Does the Customer Know Best? The Results of a Survey on E-Commerce Development

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Abstract

This study surveys forty four project leaders of recently completed e-commerce sites regarding customer participation in e-commerce development activities. Throughout the literature for four decades, a commonly cited factor pertaining to system success has been user participation in the systems development process. The business need for a rewarding customer experience on an e-commerce site would suggest customer input would substantially influence the site design. The study finds that participation by customers in developmental activities is occurring, but at a less than anticipated rate and resulting in little influence on the design of the site.

Keywords: User participation, project management, electronic commerce, systems development

Introduction

Since the 1960's it has been generally acknowledged that user participation in the Information Systems (IS) development process increases the likelihood of project success (Barki & Hartwick, 1994; Foster & Franz, 1999). Put another way, lack of communication between users and developers has been a common theme in the well-documented reasons for failures in IS implementations (Bussen & Myers, 1997). User involvement is likely to result in increased user satisfaction (Garceau, Jancura, & Kneiss, 1993), and the perceived usefulness of the application (Foster & Franz, 1999; Franz & Robey, 1986; McKeen, Guimaraes, & Wetherbe, 1994). Foster and Franz (1999) emphasise the need for user involvement, most importantly in the early stages of development, concluding, "managers should actively seek user involvement in systems development activities" (p.345).

The portfolio of applications being developed today has changed with the emergence of the E-Commerce (EC) business paradigm. Organisations are capitalising on the potential of new technologies such as the Internet, Intranets and the World Wide Web to improve communications and transaction efficiency, reduce operation costs and increase market share. This paradigm shift in business has been supported by applications with a different focus. While organizations continue to implement IS for internal use and to integrate with known business partners, the focus of this paper is business-to-customer (B2C) applications that are available for universal use.

The literature to date regarding user participation in IS development has not differentiated between applications designed for traditional environments or for B2C. In comparing the two domains, Fraternali (1999) states:

> "Applications for the Internet in such domains as electronic commerce, digital libraries and distance learning are characterized by an unprecedented mix of features that makes them radically different from previous applications of information technology" (p. 227).

However the underlying process for developing applications is addressed by Yourdon (2000), who questions whether e-business/Internet projects are really that different by suggesting "E-business projects face the same demands pressures and risks as any other kind of IT development project, but to a greater degree". This added pressure comes from not only squeezed timeframes for delivery, but also from the necessity to change accompanying business processes. He suggests also that "the e-business phenomenon is much more fundamental because it creates a much more intimate connection with customers, vendors and suppliers".

One feature of B2C systems that differentiates them from traditional MIS applications is the identity of the "user". Traditional systems are developed for a clearly defined set of known users either in-house or business partners. The development may be undertaken in-house or by external parties, but either way, the user communities are clearly identifiable. They are often championing the project and possibly funding it from their budget. Likewise off-the-shelf packages allow organisations to see what they are getting before software purchase. Customisation of the package to meet the organisations needs can then precede implementation. Again the known, distinguishable in-house user community is able to be involved in decisions regarding the adoption and adaptation of the product.

In the global business environment of today, a B2C application is inviting the consideration of the world at large. Rather than serving a known user group, B2C sites may target the world at large. Potential users are diverse in all respects, ethnically, culturally as well as geographically. They are also diverse in their computing skills as noted by Fraternali (1999),

> "Universal access by individuals with limited or no skills in the use of computer applications introduces the need of new man-machine interfaces capable of capturing the customer's attention and facilitating access to information" (p.227).

The ability to have representative end-user participation in B2C IS development is radically different from obtaining user involvement in traditional systems. The question is "are potential B2C end-users being included in the development process?" Terry and Standing (2001) in a series of preliminary interviews with five project leaders reported that "despite the business need for remote, untrained users to quickly feel comfortable and satisfied in an e-commerce site encounter, it appears that organisations are making very little effort to engage users in any e-commerce site developmental activities" (p. 671).

This paper investigates the extent of user participation in B2C IS developments by surveying project leaders of substantial B2C developments. Forty-four leaders of recently completed projects, were questioned on the role of users throughout the development lifecycle, along with the contingency factors of resource constraints and system impact that may affect the commitment of the organisation to the success of the system. The results are presented.

