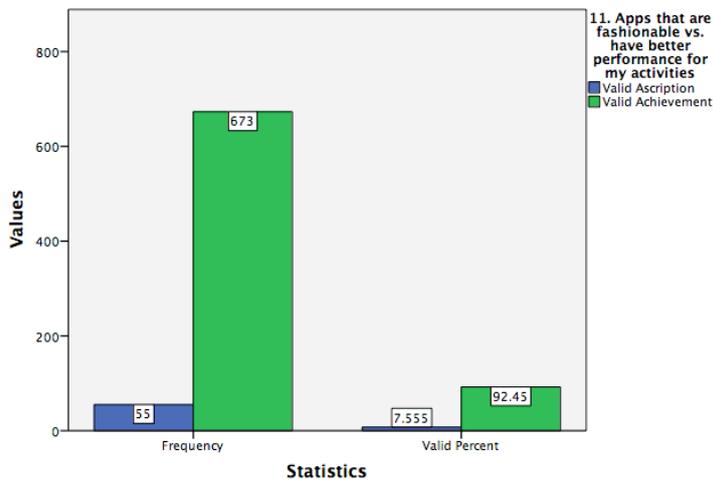


**Figure 42 – Outer Direction vs. Internal Direction (1)**



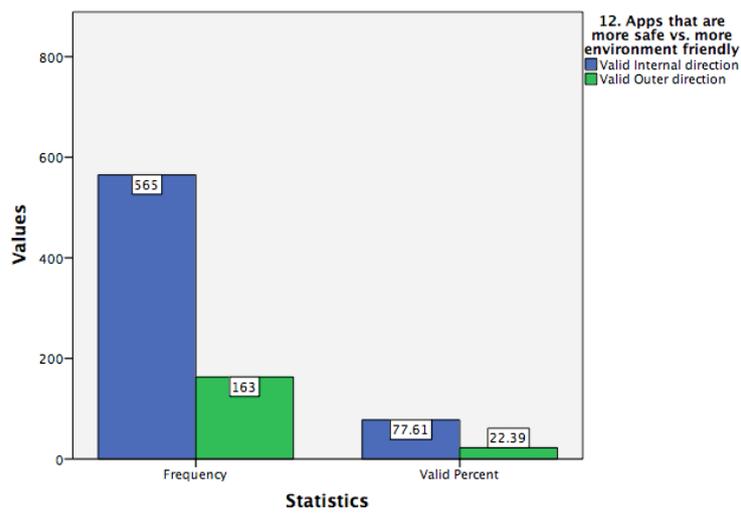
**Figure 43 - Achievement vs. Ascription (2)**

**11. Apps that are fashionable vs. have better performance for my activities**

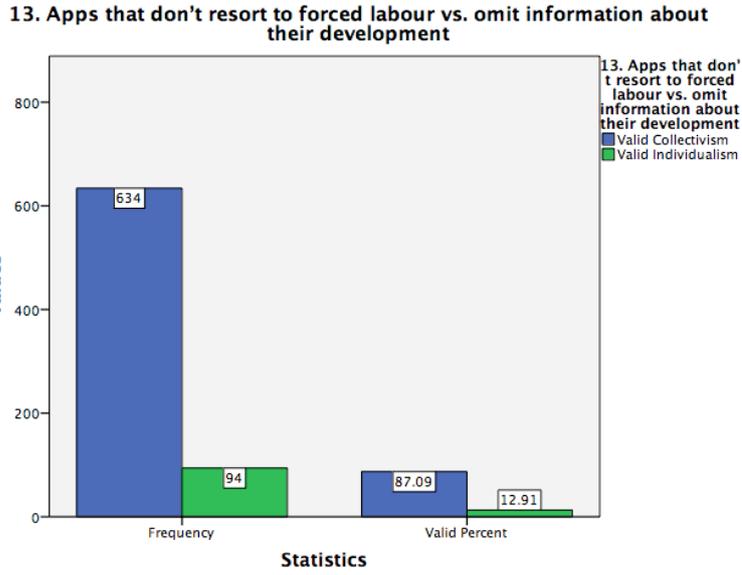


**Figure 44 - Ascription vs. Achievement (3)**

**12. Apps that are more safe vs. more environment friendly**



**Figure 45 – Internal Direction vs. Outer Direction (2)**



**Figure 46 - Collectivism vs. Individualism (2)**

**ATTACHMENT D: Receptivity to ads in age segments**

			Apps with ads		
Age			Frequency	Percent	Valid Percent
17-24	Valid	Agree completely	38	6.6	6.7
		Agree	227	39.5	40.3
		Disagree	200	34.8	35.5
		Disagree completely	98	17.0	17.4
	Total	563	97.9	100.0	
	Missing	-9999	12	2.1	
	Total		575	100.0	
25-34	Valid	Agree completely	4	3.0	3.0
		Agree	63	46.7	47.4
		Disagree	45	33.3	33.8
		Disagree completely	21	15.6	15.8
	Total	133	98.5	100.0	
	Missing	-9999	2	1.5	
	Total		135	100.0	
35-44	Valid	Agree	4	17.4	18.2
		Disagree	9	39.1	40.9
		Disagree completely	9	39.1	40.9
		Total	22	95.7	100.0
		Missing	-9999	1	4.3
	Total		23	100.0	
+45	Valid	Agree	4	40.0	40.0
		Disagree	5	50.0	50.0
		Disagree completely	1	10.0	10.0
	Total	10	100.0	100.0	

**Table 10 - Apps with ads (age segments)**

			Apps with barely visible ads		
Age			Frequency	Percent	Valid Percent
17-24	Valid	Agree completely	147	25.6	26.1
		Agree	301	52.3	53.5
		Disagree	84	14.6	14.9
		Disagree completely	31	5.4	5.5
		Total	563	97.9	100.0
	Missing	-9999	12	2.1	
Total			575	100.0	
25-34	Valid	Agree completely	25	18.5	18.8
		Agree	71	52.6	53.4
		Disagree	26	19.3	19.5
		Disagree completely	11	8.1	8.3
		Total	133	98.5	100.0
	Missing	-9999	2	1.5	
Total			135	100.0	
35-44	Valid	Agree completely	2	8.7	9.1
		Agree	11	47.8	50.0
		Disagree	5	21.7	22.7
		Disagree completely	4	17.4	18.2
		Total	22	95.7	100.0
	Missing	-9999	1	4.3	
Total			23	100.0	
+45	Valid	Agree	8	80.0	80.0
		Disagree	1	10.0	10.0
		Disagree completely	1	10.0	10.0
		Total	10	100.0	100.0

