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# The Influence of Usability Dimensions on Web-Based Transactional Systems Acceptance: A conceptual framework

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**Abstract:** The Internet and World Wide Web has made the electronic market a competitive place for business organizations around the globe. In order to survive and compete in this globally accessible virtual marketplace, many business firms have developed and launched web-based transactional systems (WTS) to facilitate their customers. Given the importance of WTS, in terms of the degree of their influence on business process and business firm's functioning, little efforts has been devoted by the research community towards the fundamental issues, such as what specific usability design characteristics influence customers' purchase decisions or how the acceptance and usage of such systems is influenced by the usability design factors. In order to address these issues, this research extended technology acceptance model by incorporating usability dimension to understand WTS acceptance and usage.

**Keywords:** Web-based transactional systems, TAM, Usability dimensions

## 1. INTRODUCTION

The Internet and World Wide Web (WWW) has made the electronic market a competitive place for organizations around the globe. It has now become very hard for individual firms to stay alive in this competitive without introducing technological reforms within their conventional structure. According to (Chandio, 2011), that have just physical presence, will not be able to compete those firms which offer electronic facilities to their customers. WWW through different ways. For example, firms that already have number of branches can build web-based systems to sale their products and services electronically without suspending their existing branch based facilities. This approach is termed as 'Click and Mortar' (DeYoung, 2005, Xue *et al*., 2011). The other approach of utilizing internet and WWW technologies can be building a virtual or internet only model without any physical presence (such as Amazon.com). In internet only model, a large computer server machine could perform all the firm's functions of the firm (Chandio, 2011).

In this regard, many firms have developed and launched web-based systems, in order to survive and compete in this globally accessible virtual marketplace. usability design characteristics influence customers' purchase decisions or how the acceptance and usage of such systems is influenced by the usability design factors.

Simply put, if usability related attributes are indeed confirmed to have an impact on customers purchase decision behavior, their design teams will be able to focus on specific design factor in order to influence consumers purchase decisions positively. (Neilson, 2000) suggests that, in an electronic marketplace, it is the potential consumer of WTS that will make the decision ultimately on whether to perform any transaction, return to the system in future, or abandon using the system as a non-viable alternative for making any purchase. Thus, finding specific usability design factors that are desirable for an effective web-based systems are worthy of investigation for overall firm's success. According to (Becker and Mottay 2001).

## 2. TAM THEORY AND HCI USABILITY

### 2.1Technology Acceptance Model

The significant body of research related to information systems acceptance and usage has applied technology acceptance model (TAM) as foundation theory in different contextual settings, such as digital libraries (Hong *et al*. 2002), (Gefen *et al*. 2003), Internet (Abbasi *et al*. 2011), and online banking (Chandio *et al*. 2013a, Chandio *et al*. 2013b, Roy *et al*. 2016). The TAM is an adaptation of theory of reasoned action (TRA), which was built specifically to understand acceptance of information systems by individuals. The fundamental concept behind the development of TAM was to predict newly designed

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systems acceptance and identify design/ and or implementation problems before individuals actually use such systems. According to TAM model's postulations **(Fig. 1)**, system acceptance and/or use can be determined or predicted by two main users' belief factors termed as perceived usefulness (PU) and perceived ease of use (PEOU). While, external factors (e.g. usability attributes) are hypothesized to have an impact on PU and PEOU (Davis 1989). PU is defined as "the degree to which a person believes that using a particular system would enhance his/her job performance", whereas, PEOU is "the degree to which a person believes that using a particular system would be free of efforts" (Davis, 1989). Despite TAM's validity in different contextual settings, researchers (Lederer *et al* 2000; Moon and Kim, 2001, Abbasi *et al*. 2011, Chandio *et al*. 2013a) reported that TAM did not adequately explain web based systems acceptance and use. This is perhaps because web-based IS have different characteristics, such as scope and focus, than traditional IS. web-based systems are mainly designed to enable customer oriented functionalities and focus on improving customers purchase decision making process (Garrity *et al*., 2004). Thus, incorporating factors that are likely to enhance acceptance and usage of such systems into TAM is highly recommended (Wixom and Todd, 2005Abaasi *et al*. 2011).

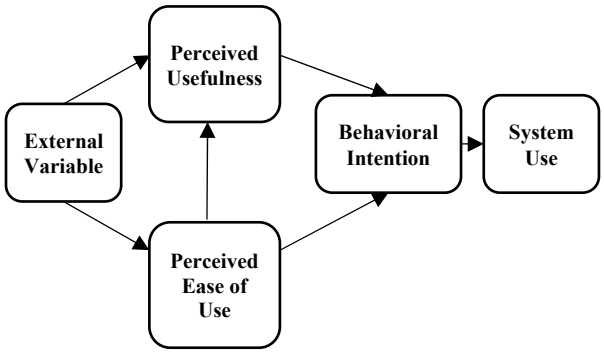



**Fig.1 TAM Model**

## 2.2 Usability

Prior works suggest that usability has always been the widely studied concept in Human Computer Interfacing (HCI) literature. Interaction between human and computer has always been the center of attraction by the researchers in designing and developing a variety of computer-based software systems. Hong *et al*. (2002) define usability in their work, as how easily and how effectively a computer-based system (e.g. web-based transactional system) can be used by a particular group of users. It is believed that "users experience usability of a site before they have committed to using it and before they have spent any money on potential purchases" (Nielsen 2000). (Palmer, 2002) becomes more emphatic while arguing that for electronic financial system holders to be successful and for users to be satisfied, it is very important that wed-based system designers should give a proper attention to usability and other web-based interface design standards during the implementation process. (Lee and Kozar 2012) in their work suggest that a usable web-based system develops positive intentions toward performing transactions online, and as a result increases its usage. The development of a usable web-based system .