Users and User Involvement

The term "user" is open to ambiguity. Land and Hirschheim (1983) acknowledge the existence of different types of user: senior management who bear ultimate responsibility for the organisation's

well-being and who may use outputs of IS developments; middle management who are responsible for the operational staff using the IS, and finally those staff who regularly interact with the system. From project conception, through the development lifecycle each of these users may contribute or participate in IS development activities. The term "user" is not generally defined specifically in the many studies published in literature, beyond the Ives and Olson (1984) definition of them as "representatives of the target user group" (p. 587).

User involvement has traditionally been referred to as participation in the system development process measured as a set of activities that users or their representatives have performed (Baroudi, Olson, & Ives, 1986; Doll & Torkzadeh, 1989; Ives & Olsen, 1984). Barki and Hartwick (1994) proposed a clearer definition for user involvement, distinguishing it from user participation as in other disciplines. They define user participation as a "the assignments, activities and behaviours that users or their representatives perform during the systems development process" (p. 60). User involvement refers to the "subjective psychological state reflecting the importance and personal relevance that a user attaches to a given system" (p. 60). These definitions appear to have been generally accepted in the ensuing literature (Hunton & Beeler, 1997; McKeen & Guimaraes, 1997) as they are in this paper.

The literature has not found the identity of the users or their representatives to be a contentious point. Often all of the three user types above are domiciled in the same workplace and are identifiable to IS development project managers. Their participation in for example, problem definition, specification of requirements, design and testing could be mandated within the organisation. So the users involved in IS projects are clearly identifiable to practitioners and to researchers.

Identifying the user community in B2C systems development is more difficult. The three user types identified by Land and Hirschheim (1983) still exist. Senior management involvement in the conceptualisation of a system is particularly important given the structural business change that will need to accompany the introduction of EC. While middle management is not as prevalent in the workforce, this group covers expert users who will have essential input developing requirements and design. Organisations will also have operational staff interacting with the system. However another user type has emerged. B2C transactions involve remote customers who may not be known to the organisation. They are the ultimate end-users, but are beyond the accepted definition of users above. They are not staff and do not fall under the control structures of the organisation. Business success is based on their acceptance and usage of the system. However their participation cannot be mandated. Likewise their involvement or attitudinal disposition to the system. We will call this group of users "customer-users".

System Success

While there is no direct measure for the success of an Information System, (see DeLone & McLean, 1992), empirical researchers have commonly used user satisfaction as the dependent variable (Doll & Torkzadeh, 1990; Franz & Robey, 1986; McKeen & Guimaraes, 1997; Powers & Dickson, 1973). Prominent among the independent variables studied for their influence on this measure, are user involvement or participation in the system development process.

Although the efficacy of user involvement in information systems development leading to system success has been the subject of much research, it has not been studied in the context of B2C systems development. However, the concept of system success as measured by user satisfaction may be more relevant to B2C developments than to traditional systems. Ensuring a system is successful from a user perspective is related to:

Meeting Requirements

For a system to be useful to users it should provide appropriate functionality. This may include providing relevant information, entertainment, downloads, or transaction capabilities.

Usability

There are many aspects of information systems design that impact on usability including: the design of the user interface, ease of navigation, online and offline help, system performance and error handling (Fisher, 1999). With no compulsion to visit and interact with a site, an Internet user needs to feel comfortable with a site's usability – and quickly. If not they can and do take their trade to another site. Shopping cart abandonment rates of 20 to 60 percent per transaction reported by Schwarz (2001) are testament to dissatisfied customers.

It has been said that there is only one chance to make a first impression. In the Internet world it may be better to have no site than an unintuitive one that is unlikely to be revisited. Furthermore customer-users are not availed of the training in application use that traditional system users expect. User support is also not likely to be as readily available. So there is a need for EC developers to be particularly sensitive to usability issues.

Research Methodology

The relationship between customer participation in EC system development and system success, as perceived by the customer is the central focus of this paper. This relationship has been ignored in the academic literature to date; it is beyond the scope of the generally accepted definition of "user participation". This paper forms part of a wider study seeking a view of this relationship from several perspectives – the project leader, the business sponsor, internal system users and external customers. This paper presents the perspective of 44 project leaders.

Project leaders of recently completed EC developments or substantial redevelopments were interviewed to ascertain the extent if any of customer profiling and customer participation in development activities. They have been responsible for the development of the EC application and are able to respond to questions regarding customer participation in the developmental process. They were asked multi-dimensional questions pertaining to potential areas for inclusion of user input throughout the development process, namely:

- requirements gathering,
- design,
- usability testing,
- post-implementation review

The other perspectives relating to the same EC system are being simultaneously captured but not yet analysed. The business sponsor is surveyed regarding costs and strategic, transactional, informational and general benefits. Internal users are asked about their participation in the EC development - they are the current equivalent of the user of traditional MIS developments. Customers are evaluating the EC sites in terms of usability, information quality, and the feeling of a sense of relationship with the organisation.