**Table 11 - Apps with barely visible ads (age segments)**

Apps with no ads at all					
Age			Frequency	Percent	Valid Percent
17-24	Valid	Agree completely	449	78.1	79.8
		Agree	83	14.4	14.7
		Disagree	22	3.8	3.9
		Disagree completely	9	1.6	1.6
	Total		563	97.9	100.0
	Missing	-9999	12	2.1	
Total			575	100.0	
25-34	Valid	Agree completely	96	71.1	72.2
		Agree	24	17.8	18.0
		Disagree	8	5.9	6.0
		Disagree completely	5	3.7	3.8
	Total		133	98.5	100.0
	Missing	-9999	2	1.5	
Total			135	100.0	
35-44	Valid	Agree completely	16	69.6	72.7
		Agree	5	21.7	22.7
		Disagree	1	4.3	4.5
		Total		22	95.7
		Missing	-9999	1	4.3
Total			23	100.0	
+45	Valid	Agree completely	7	70.0	70.0
		Agree	1	10.0	10.0
		Disagree	2	20.0	20.0
		Total		10	100.0

**Table 12 - Apps with no ads at all (age segments)**

**ATTACHMENT E: PU, ownership of SP and BI to use (gender segment)**

**Purpose Communication**

Gender			Frequency	Percent	Cumulative Percent
Male	Valid	No	33	10.7	10.7
		Yes	275	89.3	100.0
	Total	308	100.0		
Female	Valid	No	55	12.7	12.7
		Yes	378	87.3	100.0
	Total	433	100.0		

**Table 13 - PU Communication**

**Purpose Recreational/Entertainment**

Gender			Frequency	Percent	Cumulative Percent
Male	Valid	No	61	19.8	19.8
		Yes	247	80.2	100.0
	Total	308	100.0		
Female	Valid	No	85	19.6	19.6
		Yes	348	80.4	100.0
	Total	433	100.0		

**Table 14 - PU Recreational/Entertainment**

**Purpose Education**

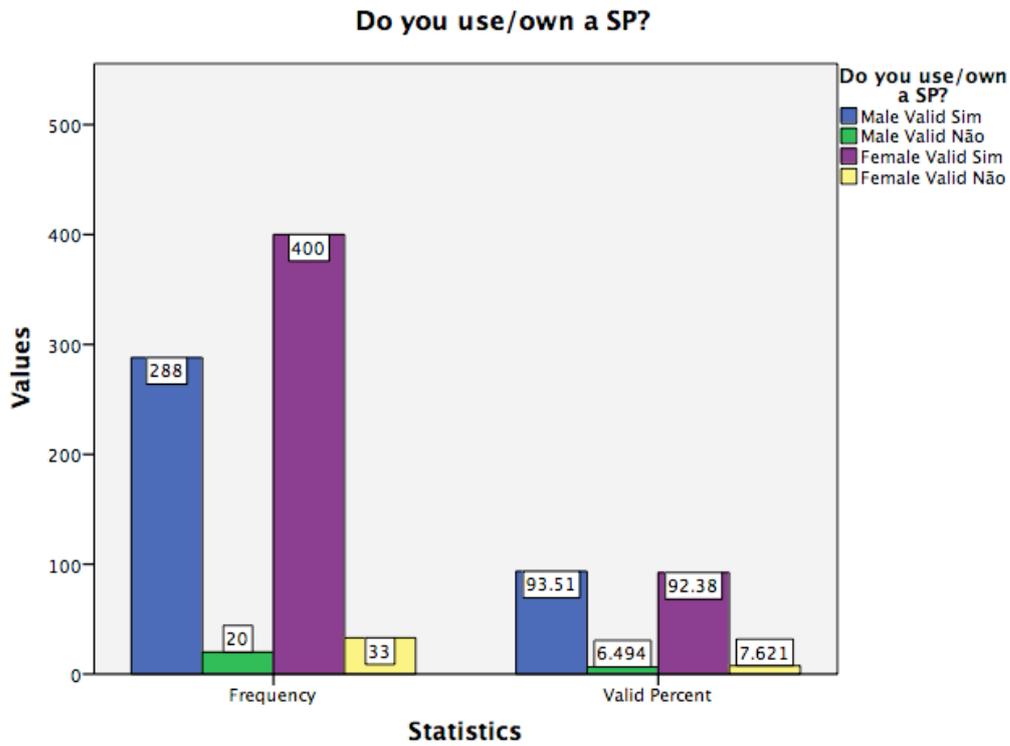
Gender			Frequency	Percent	Cumulative Percent
Male	Valid	No	186	60.4	60.4
		Yes	122	39.6	100.0
	Total	308	100.0		
Female	Valid	No	283	65.4	65.4
		Yes	150	34.6	100.0
	Total	433	100.0		

**Table 15 - PU Education**

**Purpose Personal Information Management**

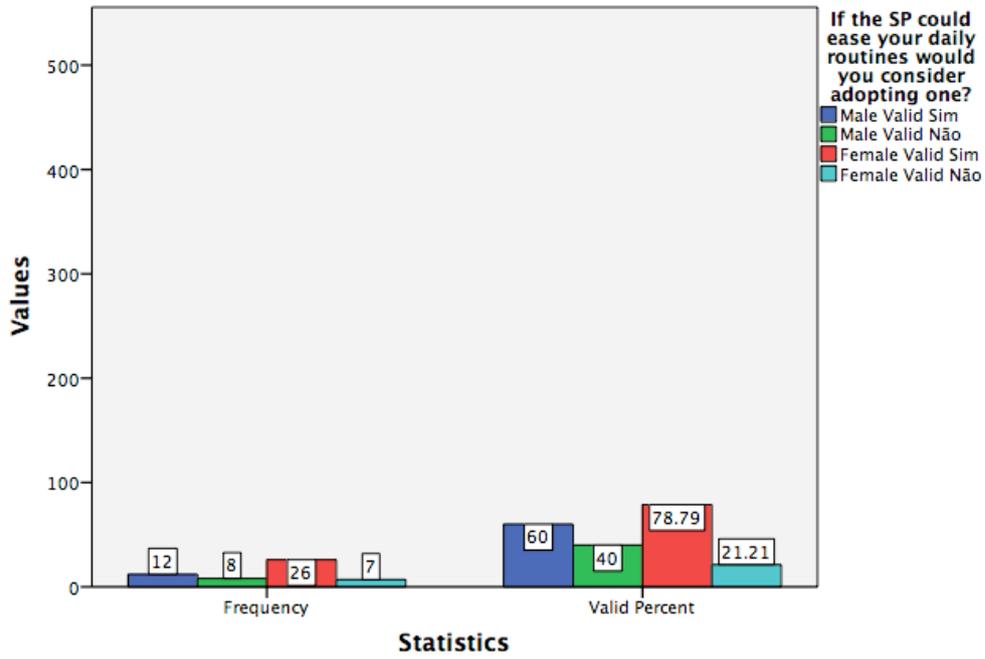
ender			Frequency	Percent	Cumulative Percent
Male	Valid	No	104	33.8	33.8
		Yes	204	66.2	100.0
	Total	308	100.0		
Female	Valid	No	176	40.6	40.6
		Yes	257	59.4	100.0
		Total	433	100.0	
	Sim	1	50.0	100.0	
	Total	2	100.0		

