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Consideration of Persuasive Technology on Users Acceptance of E-Commerce: Exploring Perceived Persuasiveness

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Abstract: Persuasive technologies, used within in the domain of interactive technology, are used broadly in social contexts to encourage customers towards positive behavior change. In the context of e-commerce, persuasive technologies have already been extensively applied in the area of marketing to enhancing system credibility, however the issue of 'persuasiveness', and its role on positive user acceptance of technology, has not been investigated in the technology acceptance literature. This paper reviews theories and models of users' acceptance and use in relation with persuasive technology, and identifies their limitation when considering the impact of persuasive technology on users' acceptance of technology; thus justifying a need to add consideration of 'perceived persuasiveness'. We conclude by identifying variables associated with perceived persuasiveness, and suggest key research directions for future research.

Key words: Technology Acceptance, Persuasive Technology, Consumer Behavior, Perceived Persuasiveness.

1. Introduction

Human computer interaction (HCI) research often places focuses on the design of information systems interfaces, with the aims to improve the effectiveness and/or efficiency of users undertaking a specific task. Within the context of e-commerce HCI research therefore commonly relates to the decision making processes that results in a user purchasing from the website [1]. Persuasive systems aims to persuade users to perform a particular action [1, 2]. Interestingly, e-commerce systems are becoming increasingly 'persuasive'; due to the fact that they are incorporating a wider range of dynamic persuasive techniques to enhance system credibility and motivating users to

adopt the systems, or move towards particular specified goals.

Designers of e-commerce websites aim to maximize revenue by increasing website conversion rates. To achieve this, designers of e-commerce websites have started applying a range of persuasive techniques similar to the techniques applied by face-to-face sellers. For instance, products on e-commerce websites are usually linked to reviews from previous consumers, expert evaluations; thus making it possible to compare alternatives. Persuasive techniques (e.g. social learning, authority, trustworthiness), amongst others, can have a strong influence on consumers' attitude and behavior; with persuasion seemingly key element in behavior and attitude change [3].

In the field of Information Systems (IS) research, the study of user attitudes and behavior concerning information systems acceptance and use, has a long history. Theories such as the Theory of Reasoned Action [4], Theory of Planned Behavior [5], Technology Acceptance Model [6], Motivational

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Model [7] and Unified Theory of Acceptance and Use of Technology [8] have all significantly contributed in increasing the understanding of users' behavior and willingness to accept or reject the use of such technology. In this paper, we are review technology acceptance theories in relation with persuasive technology, which has been extensively applied in the context of e-commerce [9] and other domains such as health [10], education [11], and sustainability [12]. The objective of the study is to examine the current state of technology acceptance theories, and whether they considered the influence of persuasive technology on determining users' acceptance of technology. The paper introduces 'perceived persuasiveness' as a new construct, which needs to be considered when determining users' acceptance of technology.

The remainder of the paper is organized as follows: in sections 2 and 3 we present persuasive technologies and review theories of technology acceptance to define the theoretical groundings of this work and, in section 4, we express the research gap; in section 5 we introduce perceived persuasiveness and variables that influence perceived persuasiveness of an e-commerce website; finally in section 6 we conclude the paper, and discuss possibilities for future research directions.

2. Persuasive Technologies

Although the concept of persuasion arouses a variety of understandings, persuasion in this paper is defined as a communication process in which a persuader sends a persuasive message to the recipient (presuadee) with the intention of influencing recipients' attitudes or behavior; leaving the recipient with the power of decision [13]. The media channel and message content used to deliver messages differentiates the value of messages; and subsequently impacts the targeted effects on the recipient. The web, mobile and other ambient technologies provide great opportunities for persuasive interaction, as users can be reached easily with the possibility to use both interpersonal and mass communication [3]. Fogg [2] defined interactive

information technology, which has been designed to change or shape a person's attitude and/or behavior, as persuasive technology. Persuasive technology therefore relates to human-computer persuasion, i.e. the study of how people are persuaded when interacting with computer technology [14]. The persuader in this case is not clear; however, those who create, design, and distribute the technology have the intention to affect user's attitude, behavior, or both [15].

