Chapter 10
Virtual Atmosphere, Emotions, Attitudes and Real Use:
When "Love is in the Air" in a Virtual Community

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ABSTRACT

This study involves several theories, namely: the theory of reasoned action, the technology acceptance model, the theory of planned behavior and the internet banking acceptance model. It aims to understand the relationships between the virtual atmosphere and emotional states, how the individual characteristics (social identity, altruism and telepresence) and emotional states influence attitudes, and how attitudes, past experience and trust influence actual use of a site. To this end, the authors developed three conceptual models explaining the relationships among the above-mentioned variables. Methodologically, descriptive statistics, exploratory factor analysis and the generalized maximum entropy estimator are used to test the three models in a wedding site. Of the eight hypotheses proposed, one can only partially validate hypotheses h1, h2, h3 and h6, while hypothesis h7 is accepted and the remaining are rejected.

INTRODUCTION

Consumer behavior is influenced by many factors. Individuals need to know in advance how their behavior influences and is influenced by others (Gefen & Straub, 2004; Gefen, 2000). However, as consumer behavior is difficult to control, the use of methods that could help understand consumer behavior has become essential to understand the individual's needs (Gefen, 2000).

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The influence of the environment on consumer behavior has been studied by psychologists. Even before traders consider this important area of study, landscapers, architects and interior decorators had already recognized consumer behavior as relevant (Donovan & Rossiter, 1982).

The world is constantly and rapidly changing, technology being currently one of its main engines. Digital technologies have contributed to consumer behavior modification constantly presenting new forms of marketing of goods and services (Schiffman & Kanuk, 2006).

Since the mid-1980s, with strong growth in the 1990s, several studies have allowed the construction of models that attempt to predict what behaviors might be associated with the acceptance of the technology. The continuous increase of such studies is justified by the significant growth in the presence of technology in our daily lives. Currently, it is relatively easy for any of us to access a computer, tablet or smartphone with internet access, and is increasingly simple and familiar to use them to make online purchases. However, to know how and why individuals use certain sites, especially those linked with very high involvement as is the case of wedding-related sites, are understudied and there is a lack of general knowledge about how users behave.

This research aggregates concepts associated with consumer behavior and environment, consumer emotions, consumer attitudes and actual use of an online service related to weddings. Moreover, one of the main contributions of this chapter is related to the evaluation of these variables in a virtual community. Another contribution is that this is the first study of its kind analyzing a virtual community using the generalized maximum entropy (GME) estimator, which is robust when using small samples sizes (micronumerosity).

This study has important contributions for several areas, namely for public relations, brand image and social media: firstly, it uses unique characteristics as virtual atmosphere, emotions and attitudes in a high-involvement virtual community; and secondly, it uses a robust estimation method when small samples are at stake, the GME.

For a better understanding of the relationships between consumer behavior and environment, consumer emotions, consumer attitudes and actual use of an online service, this study has the following main objectives:

- To understand what components of the virtual atmosphere have more influence on pleasure/arousal, as emotional states;
- To realize if individual characteristics (social identity, altruism and telepresence) and emotional states influence attitudes;
- To understand whether attitudes, past experience and trust influence the wedding site actual use;

CONSUMER BEHAVIOR

Solomon (2002, p. 24) defines consumer behavior as the study of the processes involved when individuals or groups select, buy, use or have products, services, ideas or experiences to satisfy needs and wants. Consumer behavior is seen as a continuous process of exchange where there is a transaction between two or more people who give and receive something of value (Solomon, 2002). Although the moment of exchange is an important part of consumer behavior, there is an increasingly tendency to include in this process the issues that influence the consumer before, during and after his/her purchase.

Pinheiro et al. (2006) defends interdisciplinarity as essential to the study of consumer behavior. This includes and combines concepts and methodologies of a wide field of knowledge such as psychology, economics, sociology, cultural anthropology, semiotics, demography and history.

Over time and based on the principle of interdisciplinarity, several thinkers and scientists from various fields made their theories about human behavior. As such, this chapter presents a summary of what the different theories defend, with special focus on the consumption. Among the various theories, the following ones are highlighted: the theory of economic rationality, behavioral theory, psychoanalytic theory and cognitive learning theory.

The theory of economic rationality is a theoretical approach centered on psychological utilitarianism, where consumer behavior is based on maximizing the degree of psychological satisfaction and pleasure obtained from the use of purchased products and services. That is, the study focuses on maximizing the benefits (satisfaction and pleasure) at the lowest possible cost (discomfort or suffering).

This theory states that the frequent use of a good (product or service) causes a decrease in the utility perception by consumers, in other words, the more you use that product or service, the degree of satisfaction received from its usage will continuously decrease (Giglio, 2005).

According to Pinheiro, Castro, Silva, and Nunes (2006) and Giglio (2005), the theory of economic rationality has some limitations because it is too focused on the effects that the purchase/use causes the consumer, not studying the psychological processes that give rise to the same purchase and not taking into account individual, social and cultural differences that determine the intention of consumption.

The behavioral theory highlights the importance of systematic study of the stimuli present in the consumer environment, because they produce reactions, positive (approach) or negative (removal) on consumers, compared to products available, consumption being considered as the set of physiological reactions and observable behavioral stimuli generated by those found in the environment (Pinheiro et al., (2006).

Pinheiro et al. (2006) suggest that the behavioral theory should be used as an alternative to the theory of economic rationality when it comes to understanding the cognitive, motivational and emotional processes involved in choosing and buying decision. However, because it only gives importance to extrinsic environmental factors, the need to study the consumer's mind arises, mainly the gap that occurs between stimulus presentation and the implementation or not of the purchase behavior, to better understand the purchasing process.

According to Pinheiro et al. (2006), for psychoanalytic theory, the human mind is divided into two spheres, one conscious, the other unconscious, knowing that the second has a strong determination on the former. Thus, the behavior expressed in consciousness is a distorted expression of repressed desires that reside in the unconscious.

In this theory, the intention to purchase is defined by desires, expectations, anxieties and conflicts that are located in the unconscious plan of the man´s mind. Consumption is then an attempt to satisfy these desires, projecting them in the products available in the market. The choice of products takes place according to the capacity of satisfying, even partially and temporarily unconscious impulses.

Considering the psychoanalytic theory, organizations should seek to create strategies that highlight features that awaken the unconscious desire of consumers (Giglio, 2005).

Today, cognitive learning theory is the most used by behavioral researchers because it integrates the aspects of the product, the consumer and the environment. This theory shows consumer behavior as a decision-making process where the individual solves problems and uses actively the information that surrounds itself in order to master its environment. Learning is determined by the best process that each

individual finds to retain new knowledge, new experiences, that is, learning consists of a change of the cognitive structure of the subject and is based on the way he perceives, selects, organizes and attributes meaning to objects and events (Solomon, 2002).

The cognitive theory of learning is emphasized by the importance of cognitive factors such as perception, motivation, learning, memory, attitudes, values and personality, socio-cultural factors such as group influence, family, culture and social class and even situational factors such as the localized influence of the environment at the time of purchase (Pinheiro et al., 2006). The individual learns by doing. The learning process is intentional. The individual seeks to learn due to its internal needs, its curiosity and its expectations (motivation).

According to this theory, the various purchasing decisions can be classified by the type of product, consumer motivation, frequency of purchase, search and information processing, according to the perception of the alternatives for the consumer and situational influences.

Beliefs, Attitudes and Behavior: Cognitivist Theory of Emotions

According to Kotler (1998), the consumer is the target of psychological, personal, social and cultural influences, as shown in Table 1.

Solomon (2002) based himself on these factors to develop its cognitivist theory of emotions, according to which the behavioral attitudes of individuals are sensitive to rational assessment and revision by them during the decision process before consumption.

Perceived attitudes of consumers are based on three components: affect, behavior and cognition, known as ABC. The feeling regards to how a consumer feels about an attitude object. The behavior includes the consumer's intention to do something about an object; however, not all intentions give rise to behaviors. Cognition refers to consumer beliefs about an attitude object.

All components (ABC) are important, but the relative importance varies according to the user's level of motivation in relation to the attitude object, depending on the level of involvement of consumers in the purchase decision.

The impact of these three components is explained by three effect hierarchies developed by researchers in the field: standard learning hierarchy, low engagement hierarchy and experiential hierarchy.

The standard learning hierarchy presupposes a high involvement in the purchase decision-making process. The consumer conducts a deep research about a particular product and develops a set of beliefs concerning the product. After evaluating these beliefs, a certain feeling about around the product is developed. This assessment leads to a certain behavior, or in other words, a positive or negative purchase decision. In this case, the user's action is the result of consumer's cognitive information positioning.

Table 1. Factors that influence the purchase decision process

Buyer			
Cultural Factors	**Social Factors**	**Personal Factors**	**Psychological Factors**
• Culture • Subculture • Social Classes	• Reference Groups • Family • Roles and social positions	• Age and stage of life cycle • Occupation • Economic conditions • Lifestyle • Personality	• Motivation • Perception • Learning • Beliefs and Attitudes

Source: Kotler (1998)

In low-involvement hierarchy the consumer does not have a strong preference for a brand, it acts based on the knowledge it already has about the product and limits itself to evaluating it, after purchasing it. The choice made by the consumer is enhanced by good or bad experiences with the product after purchase. Clearly, the consumer attitude is based on the learning processes that result from consumer behavior.

