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Motivations and Barriers to the Adoption of 3G Mobile Multimedia Services: An End User Perspective in the Italian Market

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1. INTRODUCTION

As telecommunications move into an era where the distinction between voice, video and data will be blurred, convergence of communications, information, entertainment, commerce and computing will lay the foundation for the development of an Information Society.

Over the last five years there have been a number of significant developments in multimedia computing power, CD-ROM technology, digital television, the Internet/Intranet, and IP-based services and terrestrial and satellite mobile communications, which could have a profound impact on our society. These technologies and systems may enable dramatic changes to take place in working practices, entertainment, education and healthcare.

Many organisations within the computing, entertainment, and communications industries are now looking to identify and capitalise on the promise of new market opportunities in multimedia created by these developments.

However, demand for multimedia services, should they be successful, is unlikely to be constrained to the fixed network. Greater pressure on time, and the need for flexibility and responsiveness in business, will lead to a growing demand for access to these services anytime, anywhere.

In order to meet the evolving needs of customers, and to capture the opportunity which this evolution represents, the mobile industry is looking to define and develop a third generation of mobile technology which will take the personal communications user into the Information Society by delivering voice, graphics, video and other broadband information direct to the user, regardless of location, network or terminal.

The purpose of the paper is to provide an end-user perspective on mobile multimedia services that are likely to emerge with the roll out of Third Generation Mobile Services (3G).

The remainder of this paper is organized into the following four section. The first section provides a brief review of the literature on the technology acceptance model. Next we present our research model based on a qualitative exploratory survey conducted in six markets. Then we test the proposed model on the Italian market and present the analysis and results of our study. Finally we make conclusion by discussing the implication of our study, followed by presenting future research direction.

2. TECHNOLOGY ACCEPTANCE MODEL (TAM): THE THEORETICAL BACKGROUND

Information Systems (IS) researchers have made significant efforts in building theories to examine and predict the determinant factors of information technology (IT) acceptance (Agarwal and Prasad, 1998; Agarwal and Prasad, 1999). Existing model of IT acceptance have their foundations from several diverse theories, most noticeably innovation diffusion theory, where individual's perceptions about using an innovation are considered to affect their adoption behavior (Agarwal and Prasad, 1998; Moore and Benbasat, 1991; Rogers, 1995). Other important theoretical models that attempt to explain the relationship between user beliefs, attitudes, intentions, and actual system use include the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980), the theory of planned behavior (TPB) (Ajzen, 1991), and the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989). In the Information System literature on IT adoption, researchers have conducted several studies to examine the relationship between perceived ease of use, perceived usefulness, and the usage of other information technologies (Davis, 1989; Davis et al., 1989, Mathieson, 1991; Adams et al., 1992; Szajna, 1996; Hendrickson and Collins, 1996; Chau, 1996). Their researches have supported the Technology Acceptance Model (TAM) proposed by Davis (1989) which posits that perceived ease of use and perceived usefulness can predict the usage of technology.

TAM was derived from the Theory of Reasoned Action (TRA). According to Davis (1989), perceived usefulness and perceived ease of use are the two determinants that influence people's attitude toward IT usage intention and actual IT usage. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" and perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p.320) Davis and his colleagues (Davis, 1989; Davis et al., 1989; Davis et al., 1992) demonstrated that perceived ease of use affected usage intention indirectly via perceived usefulness.

In an extension to TAM, Davis and his colleagues examined the impact of enjoyment on usage intention (Davis et al., 1992). They reported two studies concerning the relative effects of usefulness and enjoyment on intention to use and usage of computers. As expected, they found enjoyment had a significant effect on intention. A positive interaction between usefulness and enjoyment was also observed.

Originally evaluated with email, word processing and graphics applications, TAM has been extended to other applications such as voice-mail (Adams et al., 1992), spreadsheets (Mathieson, 1991), DBMS (Saajna, 1994), GSS (Chin and Gopal, 1995), mobile computing (Zhu and Fui-Hoon, 2002). Various constructs such as cultural differences (Straub, 1994) and gender differences (Gefen and Straub, 1997) have also been suggested.