Persuasive technologies influence users' behavior and perceptions, and different techniques can be applied to support different targeted goals [16]. For instance, designers of e-commerce websites can apply third party endorsement techniques to increase website credibility, such as endorsing PayPal as a secure and trustworthy payment method. Persuasive technologies offer the potential for a new research domain that combines literature from psychology, information systems design, as well as technology usage and acceptance [17]. For this reason, designers and web practitioners should be aware of various persuasive techniques, their usage and effects on people, and how the audiences perceive them [3]. In the following section, we review theories of users' acceptance of information technology and discuss whether the influence of persuasive technologies on users' acceptance of technology has been considered or not.

3. Users Acceptance of Information Technology

Information technology (IT) adoption is arguably the primary measurement of successful implementation, which serves as a major benchmark in the success of any IT application [18]. A number of behavioral models in social psychology have been used extensively to predict IT adoption, and have been successfully proven to be effective in predicting intentions and usage [19].

When one refers to IT acceptance, literature implies a behavioral intention to use it [20, 21]; as leading theories and models have proven, e.g. the Theory of

Reasoned Action (TRA) [22], that intention usually leads to the user actually performing the intended

behavior. According to TRA, a social-psychological/ behavioral theory that had been widely used due to its

Table 1   Constructs definitions of models/theories of user acceptance.

Constructs	Definitions	Models that include the constructs
Attitude Towards Behavior (ATT)	"an individual's positive or negative feelings about performing the target behavior" [22]	TRA/TPB/TAM
Subjective Norm (SN)	"the person's perception that most people who are important to him think he should or should not perform the behavior in question" [22]	TRA/TPB/TAM2
Perceived Behavioral Control	"the perceived ease or difficulty of performing the behavior" [5]	TPB
Perceived Usefulness (PU)	"the degree to which a person believes that using a particular system would enhance his or her job performance" [6]	TAM/TAM2
Perceived Ease of Use (PEOU)	"the degree to which a person believes that using a particular system would be free of effort" [6]	TAM/TAM2
Extrinsic Motivation (EM)	The perception that users want to perform the behavior because "it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions" [7]	MM
Intrinsic Motivation (IM)	The perception that users want to perform the behavior "for no apparent reinforcement other than the process of performing the activity per se" [7]	MM
Performance Expectancy	(See PU)	UTAUT/UTAUT2
Effort Expectancy	(See PEOU)	UTAUT/UTAUT2
Social Influence	(See SN)	UTAUT/UTAUT2
Facilitating Conditions	(See PBC)	UTAUT/UTAUT2
Behavioral beliefs	An individual's perceptions about specific positive/negative outcomes of performing the target behavior	TRA/TPB
Normative beliefs	specific groups or people who encourage/discourage the behavior	TRA/TPB
Control beliefs	specific factors or circumstances that make behavior easier/more difficult	TPB
Hedonic Motivation	Users perceptions of the fun or pleasure derived from using a technology [23]	UTAUT2
Price Value	The cost and pricing structure of using a new IT [23]	UTAUT2
Habit	The extent to which people tend to perform behaviors automatically because of learning [23]	UTAUT2

value when understanding behavior [22], two primary factors are required to support behavioral intention positively: individuals' attitude (ATT) and subjective norm (SN) [22]. TRA was expanded by Azjen (1991), to form the Theory of Planned Behavior (TPB), which defines behavioral intention as the main determinate of behavior execution. Behavioral intention can be determined by evaluating three core constructs: individual's attitude toward behavior (ATT), subjective norm (SN) and perceived behavioral control (PBC) (for definitions see table 1). The TPB focuses on

context-specific attitudes in defining behavior [22, 24]; thus it predicts intentions, as opposed to behavior [25]. When expanding TRA, to include "perceived behavioral control", [5] explained that "attitude is likely to predict behavior when the attitude includes a specific behavioral intention and the attitude is based on a first-hand experience". This theory has dominated information systems development and implementation until recently, when various versions and/or expansion were specifically derived for IT adoption [26].

In order to adapt TRA in different contexts, it was expected that a new preliminary study would be conducted to identify contextual variables to be considered in understanding IT acceptance and usage. As a result, TAM (based on the TRA) was developed to increase the use of such IT through increasing the acceptance of the IT itself. TAM identifies two factors: the perceived ease of use (PEOU) and perceived usefulness (PU) that determine individuals' ATT, which influences individual's behavioral intention [6]. These factors are identified in Table 1. Another theory that helps our understanding of new technology usage and adoption is the Motivational Model (MM), as significantly supported by [7] and [27]. The MM introduced two variables that influence individual's intention. These variables are: extrinsic motivation (EM) and intrinsic motivation (IM). EM is similar to PU as acknowledged by [6, 7] whilst IM is more relevant to ATT in the TPB [8]. However, IM is more about users' perception to perform an activity for no apparent reinforcement other than the process of performing the activity per se, which differs from the ATT that is more about users' positive or negative feelings regarding performing a particular behavior.

