Antecedents of Website Acceptance and Use: An Interdisciplinary View

Sanjiv D. Vaidya
Indian Institute of Management, sdavidya@iimcal.ac.in

Merlin Nandy
Indian Institute of Management, merlin@iimcal.ac.in

Follow this and additional works at: http://aisel.aisnet.org/amcis2005

Recommended Citation
http://aisel.aisnet.org/amcis2005/221

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2005 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
Antecedents of Website Acceptance and Use:
An Interdisciplinary View

Sanjiv D. Vaidya
MIS Group, Indian Institute of Management
Calcutta, Joka, Kolkata 700104, India
sdvaidya@iimcal.ac.in

Merlin Nandy
MIS Group, Indian Institute of Management
Calcutta, Joka, Kolkata 700104, India
merlin@iimcal.ac.in

ABSTRACT
The nature and extent of use of a website is an important determinant of the success of an electronic business initiative. Hence, it becomes important to understand the different factors behind the use of a website by its intended users. Such an understanding would enable an organization to recognize the drivers of the use of its website and to strive to reduce the gap between the planned and the actual use of the same. While the individual causal factors influencing the actual website usage are quite well understood, the concerned literature is in a highly fragmented state and thus cannot yield concrete guidelines to manage the phenomenon better. In this paper, the existing literature on the use of business websites has been critically examined. We also present a comprehensive interdisciplinary framework for analyzing the phenomenon of use of a business website. Finally we illustrate, in the light of the framework, the scope for future research in this field.

Keywords
ECommerce, Information System usage, Website usage, Technology adoption, Internet adoption

INTRODUCTION
With the advent and rapid diffusion of the Internet the world has seen a phenomenal growth in electronic commerce, both in the Business-to-Business (B2B) and Business-to-Customer (B2C) segments. The growth has been particularly evident in the B2C segment, in the initial stages of E-Commerce. However, the dot-com bust in 2000 witnessed many companies collapse and managers became cautious about IT investments (Coltman, Devinney, Latukefu, and Mifgley, 2001). All the same, as many organizations realize, the dot-com bust does not negate the tremendous potential of E-Commerce. Actually, now that the E-Commerce hype has settled down, it is the right time to review the phenomenon critically. It is necessary to examine the various pitfalls and the benefits of this new technology and the new management mechanisms that need to be deployed.

In fact, in the post-dot-com-bust period, the B2B segment is expected to grow faster than B2C, as estimated by various market researchers worldwide like, International Data Corporation (IDC), Gartner Inc., and Forrester (Raven, 2002). B2B E-Commerce presents a lot of opportunity also to firms in developing countries like India.

Organizations, however, often fail to bridge the growing gap between the intended use of Internet and the actual use of the system once it is implemented. Sometimes firms are not even consciously aware of such a gap. Typically, organizations plan for specific features of the website in the adoption and implementation phase, considering the intended use of it, at that point of time. At its inception the site generally offers only information about the company, the products and services, alternative offerings, etc. In later stages of its development, it transforms to higher levels of planned use, incorporating facilities for online purchase / order placement and financial transactions. But merely putting up a website does not ensure its success. The site should attract users and retain users so as to be effective. While ensuring use of an information system is not the only factor of its success, it still is an important determinant. A good understanding of the different factors facilitating/inhibiting use of a website by its intended users, will enable managers to significantly reduce the gap between the intended and the actual use of the website.

Researchers have attempted to study the behavior of website users in both B2C and B2B contexts. However, discussion on the different factors influencing the actual use of a website is found in a highly fragmented form in the existing literature. In addition, our understanding regarding the interactions between these variables and the nature of influence of theirs on the actual use has not reached a level of refinement where it can yield operational guidelines about the planning and management of these websites. Additionally, a major portion of the research in the area of website design and use has been conducted only in relation to online shopping and purchase in B2C environments.

In this paper, to begin with, we critically examine the existing literature on the use of business websites. Subsequently, we present a comprehensive interdisciplinary framework for analyzing the phenomenon of adoption and use of a business website by its intended users. It draws on insights from the technology diffusion, acceptance and use literature as well as the
emergent field of Internet commerce. We also briefly examine the prescriptive value of the proposed framework. Finally we illustrate, in the light of the framework, the scope for future research in this field.