**Table 16 – PU PIM**



**Figure 47 – Ownership of a SP by gender**

**If the SP could ease your daily routines would you consider adopting one?**



**Figure 48 - BI by gender**

**ATTACHMENT F: H2 Application usage and PU (Nationality segment)****Applications\_Games**

Nationality			Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid	Não	10	43.5
		Sim	13	56.5
		Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid	Não	171	25.3
		Sim	505	74.7
		Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid	Sim	1	100.0
Outros países africanos	Valid	Não	2	40.0
		Sim	3	60.0
		Total	5	100.0
Brasil	Valid	Não	4	33.3
		Sim	8	66.7
		Total	12	100.0
América do Norte	Valid	Sim	2	100.0
América Central	Valid	Sim	1	100.0
América do Sul	Valid	Não	2	22.2
		Sim	7	77.8
		Total	9	100.0
Oceania	Valid	Sim	1	100.0
Ásia	Valid	Não	6	46.2
		Sim	7	53.8
		Total	13	100.0

**Applications\_Education**

Nationality			Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid	Não	19	82.6
		Sim	4	17.4
		Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid	Não	543	80.3
		Sim	133	19.7
		Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid	Sim	1	100.0
Outros países africanos	Valid	Não	3	60.0
		Sim	2	40.0
		Total	5	100.0
Brasil	Valid	Não	9	75.0
		Sim	3	25.0
		Total	12	100.0
América do Norte	Valid	Não	1	50.0
		Sim	1	50.0
		Total	2	100.0
América Central	Valid	Sim	1	100.0
América do Sul	Valid	Não	6	66.7
		Sim	3	33.3
		Total	9	100.0
Oceania	Valid	Sim	1	100.0
Ásia	Valid	Não	7	53.8
		Sim	6	46.2
		Total	13	100.0

**Applications\_Weather**

Nationality			Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid	Não	11	47.8
		Sim	12	52.2
		Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid	Não	262	38.8
		Sim	414	61.2
		Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid	Sim	1	100.0
Outros países africanos	Valid	Não	2	40.0
		Sim	3	60.0
		Total	5	100.0
Brasil	Valid	Não	2	16.7
		Sim	10	83.3
		Total	12	100.0
América do Norte	Valid	Sim	2	100.0
América Central	Valid	Sim	1	100.0
América do Sul	Valid	Sim	9	100.0
Oceania	Valid	Não	1	100.0
Ásia	Valid	Não	6	46.2
		Sim	7	53.8
		Total	13	100.0

**Applications\_Finance**

Nationality			Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid	Não	20	87.0
		Sim	3	13.0
		Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid	Não	619	91.6
		Sim	57	8.4
		Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid	Não	1	100.0
Outros países africanos	Valid	Não	5	100.0
Brasil	Valid	Não	8	66.7
		Sim	4	33.3
		Total	12	100.0
América do Norte	Valid	Não	2	100.0
América Central	Valid	Não	1	100.0
América do Sul	Valid	Não	6	66.7
		Sim	3	33.3
		Total	9	100.0
Oceania	Valid	Não	1	100.0
Ásia	Valid	Não	11	84.6
		Sim	2	15.4
		Total	13	100.0

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Applications\_Travel

Nationality	Valid	Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid Não	15	65.2
	Sim	8	34.8
	Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid Não	538	79.6
	Sim	138	20.4
	Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid Não	1	100.0
Outros países africanos	Valid Não	3	60.0
	Sim	2	40.0
	Total	5	100.0
Brasil	Valid Não	6	50.0
	Sim	6	50.0
	Total	12	100.0
América do Norte	Valid Não	2	100.0
América Central	Valid Não	1	100.0
América do Sul	Valid Não	3	33.3
	Sim	6	66.7
	Total	9	100.0
Oceania	Valid Não	1	100.0
Ásia	Valid Não	6	46.2
	Sim	7	53.8
	Total	13	100.0

Applications\_Social\_Networks

Nationality	Valid	Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid Não	6	26.1
	Sim	17	73.9
	Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid Não	152	22.5
	Sim	524	77.5
	Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid Sim	1	100.0
Outros países africanos	Valid Sim	5	100.0
Brasil	Valid Não	1	8.3
	Sim	11	91.7
	Total	12	100.0
América do Norte	Valid Sim	2	100.0
América Central	Valid Sim	1	100.0
América do Sul	Valid Não	2	22.2
	Sim	7	77.8
	Total	9	100.0
Oceania	Valid Não	1	100.0
Ásia	Valid Não	2	15.4
	Sim	11	84.6
	Total	13	100.0

Applications\_Books

Nationality	Valid	Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid Não	21	91.3
	Sim	2	8.7
	Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid Não	539	79.7
	Sim	137	20.3
	Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid Sim	1	100.0
Outros países africanos	Valid Não	3	60.0
	Sim	2	40.0
	Total	5	100.0
Brasil	Valid Não	9	75.0
	Sim	3	25.0
	Total	12	100.0
América do Norte	Valid Não	2	100.0
América Central	Valid Não	1	100.0
América do Sul	Valid Não	5	55.6
	Sim	4	44.4
	Total	9	100.0
Oceania	Valid Não	1	100.0
Ásia	Valid Não	8	61.5
	Sim	5	38.5
	Total	13	100.0

Applications\_Health

Nationality	Valid	Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid Não	17	73.9
	Sim	6	26.1
	Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid Não	562	83.1
	Sim	114	16.9
	Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid Sim	1	100.0
Outros países africanos	Valid Não	5	100.0
Brasil	Valid Não	11	91.7
	Sim	1	8.3
	Total	12	100.0
América do Norte	Valid Não	2	100.0
América Central	Valid Não	1	100.0
América do Sul	Valid Não	7	77.8
	Sim	2	22.2
	Total	9	100.0
Oceania	Valid Não	1	100.0
Ásia	Valid Não	9	69.2
	Sim	4	30.8
	Total	13	100.0