In 2000, TAM2 was introduced, which removed ATT and added SN as a new variable; to capture the social influence that influences individuals to positively or negatively accept such IT [28]. In 2003, Venkatesh et al. [8], after conducting studies reviewing and testing all of the previous technology acceptance models and theories, introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The UTAUT model integrates eight different models, including TRA, TAM, TAM2, TPB, and MM. UTAUT includes PU when considering performance expectancy, PEOU into effort expectancy and SN into social influence. Venkatesh et al. also added facilitating conditions; which includes PBC from TPB. The UTAUT model introduced four moderators that influence perception of the main constructs in the model; which were: gender, age, experience, and voluntariness of use. The unified model explained about 70 percent of the variation in behavioral intention, and about 50 percent in actual use of IT. In 2012, the UTAUT model, however, was expanded [23] to consider consumers contexts within a new model called UTAUT2; which added three more constructs to the original model: hedonic motivation (HM), price value (PV), and habit (HB). The model also amends the moderators by removing voluntariness of use, as it is not relevant in the context of consumers. The UTAUT2 model produced a considerable improvement in the variance explained in behavioral intention (56 percent to 74 percent) and technology use (40 percent to 52 percent) in the context of consumers' acceptance of technology.

Identifying factors influencing behavioral intention is one of the continuing issues in the IS field [29]. In this section we discussed how models/theories aim to address this issue by identifying different sets of constructs to determine individuals' behavioral intention and assists businesses and organizations to manipulate these factors in order to promote acceptance [30]. In the next section, we discuss the effects of persuasive technologies in context of users' acceptance of technology, and whether it has been considered in any of the previous IT acceptance theories / models.

4. Consideration of Persuasion in User Acceptance Models

The design of IT systems, and e-commerce systems in particular, incorporates the art of persuasion by applying different persuasive techniques in the design to positively influence consumer's motivation and trust; changing consumers attitude and support making decision to purchase online [31]. Accordingly it is critical to question the effects of persuasion on individual's behavioral intention. Although persuasive technology exists to change an individual's attitude or behavior, persuasive effects have not been considered in the user acceptance models reviewed in section 3.

Instead, existing models have been used to measure changes in user's beliefs concerning such behavior by measuring the difference between user's beliefs before and after system use. Though existing models give indication of attitude or behavior change, yet they do not measure the persuasiveness of current system options; because tests are conducted at two different periods of time, and external contextual factors risk impacting change in user's attitude or behavior. Hence, such models measure change in attitude or behavior, yet do not measure users perception concerning the persuasiveness of the systems. The lack of consideration concerning the effects of persuasive technology on user's acceptance models could be justified by the fact that persuasive technology is a relatively new area within the IT field, and that the majority of the users acceptance models were developed before persuasive technology was introduced by [2]. There is, however, a need for a new construct within acceptance models to measure the effect of persuasion in user's beliefs about such behavior, i.e. accepting and using a system or technology.

Persuasion is the communication process that is designed to influence people's beliefs, values, or attitudes [13]. Kim and Fesenmaier defined persuasion as a systems' ability to arouse a positive impression toward the system [32]. Hovland et al. [33] stated that although persuasion can change attitude, it cannot change how certain personality types respond to specific forms of communication. Accordingly the success of an IT systems, for a specific user type, is not only limited by the design of the systems but is impacted also by both the type and nature of the communications offered by the systems, and the intended outcomes of the system [34]. Thus, users' perception of persuasive interactions is essential, and must be considered when analyzing user's acceptance of such system or technology.

5. Perceived Persuasiveness

5.1 Definition

Crano and Prislin [35] stated that attitude is a primary factor that must be considered when reflecting persuasion concerns; expanding that "attitudes are the evaluative judgments that integrate and summarize cognitive/affective reactions" [35]. Lehto et al. [36] and Drozd [37] introduced new models to evaluate individual acceptance of Behavioral Change Support Systems (BCSS), which is defined as "a socio-technical information system with psychological and behavioral outcomes designed to form, alter or reinforce attitudes, behaviors or an act of complying without using coercion or deception" [3]. BCSS, which was built using the persuasive systems design and technologies, included a new construct entitled "perceived persuasiveness". Although new within BCSS, we believe perceived persuasiveness is of significant importance when evaluating the acceptance of an IT system that incorporates the art of persuasion on user designs; such as e-commerce websites.