Experiential hierarchy emphasizes the importance of emotional response as a central-spectrum attitude. Thus, the consumer acts upon the emotional responses and their attitudes can be influenced by intangible product attributes, such as the package design, where the consumer attitude is based on the hedonic consumption.

STORE ATMOSPHERE

For most consumers, a particular store, regardless of the product offering, may be more or less attractive than another if it is able to induce in them welfare sensations rather than convey feelings of irritation or annoyance. Spies, Hesse and Loesch (1997) state that consumers tend to spend more money when they are in a positive frame of mind than when they are more negative. Thus, there is a direct relationship between the store features (atmosphere) and buying behavior of consumers, which should be explored in order to maximize consumption.

Baker (1986) presented a typology of three categories to characterize the elements of the store environment: the social, environmental and design factors. Social factors relate to people that are in the store, whether customers or employees. The design factors relate to visual elements that make up the store environment, such as color, layout, cleanliness and signs. Environmental factors are not visual elements of the environment, such as temperature, light, music and the smell (Baker, Grewal, & Parasuraman, 1994).

Bitner (1992) divided the components of the atmosphere into three groups: environmental conditions, space and functionality, and symbols, signs and artifacts. Environmental conditions include temperature, lighting, noise, music and the smell. The spatial arrangement is related to how the machinery, equipment and furniture are arranged in space, as well as the shape and size of these. Functionality refers to the ability of these elements to facilitate the performance and the achievement of the objectives of consumers. The symbols, signs and artifacts are used to identify a location, indicate a direction or communicate the behavior rules of the place and may be indications of the company name, location of entrances and exits or indication of local permissions and prohibitions (Bitner, 1992).

The physical store has the ability to appeal to all senses of the individual through endless combination of environmental elements, structural, social and aesthetic; however, in the online store, the store environment is limited to a screen, making it impossible to use the same taxonomy of the atmosphere elements (Eroglu, Machleit, & Davis, 2001).

In the virtual environment, Eroglu et al. (2001) consider that the store's atmosphere has two categories of elements: high relevance tasks and low relevance tasks. The highly relevant tasks refer to descriptive of the site, verbal or images that appear on the screen and that facilitate and enable the goal of buying by the consumer. Examples of such stimuli are the description of the goods, the price, terms of sale, delivery and return policies, availability of samples and site maps or search functions. The low relevance tasks refer to the information of the site that is not important for the purchase itself, although they may make the purchase experience more enjoyable, such as colors, background patterns, fonts, animations, music, the blanks, among others (Eroglu et al., 2001).

Hausman and Siekpe (2009) divided the elements of the atmosphere as computational factors and human factors. The computational factors are those whose presence provides functionality, being characterized as highly relevant tasks. These include the technical aspects, the navigation aspects, impartiality and information content. Human factors are elements that contribute to user satisfaction when using the site, being low relevance tasks. These elements can be the specific pleasure, cognitive result, reliability, user training, the visual appearance and organization of the information content.

By studying the effects of the store's atmosphere in consumer purchasing behavior, the SOR (stimuli, organism, and response) model was derived from environmental psychology (Donovan & Rossiter, 1982; Eroglu et al., 2001; Koo & Ju, 2010; Mehrabian & Russell, 1974). Mehrabian and Russell (1974) suggest that the model should have the following components: a taxonomy of stimuli, a set of intermediate variables and a response taxonomy. The stimuli function as a history of emotional states of the consumer (organism), whose response can result in purchasing behavior (response) (Donovan & Rossiter, 1982; Koo & Ju, 2010; Mehrabian & Russell, 1974).

Donovan and Rossiter (1982) applied the model for the first time to the retail context. The components of the shop's atmosphere were considered the stimulus, the emotional states (pleasure, arousal and dominance) the organism and the attitudes and intent of behavior (approach and retraction) the answer.

The stimuli (S) are the physical characteristics used during the creation of the environment, being represented by a set of attributes that affect consumer perceptions (Eroglu et al., 2001; Sherman, Mathur, & Smith, 1997). These attributes enter the consumer's mind consciously or unconsciously waking him or urging him to action (Koo & Ju, 2010). An appropriate taxonomy of stimuli is difficult to achieve because any environmental setting has a large number of stimuli involved. It takes a lot of experience in the store to determine what kind of stimulus evokes that kind of emotional response in order to result in an approach/ retraction behavior (Donovan & Rossiter, 1982).

The organism (O) refers to the internal processes and structures involved between external stimuli to the individual and his reactions, final actions or responses emitted by the consumer (Sherman et al., 1997), which cause changes in the emotional and cognitive state of the consumer (Koo & Ju, 2010). The consumer converts the stimuli into meaningful information and uses it to understand the environment before making any judgment or draw any conclusions. These processes are based on perception, physiological, feeling and thought activities. Perception can be characterized by the judgments that a consumer has when he/she comes into contact with the price of a product. Physiological activities can be produced by agglomeration in the shop, resulting in the consumer's perspiration. Feeling is expressed in terms of agitation, enjoyment and arousal and is derived from the feeling achieved during shopping trip (Koo & Ju, 2010).

Mehrabian and Russell (1974) defend that there are three emotional states that moderate the approach and retraction behavior: pleasure, arousal and dominance, known as PAD. Donovan and Rossiter (1982) and Sherman et al. (1997) stated that any environment can produce an emotional state that can be characterized in any of the PAD dimensions.

Pleasure refers to the degree to which an individual feels good, cheerful, happy or satisfied in a given situation. Pleasure is related to how an individual feels encouraged by the atmosphere, or excited, active or alert in a certain situation. Dominance refers to the control an individual feels over the situation (Donovan & Rossiter, 1982; Koo & Ju, 2010; Wu, Cheng, & Yen, 2008). However, Donovan and Rossiter (1982) decided to exclude dominance of the model, because they consider that this dimension requires a cognitive interpretation by the individual, making it not purely applicable in situations that require emotional responses (Donovan & Rossiter, 1982; Eroglu et al., 2001; Koo & Ju, 2010; Sherman et al, 1997).

The response (R) is the final result, or the final action, of consumers, that include psychological reactions that express their satisfaction or dissatisfaction with the consumption experience (Koo & Ju, 2010; Sherman et al., 1997). Mehrabian and Russell (1974) state that all responses to an environment should be considered as approximation or withdrawal behaviors, considering four antagonistic aspects: approximation behaviors are reflected as positive responses like a "physical" desire to stay in a particular environment; the desire to explore the environment; the desire to communicate with other individuals in the environment; the degree of improvement of "performance and satisfaction" of tasks. Retraction behaviors are negative responses like "physical" desires of leaving a given environment; a tendency to remain inanimate in the environment; avoid interaction with other individuals in the environment; the degree of retreat of the "performance and satisfaction" with tasks (Donovan & Rossiter, 1982).

Eroglu et al. (2001) applied the model to the online retail context. They propose that some of the atmospheres of the virtual store, mediated by the involvement and the atmospheric response, influence the internal affective and cognitive states of consumers that involve themselves in the type of response (clearance or approach) that consumers have given the online shopping experience.

Eroglu, Machleit, and Davis (2003) empirically tested the model presented showing the significant effect of the atmosphere of the site on consumer attitudes, satisfaction and in approach behaviors.

Following the study of Eroglu et al. (2001), Koo and Ju (2010) they developed a research model in order to test the effect of the atmospheric stimuli of online stores in the emotional states of consumers, which, in turn, influence their buying intentions. They state that the stimuli are the atmospheric elements of virtual stores (graphics, colors, links and menus), the organism is the set of emotions (pleasure and arousal) that translate the feeling of users when they search and buy products online. The answer is the set of intentions that the consumer presents (continue or not to use the online store). Here, perceptual curiosity is introduced as a moderating variable between stimuli and the emotions of consumers (Koo & Ju, 2010).

The results are not uniform. While Eroglu at al. (2003) confirm that most of the atmospheric stimuli (graphics, colors, links and menus) have a positive impact on pleasure and arousal, which in turn affect the costumers' intention, Koo and Ju (2010) and Mummalaneni (2005) contend, on the other hand, that menus have a negative impact on the consumer's emotions.

TECHNOLOGY ACCEPTANCE MODEL

Since the early 1980s (Yuanquan, Jiayin, & Huaying, 2008) the need to understand the relationship between technology and the consumer began to emerge, but it was during the 1990s, especially in the second half of the decade, that the research in this area took considerable proportions (Silva & Dias, 2007). Given the principles of consumer behavior and the need to adapt that understanding to the constant technological changes, the researchers sought to build models to better understand the impact of technology on human behavior. Consumers who use the technologies are called users.

Nowadays, it is easy to understand the reason of this sudden need. The truth is that, as Silva and Dias (2007) report, the amount of information flowing through the information systems is so vast that it is impossible to manipulate it without the help of technology. However, according to Davis (1989), the important thing is not the capacity of the technological system, but rather the acceptance of the technology by the user. Davis (1989) considers that the reason why a certain technology is or is not used is of great importance. The truth is that possible failures of technology are directly connected with the non-

acceptance by the target audience, as well as the inappropriate use of it. Individuals are no longer the targets of technology, starting to become the responsible ones for it, as active elements.

The theory of reasoned action (TRA) is considered by many researchers as the first concrete model with applicability in measuring the acceptance of technologies by users (Moutinho & Roazzi, 2010).