Applications\_Business

Nationality	Valid	Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid Não	21	91.3
	Sim	2	8.7
	Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid Não	649	96.0
	Sim	27	4.0
	Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid Não	1	100.0
Outros países africanos	Valid Não	5	100.0
Brasil	Valid Não	11	91.7
	Sim	1	8.3
	Total	12	100.0
América do Norte	Valid Não	2	100.0
América Central	Valid Não	1	100.0
América do Sul	Valid Não	7	77.8
	Sim	2	22.2
	Total	9	100.0
Oceania	Valid Não	1	100.0
Ásia	Valid Não	11	84.6
	Sim	2	15.4
	Total	13	100.0

Purpose\_Entertainment

De onde vem?	Valid	Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid No	7	30.4
	Yes	16	69.6
	Total	23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid No	132	19.5
	Yes	544	80.5
	Total	676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid Yes	1	100.0
Outros países africanos	Valid No	3	60.0
	Yes	2	40.0
	Total	5	100.0
Brasil	Valid No	1	8.3
	Yes	11	91.7
	Total	12	100.0
América do Norte	Valid Yes	2	100.0
América Central	Valid Yes	1	100.0
América do Sul	Valid Yes	9	100.0
Oceania	Valid No	1	100.0
Ásia	Valid No	3	23.1
	Yes	10	76.9
	Total	13	100.0

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Purpose\_Work

De onde vem?			Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid	Não	12	52.2
		Sim	11	47.8
	Total		23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid	Não	314	46.4
		Sim	362	53.6
	Total		676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid	Não	1	100.0
Outros países africanos	Valid	Não	2	40.0
		Sim	3	60.0
	Total		5	100.0
Brasil	Valid	Não	7	58.3
		Sim	5	41.7
	Total		12	100.0
América do Norte	Valid	Não	2	100.0
América Central	Valid	Sim	1	100.0
América do Sul	Valid	Não	4	44.4
		Sim	5	55.6
	Total		9	100.0
Oceania	Valid	Não	1	100.0
Ásia	Valid	Não	5	38.5
		Sim	8	61.5
	Total		13	100.0

Purpose\_Personal\_Information\_Management

De onde vem?			Frequency	Percent
Europa do Norte (UK, DE, NL, DK, SW, CH, IE, FR, ...)	Valid	Não	8	34.8
		Sim	15	65.2
	Total		23	100.0
Europa do Sul (PT, ES, IT, GR, TR, ...)	Valid	Não	259	38.3
		Sim	417	61.7
	Total		676	100.0
Angola, Moçambique, Guiné Bissau, Cabo Verde, São Tomé e Príncipe	Valid	Não	1	100.0
Outros países africanos	Valid	Não	2	40.0
		Sim	3	60.0
	Total		5	100.0
Brasil	Valid	Não	6	50.0
		Sim	6	50.0
	Total		12	100.0
América do Norte	Valid	Não	1	50.0
		Sim	1	50.0
	Total		2	100.0
América Central	Valid	Não	1	100.0
América do Sul	Valid	Não	1	11.1
		Sim	8	88.9
	Total		9	100.0
Oceania	Valid	Não	1	100.0
Ásia	Valid	Não	1	7.7
		Sim	12	92.3
	Total		13	100.0

**ATTACHMENT G: H3 – PU’s and BI**

**Purpose\_Communication**

If the SP could ease your daily routines, would you consider adopting one?			Frequency	Percent	Valid Percent	Cumulative Percent
Yes	Valid	No	8	21.1	21.1	21.1
		Yes	30	78.9	78.9	100.0
		Total	38	100.0	100.0	
No	Valid	No	15	100.0	100.0	100.0

**Purpose\_Recreational/Entertainment**

If the SP could ease your daily routines, would you consider adopting one?			Frequency	Percent	Valid Percent	Cumulative Percent
Yes	Valid	No	16	42.1	42.1	42.1
		Yes	22	57.9	57.9	100.0
		Total	38	100.0	100.0	
No	Valid	No	15	100.0	100.0	100.0

**Purpose\_Work**

If the SP could ease your daily routines, would you consider adopting one?			Frequency	Percent	Valid Percent	Cumulative Percent
Yes	Valid	No	16	42.1	42.1	42.1
		Yes	22	57.9	57.9	100.0
		Total	38	100.0	100.0	
No	Valid	No	15	100.0	100.0	100.0

**Purpose\_Education**

If the SP could ease your daily routines, would you consider adopting one?			Frequency	Percent	Valid Percent	Cumulative Percent
Yes	Valid	No	21	55.3	55.3	55.3
		Yes	17	44.7	44.7	100.0
		Total	38	100.0	100.0	
No	Valid	No	15	100.0	100.0	100.0

**Purpose\_Personal\_Information\_Management**

If the SP could ease your daily routines, would you consider adopting one?			Frequency	Percent	Valid Percent	Cumulative Percent
Yes	Valid	No	12	31.6	31.6	31.6
		Yes	26	68.4	68.4	100.0
		Total	38	100.0	100.0	
No	Valid	No	15	100.0	100.0	100.0

**Table 17 - Purposes of use and BI**

Purpose\_Communication

If the SP could ease your daily routines would you consider adopting one?	Age	Why not?			Frequency	Percent	Valid Percent	Cumulative Percent
			Valid	No				
Yes	17-24	Monetary reasons	Valid	No	1	7.7	7.7	7.7
				Yes	12	92.3	92.3	100.0
				Total	13	100.0	100.0	
		Lack of interest	Valid	No	4	22.2	22.2	22.2
				Yes	14	77.8	77.8	100.0
				Total	18	100.0	100.0	
		Personal reasons	Valid	No	2	100.0	100.0	100.0
				Yes	1	100.0	100.0	100.0
				Total	3	100.0	100.0	
	25-34	Personal reasons	Valid	Yes	1	100.0	100.0	100.0
	35-44	Monetary reasons	Valid	No	1	100.0	100.0	100.0
				Yes	1	100.0	100.0	100.0
Total				2	100.0	100.0		
	Lack of interest	Valid	Yes	1	100.0	100.0	100.0	
			No	1	100.0	100.0	100.0	
			Total	2	100.0	100.0		
+45	Lack of interest	Valid	Yes	2	100.0	100.0	100.0	

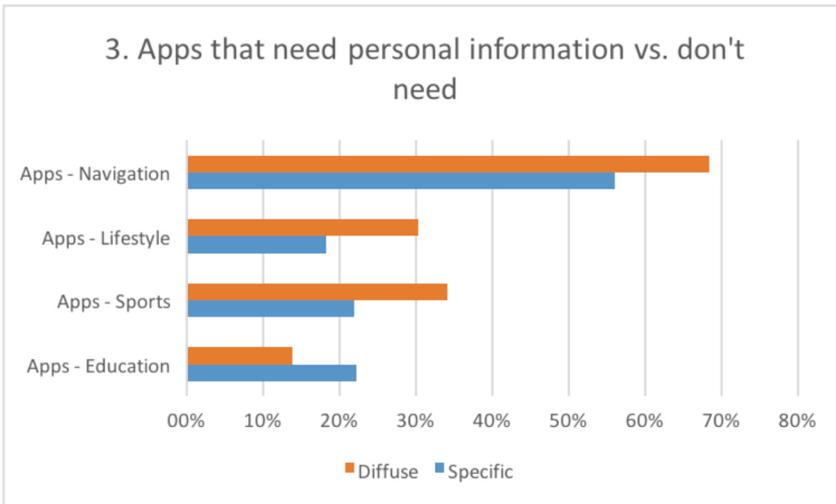
Table 18 - PU communication vs. BI, age and reasons why don't users own a SP