Results

The section describes an initial reporting and interpretation of the survey data as a precursor to a detailed quantitative analysis.

Table 1 shows a summary of the data. Project leaders were asked a number of questions relating to customer participation in Requirements, Design and User Testing based on a 5 point Lickert scale. The figures shown here are an aggregation of these multiple questions in each area.

The customer perception of the success of the site was a rounded average of the perceptions of five customers of each site.

Table 1: Project leader perspective of user participation.

Organisation #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Requirements	1	5	1	3	4	3	4	1	5	4	4	3	1	4	4
Influence	1	3	1	1	5	4	4	1	3	4	4	4	1	5	3
Design	1	4	1	1	5	3	3	1	3	1	1	2	1	2	1
Usability testing	1	2	1	1	3	4	5	1	5	4	2	4	4	2	1

Organisation #	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Requirements	2	3	3	2	4	1	3	5	4	3	1	1	2	2	3
Influence	3	1	1	2	3	1	3	3	4	4	1	1	1	1	1
Design	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1
Usability testing	2	3	1	3	3	2	1	2	4	4	1	1	1	1	1

Organisation #	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Requirements	5	1	4	4	3	1	2	3	3	3	2	1	2	1
Influence	4	1	4	4	5	1	3	3	4	4	3	1	2	1
Design	2	1	4	4	5	1	2	2	1	2	2	1	1	1
Usability testing	4	1	3	4	4	1	2	3	1	4	2	1	2	1

Requirements, Design and Usability testing are based on a 5 point Lickert scale for customer input where:

   1 = no input, to 5 = extensive input.

Influence uses a 5 point Lickert scale where:

   1 = customer input had no influence on site requirements, to 5 = customer input had extensive influence on site requirements.

Requirements Gathering

Seventy-five percent of respondents incorporated some form of user participation in the Requirements gathering process. Many used more than one technique. Of these 75%, the techniques most used to elicit requirements were:

- evaluation of comparable sites (64%)
- electronic (email or web-based) surveys (57%),
- bringing people together for focus groups (45%),
- conducting telephone surveys (33%),
- interviews (33%).
- traditional paper-based surveys (21%)

It appears that project leaders employ a wide variety of techniques to capture information regarding "what" potential customers would like the site to provide. Seventy eight percent of the organisations that embraced user participation utilised 3 to 6 different techniques in the requirements gathering process (see Figure 1).
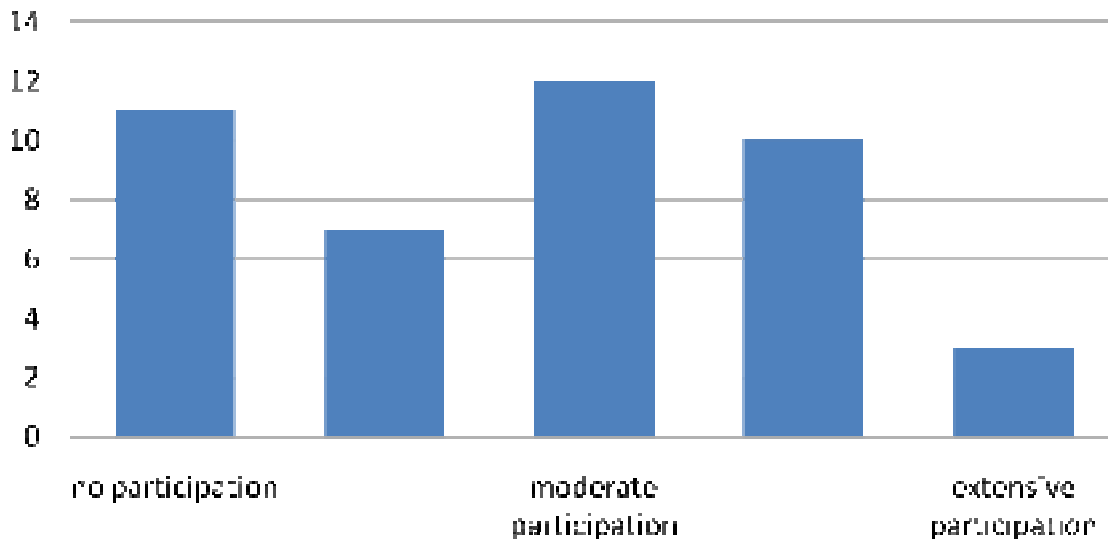
Figure 1: Customer participation in requirements analysis