This theory accepts the principle of man's rationality and defends their ability to assimilate and transform information into effective decisions that directly influence their behavior (Moutinho & Roazzi, 2010). The success of this model is due to its applicability in the analysis of dependent behavior of a direct intention of the individual, that is, the TRA believes that people behave rationally, evaluating the environmental conditions to decide whether to perform or not a particular behavioral intention.

For Fishbein and Ajzen (1975), the main objectives of the TRA model are: (1) understand and predict the behavior of individuals and (2) identify accurately the degree of intent with which the individual has those behaviors. In turn, this behavior intention has two basic determinants (Moutinho & Roazzi, 2010): (1) the behavioral attitude, referring to the personal aspects, and (2) the subjective standard, with reference to social influence.

In the mid-1980s, Fred Davis was invited by the Massachusetts Institute of Technology (MIT) to build a research whose assumption was the assessment of the market potential for new products of the brand IBM Canada and to obtain an explanation of the determining factors in the use of computers (Silva & Dias, 2007). In 1986, Davis, considered by many the "father" of TAM, proposed in his doctoral thesis (Dias, Zwicker, & Vicentin, 2003) a TAM model that was intended to focus on the reasons why users accept or reject the new technology and to provide proposals regarding how to improve the acceptance process, providing a support for prediction and explanation of acceptance levels of a certain technology. Since its introduction, this model has been tested extensively by many researchers and it is assumed that it correctly forecast the use of technology in more than 40% of the situations (Dias et al., 2003).

Davis' model is an adaptation of the TRA, proposed by Fishbein and Ajzen (1975), where it is assumed, as already mentioned, that the beliefs, attitudes and intentions are basic assumptions for the understanding of a particular behavior.

Davis added to this specific model for information technology (Silva & Dias, 2007) two basic constructs to predict behavioral intention of an individual in respect of information systems and technologies: perceived ease of use and perceived usefulness (Dias et al ., 2003).

Perceived ease of use refers to the degree to which a user believes that by using a system he/she will be free for effort, so this system does not raise difficulties or obstacles in its use. While the perceived usefulness refers to the degree that a user associates to the belief that using this system will be able to improve their performance, that is, by streamlining their tasks, they increase their performance level (Dias et al. 2003; Silva & Dias, 2007).

These beliefs are interconnected since both assume that the individual will have a sense of satisfaction with the use of technology, resulting therefore in positive results. Both these constructs are conditioned by external variables (e.g. situational and socio-cultural factors).

Consequently, the perception obtained on the perceived ease of use and perceived usefulness, allow the individual to generate a set of attitudes that may or may not influence the intention of a certain behavior to use the technology in question. The correlation between all these elements is essential for understanding of the results obtained from the analysis of acceptable levels of an information technology system.

According to Silva and Dias (2007, p. 83), "the use of information systems would be mainly determined by the intention of use that the individual shows."

In turn, this behavioral intention to use will be substantiated by the real use of technology and the perceived utility before it. The idea that is obtained is that the more the feelings toward technology are positive, the greater the intended use and there will be a greater propensity to actual use, therefore, higher the acceptance.

TAM, as a behavioral model, can only be considered taking into principal the issues related to the user, their perceptions and motivations related to the use of the system.

The usefulness of this model transcends the ability to forecast the degree of acceptance of the technology by identifying the reason for non-acceptance, if any, allowing for corrections and improvements.

The Theory of Planned Behavior (TPB) appears as an extension of the TRA, about a decade later, being proposed by Icek Ajzen (Silva & Dias, 2007).

Ajzen complements the TRA adding the construct of perceived behavioral control, noting that the intentions and behaviors may also be influenced by other factors, such as the individual´s current habits or past behaviors and their results. Some behaviors are so habitual and routine that individuals are not fully aware of what led them to act, as if they had no voluntary power over this action (Moutinho & Roazzi, 2010). TPB adds to the TRA the existence of beliefs about control that are referred as the perceived behavioral control. These are related to the perception of control that the individual has, or not, on their behavior and the degree of ease and / or difficulty encountered while implementing it (Moutinho & Roazzi, 2010).

TPB seeks to predict and explain human behavior in specific environments and conditions (Silva & Dias, 2007). It is assumed that an individual in full control of a situation may act in accordance with the intention of previous behavior or not: in fact behavioral intentions reflect only the motivation to act, while the execution of an action does not only depend on this, but also on the greater or lesser control over the behavior (Moutinho & Roazzi, 2010).

The internet banking acceptance model (IBAM) derives from the need that Alsajjan and Dennis (2009) found to measure the degree in which online banks were accepted by consumers. The authors observed that the most used models to measure the adoption of e-commerce were the behavioral models such as the TAM and TPB and decided to adopt them to the online banking context. Later, Dennis, Jayawardhena, and Papamatthaiou (2010) considered the model was extendable to online businesses in general.

By investigating about TAM, Alsajjan and Dennis (2009) found that some previous studies on TAM suggested that the perceived usefulness and perceived ease of use were not the only constructs that mediated the impact of external variables on attitudes and intentions and they also added that the perceived ease of use has no direct impact on attitudes.

Alsajjan and Dennis (2009) also analyzed the perceived behavior control of TPB, which they considered is a close measure of the perceived use of the TAM. This behavioral control tries to assess difficult behaviors in the adoption of technology while perceived ease of use relates to the individual's self-efficacy. Thus, they interpreted the perceived ease of use and the perceived behavioral control as a single construct, the perceived viability. They also added the variable trust as they consider it as "the heart of all kinds of relationships" (Alsajjan & Dennis, 2009, p. 958).

Gefen, Karahanna, and Straub (2003) add that any technology acceptance model which presents more social dimensions should include trust, especially when it involves uncertainty and risk, as in the case of online banking or e-commerce itself.

VIRTUAL COMMUNITIES

Humans are social animals; they are all part of groups, where each individual tries to please others, following clues of how to behave by watching others around him/her (Solomon, 2002). The term reference group is defined as an individual or group capable of having significant relevance in the ratings, aspirations and behaviors of an individual (Solomon, 2002), and has been subject to new perspectives as such groups are identified as being loyal to a product or an activity (Solomon, 2002).

Reference group is considered to be any person or group of persons exercising influence, consciously or unconsciously, on the behavior of an individual (Bearden & Etzel, 1982) and may be composed of family, friends or colleagues, whose opinion is considered important / relevant (Valck, Bruggen, & Wierenga, 2009).

A reference group can exert influence on consumer decisions, since the attitude, values and behavior of its members represent standards that the individual uses to make his/her own assessments. However, the degree of this influence depends on the personality of the individual, the nature of the product and social factors (Leal, Hor-Meyll, & Pessôa, 2013). An individual with no experience or information about a product is more easily influenced by the advice or examples of others who he/she considers reliable, as they have similar values to theirs, thus influencing their purchase decision (Shen, Huang, Chu, & Liao, 2010).

In today's world, internet is increasingly used by consumers to communicate, both with companies, in exchange for information or transaction of goods and services, and among each other, sharing views and experiences about a good or service (Thomsen, Straubhaar, & Bolyard, 1998). The communication over internet allows consumers to overcome geographical and temporal barriers that previously existed facilitating the creation of reference groups based on common interests, many of them related to consumption (Leal et al., 2013), called virtual communities.

Virtual communities are social aggregations as chats, fora and social networks through which people with the same interests, experiences, tasks and concerns can interact with each other (McKnight, Choudhury, & Kacmar, 2002) for a period of time and a certain degree of engagement, to create personal relationships (Hagel & Armstrong, 1997; Leal et al, 2013; Valck et al., 2009; Wu, Chen, & Chung, 2010), where members tend to act as if these societies exist physically, governed by common rules, values and codes of conduct (Hagel & Armstrong, 1997; Leal et al., 2013)

An individual, at the time of joining a virtual community, usually is not familiar with the environment, with the community members, or with the codes of conduct as he/she does not have many social ties or commitments to the community; their visits are used to acquire information and gain knowledge (Leal et al., 2013). However, over time, the lack of initial knowledge is overcome and the individual becomes more confident in the exchange of information and increases the regularity of participations (Langerak, Verhorf, Verlegh, &Valck, 2004).

The access to information, the desire to interact socially and the interest in finding specific information related to a purchase decision are amongst the most common reasons to generate a virtual community (Ridings, Gefen, & Arinze, 2006): Social interaction is very strong involving time, effort and empathy in helping each other. This investment is made without interest in retribution; however, the individual expects to be compensated in the form of gratitude or mutual aid (Chan & Li, 2010).

The information exchanged in virtual communities' influences purchasing decisions as they are understood by consumers as coming from consumption partners and, as such, without commercial interest or manipulation intent (Shen et al., 2010).

A virtual community has both social and business functions. From a social perspective, the virtual community promotes interaction between individuals through a communication platform and social network. The objective of its members is to develop friendships, share interests and exchange information (Hagel & Armstrong, 1997; Wu et al., 2010). From a business point of view, the virtual community works as a commerce and marketing platform that allows interaction between vendors, intermediaries and buyers (Schubert & Ginsburg, 2000; Wu et al., 2010) with three main functions (Hagel & Armstrong, 1997; Wu et al., 2010): to allow suppliers to leverage the ideas of consumers in terms of design and customization of new products; to serve as an incentive mechanism to transaction trends and; to reach a large mass of individuals at reduced costs. Virtual communities are still relatively informal and their business value depends on the willingness of consumers to exchange information. For a community to be profitable traffic flow must be constant and loyalty to the site is mandatory (Wu et al., 2010).

