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# Theoretical aspects of the acceptance of new technologies on the smartphone market

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**Abstract.** Adoption of new technologies on mobile phone market in the past 30 years has transformed the industry and had a large impact on the global economy. Technological progress, as the main factor in the adoption of new technologies, has enabled reduce costs and increase equipment performance. The smartphone is perceived by consumers as a sustainable element, to which the price sensitivity is less important. Consumers are willing to pay more in exchange for better quality and features of the product. Smartphones have changed the way people communicate with others, find information and manage their daily life. In addition, recent developments of new operating systems, abundant applications and competition between suppliers have facilitated a marked increase of the users' number.

## 1. Introduction

Technology diffusion research seeks to understand its spread through modelling the entire life cycle in terms of consumer interaction, too. Numerous marketing studies have focused on how the new technology is perceived by consumers, which is usually tested by the adopters' behaviour and reactions to technological innovation and by the manner it can change over time. Regarding new product development, studies try to discover the stages in the process of technology diffusion or the features of new product developments that are most critical to achieving market success and broad adoption. This paper approaches the manners of acceptance of new technologies in the smartphone market and how they are affected by the characteristics of the society to which the potential users belong.

## 2. The interaction between technology and the social context in terms of consumer acceptance of new technologies

On the one hand, technology acceptance is the central problem of the transdisciplinarity between technology diffusion and marketing management and on the other hand it relies on the theoretical works of sociology and information management in cognitive psychology [1]. Some researchers believe that understanding the relationship between users may be more important than the factors of the product itself, which highlights the resistance to technology [2]. Barak and Levenberg identified three main factors that may indicate the consumers' dispositional inclination to think flexible in adopting new technologies: the acceptance of new or changing technologies (technology acceptance), openness to others' ideas (open mindedness) and adaptation to changes in learning situations (adapting to new situations) [3]. The transformation of useful information on technology into knowledge leads to competitive advantages [4], communication playing an essential role in this process. Providing to the right people complete, accurate, relevant and timely information is important in order to support the



decision-making process regarding the acceptance of new technologies. The quality of information and communication channels affects user satisfaction on the new technology and, consequently, influences their beliefs about its use [5].

### *2.1. The influence of technology on consumers, in the mobile phone market*

The adoption of new technologies in mobile telecommunications, in recent years, has transformed the industry and has had a large impact on the global economy. In particular, mobile subscribers exceeded the population in many countries where there is universal adoption. The mobile revolution began in Europe and United States, but was quickly extended globally and influences the evolution of many developing countries. The empirical literature has confirmed substantial positive welfare effects with the introduction of mobile telecommunications.

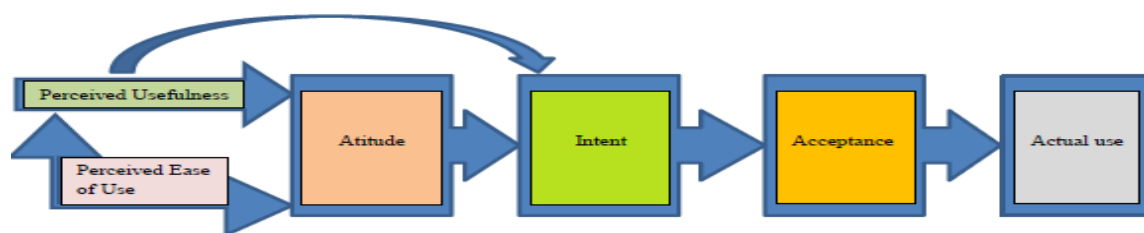
Many people and organizations today use mobile wireless technology through mobile WAP, handheld devices, smartphones, wireless laptops, m-commerce, etc. However, despite market growth, research on examining the key factors affecting users' behaviour and adoption are rare. What is missing is an understanding of the motivation resulting in the adoption of new technology by the consumer.

Today, smartphones are no longer interpersonal communication devices via voice and text messaging services. They are a combination of new technologies which are used for browsing the internet, checking e-mails, chat online, time management, entertainment, online / offline games, images and videos sharing, self-expression, establishing identity, online payments and running various mobile applications.