Purpose\_Personal\_Information\_Management

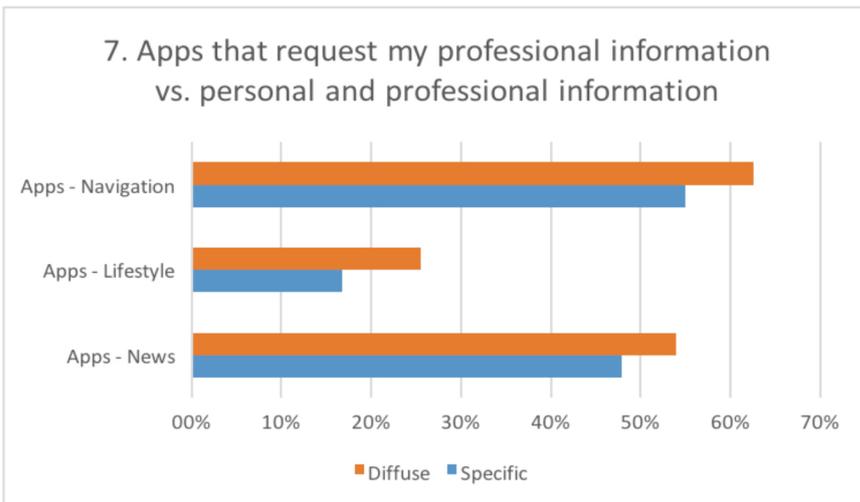
If the SP could ease your daily routines would you consider adopting one?	Age	Why not?			Frequency	Percent	Valid Percent	Cumulative Percent
			Valid	No				
Yes	17-24	Monetary reasons	Valid	No	2	15.4	15.4	15.4
				Yes	11	84.6	84.6	100.0
				Total	13	100.0	100.0	
		Lack of interest	Valid	No	7	38.9	38.9	38.9
				Yes	11	61.1	61.1	100.0
				Total	18	100.0	100.0	
		Personal reasons	Valid	No	1	50.0	50.0	50.0
				Yes	1	50.0	50.0	100.0
				Total	2	100.0	100.0	
	25-34	Personal reasons	Valid	No	1	100.0	100.0	100.0
	35-44	Monetary reasons	Valid	Yes	1	100.0	100.0	100.0
				No	1	100.0	100.0	100.0
Total				2	100.0	100.0		
	Lack of interest	Valid	Yes	1	100.0	100.0	100.0	
			No	1	100.0	100.0	100.0	
			Total	2	100.0	100.0		
+45	Lack of interest	Valid	No	1	50.0	50.0	50.0	
			Yes	1	50.0	50.0	100.0	
			Total	2	100.0	100.0		

Table 19 - PU PIM vs. BI, age and reasons why don't users own a SP

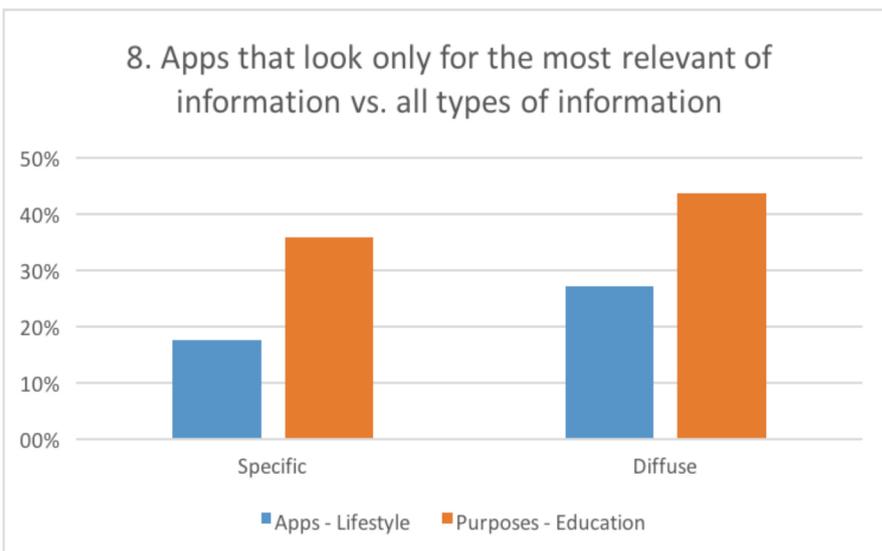
**ATTACHMENT H: H2 - Cultural dimensions vs. App usage and purpose of use**



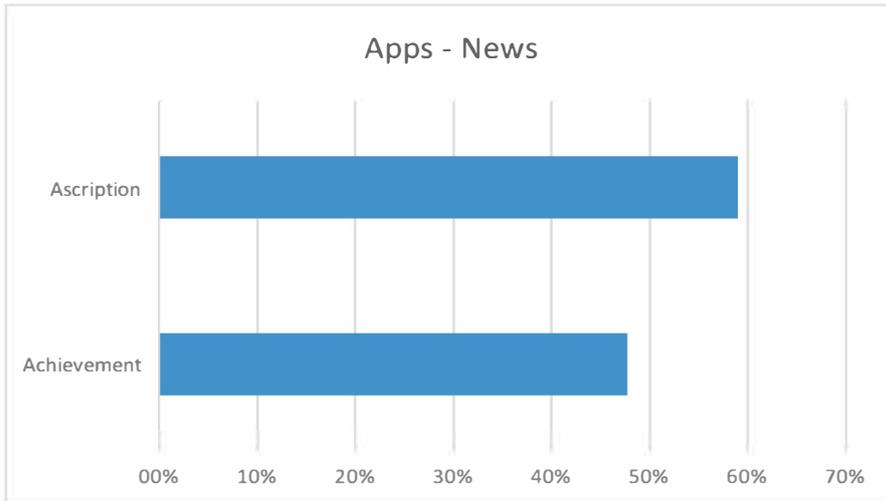
**Figure 49 - Dimension 3 vs. App usage and PU**