The biggest difference between these groups on the Internet groups is that their participation is voluntary, conscious and written, so it is possible to consider carefully about what one would write (Bagozzi & Dholakia, 2002; Leal et al., 2013), while in the traditional reference group participation can be imposed by factors such as the proximity of residence. In virtual communities people are free to participate or not and can always decide on not being a part of the group when it ceases to be of interest to them. This can make the virtual communities most influential than traditional communities where the individual does not always feel deeply connected with it (Valck et al., 2009).

INDIVIDUAL CHARACTERISTICS

Most information systems are task-oriented, i.e., they aim to provide useful information for users to improve their decision making. Thus, many studies have attempted to examine the cause-effect relationships between environmental and human characteristics and the intention to use a system (Kwon & Wen, 2010).

Technology acceptance models set out in this chapter provide some variables to connect the individual characteristics and intention to use. However, when it comes to online communities, where there is a human relationship involved, these variables seem not to be enough. Thus, the social identity, altruism and telepresence dimensions are considered relevant for this study.

Social identity derives from social psychology, but has recently been expanded to the area of organizational research (Ashforth & Mael, 1989), being characterized by the solidarity that an individual has to the social group to which it belongs to according to his/her social norms, which discriminates him/her from other groups (Riedlinger, Gallois, McKay, & Pittam, 2004).

In online communities, social identity is the perception of belonging to a community where individuals are motivated to interact with each other, being able to influence their attitudes (Kwon & Wen, 2010).

Kwon and Wen (2010) classify altruism in two types: genetic altruism and reciprocal altruism. Genetic altruism is when an individual sacrifices him/herself in favor of another, i.e., to help others knowing that this might bring him/her negative consequences, while reciprocal altruism happens when an individual helps another based on the belief that he/she will also be helped by the other in the future (Ashtona, Paunonen, Helmes, & Jackson, 1998), without the intention of having any reward, but a reciprocal help.

Altruism is considered a strong candidate to explain human behavior although it is still difficult to understand due to the economic vision of society that is oriented to the maximization of personal profits (Kwon & Wen, 2010).

Telepresence exists to describe a type of feeling that the user is exposed to when in a virtual environment. The user feels like he is in the environment, as if physically there, although he is only connected virtually (Kwon & Wen, 2010). That is, in the case of virtual communities the user feels like he/she is really directly contacting with other users, even though the contact is only virtual and not physical.

This sense of telepresence allows the user to create human relationships with other users who are remotely located and if the experience is considered as positive, it is expected to develop positive attitudes (Kwon & Wen, 2010; Li et al., 2002). Telepresence also seems to influence the person interactivity and subjective norms (Walther 1996) by converting the cognitively generated experiences produced by machine and person interactivity into the simulated perception of direct experience of a real shopping environment (Suntornpithug & Khamalah, 2010).

TRUST AND PAST EXPERIENCE

Moorman, Deshpande, and Zaltman (1993) defined trust as the willingness to rely on somebody that you believe in. For Morgan and Hunt (1994) trust is the perception to believe in the partner's reliability and integrity. In a more commercial context, Corbitt, Thanasankit, and Yi (2003, 204) consider that trust is "the expectation that the other party will behave in accordance with their commitments, negotiate honestly and not take advantage, even if the opportunity arises."

In the literature, many authors consider that trust is crucial in the relationship between businesses and consumers (Brei, 2001; Corbitt et al. 2003; Moorman et al., 1993; Morgan & Hunt, 1994). More specifically, they consider it a central aspect in the online purchase intentions (Corbitt et al. 2003; Fortin, Dholakia, & Dholakia, 2002; Goode & Harris, 2007; Lee & Turban, 2001).

The lack of trust is considered the most serious problems in online activities knowing that it is not easy to maintain loyalty in the environment. The community needs to develop ways to encourage members to believe in each other and to be loyal. Trust is the way to attract an individual to participate in a virtual community and to remain faithful to it (Wu & Tsang, 2008).

Dennis, Merrilees, Jayawardhena, and Wright (2009) suggested that online consumer trust would have a positive effect on the intentions of that consumer. In the same year, Alsajjan and Dennis (2009), with its IBAM model proved that purpose on the online bank. Subsequently, Dennis et al. (2010) considered that this model could be extended to online businesses in general, and therefore that online consumer trust influences their intentions.

The study by Kim, Ferrin, and Rao (2008) confirms that consumer trust influences directly and indirectly its intention to purchase, having a positive effect on it, especially in electronic context. The authors also state that trust is the strongest predictors of purchase intentions.

With regard to virtual communities, trust is an important catalyst to facilitate social interaction and relationships in the long term (Wu et al., 2010).

Gefen (2000) argues that familiarity is another way for individuals to reduce uncertainty and simplify their relationships with others. This is an understanding of what, why, where and when others do what they do, often based on previous interactions, experiences and learnings.

The model of Klein (1998) suggests that online shopping past experience is a significant antecedent of internet research behavior. Shim, Eastlick, Lotz, and Warrington (2001) stated that previous shopping experiences are positively related to online purchase intentions. Familiarity allows consumers to deter-

mine future expectations and create ideas about these future expectations based on previous interactions (Chen & Barnes, 2007).

Shim and Drake (1990) stated that as online consumers become more experienced, their trust increases and tend to buy more and to become less concerned with uncertainty.

That said, trust and familiarity are truly different: familiarity refers to the understanding of current attitudes of others, trust is related to beliefs about future actions that are more dynamic, complex and risky (Gefen, 2000). Familiarity reduces uncertainty by establishing a structure; trust reduces uncertainty letting people hold relatively reliable expectations on favorable actions of others (Gefen, 2000).

In line with Hoffman et al. (1999) and Suntornpithug & Khamalah (2010) study, customer's lack of perceived behavioral control is assumed to reflect past experience as well as anticipated obstacles. As such, past experience and trust are expected to positively influence real use.

WEDDING AND EMOTIONS

Marriage is an ancient institution that is based on two traditional pillars: a psychological (emotional) contract largely unconscious and a transition to a cohabitation that leads to a more intrinsic relationship between both partner's elements (Fonseca & Duarte, 2014).

The prenuptial period is important as it antecedes the constitution of the couple and consists of a period of time where emotions and the excitement of creating a new identity sense are important. It is a period where there is a strong individualization process that allows both spouses analyze their differences and shape to each other, ensuring their individualities.

Love and intimate relationships are part of individuals every day's life (Wright, Simmons, & Campbell, 2007). They are also a basic need to love and be loved (Fletcher, 2002). Although marriage is the most common form of the official intimate relationships, in Portugal there has been a progressive growing of other forms of cohabitation as previous experience to marriage (Leite, 2003).

Although the formal role of marriage as essential unit of economic survival gave way to a symbol of individual freedom enjoyed in Western societies (Leite, 2003), it has always associated a romantic ideal of love (Acevedo & Aron, 2009; Duarte, 2011; Ribeiro, 2002).

Nowadays we are witnessing a change of values and representations about marriage and its purposes, denoting a more secular and devaluating the sacramental and institutional vision aspect (Leite, 2003). To Aboim (2005), Portugal and the western world is witnessing a plural form and definition of marriage involving dating, living together, cohabitation as a variable set of transitory informal marital experiences. In general, the research reflects the continuing desire to celebrate the marriage, regardless of their informal marital experience, being positively perceived by young people, particularly as a commitment (Martin, Specter, Martin, & Martin, 2003).

The expectations from each partner, the expectations for marriage, the expectations of and for both families of origin, the expectations for marriage as an institution and the ideal partner image or concept are well expressed in the epigenetic model of marital expectations proposed by Bhatti (1993).

There are several factors that influence expectations about marriage: social norms and the sociocultural context (Juvva & Bhatti, 2006), the structure and family experiences since childhood (Flouri & Buchanan, 2001), and the experience gained with the partners and romantic relationships they have established (Hall, 2006).

It is worth mentioning that most studies that analyze online services are based on the transaction of products. This study aims to analyze consumer behavior based on an online community related to marriage, which is an intangible concept.

METHODOLOGY AND DATA

In the former sections a review of the literature covered the main topics of this chapter: consumer behavior and environment, consumer emotions, consumer attitudes and actual use of an online service. As referred above this study has the following main objectives:

- To understand what components of the virtual atmosphere have more influence on pleasure/arousal, as emotional states;
- To realize if individual characteristics (social identity, altruism and telepresence) and emotional states influence attitudes;
- To understand whether attitudes, past experience and trust influence online site actual use;

This research focuses on the study of the behavior of individuals participating in an online community related with wedding: the site www.onossocasamento.pt. As such, from the review of previous literature, the problem was delimited, and we proceeded with the formulation of hypotheses and subsequent data collection.

Models and Hypotheses

In this study the influence of the virtual atmosphere in the real use of a system is going to be analyzed.

To develop this model, we started with the Mehrabian and Russell's (1974) SOR model. The virtual atmosphere constructs, conceptualized by graphical components, colors, links and menus and emotions, conceptualized by pleasure and arousal, were withdrew from Koo and Ju (2010). Situational attitudes, perceived ease of use, perceived usefulness and subjective norm were considered as components of attitude.

Although the connection between emotions and attitudes has not been addressed before, they are often referred to as antecedents of intention to use, particularly in the theory of reasoned action, technology acceptance model and theory of planned behavior. As such, it was decided to test the relationship of emotions as antecedents of attitudes.