EXISTING RESEARCH AREAS

(Delone and McLean 1992) in their study investigated the different aspects of IS success and suggested measures of success including, system quality, information quality, use, user satisfaction, individual impact and organizational impact. But traditional business performance metrics are not useful in the case of net-enabled organizations (Straub, Hoffman, Weber and Steinfeld, 2002) as they are affected by many external factors like industry conditions, competition and health of the economy at any given time. They suggested that if websites are dynamic and constantly changing then the dependent measure could be satisfaction deltas (Straub et al., 2002) reflecting website usage over windows of time. The Internet does have unique characteristics that have to be acknowledged and taken into account when planning an e-business strategy (Hoffman and Novak, 1996) and hence requires new metrics to learn what works and what does not in any online environment.

(Cooper and Zmud’s, 1987) IS implementation model examines six stages of IS implementation: initiation, adoption, adaptation, acceptance, use/routinization and infusion. Studies have been derived from this model to examine adoption and use of IT innovations in organizations (Eder and Igbaria, 2001). Examining the existing literature, it is observed that there are many factors that influence the decision of a website user to use a website in a particular way. We study and analyze those factors in the following sections.

Measures for Website usage

As has been mentioned earlier, system use is an important determinant of system success and effectiveness, though it is not the only one. There exists a spectrum of models on system usage and use of online commerce websites that define different operational measures of actual use of the particular technology

Few empirical studies on B2C Internet commerce are listed in Table 1, where authors have attempted to explain user behavior and actual website usage. The various phenomena and the various operational measures and definition of the outcome variable have been listed.

Factors driving website usage

Website characteristics

Several studies have established the importance of characteristics like perceived ease of website use, easy navigation, design and layout, readability of the text, user friendliness, access time, response time and download delays (Chau 1996; Hwang and Yi, 2002; Lia and Li, 2005; Moon and Kim, 2001; Page and Uncles, 2000; Saade and Bahli, 2005; Shang, Chen and Shen, 2005; Venkatesh 2000). (Aladwani and Palvia, 2002; Yi, 2002) have cited website quality as an important attribute which includes service quality, security, consistency, content quality, information quality, scalability, availability, accuracy of the information, relevance, completeness of data and perceived attractiveness of the website. Observing online bookstore purchases as suggested by (Liang and Lai, 2002) shows design quality to be an important determinant for consumer choice of purchase or future visit. The GE Plastics case is an example to show the importance of website characteristics in building strong online relationships and customer loyalty. They focused on the end-user functions like ‘buy, design, research and interact’, to make the website user friendly.

Participant characteristics

This construct refers to characteristics of website users, who may include individual and corporate customers and vendors as well as the primary (website-hosting) organization. There are not many studies available in this area. Factors related to the primary organizations have been addressed by (Igbaria, 1995; Ruppel, 2003). They describe organizational preparedness and technology soundness as facilitators of website use. (Cooper and Zmud, 1987) have identified factors like user community characteristics, organization characteristics, task and technology characteristics and organizational environment characteristics, which impact diffusion and infusion of IT. (Cho, 2004) demonstrates that features of the products being sold online are equally important in promoting website use. A study by (Ancion, Cartwright and Yip, 2003) on the drivers of new information technologies discusses the inherent characteristics of product or service and reveals the important role of drivers like information intensity, electronic deliverability, customizability and aggregation effects. User characteristics are defined by adequacy of regulations as perceived by the target customers (Gefen et al., 2003), level of involvement of target customers in the product for example, in fashion products (Shang et al., 2005), organizational support to users in using the website and the importance of the concerned business for the user organization (Igbaria et al., 1995; Lederer et al., 1998). Variables like user age and IT competency have been shown to influence intention to use online banking websites (Lai and Li, 2005).
Application-specific self-efficacy (Hwang and Hi, 2002), experience in using the Internet, perceived complexity of using the Internet, and the natural inclination of the user towards using the website (Gardner, 2004) are a few other factors that drive use of internet-based applications. The foundation of many of these studies is the technology acceptance model (TAM) by (Davis, 1989). Social influence (Ambra and Rice 2001) is measured by identifying pressures to use, which may come from peers, workplace and the media. They discuss factors like potential costs of web usage, understanding the Internet, legal implications, fear of being monitored and finally the Task-technology-fit (TTF). Citibank’s e-business strategy for global corporate banking highlights the importance of continuous investment in technology. The senior executives outlined this as one of their competitive advantages. The case of GE Plastics, discusses the very high involvement of top management in e-business transformation in the company, the interaction among top leaders, and the active participation of the website users/customers in designing the website, the interface and the supporting services.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Phenomenon Studied</th>
<th>Operational Measures</th>
<th>Scale Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lederer et al</td>
<td>1998</td>
<td>WWW Usage</td>
<td>Extent of Use</td>
<td>Overall Perceived frequency of use</td>
</tr>
<tr>
<td>Moon and Kim</td>
<td>2001</td>
<td>WWW Usage</td>
<td>Frequency of use</td>
<td>Number of times WWW was used in a week</td>
</tr>
<tr>
<td>Heijden</td>
<td>2003</td>
<td>Website usage in Netherlands</td>
<td>Frequency of Use</td>
<td>No. of times portal is visited</td>
</tr>
<tr>
<td>Pavloul</td>
<td>2003</td>
<td>Use of online shopping sites</td>
<td>Frequency of use</td>
<td>No. of times products purchased and monetary transactions conducted in last 6 months</td>
</tr>
<tr>
<td>Gefen et al</td>
<td>2003</td>
<td>Use of B2C online shopping site</td>
<td>Intended use</td>
<td>Online purchasing using credit card Provide information to online vendor</td>
</tr>
<tr>
<td>Cho</td>
<td>2004</td>
<td>Intention to complete a purchase online</td>
<td>Likelihood to abort an intended transaction</td>
<td>Ways in which the user exits the shopping site (completion of transaction / abandoning shopping cart)</td>
</tr>
<tr>
<td>Hsu and Lu</td>
<td>2004</td>
<td>Intention to play Online Games</td>
<td>Intention to use</td>
<td>Deciding if it was worth playing or not Frequency of playing in the future</td>
</tr>
<tr>
<td>Shang et al</td>
<td>2005</td>
<td>Use of online shopping sites</td>
<td>Intensity of shopping</td>
<td>No. of times shopped Duration of shopping Amount of money spent online</td>
</tr>
<tr>
<td>Saade and Bahli</td>
<td>2005</td>
<td>Intention to Use Internet based learning systems</td>
<td>Intention to Use</td>
<td>Intention to take more online courses in the future Intention to show others the online system</td>
</tr>
<tr>
<td>Lai and Li</td>
<td>2005</td>
<td>Use of Internet banking</td>
<td>Intention to use</td>
<td>Intention to use regularly in the future Intention to use frequently Intention to recommend website to others</td>
</tr>
</tbody>
</table>