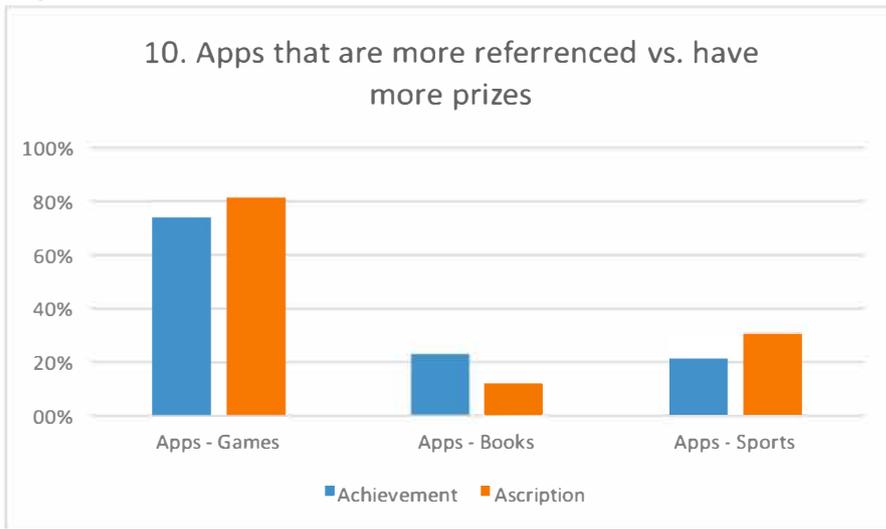
**Figure 50 - Dimension 7 vs. App usage and PU**



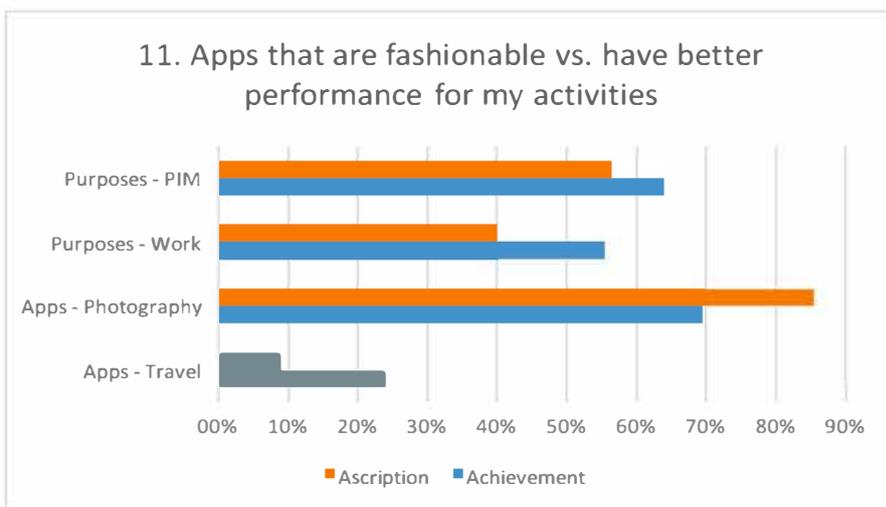
**Figure 51 - Dimension 8 vs. App usage and PU**



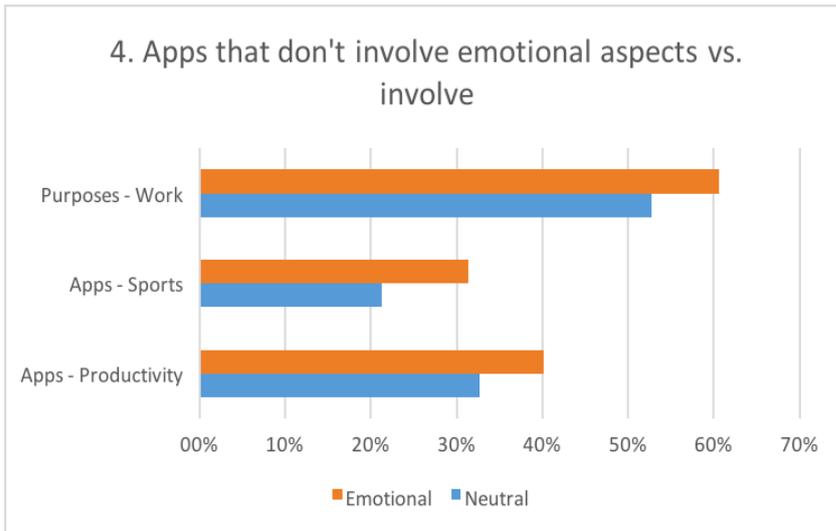
**Figure 52 - Dimension 6 vs. App usage**



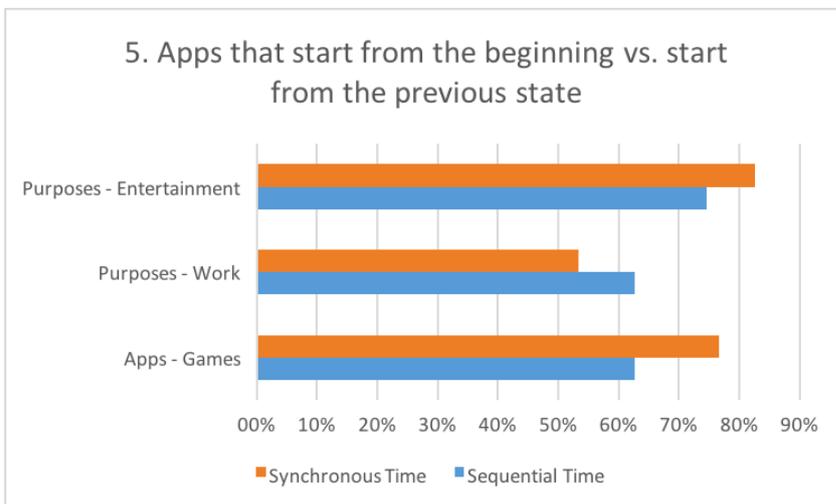
**Figure 53 - Dimension 10 vs. App usage and PU**