Participation in a process and influence brought to bear on a final product may be quite different. From the above results it appears that the respondent project leaders were keen to utilise potential users. However project leaders were also asked the question, "to what extent did the input from targeted customers influence the content of the site?" Twenty one percent of the organisations that embraced some form of user participation indicated that the influence of the targeted customers on the site was zero (see Figure 2). These organisations with project leaders that involved customers in determining requirements for their site, were unable to utilise any customer input into the site requirements. Together, the organisations not utilising customers in requirements and those not being influenced by them account for 43% of the sample. Only three project leaders (9%) indicated that the user participation led to extensive influence on the content of the site.
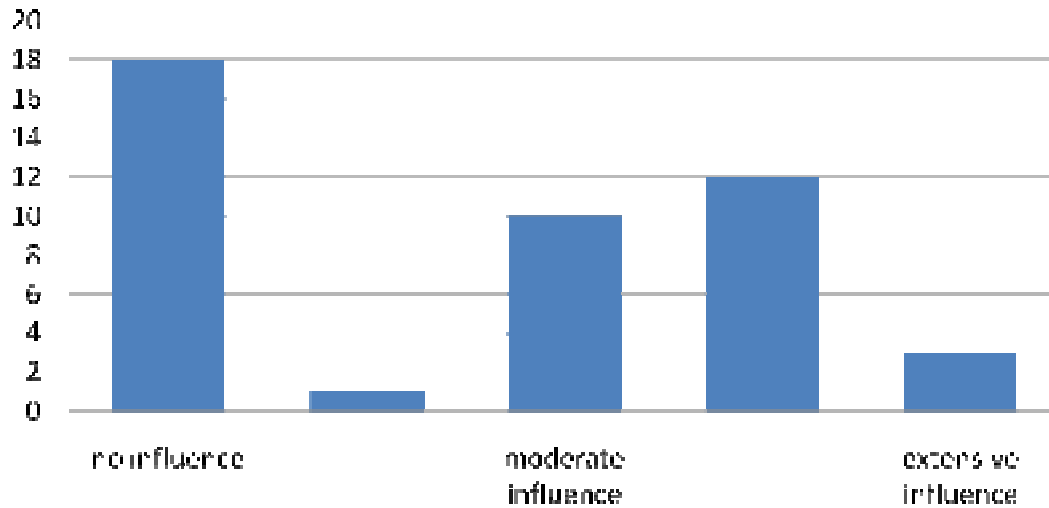
Figure 2. Customer influence on requirements

Design

There was a significant fall away of customer participation from requirements gathering to design activities. Forty eight percent of all organisations, (or only 61% of organisations that used customers for requirements gathering), utilised customers for design activities (see Figure 3). Of this group the activities and participation rates were as follows:

- a walkthrough of the completed design (45%);
- developing the structure of the site (15%), and
- developing the navigation for the site (15%).