Individual characteristics, more specifically the social identity, altruism and telepresence, were proposed by Kwon and Wen (2010) as antecedents of perceived ease of use, perceived usefulness and perceived encouragement.

Trust comes from the online bank acceptance model suggested by Alsajjan and Dennis (2009), which can be extended to online commerce in general. Past experiences have been proposed by Dennis et al. (2009) for a review of the site real use. The evaluation of real use is supported by the theory of rational action, the technology acceptance model and the theory of planned behavior.

In accordance with the research objectives, a questionnaire-based quantitative approach was adopted, which was developed by extensively reviewing the literature on virtual atmosphere, emotions, social identify, altruism, telepresence, attitude, trust, past and real use, to identify reliable measures used in

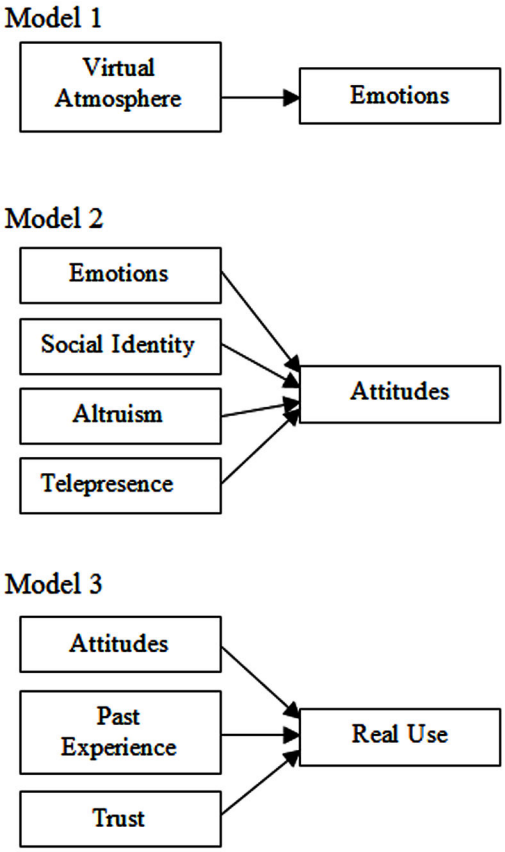
previous studies. Based on the theoretical background, we established and tested three research models, as shown in Figure 1, and the detailed hypotheses were defined.

Based on the literature review performed previously, and based on the presented models, following research hypotheses are put forward:

H1: The virtual atmosphere has a positive effect on emotions;
H2: Emotions have a positive effect on attitudes;
H3: Social identity has a positive effect on attitudes;
H4: Altruism has a positive effect on attitudes;
H5: Telepresence has a positive effect on attitudes;
H6: Attitudes have a positive effect in real use;
H7: Past experiences have a positive effect in real use;
H8: Trust has a positive effect on real use.

In order to assess the validity of the hypotheses, we built a questionnaire for members of online communities related to the event "Marriage". The questionnaire consists of ten sets of questions, one for each main construct being assessed: virtual atmosphere, emotions, attitudes, social identity, altruism, telepresence, trust, past experiences and real use.

Figure 1. Models Proposed



The Virtual atmosphere is composed of four different constructs, as shown in Table 2: Graphics (four items); Colors (three items); Links (four items); and Menus (four items). Social identity and altruism and telepresence were adapted from Kwon and Wen (2010). These are shown in Tables 3, 4, and 5. Emotions are subdivided in two constructs: Pleasure (five items) and arousal (four items). These two scales were adapted from Koo and Ju (2010), as shown in Table 6.

Attitude is a variable composed of four different constructs: Situational attitude, Perceived utility, Perceived ease of use, and Subjective norm. Situational attitude uses five items adapted from Suntornpithug and Khamalah (2010). The four items of perceived utility are adapted from Lee (2008). Perceived ease of use uses four items adapted from Venkatesh and Davis (2000) and Venkatesh and Morris (2000). Finally, Subjective norm uses three items adapted from Suntornpithug and Khamalah (2010). The items and constructs that compose attitude are shown in Table 7. Trust, which is shown in Table 8, was adapted from Suntornpithug and Khamalah (2010). Finally, Actual use, as shown in Table 9, was adapted from Kwon and Wen (2010).

The study was carried out between October 2013 and February 2014 on "Our wedding" website (in Portuguese: "O nosso casamento"; www.onossocasamento.pt). The questionnaire required the knowledge of the users concerning the different services and platforms available on the website. The

Table 2. Items and constructs that compose Virtual Atmosphere

Graphics	**Source**
It is fun watching the graphics such as picture, animation in the website. The website looks nice because of graphics. The graphics in the website are beautiful. The graphics of the website are visually comforting.	Adapted from Koo & Ju (2010)
Colors	
The website emphasizes newly displayed merchandises with distinctive colors. The colors in the website are visually appealing. Visually appealing colors are used in the website to distinguish important contents and emphasized parts from others.	
Links	
The website presents buttons and/or paths to help customers find products/services. The website shows buttons and shortcut paths to make customers find out products they already know. The website makes it possible to find out what customers want within three clicks from the first page. The website provides convenient links to move into the sub-sites.	
Menu	
The menus of the websites appear clean and neat. The segmentations of the website are quite satisfying. Menus of the website fit with the website design. Menus of the website are consistent with the overall style.	

Table 3. Items of Social Identity

	Source
As a member of the community, my position is very important to me. As a member of the community, I am the type of person who likes to engage in my community. Activities in my community are the important part in my life.	Adapted from Kwon & Wen (2010)

Table 4. Items of Altruism

	Source
I tend to encourage people who are in a real crisis or need. I usually help people when they ask me the solution. I give congratulation when people tell me good news.	Adapted from Kwon & Wen (2010)

Table 5. Items of Telepresence

	Source
When my online visit ends, I felt like I actually met other people. I felt that this site creates a new world. While engaged with this site, I felt I was in a different society. While engaged with this site, the site's world was more real or present to me compared to the "real world".	Adapted from Kwon & Wen (2010)

Table 6. Ite ms and constructs that compose Emotions

Pleasure	**Source**
Using online shopping site is Contented–depressed Happy–unhappy Satisfied–unsatisfied Pleased–annoyed Free–restricted	Adapted from Koo & Ju (2010)
Arousal	
When I use online shopping stores, I'm Aroused–not aroused Wide awake–sleepy Excited–calm Frenzied–sluggish	

questionnaire was posted online on "Our wedding" website forum and users were kindly asked to answer the questionnaire. With this strategy, there is no interviewer bias since the interviewer played no part in the interview process. Although this cannot be considered a random sampling procedure, the initial idea was to implement a process of systematic random sampling. In future work, a fully random sampling procedure should be accomplished. Traditional approaches to minimize non-responses were also implemented in this study.

The population under study is all the users of "Our wedding" website and the sample is composed of 72 voluntary answers from website users (76.4% female, 23.6% male; 1.4% less than 21 years old, 73.6% between 21 and 30 years old, 22.2% between 31 and 40 years old, 2.8% more than 40 years old).

All constructs were measured using a likert scale with 'strongly disagree' and 'strongly agree' options as the anchors. The initial questionnaire was based on practical experience gained from rigorous analysis provided by academics and online experts to validate its construction, language clarity and to obtain comments and suggestions to improve its readability. The questionnaire was pretested with 20 master students to evaluate its consistency.

Table 7. Items and constructs of Attitudes

Situational Attitude	**Source**
Shopping with this online store is pleasant. Shopping with this online store has many benefits (e.g., fast, easy, convenient, and etc.). I am content shopping with this online store. Shopping with this online store satisfies my needs. In general, I have good attitudes toward online shopping with this online store.	Adapted from Suntornpithug & Khamalah (2010)
Perceived Usefulness	**Source**
This site enables me acquire more information or perform my searches. Using this site would improve my efficiency when doing my searches. This site is a useful. Generically, this site is of added value.	Adapted from Lee (2008)
Perceived Ease of Use	**Source**
My intention when using this site was clear and comprehensible. Interacting with this site does not demand a lot of mental effort. The process of using this site is clear and understandable. I think the site is easily maneuverable.	Adapted from Venkatesh & Davis (2000) and Venkatesh & Morris (2000)
Subjective Norm	**Source**
I would like very much to make purchases with this online store because others think I should do it. If other buyers think that purchases with this online store are valuable, then I should buy online. Others strongly support my purchasing with this online store.	Adapted from Suntornpithug & Khamalah (2010)

Table 8. Items of Trust

	Source
I feel secure about the electronic payment system of this online store. This online store ensures that transactional information is protected from being accidentally altered or destroyed during transmission on the Internet. I think that the security of my personal information is at stake when shopping with this online store. I think that this online store implements security measures to protect my information from hackers. I think that this online store has the ability to verify my identity for security purpose. It bothers me when this online store asks me for personal information. I think that this online store is collecting too much personal information from me. I think that this online store will use my personal information for other purposes without my authorization. I think my personal information in this online store's database is not accurate. I think that unauthorized people (i.e., hackers) have access to my personal information when shopping at this online store. There might be general misrepresentations or fraud shopping with this online store. I feel shopping with the online store has low potential for non-delivery of ordered products. In general I trust shopping with this online store.	Adapted from Suntornpithug & Khamalah (2010)

Table 9. Items of Actual use

	Source
I spend to use this site frequently I spend a lot of time on this site I exerted myself to use this site	Adapted from Kwon & Wen (2010)

A descriptive statistical analysis was firstly used to describe all the variables through different graphics and statistics, followed by an Exploratory Factor Analysis (EFA) and, finally, a regression analysis using the generalized maximum entropy estimator.