There is currently no clear definition for how persuasively a system influences the user [38]. Persuasion has often only been limited to only the positive impression towards the systems meaning, which is limited to the positive evaluation of the system. Oinas-Kukkonen, and Harjumaa [39] argued that "a system's persuasiveness is mostly about system qualities", which implies that persuasiveness relates to users perceptions concerning 'system's qualities'. Aladwani and Palvia defined persuasiveness as the users' evaluation of a system's features, and whether they meet the users' needs and expectations of system excellence [40]. Drozd et al. [36] defined perceived persuasiveness as "the integration of the individuals subjective evaluation of the system and its impact on the self". This range of definitions involves both positive and negative evaluations, and definition are, in part, therefore in contradiction with the idea of persuasion relating to only positive influences on users' attitude or behavior. In the present study, we integrate the previous definitions, and identify

perceived persuasiveness as the integration of users' positive evaluation concerning system features, the overall excellence of the system, and its impact on users' resultant use of the system. Therefore, perceived persuasiveness is about user's satisfaction level of system's qualities.

5.2 Variable Associated with Perceived Persuasiveness

According to Hovland [33] there are three factors that affect message persuasiveness: recipient characteristics, source credibility, and the nature of the message itself. Though Hovlands' work is purely about human interaction, these factors have been studied in relation with information systems persuasiveness and prove to be influential [34]. Pornpitakpan identified a strong relationship between credibility and persuasiveness [41], and showed that highly credible sources are seen as being more persuasive. Kim and Fesenmaier [32] analyzed six factors (i.e. informativeness, usability, credibility, inspiration, involvement, and reciprocity), which persuasion and communication literature stated as being factors that influence the persuasiveness of websites. The study used these six factors to measure the persuasiveness of destination websites within the United States; with results revealing that inspiration had the most significant effect on users' perceptions of website persuasiveness. This result means that visually appealing stimuli, i.e. 'design aesthetics / attractiveness', is the essential tool in: increasing website persuasiveness; in converting browsers into users; increasing users tenure and reducing customer churn [32]. Usability was defined as the second most significant factor, and credibility was placed in third position.

The work of Kim and Fesenmaier indicates that in order for the system to be persuasive it has to be useful and easy to use, meaning that the system usability has to be high to help support users' needs and achieve users' primary goals. Accordingly, we might presume that a website, with a clear and easy to use navigation

path, which offers obvious cues concerning credibility, is likely to be highly persuasive. According to the Persuasive Systems Design (PSD) Model, there are four dimensions impacting design for systems quality and persuasiveness: primary task support, dialogue support, system credibility support and social support. Primary task support is about extrinsic IT task, which is more about the use of IT as being instrumental to achieve the goal, not that the IT is the primary end of the product or service. Dialogue support relates to system interactivity and how interactive help increases users' motivation to achieve the target goals. Credibility supports the process of making the system design more credible; hence, more persuasive. The last dimension, i.e. social support, focuses on incorporating a range of social influences to motivate and persuade users to perform particular action or behavior. For instance, a e-commerce website might offer browsers feedback from customer reviews, or access to a discussion board, to allow consumers to socially interact with each other; which, especially in some cultures, could increase users' motivation to buy from the site. These dimensions are not limited to persuasive systems alone, but are fundamental aspects when increasing the persuasiveness of any technology or system; and thus increasing the probability of users' acceptance and use of the technology. Furthermore, Everard and Galletta [42] reviewed three studies about perceived quality in three different domains. Their final result shows that there are three factors influencing design for systems quality: system's ambience, functionality, and information reliability. For example, poor aesthetics (ambience), the "under construction" page (functionality), and existence of language errors (reliability) are design issues that form users impression of poor systems quality; hence, less persuasive. Table 2 summarizes current literature concerning variables influencing perceived persuasiveness of the system.

From table 2, it can be seen that some of these variables capture the same concept. Inspiration, design

Table 2   Summary of selected prior studies.