Table 1. Studies on the Use of Websites

Perceived Usefulness (PU)

Perceived usefulness is defined in the different ways by different researchers. (Davis, 1989) defines it as the degree to which a person believes, that using the particular system would enhance his/her job performance. (Shang et al., 2005) describe PU along two dimensions, viz., near-term usefulness and long-term usefulness. Perceived playfulness defined as ‘source of amusement and enjoyment’ and personal innovativeness, are determinants of cognitive absorption as described by (Chung and Tan, 2004; Hwang and Yi, 2002; Moon and Kim, 2001; Saade and Bahli, 2005). (Atkinson and Kydd 1997) have examined the influence of playfulness, intrinsic factors and extrinsic factors on the use of WWW for entertainment purposes and course work purposes for students. Furthermore, (Venkatesh, 2000) proposed in their study a model with these intrinsic and extrinsic factors as extensions to the TAM. TTF is also an influencing variable from Dishaw’s model (Dishaw, Strong and Bandy, 2002) with antecedents as system functionality and task characteristics. (Ambra and Wilson, 2004) have argued that IS will have a positive impact on performance if the system is used and there is a good fit with the task’s characteristics that system has to accomplish. (Benslimane, Plaisent and Bernard, 2003) have in their paper examined the application of TTF model to WWW-based procurement from the business buyers’ perspective and suggest that a better fit leads to higher levels.
of usage which leads to better performance for users. (Koufaris, 2002) discusses the variables derived from TAM, psychology and marketing to predict unplanned purchases and intention to return to an online storefront. These individual and website factors include PU, perceived ease of use, concentration, enjoyment, perceived control, individual web skills and product involvement. The hypermedia computer mediated environment as discussed by (Hoffman and Novak, 1996) represents a different environment for marketing activities than do traditional media. They proposed a model of consumer navigation on the Internet with factors like, the nature of task and concept of flow. (Ambra and Rice, 2001) have studied PU and the perceptions of how much interesting, enjoyable and productive the use of web is.