Normality of the items was tested through different procedures such as normality tests, QQ-plots, skewness and kurtosis statistics (Curran, West, & Finch, 1996). Cronbach's alpha was used to estimate the internal consistency of scale's items (Pestana & Gageiro, 2003). EFA was used for data reduction purposes: the idea is to describe the variability among the large sets of correlated variables to acquire a small set of variables, usually known as latent factors. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used to evaluate the suitability of factor analysis (Pestana & Gageiro, 2003). The descriptive statistics, the EFA, the normality tests and the QQ-plots were implemented using SPSS-20 software.

Finally, to explore the three models discussed previously, a regression analysis procedure was implemented. Since the analysis is based in a small sample (the micronumerosity problem), a maximum entropy approach was chosen instead of other traditional approaches such as the ordinary least squares or maximum likelihood estimator. For instance, it is worth to mention that maximum likelihood estimator is attractive mainly due to its large-sample properties. For reader's convenience, the maximum entropy (ME) principle and the generalized maximum entropy (GME) estimator are briefly discussed next.

The ME principle was first established by Jaynes (1957a, 1957b) based on physics (the Shannon entropy and statistical mechanics) and statistical inference. The ME principle provides a tool to make the best predictions from the (usual limited) available information. However, as noted by Jaynes (2003, p. 369), "[…] the principle of maximum entropy is not an Oracle telling which predictions *must* be right; it is a rule for inductive reasoning that tells us which predictions *are most strongly indicated by our present information*." An interesting feature of ME is that it can be seen as an extension of Bernoulli's principle of insufficient reason (Jaynes, 1957a).

To illustrate the ME principle, the famous die problem discussed by Jaynes (2003) is briefly discussed. Only with the average outcome y from a large number N of independent rolls of a dice, how to estimate the probability vector $p=(p_1,p_2,\ldots p_6)$? Considering that the observed frequency distribution of the sample is unknown, only with this information at hand (the average of the results), the ME principle can be applied to select the probability vector p that maximizes

$$-\sum_{k=1}^{6} p_k \ln p_k ,$$

subject to the model constraint

$$\sum_{k=1}^{6} k p_k = y$$

and the additivity constraint

$$\sum_{k=1}^{6} p_k = 1 .$$

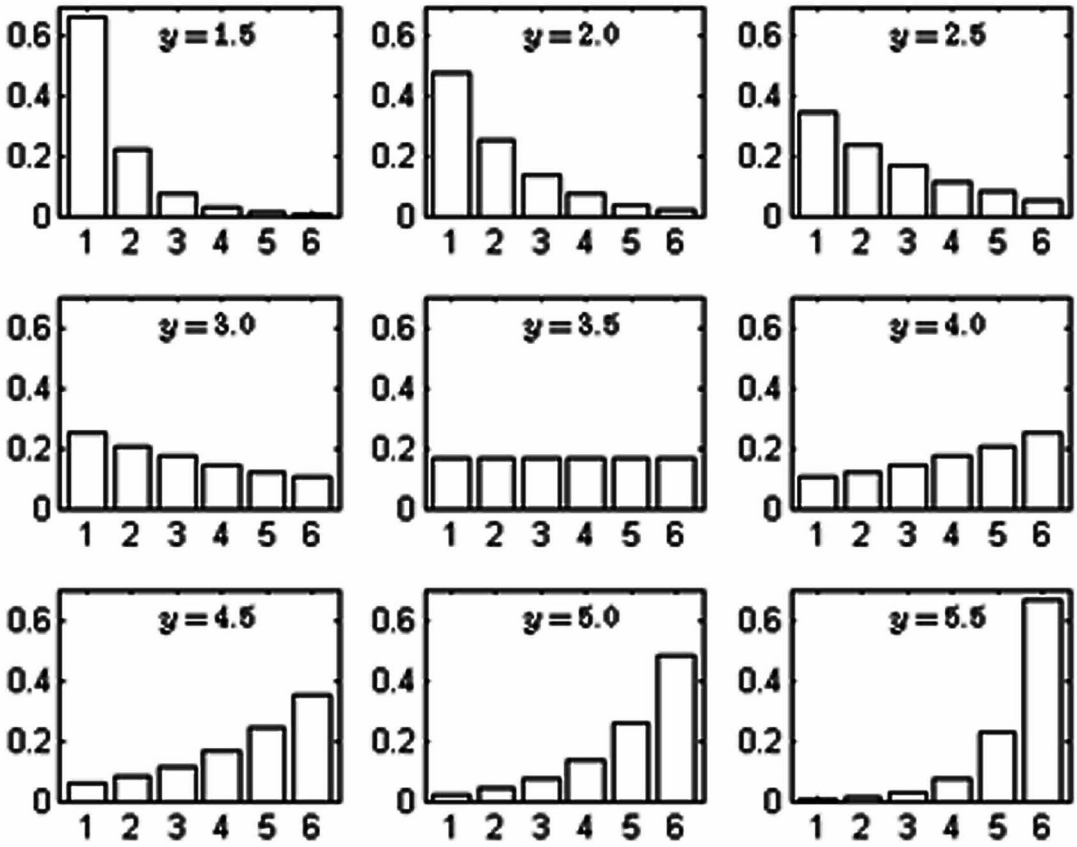
The formal solution is easily derived for the die problem using the Lagrangian function and the corresponding first-order optimality conditions. In Figure 2, the estimated ME distributions for different values of y are presented. Note that, as expected, when y=3.5, the estimated ME distribution is a uniform distribution.

The ME principle is often used for solving ill-posed problems, for example, in physics, informatics, linguistics, biology, medicine, communication engineering, statistics and economics. Some examples of applications of the ME principle can be found in Dionísio et al. (2008), Golan and Dose (2001), Park and Bera (2009) and Vinod and López-de-Lacalle (2009), among many others.

As noted by Golan et al. (1996), statistical data are frequently limited and affected by collinearity implying that the associated statistical models may be ill-posed, unless simplifying assumptions or procedures are imposed to generate seemingly well-posed statistical models that can be estimated with traditional statistical tools. Giving heed to this problem, Golan et al. (1996) generalized the ME formalism and developed the GME estimator, which is useful in models exhibiting collinearity, in models with small samples sizes (micronumerosity) and non-normal errors, as well as in models where the number of parameters to be estimated exceeds the number of observations available (under-determined models).

The GME estimator contributed to the development of the ME econometrics literature in the recent years. In view of the fact that ill-posed real-world problems seem to be the rule rather than the exception

Figure 2. Estimated ME distributions for the die problem



in statistics, the GME estimator has acquired special importance in the toolkit of statistical techniques, by allowing statistical formulations free of restrictive and unnecessary assumptions. For applications of the GME estimator see, among many others, Campbell et al. (2008), Ferreira et al. (2010), Macedo et al. (2014) and Robaina-Alves et al. (2015), and the references therein.

Considering the linear regression model defined in matricial form as

$$y = X\beta + e\,,$$

where *y* denotes a $\left(N \times 1\right)$ vector of noisy observations, β is a $\left(K \times 1\right)$ vector of unknown parameters, *X* is a known $\left(N \times K\right)$ matrix of explanatory variables and *e* is a $\left(N \times 1\right)$ vector of random errors, usually assumed to have a conditional expected value of zero and representing spherical disturbances, Golan et al. (1996) treat each β_k as a discrete random variable with a compact support and $M \geq 2$ possible outcomes, and each e_n as a finite and discrete random variable with $J \geq 2$ possible outcomes. Assuming that both the unknown parameters and the unknown error terms may be bounded *a priori*, the linear model can be presented as

$$y = XZp + Vw\,,$$

where

$$\beta = Zp = \begin{bmatrix} z'_1 & 0 & \cdots & 0 \\ 0 & z'_2 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & z'_K \end{bmatrix} \begin{bmatrix} p_1 \\ p_2 \\ \vdots \\ p_K \end{bmatrix},$$

with Z a $\left(K \times KM\right)$ matrix of support values and $p > 0$ a $\left(KM \times 1\right)$ unknown weight vector, and

$$e = Vw = \begin{bmatrix} v'_1 & 0 & \cdots & 0 \\ 0 & v'_2 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & v'_N \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_N \end{bmatrix},$$

with *V* a $\left(N \times NJ\right)$ matrix of support values and $w > 0$ a $\left(NJ \times 1\right)$ unknown weight vector. In matricial form, the GME estimator is given by

$$\arg\max_{p,w} \left\{-p' \ln p - w' \ln w\right\},$$

subject to the model constraint,

$$y = XZp + Vw$$

and the additivity constraints for *p* and *w*, respectively,

$$1_K = \left(I_K \otimes 1'_M\right) p\,,$$

$$1_N = \left(I_N \otimes 1'_J\right) w\,,$$

where $\otimes$ represents the Kronecker product. The GME estimator generates the optimal vectors $\hat{p}$ and $\hat{w}$ that can be used to form point estimates of the unknown parameters and the unknown errors through the reparameterizations defined previously. Additional details can be found in Mittelhammer et al. (2013).