In this research our goal is to extend the TAM model to study motivations and barriers to the adoption of 3G mobile multimedia services. In the following sections the research is divided into two stages: an exploratory qualitative stage followed by a quantitative stage focused on the Italian market.

3. RESEARCH FRAMEWORK

3.1 Methodology

Many factors positively or negatively influence user's adoption of multimedia mobile services. In this section we identify several variables that influence adoption of 3G mobile multimedia services. The variables are derived from an exploratory qualitative stage conducted by Nokia through 24 focus groups in 6 markets (Brazil, Germany, Italy, Singapore, UH, USA).

The second stage of the analysis concentrates specifically on a quantitative marketing research conducted on a sample of 1.000 Italian users of mobile. It tries to describe behaviors, roles and test variables influencing adoption of mobile computing. We consider Italy because it is the European country with the higher penetration of mobile phones and profitability, it is also prone to market innovation.

3.2 Exploratory Qualitative Stage

The fieldwork has been carried out face to face in the first and second quarters of 2001 through 24 focus groups conducted by Nokia Networks in 6 markets (Brazil, Germany, Italy, Singapore, UK, USA). The interviews focused in on the core target for the 3G offering, namely, teenagers, young adults and family adults, all currently using mobile phones for personal usage. The sample was segmented by age, 16-19, 20-29 and 30-45 and by life-stage.

The research looked primarily at the following mobile multimedia services: photo messaging, mobile e-mail, video messaging and postcard messaging. However, the research also briefly touched on rich text messaging, and on video calling.

Of utmost importance in the study was to ensure that the respondents concentrated on the messaging format, and did not allow previous misconceptions about service or delivery of the service. They were therefore told to imagine that there would be no network problems, and not to concentrate on pricing.

The prompted statements offered to the sample as motivations for usage of the future multimedia mobile services can be classified to form eight broad segments of usage (Table 2):

1) Business
2) Formality
3) Urgency
4) Function
5) Price
6) Discretion
7) Personal Contact
8) Fun

The research model to be empirically tested in the Italian market is illustrated in Figure 1. The model is derived from the theories and hypothesis described in the preceding section. The relationship constituting the model also have support from prior theoretical and empirical work in the exploratory qualitative stage.

3.3 Exploratory Quantitative Stage

A following stage of analysis concentrates specifically on a quantitative marketing research conducted in the second quarter of 2002 through questionnaires on a sample of 1.000 Italian users of mobile (sampled among over 18 Italians).

Table 1 – Fieldwork details

Country	Sample	Field times
Brazil	Nationally representative of adults aged 18-64, who are economically active	6th – 20th March 2001
Germany	Nationally representative of adults aged 14+	23rd March – 5th April 2001
Italy	Nationally representative of adults aged 15+	23rd March – 5th April 2001
Singapore	Nationally representative of adults aged 15-64	13th – 26th April 2001
UK	Nationally representative of adults aged 15+	23rd March – 5th April 2001
USA	Nationally representative of adults aged 18+	21st – 30th March 2001

Table 2 – Motivation segmentation

- ***Business***
- for business purposes
- ***Formality***
- When I want to send a formal message
- ***Urgency***
- When I need to know the message has arrived
- When I want to send urgent communication
- As a rapid way to stay in touch
- ***Function***
1. To send a long piece of text
2. To send an attachment
3. When I don't feel like talking
4. Practical reason (like to show something I want to buy)
- ***Price***
- When I want to communicate cheaply
- ***Discretion***
1. Need to be discret and quiet
2. When talking would disturb people around me
3. Might disturb the person I'm trying to contact
- ***Personal contact***
• To keep in touch with friends/family abroad
• To send an intimate message
• To contact people I don't see very often
• As a personalised way to send a message
• To increase the feeling of contact
• To share an experience
• Nice for people to see me if they haven't done so for a while
• For longer greetings
• When I don't want to talk, but need to communicate
- ***Fun***
• Joke or chit-chat with friends
• As a novel way to message
• To share an experience
• As it is just great fun
• To send pictures from my holiday
• To show something like a view
• To express creativity

1.000 interviews provide a sampling error (at 50%) of 3,1% (with a probability level of 95%).