Perceived risk (PR)

Users comfortable with transacting online perceive a high level of security in financial transactions (Ruppel, Linda and Harrington, 2003; Jarvenpaa and Tractinsky, 1999; Pavlou, 2001; Featherman and Pavlou, 2002), perceive less risk in giving away personal information and in losing products ordered and getting wrong products (Jarvenpaa et al., 1999; Keat et al., 2004; Liu, Lu and Yu, 2005; Pavlou, 2001; Ruppel et al., 2003). (Featherman and Pavlou, 2002) suggested that perceived risk affects PU and expanded the construct into performance risk, financial risk, time risk, social risk, privacy risk and overall risk in the case of e-services. (Jarvenpaa et al., 1999; Pavlou, 2003) posit PR as an additional construct in TAM, which affects Intention to transact online, with its antecedent as trust. This is similar to the views of (Lai and Li, 2005) who concluded that PR and perception of risk-reduction measures affect willingness to adopt online banking.

Perceived Trust

E-Commerce literature emphasizes the importance of user trust as an important driver of website usage. User trust encompasses their trust in the Internet, trust in the concerned organization (Gefen et al., 2003; Liu et al., 2005; Pavlou, 2001; Ruppel et al., 2003) and confidence in the website (Keat et al., 2004; Liu et al., 2005). Many such trust models have been based on the TAM. (Keat et al., 2004) have studied these existing models and proposed an integrated model that explains the relationship between consumer trust and eCommerce, with antecedents of trust as reputation and perceived strength of control. (Dahlberg, Mallat and Oorni, 2003) introduced an enhanced version of TAM with a construct called perceived trust and disposition to trust which affects PU. (Pavlou, 2003) had trust as an antecedent to PR, which affects Intention to Transact Online. (Jarvenpaa et al., 1999; Suh and Han, 2004) also considered trust, as a construct in influencing the attitude and willingness to buy online, with antecedents as perceived size of the store and perceived reputation of the store. (Yi, 2002) highlights market orientation, user’s web experience, perceived site quality, technology trustworthiness and PR as antecedents to trust in an online B2C environment.

ANALYSIS OF THE LITERATURE

From the above discussion, we can make the following important observations, in respect of the existing literature on the use of websites by the intended users. In particular, we analyze the literature on website usage and its antecedents, highlighting the contributions and shortcomings. Harvard Business School cases on Dell Computer Corporation, GE Plastics and Citibank have provided support for the various factors and are included in the analysis.

1. There has been extensive discussion on the different possible measures of website use. However, if we consider the entire literature together, the discussion appears fragmented, with inadequate attempt to correlate and integrate the different measures. More importantly, most of the measures are primarily applicable in B2C situations. B2B situations involve considerably more structured use of the website and depend significantly on factors related to user organizational requirements and practices.

2. Studies so far, have also considered the different factors responsible for a particular level of use of a website. Particular emphasis seems to have been on the constructs - perceived ease of use and PU - indicating the fact that most of the models discussed have the TAM as their foundation. Researchers have also suggested that characteristics of a website influence the behavior of target users and hence the website usage. The variables ‘perceived risk’ and ‘perceived trust’ also have been adequately discussed by several authors. These can be referred to as control variables. The foundation of most of these studies is again the TAM proposed by Davis. Few of the frameworks have also emerged from the TPB (Theory of Planned Behaviour) (Ajzen, 1991) and TTF models. TPB considers factors that influence user intention, which in turn influences actual usage.

1. Factors related to website users have been partially addressed. Users will not use e-business solutions just because the firm implements them. Leveraging the power of the Internet requires knowledge of the people-side of technology. Hence, there is a need to understand why people use technology and why they avoid using technology. Also, there is a need to consider various other factors like pressures to adopt a technology and different product characteristics. For a B2B website, the technology orientation of the user firm and the related cultural factors, have also to be considered.
Business partners normally have long-term relationships and the orders are usually planned and repeated with no impulse buying. The case on Dell also focuses on the type of organizational relationship between the primary firm and its corporate customers. All the website users need to be convinced that their interests are kept in mind. A case of the Finnish Center for Pensions (FCP) shows that work processes, roles of people in the processes and the systems are to be well coordinated to ensure faster information delivery on the Internet.

4. Although there have been attempts to explain how the drivers influence website use, these have been statistical generalizations for the phenomena of website use and no conceptual links have been established. Further inadequacies in the current understanding of website use appear as lack of explanation of the interaction between the influencing factors and the effect of this interaction on the outcome variable.

5. There is relatively much less literature discussing management strategies for ensuring use of websites. This is possibly because of the fact that the existing literature is not yet a reached a stage of refinement, where one can develop operational management guidelines from it.

Thus, we find that the different factors behind the use of a website at a particular level have been presented in the existing literature in a fragmented manner. The literature also does not explain the interactions among the different factors. Further, it does not explain the nature of influence of the different factors on the use of a website in a particular way. Finally, the literature does not present concrete, operational guidelines for managing the use of websites.