Therefore the major design activity in which the project leaders invited customer resources for input, was to provide feedback after the design had been completed; this exceeded customer involvement in developing the design.
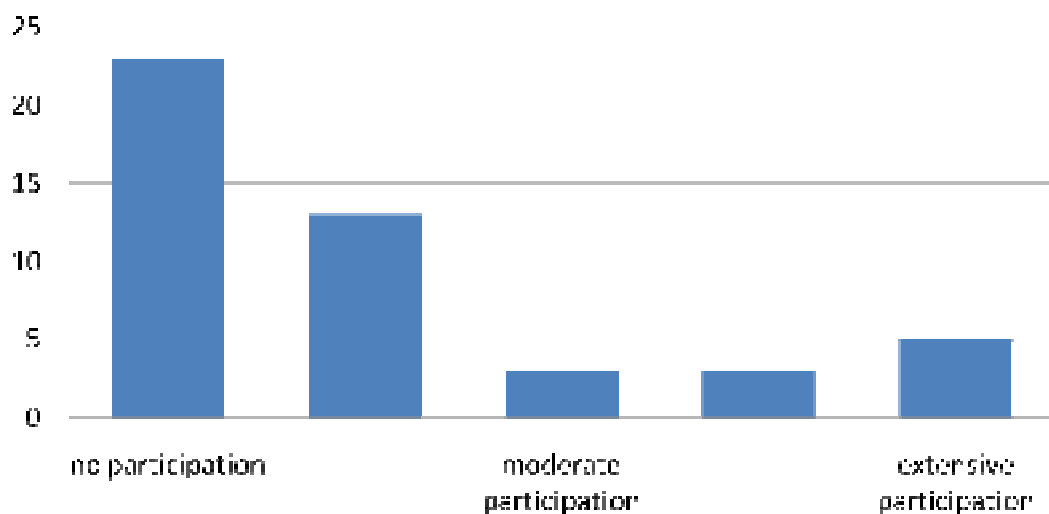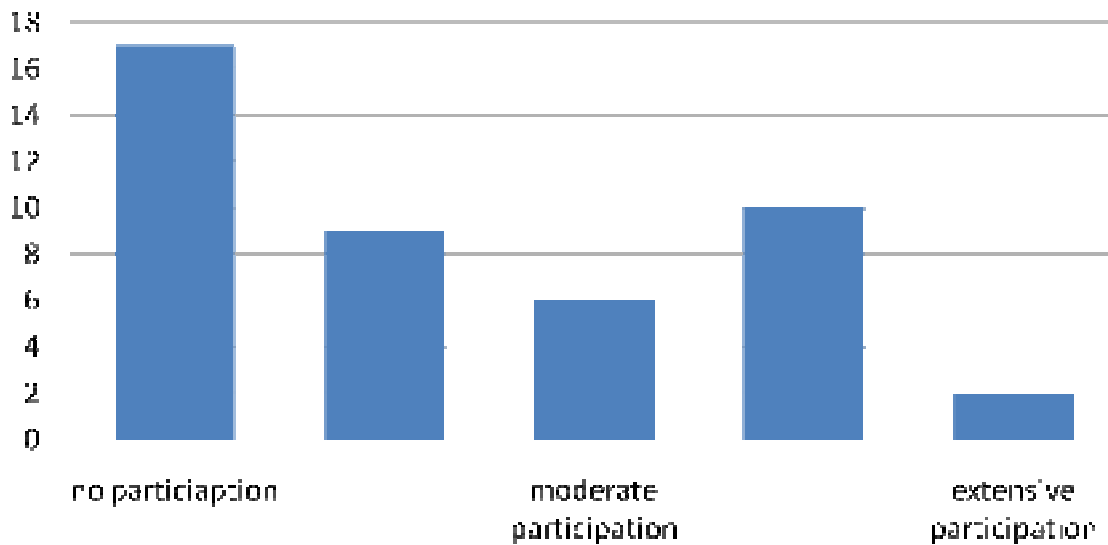

Figure 3: Customer participation in design

Usability Testing

Sixty one percent of project managers had potential customers perform some form of usability testing on the site (see Figure 4). Those organisations that performed usability testing employed a variety of testing techniques as are shown below:

- The customers were given specific tasks to perform (37%),
- The customers were asked to complete a questionnaire regarding their experiences (30%),
- The customers were observed while performing usability testing (26%),
- The customers' actions were automatically logged as they performed tests (22%),
- The customers were asked to verbalise their thoughts as they performed tests (22%),
- The customers were recorded while performing usability testing, for later analysis (7%).

Figure 4: Customer participation in usability testing

Metrics from Testing

Of the organisations that performed usability testing, 78% collected quantitative performance measurements from the process. The following are metrics were collected with numbers as percentage of all organisations:

- Tasks successfully completed (34%),
- Number of errors made (23%),
- Time taken to complete a task (20%),
- Time spent recovering from errors (9%).

Beta testing

Fifty percent of organisations released the application to a limited set of customers for beta testing before putting the application into full production. All of these organisations had involved customers in usability testing.

Post-implementation review

There was very little active seeking of site review feedback from customers. Only 23% of all organisations asked customers to complete either an online or paper-based survey. None used a commercially or generally available instrument for this purpose. However 61% of organisations indicated that they perform their own review of customer/site interaction by evaluating site logs. The majority of organisations (73%) provided a passive mechanism for some form of customer feedback - this was a simply providing a link for customers to contact the webmaster concerning problems or suggestions.