The research, managed through telephone calls, tries to describe behaviors, roles and variables influencing adoption of mobile computing.

The results of the quantitative marketing research are now summarized. This research was structured in order to deepen the motivations and barriers towards the innovative services delivered through 3G mobile services, the eventual levels of demand and usage and the content types and formats that consumers express opinion for.

Figure 1 - Adapted TAM Model on the Adoption of multimedia mobile services

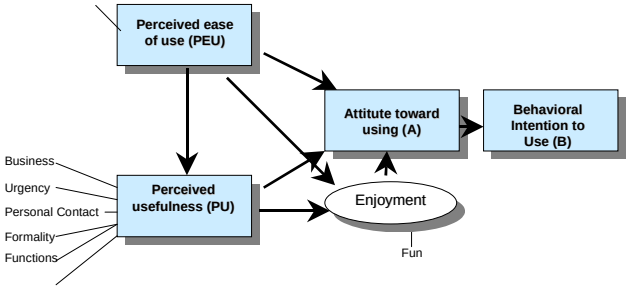
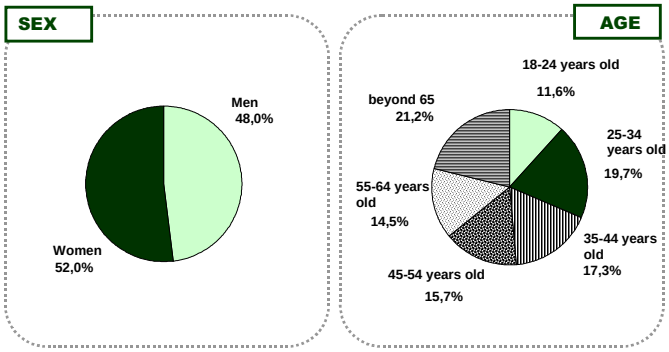


Figure 2 - Composition of the sample



Key items in the questionnaire used for analyzing the survey are as follows:

1. **Degree of service innovation** perceived by consumers. Respondents selected their answers from a list of innovative services categories;
2. **Interest** for the services categories under scrutiny;
3. **Preference** for means/platforms through which selected services can be accessed (portables, phone and/or Tv);
4. **Analysis** of key features of services (ease of use, speed, cost and usefulness);
5. **Ranking** of services features.

The services considered in the questionnaire are the following:

- interactive and real-time entertainment;
- data exchange among people and among people and various electronic devices;
- contextual and real-time shopping;
- portfolio and personal funds management;
- safety-related services;
- location-based services.

All the services have been considered rather innovative (the average is 7,1 on a 1-9 scale).

In terms of the interest expressed towards these services, the sample distributes as follows (see Figure 3).

Table 3 shows the mean features preferred by the people to be attracted to use these services.

"Usefulness" and easy of use are considered the most important variable in order to access the segments of population and, as shown in figure 4 and 5, there are different meaning assigned to these words.

Figure 3 – Interest expressed towards multimedia mobile services

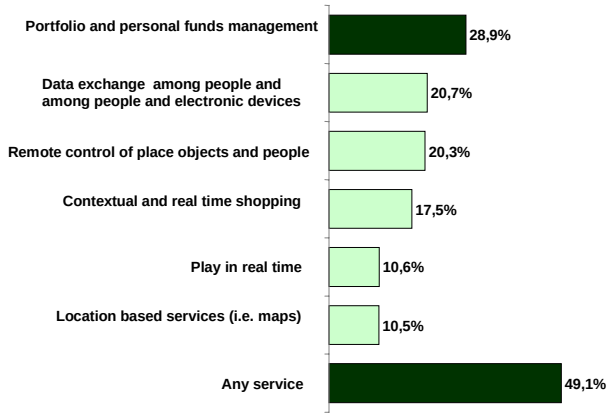


Table 3 – Features preferred

	Importance	
	Ranking	%
Usefulness	**1°**	31,3%
Easy of use	**2°**	26,7%
Price	**3°**	23,8%
Speed of use	**4°**	18,2%