The support matrix Z is defined by the researcher based on prior information. When such information does not exist wide bounds can be used. In this work, the supports in Z are defined through [–10, 10] for all the parameters of the models, considering five points $\left(M = 5\right)$. Different supports with wide bounds were also used to test the stability of the estimator and the results were similar to the ones presented next. The supports in the matrix *V* are defined symmetrically and centered on zero, considering $J = 5$ and using the three-sigma rule with the empirical standard deviation of the noisy observations.

Since the GME estimator is consistent and asymptotically normally distributed, some asymptotic results can be used to test hypotheses on model parameters (Mittelhammer et al., 2013). However, since this work is based in a small sample, the bootstrap method is used to resampling residuals (1000 trials) and 95% confidence intervals (CI) are obtained by using the percentile method.

The GME estimation procedures are conducted in MATLAB software and all the code was computed by us. However, for those that are not familiar with programming and optimization procedures, the GME estimator with tests and statistics is available, for example, in SAS and LIMDEP software.

RESULTS

Some descriptive statistics are presented in Table 10. Based on the skewness and kurtosis values one can admit there is no reason to reject the normality hypotheses (Curran et al., 1996).

Tables 11, 12 and 13 present some results of the EFA. Virtual atmosphere is composed of four factors/variables, emotions are composed by two factors/variables and attitudes are composed by four factors/variables. The remaining variables (social identity, altruism telepresence, trust and real use) are unifactorial variables. Generally speaking, one can consider that the results are acceptable in terms of cumulative variance, Cronbach's alpha and KMO.

The three research models defined previously are now discussed. For simplicity purposes, the estimated coefficients (EC) and the associated confidence intervals (CI) are presented only for those variables that are considered relevant according to the maximum entropy estimation.

Thus, according to the GME estimator, Virtual atmosphere-graphics is the only independent variable that is considered relevant (EC: 0.594; 95% CI: 0.373 – 0.778) to explain the dependent variable Emotions-pleasure (Model R^2: 38%) in Model 1, as shown in Figure 3. This means that, when the other

Table 10. Some descriptive statistics

Variable/Construct	Mean	Standard Deviation [Min; Max]	Skewness [Min; Max]	Kurtosis [Min; Max]
Virtual Atmosphere	3.75	[0.698; 1.212]	[-1.032; 0.187]	[-0.905; 1.062]
Emotions	3.52	[0.828; 1.179]	[-1.067; 0.151]	[-1.085; 1.337]
Attitudes	3.71	[0.765; 1.250]	[-1.489; 0.889]	[-0.791; -2.373]
Social Identity	2.77	[1.071; 1.237]	[-0.087; 0.125]	[-0.974; -0.705]
Altruism	3.49	[1.061; 1.213]	[-0.953; -0.302]	[-0.589; 0.732]
Telepresence	2.81	[1.119; 1.202]	[-0.146; 0.222]	[-1.032; -0.486]
Trust	2.85	[0.768; 1.267]	[-0.910; 0.525]	[-1.047; 1.399]
Real Use	2.74	[0.927; 1.278]	[-0.441; 0.518]	[-0.971; -0.590]

Table 11. Exploratory factor analysis: virtual atmosphere and emotions

	Virtual Atmosphere				Emotions	
	Graphics	**Colors**	**Links**	**Menus**	**Pleasure**	**Arousal**
Eigenvalue	2.819	1.857	2.152	2.816	3.316	2.375
Cumulative variance	70.477	61.899	53.792	70.399	66.327	59.386
Cronbach's α coefficient	0.858	0.683	0.706	0.855	0.850	0.740
KMO	0.783	0.597	0.678	0.793	0.838	0.699

Table 12. Exploratory factor analysis: attitudes

	Situational Attitudes	Perceived Utility	Perceived Ease of Use	Subjective Norm
Eigenvalue	3.674	2.898	2.892	1.986
Cumulative variance	73.489	72.462	72.303	66.195
Cronbach's a coefficient	0.909	0.870	0.872	0.739
KMO	0.851	0.688	0.748	0.625

variables are fixed, the rate of change of the conditional mean of the Emotions-pleasure with respect to the Virtual atmosphere-graphics is estimated to be approximately between 0.373 and 0.778 units.

The coefficients associated to the Colors, Links and Menus are not statistically significant and thus should not be interpreted. In other words, no statistically significant linear dependence is detected between the mean of Emotions-pleasure and these independent variables. Moreover, there is no statistically significant linear dependence between Virtual atmosphere and Emotions-arousal.

Considering Model 2 in Figure 4, there are four significant relations, according to the GME estimator. They are:

Table 13. Exploratory factor analysis: social identity, altruism, telepresence, trust and real use

	Social Identity	Altruism	Telepresence	Trust	Real Use
Eigenvalue	2.383	2.384	2.977	5.128	1.843
Cumulative variance	79.445	79.464	74.416	36.627	61.445
Cronbach's α coefficient	0.866	0.867	0.882	0.742	0.615
KMO	0.703	0.705	0.788	0.802	0.745

Figure 3. Research Model 1

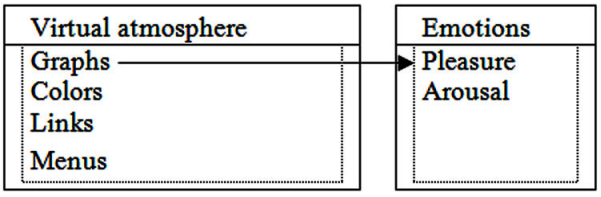
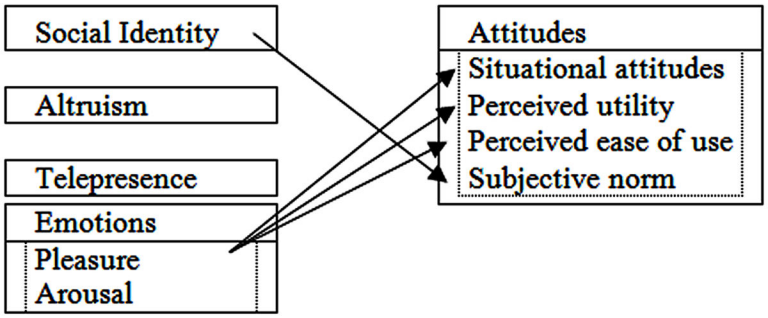


Figure 4. Research Model 2



- The Emotions-pleasure is considered significant (EC: 0.769; 95% CI: 0.614 – 0.929) to explain the Attitudes-Situational attitudes (Model R^2: 59%);
- The Emotions-pleasure is considered significant (EC: 0.565; 95% CI: 0.360 – 0.736) to explain the Attitudes-Perceived utility (Model R^2: 46%);
- The Emotions-pleasure is considered significant (EC: 0.574; 95% CI: 0.364 – 0.771) to explain the Attitudes-Perceived ease of use (Model R^2: 34%);
- The Social identity is considered significant (EC: 0.422; 95% CI: 0.141 – 0.677) to explain the Attitudes-Subjective norm (Model R^2: 30%).

The coefficients associated with the remaining variables of Model 2 not mentioned above are not statistically significant.

Finally, according to the GME estimator, there are four significant relations in Model 3, as can be seen in Figure 5. The Attitudes-Situational attitudes (EC: 0.114; 95% CI: 0.013 – 0.223), the Attitudes-Perceived utility (EC: 0.142; 95% CI: 0.009 – 0.218), the Attitudes-Perceived ease of use (EC: 0.131; 95%

CI: 0.005 – 0.211) and Past experience (EC: 0.002; 95% CI: 0.001 – 0.003) are considered relevant to explain the Real use (Model R^2: 42%). The coefficients associated with the variables Attitudes-Subjective norm and Trust are not statistically significant.

Taking into account the abovementioned results one can only partially validate hypotheses H1, H2, H3 and H6, while hypothesis H7 is accepted and the remaining are rejected. The outcomes of the hypotheses are shown in Table 14.

CONCLUSION

Consumer behavior, especially associated to wedding, is full of emotionality and romanticism, as "love is in the air." However, despite its unique characteristics, it has been under researched in the virtual environment. As such, this chapter has several contributions: firstly, it is original in what concerns the analysis of virtual atmosphere, emotions, attitudes and real use in a virtual community involving wedding as its main theme. Secondly, it is the first study of its kind analyzing a virtual community using the GME estimator, which is robust when using small samples sizes (micronumerosity).

A first conclusion is that the relationship between virtual atmosphere and emotions, as well as emotions and attitudes, are poorer than expected. Two reasons can be advanced for this. In fact, the studies analyzed in the literature were obtained for online customers and not for online users, namely when

Figure 5. Research Model 3

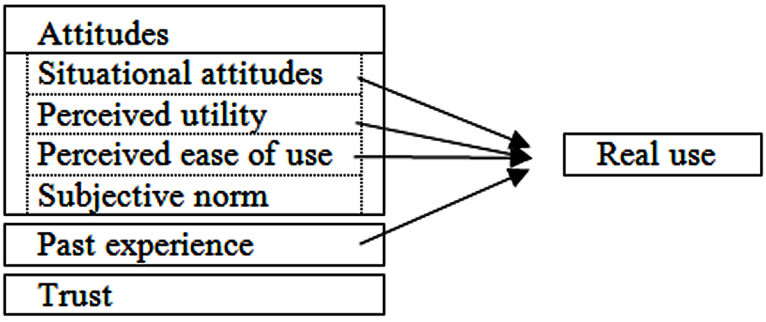


Table 14. Validated hypotheses under investigation

Hypotheses	Results
H1: Virtual atmosphere has a positive effect on emotions.	Partially accepted
H2: Emotions have a positive effect on attitudes.	Partially accepted
H3: Social identity has a positive effect on attitudes.	Partially accepted
H4: Altruism has a positive effect on attitudes.	Rejected
H5: Telepresence has a positive effect on attitudes.	Rejected
H6: Attitudes have a positive effect on real use.	Partially accepted
H7: Past experience has a positive effect on real use.	Accepted
H8: Trust has a positive effect on real use.	Rejected

these users are looking for information for marriage, or as referenced "when love is in the air." The big difference between customers and users of online technology in the research carried out is that the site provides information on weddings and lacks a commercial vocation. As a result, we are facing users, not buyers, which may have biased the results of relations between the two aforementioned variables.