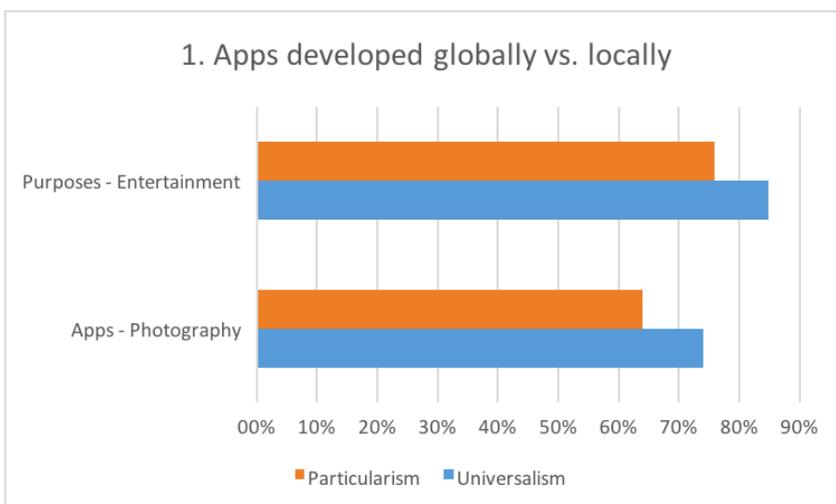
**Figure 54 - Dimension 11 vs. App usage and PU**



**Figure 55 - Dimension 4 vs. App usage and PU**



**Figure 56 - Dimension 5 vs. App usage and PU**



**Figure 57 - Dimension 1 vs. App usage and PU**

Applications\_Produtividade

4. Apps that don't involve emotional aspects vs. involve		Age	Professional activity		Frequency	Percent	Valid Percent	Cumulative Percent
Emotional	17-24	Student	Valid	No	55	67.1	67.1	67.1
				Yes	27	32.9	32.9	100.0
				Total	82	100.0	100.0	
	Tech-related engineering	Valid	No	8	66.7	66.7	66.7	
			Yes	4	33.3	33.3	100.0	
			Total	12	100.0	100.0		
	Non-tech related engineering	Valid	Yes	2	100.0	100.0	100.0	
	Economics/Management	Valid	No	1	33.3	33.3	33.3	
			Yes	2	66.7	66.7	100.0	
			Total	3	100.0	100.0		
	Medical	Valid	No	2	50.0	50.0	50.0	
			Yes	2	50.0	50.0	100.0	
			Total	4	100.0	100.0		
	25-34	Student	Valid	No	6	40.0	40.0	40.0
				Yes	9	60.0	60.0	100.0
				Total	15	100.0	100.0	
		Tech-related engineering	Valid	No	2	50.0	50.0	50.0
				Yes	2	50.0	50.0	100.0
				Total	4	100.0	100.0	
		Non-tech related engineering	Valid	No	1	33.3	33.3	33.3
Yes				2	66.7	66.7	100.0	
Total				3	100.0	100.0		
Economics/Management		Valid	No	1	100.0	100.0	100.0	
Medical	Valid	No	1	50.0	50.0	50.0		
		Yes	1	50.0	50.0	100.0		
		Total	2	100.0	100.0			
Liberal profession	Valid	Yes	1	100.0	100.0	100.0		
Other	Valid	No	2	100.0	100.0	100.0		
35-44	Student	Valid	No	1	100.0	100.0	100.0	
			Yes	1	100.0	100.0	100.0	
	Tech-related engineering	Valid	Yes	1	100.0	100.0	100.0	
	Arts (Architecture, Fine arts, ...)	Valid	No	1	50.0	50.0	50.0	
			Yes	1	50.0	50.0	100.0	
Total	2	100.0	100.0					
Other	Valid	No	1	50.0	50.0	50.0		
		Yes	1	50.0	50.0	100.0		
		Total	2	100.0	100.0			

Table 20 - Emotional dimension vs. age and professional activity

Purpose\_Work

4. Apps that don't involve emotional aspects vs. involve		Professional activity		Frequency	Percent	Valid Percent	Cumulative Percent
Emotional	Student	Valid	Não	44	44.9	44.9	44.9
			Sim	54	55.1	55.1	100.0
			Total	98	100.0	100.0	
	Tech-related engineering	Valid	Não	7	41.2	41.2	41.2
			Sim	10	58.8	58.8	100.0
			Total	17	100.0	100.0	
	Other types of engineering	Valid	Não	1	20.0	20.0	20.0
			Sim	4	80.0	80.0	100.0
			Total	5	100.0	100.0	
	Economics/Management	Valid	Não	1	25.0	25.0	25.0
			Sim	3	75.0	75.0	100.0
			Total	4	100.0	100.0	
	Arts (Architecture, Fine arts, ...)	Valid	Sim	2	100.0	100.0	100.0
	Medical	Valid	Sim	6	100.0	100.0	100.0
	Liberal profession	Valid	Sim	1	100.0	100.0	100.0
	Other	Valid	Não	1	25.0	25.0	25.0
			Sim	3	75.0	75.0	100.0
			Total	4	100.0	100.0	

Table 21 - Emotional dimension vs. professional activity

**ATTACHMENT I: H1 Model summaries and ANOVA tables**

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	10.168	3	3.389	37.155	.000 <sup>d</sup>
	Residual	67.410	739	.091		
	Total	77.577	742			

d. Predictors: (Constant), Applications\_Social\_Networks, Applications\_Navigation, Applications\_Games

**Table 22 - ANOVA table PU Communication**

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
5	.473 <sup>e</sup>	.224	.218	.35242

e. Predictors: (Constant), Applications\_Games, Applications\_Photography, Applications\_Travel, Applications\_News, Applications\_Social\_Networks

**Table 23 - Model Summary PU Entertainment**

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
5	Regression	26.379	5	5.276	42.477	.000 <sup>f</sup>
	Residual	91.537	737	.124		
	Total	117.917	742			

f. Predictors: (Constant), Applications\_Games, Applications\_Photography, Applications\_Travel, Applications\_News, Applications\_Social\_Networks

**Table 24 - ANOVA table PU Entertainment**

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
7	Regression	32.170	7	4.596	22.101	.000 <sup>h</sup>
	Residual	152.837	735	.208		
	Total	185.007	742			

h. Predictors: (Constant), Applications\_Productivity, Applications\_Books, Applications\_Weather, Applications\_Medical, Applications\_Sports, Applications\_Business, Applications\_Health

**Table 25 - ANOVA table PU Work**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
7	.484 <sup>e</sup>	.234	.227	.42419

g. Predictors: (Constant), Applications\_Education, Applications\_Medical, Applications\_Health, Applications\_Produtividade, Applications\_Books, Applications\_Navigation, Applications\_Games

**Table 26 - Model summary PU Education**

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
7	Regression	40.441	7	5.777	32.108	.000 <sup>b</sup>
	Residual	132.251	735	.180		
	Total	172.692	742			

h. Predictors: (Constant), Applications\_Education, Applications\_Medical, Applications\_Health, Applications\_Productivity, Applications\_Books, Applications\_Navigation, Applications\_Games

**Table 27 - ANOVA table PU Education**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
5	.374 <sup>e</sup>	.140	.134	.45149

e. Predictors: (Constant), Applications\_Productivity, Applications\_Navigation, Applications\_Uilities, Applications\_Weather, Applications\_Lifestyle