When we talk about smartphones, we talk about custom devices available for use in most contexts and locations. Now they have become ubiquitous and visible to the public. The smartphone pathology is like a double-edged sword: they create and destroy opportunities. The attitude of using a highly customized smartphone allows the fulfillment of pleasures and utilitarian needs of users. Indeed, the favorable attitude towards smartphones could enslave a person, it would influence her to forget the social environment, to spend long hours actively with this device even in inappropriate situations [6].

### *2.2. Technology acceptance model as a theoretical framework*

Technology acceptance model is one of the most widely used theoretical models to examine the factors of adoption and use of technology. Focusing on the associations between perceived usefulness, the perceived ease of use and the intention to use the system effectively, the model attempts to predict the relative importance of perceived usefulness and perceived ease of use, with other variables relevant to research in different contexts. Perceived usefulness is the subjective assessment of a potential user using a particular technology which will improve the performance both at work and in the social life, while the perceived ease of use concerns the extent to which the potential user anticipates the effort to use technology. Both the perceived usefulness and perceived ease of use influence the consumer behaviour and the intention to accept and use the new technology. The model scheme can be followed in Figure 1. The technological complexity, individual differences, social, environmental and trust influences have a positive impact on the usefulness and the ease of use [7].



**Figure 1.** Technology Acceptance Model

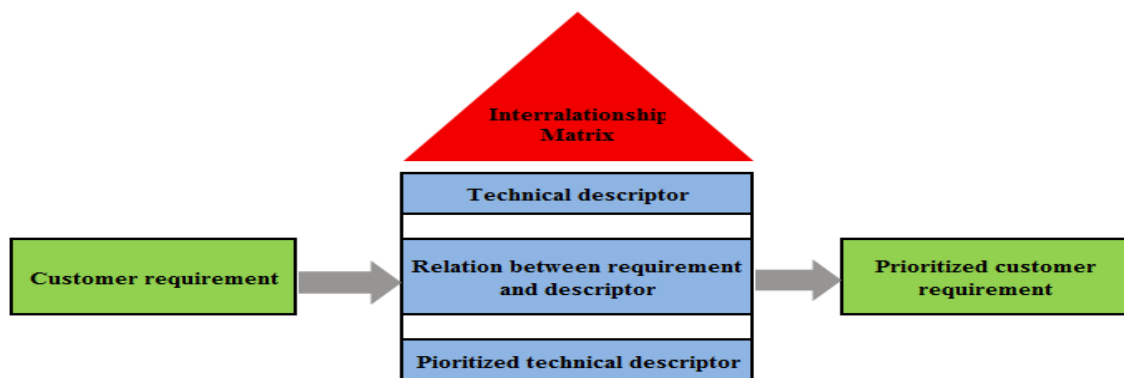
There were hundreds of published studies that used the technology acceptance model as a theoretical framework, demonstrating the robustness of the model in areas of personal computers and Internet software applications [8], email [9], word-of-mouth [10], online communities [11], wireless mobile services data [12], etc. In the case of smartphones, their utility with many advanced features and functions has long been observed among users.

### 2.3. Choosing and using smartphones

There have been several studies on the choice of mobile phones and their use. In his book, Rogers briefly mentioned why a mobile phone has been successfully adopted by consumers. He attributed value to the successful adoption as relative advantages of cordless telephones, mobile phones compatible with existing systems, ease of use, and observability [13]. Although there have been a few studies on the use of mobile phones, there has been no study on the factors affecting a person to choose a smartphone, especially using the economic utility theory and the econometric models.

Many products these days tend to answer to several market segments and to offer consumers the possibility of larger selection than ever before. Consumers also become more aware of their styles and specific preferences and therefore know better what products might suit to their requirements [14]. The preferences for the mobile phone features such as technology, style (color, design, size, etc.) have developed greatly from the launch of the original mobile phone. At first, voice was the dominant feature while today mobile phones include multi-tasking features, such as camera, calendar, mp3 player etc. It is obvious that mobile phones are deeply rooted in every human life everyday [15], and perform many tasks that go beyond traditional communication.