Prior research suggests that current web-based systems (or websites) have number of usability design issues (Becker and Mottay, 2001; Chau and Wong, 2010). The frequently identified usability issues in prior work are, content quality, design credibility, formats inconsistency, navigation difficulties, disorientation, improper interactivity and reliability, slow loading time, ineffective search capabilities, and vaguely definedhelp functions. In the view of (Becker and Mottay, 2001) the major obstacle towards using a particular web-based system is the poorly designed interface of such systems. All this stresses the need of developing usable web-based systems that are likely to be accepted by the potential users. However, the effect of usability on users' intention to perform financial transaction using web-based systems, cannotbe fully explained and/or understood without thorough assessment of what specific features (dimensions) influence users' perceptions towards the usability of web-based transactional systems, and subsequently on their usage.

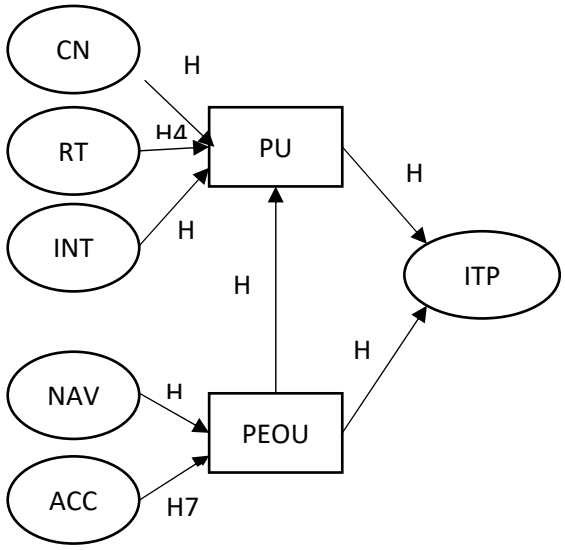
## 3. RESEARCH MODEL AND PROPOSED HYPOTHESES

In order to understand web-based transactional systems acceptance and usage, this study develops a conceptual model **(Fig-2)** based on TAM as a grounded theory. The proposed model consists of 8 main factors. Among those, intention to purchase (ITP), perceived usefulness (PU) and perceived ease of use (PEOU), are derived from the TAM model. Whereas the content (CN), response time (RT), interactivity (INT), navigation (NAV), and accessibility (ACC) are usability dimension identified in the literature. Although there were many usability dimensions reported in the prior work, most of them just had different names but similar definitions and measurement items. Thus, this study incorporates those dimensions that have been frequently used in the literature (Plamer, 2002; Neilson, 2000).

**Fig-2 WTS acceptance model**

### 3.1 Dependent variable: Intention to Purchase

(Swanson, 1988) in his research work defines system acceptance as potential consumers' (users')




predisposition towards personally using a specific system. According to (Davis, 1989) system acceptance is the predictor variable of system usage within the conceptualization of TAM model. In this regard, most of the research surrounding technology acceptance has often applied behavioral intention as a dependent variable to measure the user acceptance and usage (Chandio *et al*., 2013a; Chandio *et al*., 2013b; Abbasi *et al*., 2011). In accordance to previous work, this study alsouses 'intention to purchase' as the dependent variable in the framework. This is also consistent with the postulations of original TAM.

### 3.2 Hypotheses Drawn from the TAM Model

Several researchers in the field of information systems, electronic resources, e-marketing, and online banking systems(Chan and Lu, 2004; Wang *et al*., 2003; Abbasi *et al*., 2011 Chandio *et al*., 2013a, Chandio *et al*., 2013b) have shown evidence of strong impact of PU and PEOU on newly developed systems acceptance and/or usage. PU, however, has often beenproven to have a stronger interrelationship with intended behavior as compared to PEOU. This stronger impact of PU on intended behavior indicates that consumers are generally inclined to accept and use a system because of its functionality and the utility it provides. Therefore, it can reasonably be said, in the context of web-based transaction systems, that if consumers have positive beliefs about usefulness of these systems, they are more likely to perform transactions (including financial) using such systems. This, however, should not detract the fact, that both PU and PEOU are significant determinants of intention to use a particular information system. For example, TAM posits that PEOU not only influences intended system use directly but have impact on it indirectly through PU (Davis, 1989). Therefore, in connection to the original TAM postulations and the findings obtained through prior work, following hypotheses are proposed in this research:

Perceived usefulness of Web-based transactional system will have a significant positive effect on intention to purchase.