**Table 28 - Model summary PU PIM**

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
5	Regression	24.496	5	4.899	24.035	.000 <sup>f</sup>
	Residual	150.230	737	.204		
	Total	174.727	742			

f. Predictors: (Constant), Applications\_Productivity, Applications\_Navigation, Applications\_Uilities, Applications\_Weather, Applications\_Lifestyle

**Table 29 - ANOVA table PU PIM**

**ATTACHMENT J: H4 - Cultural dimensions vs. ads****11. Apps that are fashionable vs. have better performance for my activities**

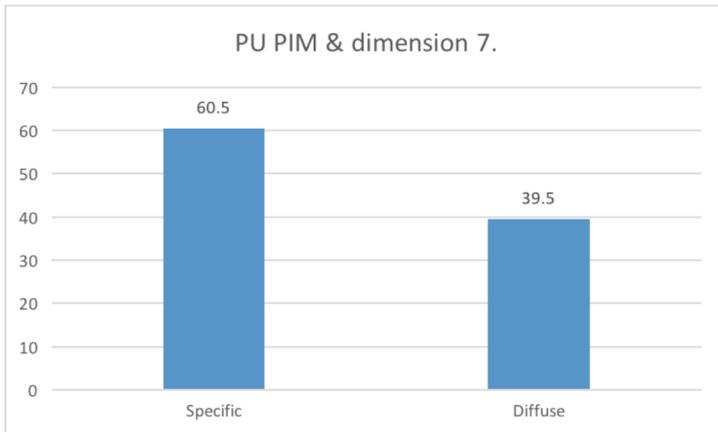
SP apps and ads ["I'm willing to use SP if they have apps in them."]			Frequency	Percent
Totally agree	Valid	Ascription	6	14.3
		Achievement	36	85.7
		Total	42	100.0
Agree	Valid	Ascription	24	8.1
		Achievement	274	91.9
		Total	298	100.0
Disagree	Valid	Ascription	19	7.3
		Achievement	240	92.7
		Total	259	100.0
Totally disagree	Valid	Ascription	6	4.7
		Achievement	123	95.3
		Total	129	100.0

**Table 30 - Apps with ads vs. cultural dimension 11****10. Apps that are more referenced vs. that have more prizes**

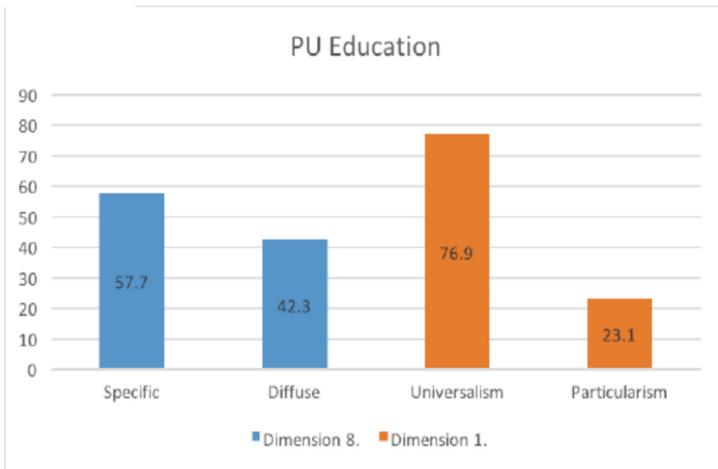
Aplicações de Smartphone e anúncios ["Estou disposto/a a usar aplicações se estas não tiverem absolutamente anúncios nenhuns."]			Frequency	Percent
-9999	Missing	-9999.0	15	100.0
Totally agree	Valid	Achievement	456	80.3
		Ascription	112	19.7
		Total	568	100.0
Agree	Valid	Achievement	92	81.4
		Ascription	21	18.6
		Total	113	100.0
Disagree	Valid	Achievement	31	93.9
		Ascription	2	6.1
		Total	33	100.0
Totally disagree	Valid	Achievement	10	71.4
		Ascription	4	28.6
		Total	14	100.0

**Table 31 - Apps with no ads at all vs. cultural dimension 10**

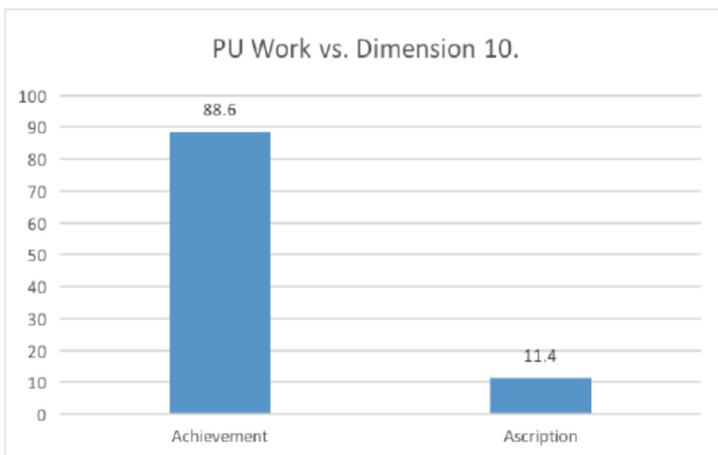
**ATTACHMENT K: Regression models vs. Cultural dimensions**



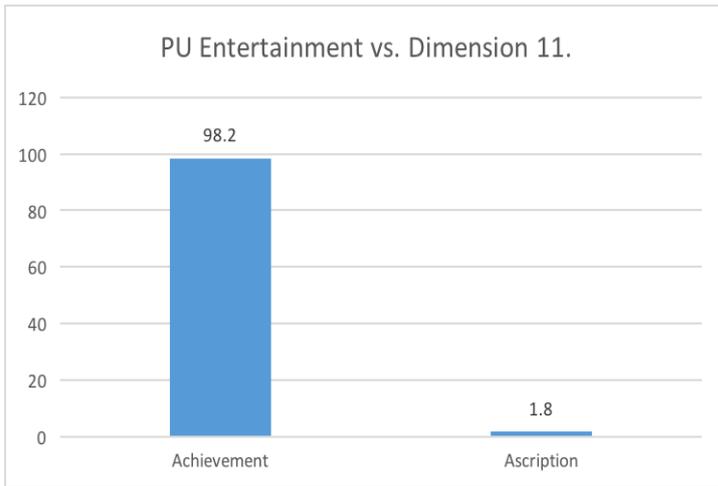
**Figure 58 - Model 1 vs. dimension 7**



**Figure 59 - Model 2 vs. dimension 8 and 1**



**Figure 60 - Model 4 vs. dimension 10**



**Figure 61 - Model 5 vs. dimension 11**