One has also to take into account that this model was tested in relation to the wedding site. Thus, it is relevant to take into consideration some aspects. The site analyzed portrays marriage as more than an engagement contract between two people; wedding is portrayed as the event created around that day/event. The target audience is the groom and bride, that is, those people who decided to marry but have not yet done it.

Being more than a psychological contract, marriage is a particularly emotional event in the life of two people. Utopically, marriage is seen as a unique and singular event, traditionally being associated with something that happens only once in life, which has clear emotional influences over the event experienced.

Because it is a singular, unique event, the site under study is of interest to users during the period of time previous to marriage. After marrying the site loses interest, at least in relative terms.

Culturally, it is also known that women are more emotional than men. Hosftede (1980) used this information to set one of the four cultural dimensions, masculinity vs. femininity. He considered that in more masculine cultures prevail focus on results, success and competition and in more feminine cultures the well-being and the quality of interpersonal relationships especially valued, men being more rational, while women being more emotional. In this study, the majority of respondents (76.4%) are women, so the emotional issue is here more emphasized.

In any case, as presented in the literature review, the social perspective, cohabitation and transient informal conjugality that have been evolving in Western society makes this study the starting point for further studies, as the results (lack of greater validity of the assumptions presented) may indicate that this exploratory study may require a greater depth to the target audience segmentation level associated with marriage, as well as greater conceptual clarity of the depth of emotional involvement associated with marriage.

This work had as its main focus to answer the following three questions:

- To understand what components of the virtual atmosphere have more influence on pleasure/arousal, as emotional states;
- To realize if individual characteristics (social identity, altruism and telepresence) and emotional states influence attitudes;
- To understand whether attitudes, past experience and trust influence online site actual use;

Overall, the results show that the virtual environment partially influences emotions. More specifically, only the graphics have an influence on pleasure, not validating the assumptions that (a) the colors, links and menus have a relationship with emotions and (b) arousal is influenced by any of the virtual atmosphere components. These results are very different from those obtained by Koo and Ju (2010). For them both emotions, pleasure and arousal, are influenced by the graphics, colors and links. Only the menus have no influence on emotions.

Small changes in the sites atmospheric characteristics can sometimes have a big impact on the consumer's emotions. Although this is not an easy task, it is important that managers know well the interests of users to go match their needs and preferences. Thus, according to the results of this study, a possible

conclusion is that we need to understand how important are colors, links and menus when emotional users are at stake.

A more likely conclusion is that emotions, as measured by Koo and Ju (2010), are more relevant to online customers but not so relevant for online users of a site with a high emotionally load, which is the case of brides and grooms, given the importance of marriage. In these circumstances the virtual atmosphere loses some of its influence on emotions due to the fact that online users are most influenced by intrinsic motives than by the virtual atmosphere. In any case, it is necessary to consider the various segments associated with the target audience in order to analyze their influence in these relationships.

With regard to the relationship between emotions and attitudes, only pleasure exerts partial influence on attitudes, particularly in situational attitudes, perceived usefulness and perceived ease of use. The subjective norm is not influenced by emotions. Arousal has no influence on any of the attitude factors.

The relationship between emotions and attitudes was proposed in this study in order to adapt the relationship between emotions and the intention to use, proposed by Koo and Ju (2010). On the one hand, it was intended to test how emotions influence attitudes and, on the other hand, how attitudes influence the real use. It is clear that while pleasure is a clear antecedent of attitudes, arousal has no influence.

In the case of users with a high emotional charge one can say that pleasure plays an important role associated with the event, eventually placing on second place any arousal associated with situational attitudes, perceived usefulness and perceived ease of use. As such, the components joy, happiness or satisfaction are more relevant than the components associated with excitation, especially since they are closer to the emotional reality of the site's users associated with marriage.

The other antecedents of attitudes – social identity, altruism and telepresence – do not significantly influence attitudes. Kwon and Wen (2010) concluded that there is a relationship between the social identity and perceived utility, as well as with the perceived ease of use. Regarding altruism and telepresence, they only found influence with the perceived ease of use. They did not study situational attitudes and subjective norm. The results did not match those of Kwon and Wen (2010), which can be explained by the fact that perceived usefulness, perceived ease of use or subjective norm are associated with various non-anticipated website user profiles (dating, living together, cohabitants) seeking information on weddings.

In turn, telepresence and altruism, associated more with individual characteristics than to social ones, portray that the reality of the site is closer to an informational reality than to a participatory one, which eventually limits the participation with other users' networks.

Although Suntornpithug and Khamalah (2010) consider there is a direct influence between trust and intention to use, in this study the relationship between trust and real use did not occur.

Although past experiences have been suggested by Dennis et al. (2009) without any empirical validation, it is possible to affirm that positive past experiences lead to a higher real use, which represents the users' website behavioral perspective, which can be regarded as behavioral trust. Thus, it appears that past experience with the site is a strong antecedent of the actual use of "Our Wedding" site. On the other hand, the lack of relationship between trust and real use might be explained by the construct, as it was built including too many items that do not represent the emotional involvement of the users, which in turn may explain the poor variance of the construct trust.

Considering the goals established in this work, one can state that they were partially accomplished:

- The hypotheses 1, 2 and 3 were partially corroborated. From the four components of the virtual atmosphere, only the graphics have influence on the pleasurable emotions. However, virtual envi-

ronment has no influence in the arousal. Also the arousal does not have any influence on attitudes. On the other hand, social identity and emotions have influence on attitudes;
- The individual characteristics (altruism and telepresence) do not play any role in attitudes, as well as trust does not have influence on the real use of the website;
- Past experiences are a strong predictor of real use;
- Attitudes partially influence the actual use of the website.

This work has some limitations and thus additional efforts in future research are recommended:

- Will be necessary a fully random sampling procedure and a large sample to provide more reliability of the inference process;
- The questionnaire has 75 questions, which can in certain circumstances limit the website users' involvement in this study. A simplification on the questionnaire should be accomplished;
- The questionnaire was implemented in a very specific website. Marriage being mostly a singular event in the life of an individual, active participation in the website is relatively situational.

FUTURE RESEARCH DIRECTIONS

It is necessary to restructure the model based on the results obtained. It would be advisable to categorize the components of the virtual atmosphere, emotions and attitudes as independent variables, not only to replicate the models of the theory of planned behavior, but also to test the perceived ease of use, intention to use and actual use.

It is necessary to apply the model in a more global and general type of site where relational issues are more relevant than situational ones, or where the engagement / involvement is not as intricate as is the wedding as emotional event. It may also be tested in a more commercial environment where the purchase intent is more pragmatic than the merely use intention.

It is advisable to deepen the study of the differences between genders and ages, as there can be clear perceptual and behavioral differences among them that have not been studied in this sample due to the limitation of the number of respondents.

With respect to attitudes, the model considered situational attitudes, perceived usefulness, perceived ease of use and the subjective norm as components of attitudes. However, the clustering of variables was not proven and they shall be considered as independent variables in future studies.

In future studies, it is necessary to take into consideration target audiences associated with marriage *lato sensu,* as there are behavioral, social and emotional differences that can lead to a deeper and differentiated analysis.

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KEY TERMS AND DEFINITIONS

Altruism: Occurs when an individual sacrifices him/herself in favor of another knowing that this might bring him/her negative consequences, without the intention of having any reward, but a reciprocal help.

Marriage: Is an ancient institution based on two traditional pillars, a psychological (emotional) contract largely unconscious and a transition to a cohabitation that leads to a more intrinsic relationship between two partners.

Social Identity: Is characterized by the identity and solidarity an individual creates with certain individuals or groups. This identity generates behaviors or concepts that discriminate them from other individuals or groups.

Store Atmosphere: Is the set of environmental conditions, space and functionality, and symbols, signs and artifacts that might influence the direct relationship between the store features (atmosphere) and buying behavior of consumers. As such, store atmosphere needs to be explored in order to maximize consumption. In the case of virtual environments, one may refer to virtual atmosphere.

TAM: Technology Acceptance Model or TAM is a model that was developed to understand the reasons why users accept or reject the new technology and to provide proposals regarding how to improve the acceptance process, providing a support for prediction and explanation of acceptance levels of a certain technology.

Telepresence: Is the feeling that a user or a consumer has when exposed to a virtual environment experience. In the case of virtual communities, the user feels like he/she is directly contacting with other users, even though the contact is only virtual and not physical. The sense of telepresence allows a user to create human relationships with other users who are remotely located.

Wedding: Is an event full of emotionality and romanticism associated to a marriage. Normally, wedding is portrayed as the event created around the day/event when marriage occurs.