Some researchers developed various methods using Multiple Criteria Decision Making (MCDM) and Quality Function Deployment (QFD) to assess options for mobile phones in terms of user preferences order [16]. The main tool of the QFD is the house of quality represented in Figure 2, through which the voice of the customer is translated as design requirements that become specific target values, which will be operated by the organization in order to be met. Many managers and engineers take into account the house of quality for the main graph in quality planning.



**Figure 2.** House of quality [16]

Artistic preferences for a product can be improved by adding features to the new technology that the competition does not have yet. The features are the primary sources of benefits received when the product is purchased and thus have a positive impact on product evaluation. This positive impact of the addition of new features through new product technologies is still the subject of research as an interesting phenomenon, robust, even in situations where the new features are irrelevant. Users experience the positive impact of adding new features, however, with a degree of decrease so that the features added to an inferior product have a relatively more positive impact on the assessment of product features added to a product than in the case of a superior product. It is very important if the customer did or did not have experience with the product. Many studies are focused on product

features that have an impact on quality assessment by consumers [17] and on integrating concepts used in product development as specialized ontologies [18], [19]. Consumer involvement in the design, creation and development of products is one of the marketers' targets in order to be able to identify their preferences.

### **3. The influence of marketing strategies on the decision of granting new technologies in the smartphones market**

It is important to emphasize the importance of marketing strategies and influences on the consumer purchasing decision in the context of the smartphones market. "The cleverness" of smartphones is still in full operation by consumers [20]. The mobile phone is one of a handful of consumer products that has been accepted globally in a relatively short period of time [21]. The mobile phones market has become an extremely competitive market. If the intensity of competition increases, companies in the industry are more likely to sustain their current level of sales, the profit margin and market share not only by keeping their current customers, but also by acquiring new customers. The interesting feature in the mobile industry is that it evolves rapidly, the products being manufactured for a short lifecycle, to which they add new features, as well as the fierce competition between many companies in the industry. If the client is facing additional functionality and increased complexity of new technologies for the mobile phone it is likely to face problems that can have a negative impact on customer satisfaction, and therefore reduce its intention to repurchase.

#### *3.1. Marketing opportunities brought by new technologies*

New technologies create marketing opportunities and challenges. Phones and personal digital assistants increase availability, frequency and speed of communication. Still, the technology associated with these devices, enabling marketers to communicate personally with consumers, continues to evolve. Recognizing the complementary networks World Wide Web and mobile, a content analysis of the Fortune Global 500 websites investigated the adoption of mobile business models and technologies by region and industry. The results suggest geographical differences in the diffusion technology that affects marketing strategies. There are two categories of success factors, messages features and media, influencing three dependent measures of success: consumer attention, the intention of consumption and consumer behavior, as we have seen within the technology acceptance model. The results of these qualitative and quantitative studies give managers insights on mobile marketing and mobile advertising [22]. Many firms vertiginously innovate and create products of successive generations to replace the existing ones, in order to take advantage of the customers' trend to upgrade [23].

The widespread adoption of mobile phones is a huge marketing opportunity to reach and serve customers anytime, anywhere. Paradoxically, while consumers adopt mobile phones to improve their privacy and social life, in marketing mobile phones are seen as a marketing channel. The introduction of smartphones means that they can develop a wider range of services based on engaging a larger set of marketing techniques.

#### *3.2. The importance of technology diffusion and marketing in the adoption of new technologies in the smartphone market*

If the concept of marketing was selling the product for profit, now marketing aims at identifying consumer preferences, providing them value through the sold product. This identification is made possible by the abundance of information provided by market research and communication channels and starts from an idea on a technological innovator product. In this direction, the diffusion of technology is based only on knowing the adopter of new technology in order to impress him by the novelty of the product offered by technology.

Technology adoption, which is specific to technology diffusion, is part of marketing, but we cannot ignore the fact that technology diffusion is correlated with R & D management, technology management and strategic management. The new technology is the result of consumer needs and



values that are identified through market research and has a specific path before being brought to market and adopted.