**A FRAMEWORK FOR UNDERSTANDING THE PHENOMENON OF WEBSITE USE IN AN E-COMMERCE ENVIRONMENT: DIRECTIONS FOR FUTURE RESEARCH OPPORTUNITIES**

As we have seen above, the existing literature delineates measures of website use in considerable detail. It also discusses many factors responsible for the use of a website in a certain way. However, the literature does not present an integrated view of the causal factors, as well as the different levels of use of a website by its intended users. Some of these factors, which have not been thoroughly researched, have been described in the various published cases analyzed in the section above. This further strengthens our argument for addressing these factors in future studies. Further, the literature does not explain the nature of influence of the different causal factors on the website use. In Figure 1 below, we present a comprehensive framework for analyzing the phenomenon of use of a business website by its intended users.

In addition, Figure 1 presents areas, which have been covered by the current literature, and hence demonstrates the existing gaps, which also represent scope for future work in this area.

The framework is further explained below and the directions for future research opportunities outlined.

a. Constructs grouped under [1] in the above figure, indicate those variables, which have been discussed in the MIS and technology adoption literature.

b. User characteristics is an external factor which is not directly under the control of the primary firm hosting the website and is like a disturbance variable. All other factors mentioned are internal to the organization and are directly under the control of the firm.

c. Opportunity marked as [2] in Figure 1, indicates that the identification of the causal factors that lead to different usage levels of the website is still incomplete. The GE Plastics case highlights this factor when discussing the digitization of organizational processes. Information intensity of the user value chain which largely depends on product and usage characteristics is an important determinant in website use. The literature does not deal with this in detail. While these characteristics can also influence the PU of the website, they distinctly indicate the scope for website use, which in turn influences the actual use. User - whether organizational or individual - characteristics have been discussed as an external variable and are antecedent to perceived ease of use, PU and Perceived playfulness. However, dimensions like technical capability (of roles, people, technology) and backend processes supporting the website have not been emphasized in the models. Dell is an example to highlight the importance of these and other factors like employee awareness and motivation within the primary organization beyond the senior management. These ultimately help the primary organization in providing value-added services. Dell also stresses the importance of organization structure and its organization’s culture in accepting new disciplines. They continuously convince customers about the use of technologies and their impact on performance through presentations and other media. If these fail, then most visitors would slowly discontinue use over time.
d. The area marked as [3] in the figure, refers to the lack of a detailed, conceptual measure for the construct ‘website usage’. From the foregoing analysis of the literature we see that there is a need to understand the different factors relevant to B2B situations and develop an integrated view of the same. This would enable us to define operational measures for website usage that would indicate the productive use of the website, to define types of website usage, relationship between acceptance and usage and the business outcome of different types of usage.

e. Opportunity [4] in Figure 1 suggests that there is a need to investigate the nature of influence of the causal variables on the outcome variable. This has not been addressed in the literature. The individual influence of constructs and their collective influence on the outcome variable have also not been examined till date.

CONCLUSION

It is often observed that organizations adopting electronic business and deploying websites do not get the desired results. Among the various factors that determine website success, actual use of the website is an important one. An understanding of the phenomenon of website use is expected to lead to more effective management of the Internet adoption process. In this paper, we have tried to examine the factors responsible for website usage and identified gaps in the current literature. Subsequently we have developed a broad framework for explaining this phenomenon, and suggested directions for future research efforts in B2B and B2C scenario. Such an analysis of websites would provide organizations with an understanding of the influencing factors that drive website usage and enable them to manage the factors which are under the firm’s direct control and develop management mechanisms accordingly. Literature on B2B Internet commerce is relatively sparse and application of TAM, TTF framework and other models to this field is still being explored. Considerable research has been carried out to address the issues of B2B market structure but there has been no conceptual framework specific to the B2B Internet commerce applications usage. Many organizations have successfully implemented e-business technologies and have derived significant benefits out of it. The knowledge of new technologies and the broad strategies that these firms adopted are available to all organizations. Then why are only few able to implement it effectively? Our framework attempts to address this problem by including relevant characteristics of the user organization, the primary organization and the product.
characteristics among the causal factors. This also renders the framework generalizable. The nature and availability of the product could influence usage of B2B websites. Differences between individual and organizational users are in terms of buying behaviors, business pressures, the influence of organizational cultures and dominant coalitions, etc. Extensive field research in both B2B and B2C Internet commerce would also bring out the differences and highlight important factors.

REFERENCES