The perceived ease of use of Web-based transactional system will have a significant positive effect on intention to purchase.

The perceived ease of use of Web-based transactional systems will have a significant positive effect on perceived usefulness.

### 3.3 Usability Related Hypotheses

Based on the prior work the following dimensions of usability have been identified. As suggested in previous section, the extant literature permits (because of overlapping definitions of usability dimensions) the current study to summarize the previous research into five separate usability specific dimensions. This, also, helps in developing a model that could provide greater parsimony, which is the need of current situation in terms of providing specific managerial research implications for designers and developers. The hypotheses related to specific usability dimension are discussed as under:

**Content:**

Palmer (2002), citing media richness theory, suggested that when information is being exchanged across a medium (in this case web-based transaction systems), three factors i.e., quality, accuracy, and reliability, are of high importance. According to him (ibid), comprehensives and completeness of information, are the key capabilities of a website (or web-based system). (Jarvenpaa and Todd 1997) become more emphatic while claiming that, variety and quality of content are key consumers measures related to web purchasing. Based on the work of Palmer (2002) and Green and Peasron (2010), the variable content in this research is defined as the amount, variety, and relevance of product or services text, graphics, and multimedia. Thus, this research proposes following hypothesis related to content.

Content positivelyinfluence on perceived usefulness of a web-based transactional system.

**Response Time:**

Response time, in this article, is defined as the degree to which a consumer perceives that the response from the web-based transactional system is fast, consistent, and reasonable (Chandio *et al*., 2013a; Chandio, 2011; Pituch and Lee, 2006). Past research suggests that, fast response from the web-based system, has a significant influence on consumers' willingness to use such system (Liao and Cheung, 2002). In the view of (Chandio, 2011), when a consumer performs any transaction (e.g. financial or otherwise) using a web-based transactional system, a slow and/or delayed

response from the system causes him/her concerns as to whether the transaction was actually completed. (Chandio, 2011)suggests that convenience and speed are the important reasons behind consumers' use of web-based transactional systems. It has been observed as well as argued in the work of (Pituch and Lee 2006) that a poor or delayed response from a particular system negatively affects its usefulness or ease of use perceptions. Hence, with regard to response time, following hypothesis is proposed:

Response time positively influences perceived usefulness of web-based transactional systems.

**Interactivity:**

Web-based transactional system's ability to provide smooth interaction and communication with consumer can increase his/her performance. Interactivity, as defined by Williams *et al*. (1989) refers to the degree to which participants in a communication process have control over, and can exchange roles in their mutual discourse. Past research suggests that the two main attributes of interactivity areuser control (Hoffman and (Novak, 1996) and information exchange (Green and Pearson's (2010) study revealed that interactivity and usefulness of web-based system were significantly correlated. Thus, following hypothesis is proposed in this research with regard to interactivity:

Interactivity positively influences perceived usefulness of a web-based transactional system.

**Navigation:**

Well organized and smoothly navigable web-based systems not only decrease error rate and learning time, but have capability to increase performance and consumer satisfaction (Green and Pearson, 2010). In the context of usability, Nielson (2000) and Palmer (2002) claims that organization and navigation are important elements to outcomes. In view of Green and Pearson (2010), design, layout, sequencing and arrangements are key components of Web-based system. It has been observed that users (consumers) while using web-based systems face navigation-related issues - frequently (Preece, 2001). One of those issues is disorientation (Park and Kim, 2000), in which consumers find it difficult to identify their current browsing location and cannot properly return to previously browsed pages. Empirical evidence suggests that navigability is a significant determinant or predictor of ease of use of a web-based system (Green and Person, 2010). In consistent with prior work, following hypotheses is proposed:

Navigation positively influences perceived ease of use of a web-based transactional system.

**Accessibility**

Web-based systems that are accessible to largest possible range of consumers are likely to be considered as easy to use. Accessibility, based on the work of (Kling and Elliot 1994, Chandio *et al*., 2013a), is defined in this research as, the ease with which a consumer (or a user) can locate a particular web-based transactional system. There is plethora of research that suggests a significant relationship between accessibility and ease of use of a particular web-based system. For example, (Chandio *et al*. 2013a) found that accessibility had a strong impact on perceived ease of use. Therefore, this can reasonably be suggested that, accessibility will likely have an effect on perceived ease of, in web-based transactional systems context. In this connection, following hypothesis has been proposed:

Accessibility positively influence perceived ease of use of a web-based transactional system.

## 4. CONCLUSION

There may be a number of factors behind poorly designed and unusable web-based transactional systems; however this study focused on usability factors that are likely to have an impact on their acceptance and usage. Based on the usability dimensions, as identified in the literature, this research developed a theoretical framework to understand web-based transactional systems acceptance using TAM as foundation model. The proposed frame work will not only enablefirm's owners to systematically predict, understand and/or explain the effects of usability on consumers' beliefs towards web-based transactional systems, but also guide system designer to focus on those usability dimensions that impact consumers' perceptions.

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