With the introduction of new technologies on the smartphone market, marketing and consumers will be exposed to a whole range of marketing innovations that were not possible with the classical mobile phone. For example, applications for smartphones such as Amazon and Google Shopper allow consumers in a retail store to use their smartphone to enter the barcode of a product or take a picture of a product and immediately receive price comparisons, customer reviews, discounts, coupons and other information oblivious of the product from the store. The smartphone has the ability to transform the shopping experiences of consumers and the market value: consumers now can shop quickly and easily across multiple channels (physical, web-based and mobile store) with a significantly higher level of comfort, flexibility, efficiency and customization. The smartphone is seen as another key step in the evolution of technology in the market because it has the ability to seamlessly integrate Bluetooth services, location-based marketing, and other web-based technologies [21].

Research into the mobile market showed that mobile services have increased the adoption rate of mobile phones. Moreover, because the sales of smartphones continued to rise, mobile providers are concerned not only with mobile phones functionality but also with operating systems which are likely to play an important role in the development of smartphones. However, few researchers have focused on competitive technology diffusion among the operating systems of smartphones. Assessing how consumers choose smartphones, in terms of operating systems at the same price level, will allow manufacturers to target consumer segments and produce specialized smartphones [24].

#### **4. Conclusions and discussions**

On the smartphone market, and not only, the acceptance of new technologies is conditioned by everything that is involved in promoting and selling the product. It is very important the cooperation of marketing and technology diffusion so that the marketing provides the company the control through advertising, product promotion and conferring value to the product. The other side, the diffusion process, on which the company has no control, but which is nevertheless important for market penetration is an essential promotion through use. Fundamentally, one can score three important conditions for the diffusion of technology, for its acceptance by the consumer:

1. to stay informed of the new technology,
2. to accept and adapt to new technology, and
3. to adopt the new technology considering the price and the level of risk.

The diffusion of technology is the cumulative result of a series of calculations that measure the benefits of adopting new technology and decrease costs in an environment of uncertainty (as is the future evolution of technology and benefits) and limited information (about the benefits, cost and technology duration). Although the final decision is given by demand, benefits and costs, it can be noticed the influence of new technologies on customers' decisions. The diffusion rate is thus determined by the sum of these decisions.

In this paper it has been highlighted how technology is perceived by consumers, which is usually tested by the adopters' behaviour and reactions of technological innovation and how they may change over time. An understanding of the smartphones market and trends in terms of consumers is valuable, industry stakeholders can greatly appreciate the information that can be used to build marketing strategies and plans for future research directions.

As noted in the paper, in the smartphone market, an important role is played by developing OS through key factors, such as the performance of consumption, the state of the app stores, software quality, the degree of competition within operating systems, the share of information available for development etc. Companies developing operating systems for smartphones should retain these key factors for decision-making on technology diffusion and therefore, take the best possible marketing decisions.

Technology users who postpone their purchases take into account the difference between the current model and future versions features. Therefore, marketers should target such uncertainties.

Customer satisfaction is one of the most important factors influencing the decision to upgrade, followed by price and the perceived usefulness. Therefore, what makes consumers accept new technologies would be useful marketing strategy for mobile phone manufacturers, making them accept a product with enhanced functionality or a newer model at a reasonable price.

The mobile market is divided into two different markets, namely: mobile phone market and the market for mobile service providers. Choosing a smartphone is often a combination of a phone and services offered. Such a choice can be influenced by social and motivational variables, even if the latter are more relevant in services due to interpersonal relations. These variables affect not only consumers but also companies in launching new products, both in terms of technology and marketing, companies being often able to predict the end of life of the new product in terms of technology.

The extraordinary growth in demand is due to the psychological and social reasons which, combined, have produced specific features both of users and potential users. The interactions between technological advances, changes in consumer and firm strategies influence the evolution of the mobile market. In the mobile industry it is useful to offer new services and to strengthen customer loyalty and customer base rather than acquire more subscribers. In one such industry where product offerings are multiplied through differentiation and versions, this leads, in most cases, to the existence of confused market customers. Therefore, the diffusion of technology and marketing are highly interconnected, as the first changes in the media and branding tools, in addition to developing new opportunities. The latter, in turn, helps companies in differentiating and guiding consumers in their choice.

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