Figure 4 – The meaning of usefulness

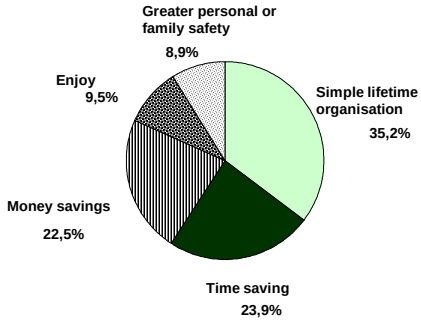
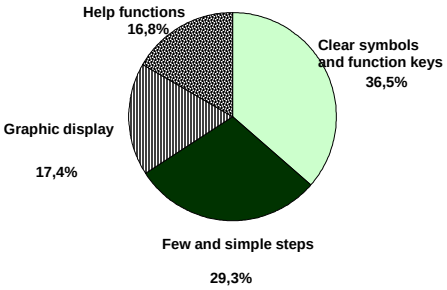


Figure 5 – The meaning of easy of use



The final objective of the research was to identify the key descriptive elements of homogeneous segments of the population. This is relevant in order to define the right strategies to offer the new services in the proper and differentiated way.

The most statistically powerful variable in order to distinguish the behaviors of people is the degree of interest towards the innovative services.

If we then clusterize the sample using this variable, and cross it with the socio-demo data, it turns out that the kind of activities performed in life by the consumers is the strong predictor of their future use of the new services.

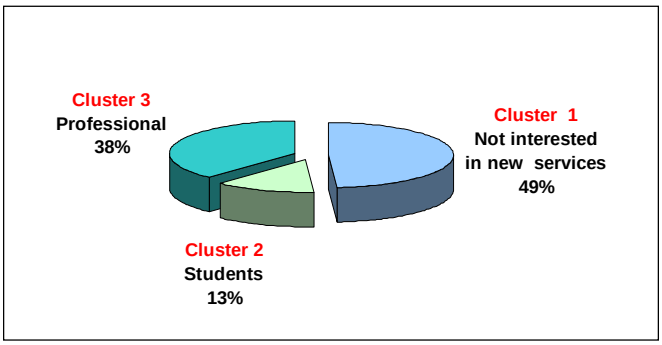
In particular, it is possible to describe two different segments as indicated in the following figure:

- cluster 1 is composed by people who declared they are not interested in the new services;
- the remaining 51% can be divided in two groups which are different in terms of the way firms should approach them to sell the new services.

The two segments are:

- the "professionals", that is people who mainly are managers or entrepreneurs in life, who are 38% of the interviewed base;
- the "students", who account for the remainder 13%.

Figure 6 – Main clusters of mobile users in the Italian market (base 1000 Italian mobile users)



The purpose is now to identify the variables network operators can use to access the identified clusters. This is an essential piece of information for crafting the right strategies in order to "catch" the segments.

The "professional" segment is made of people who look for *usefulness* as the almost exclusive variable in order to access and pay for the service.

The "students" segment is made of people who look mainly for *low-cost* and *convenience*.

For all the interviewed base, an interesting relationship emerges: the degree of interest is inversely related to the degree of knowledge of the service. In particular it has been noticed that people who declare a low level of interest in these services, are those who actually know least the main features and potential outcomes of these services, even though the interviewer deeply explained the meaning of each service.

4. CONCLUSION

In this research, we attempt to identify valid factors that predict a user's adoption of 3G mobile multimedia services.

The findings show key characteristics and factors playing decisive roles in the development of strategies for the launch of multimedia mobile services.

The findings of this study have significant implications also in the perspective of research on mobile consumer behavior. Our study provides further evidence on the appropriateness of using the TAM model to measure the different dimensions of actual multimedia mobile usage and it provides empirical evidence that PEU (perceived easy of use), PU (perceived usefulness) are important factors that influence the user's adoption of 3G multimedia mobile services.

The findings of the study suggest important practical implications for businesses currently providing mobile multimedia services as well as that are planning to do so. It is evident from this study that to influence adoption of 3G multimedia services, perceived ease of use (PEU) and perceived usefulness (PU) must be enhanced.

ENDNOTES

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