Variable	Definition	References
Involvement	Individuals' motivational state toward an object. This state is activated by the potential importance or relevance of an object to the recipient.	[43]
Informativeness	Consumers seek information from a website and expected the website to inform them about products/services.	[44]
Usability	Its core concept is ease of use, which is composed of two distinct features: (i) ease of understanding and (ii) ease of navigation.	[32, 39]
Credibility	The perceived quality of a site or the information contained therein and it is usually associated with believability.	[32, 37, 39, 45]
Inspiration	The website look infuses a positive idea or purpose into the mind. It evokes positive motivation through the use of stimuli that appeals to beauty, truth, or goodness.	[32, 39, 45]
Design aesthetics	The amelioration effect of visual design and beauty.	[36, 37]
Reciprocity	The extent to which the website perceived to be interactive through providing two-way information exchange between the website and the user.	[32]
Dialog support	The website provides users with appropriate argumentation and feedback.	[36, 37]
Social support	The website motivates users by leveraging different aspects of social influence.	[2, 39]
Unobtrusiveness	System's ability to fit into user's environment in which s/he uses the system.	[36, 37, 39]
Primary task support	System's ability to aid the user in performing his or her primary task.	[36, 37]
System's ambience	System's aesthetics and appearance.	[42]
System's functionality	Conscious design issues that negatively influence user's impression about system's usability.	[42]
Information reliability	Any cues that interfere with the reliability of the information on the site.	[42]

aesthetics and systems' ambience are all about attracting users through making the design more appealing. Reciprocity and dialog support share the same meaning concerning the exchange of information; and provide appropriate feedback to support decision-making. Furthermore, information reliability is part of credibility as the system cannot be credible if the information provided is not deemed reliable. Likewise, usability and system's functionality share the same meaning as the performance of system's functionality form the usability of the system. Social support and involvement have some similarities, as they aim to motivate users towards an object either through its relevant to the users or through social influence. Moreover, unobtrusiveness is a part of primary task support, as the system will not be able to aid the users in their tasks if it does not fit with the user's environment where s/he uses the system [36]. Multiple variables, which capture the same concept, will therefore be treated as a unified variable.

It was also deemed that, in the context of this paper, not all of these variables are relevant to perceived persuasiveness of e-commerce website. Variables defined as being associated with perceived persuasiveness of e-commerce website are:

• Website usability i.e. usefulness and ease-of-use: the more performance and effortless is the website in allowing consumers to perform the purchasing online, the more persuasiveness it will be. Hence, e-commerce website has to improve the performance and facilitate the process of purchasing online and related services in order to support them completing the process of purchasing online and avoiding terminate consumers from the website especially that customers' switching costs is very low 'one click' in e-commerce environment[46].

• Primary task support: e-commerce website should provide the means to help and assist consumers to be able to complete the process of purchasing online.

• System credibility support: the design of e-commerce website and the services provided should be credible, trustable, reliable, and believable to ensure that consumers will be persuaded by the website; hence, will not abandon their shopping cart.

• Dialog support: e-commerce website should be interactive and provide consumers with appropriate

feedback to keep them motivated to perform the behavior of purchasing online.

- Social support: the design of e-commerce website should incorporate a range of social influence to motivate and persuade users to purchase a solution online by offering them alternatives similar to what those 'social interaction' that are available when they shop in the physical store.

- Design aesthetics: the design of the website has to be appealing and attractive as a well-lit, tidy and appropriately ordered online store implies professionalism, and is used to support the customer in finding desired products, or highlight products that are new or unique, which increases the overall persuasiveness of the website.

6. Conclusions

Human behavior influences the whole life cycle of IT, starting from its design and ending with its adoption and use. Persuasion is an essential factor in influencing the way users perceive and accept technology and systems [47]. In this paper, we reviewed theories and models of technology acceptance and point to their limitation in considering the effects of persuasive technology on user's behavior to accept or reject the use of such technology or systems. We introduced and discussed the concept of perceived persuasiveness, which we believe to be critical when evaluating consumer's acceptance of technology or systems. We then extend the current rather limited body of knowledge regarding variables affecting perceived persuasiveness, and defined what variable groupings we believe to be of particularly relevance to perceive persuasiveness in context of e-commerce websites. Future research is required; i.e. to further develop and empirically test perceived persuasiveness and variables influence perceive persuasiveness of e-commerce website to empirically identify the variables that most impact user acceptance. Moreover, consideration of perceived persuasiveness, in context of consumer's acceptance of technology, is required to facilitate

effective integration within existing technology acceptance theory / models. Incorporation of perceived persuasiveness within technology acceptance models is certainly needed to support the creation of guidelines to help designers, especially of e-commerce websites, to support user adoption and acceptance by enhancing the persuasive features of the system.

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