Figure 5: User participation in development activities
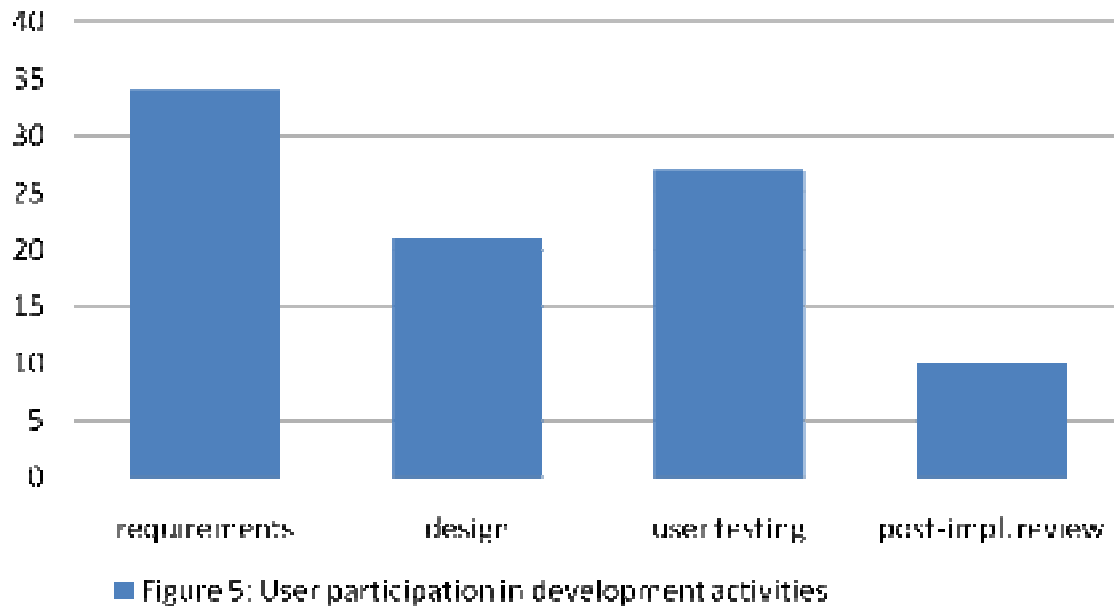
Discussion

This paper describes the perspective of project leaders of EC developments, regarding customer participation in projects. The majority of projects (75%) have embraced some form of customer participation in the development process (See Figure 5). The scale of this participation has varied markedly between development phases. There was a clear drop in participation in design phase activities, but all projects that utilised user participation in design had also done so in the requirements analysis phase. In fact of the 34 projects that used customers in requirements generation, only 9 continued to use them in developing the design (as opposed to a customer walk-through of the design, which a further 11 projects utilised).

Only one further organisation emerged to involve customers in user testing activities, (including both usability and beta testing), that had not done so in requirements analysis.

While it is unclear why there is a drop away in user participation after the requirements gathering exercise, the influence these customers exerted on the final site requirements emerges as an interesting statistic. Of the 34 projects that used customers for requirements gathering, 7 (21%) indicated that the customer input had no influence on the site at all, and only 3 of these 34 organisations (9%) had extensive influence. It would appear that these project leaders found customers did not add significantly to the requirements of the system. Either the customers espoused what was already known by the organisation about the site requirements, or their input was discarded as being outside the project scope. It is realistic to conclude that many organisations attempting to transact with customers over the web do have a clear idea of what their site is going to provide. In

many cases content and functionality for a limited product set is restricted. Navigation is likewise. As the web becomes more accepted as a means of completing commercial transactions, EC site developers and consumers alike have more shared expectations about site usability. The most-performed requirements gathering function by customers, was the evaluation of comparable sites.

This paper summarises the complete data set collected from project leaders. However it is only part of a multi-perspective study that has also surveyed business sponsors, internal users and the actual customers of the site. Of interest will be the comparative data on the success of the EC site and any links to the role of the customer in the developmental activities. This preliminary summary analysis indicates that project leaders are not utilising customers in development activities to the extent that was anticipated. There could be any number of reasons why this is so:

- project leaders believe the customers do not know what is required or how it should be designed,

- developers are getting better at understanding the requirements for EC systems, many of which have basic features in common,

- EC development teams include design specialists who substitute for the customer.

Conclusion

This research has been motivated by the need for a comprehensive study addressing the relationship between system success and user participation in modern systems development. This paper represents an initial analysis of the first part of that study – the project leader perspective of customer participation throughout development.

The generally accepted traditional view that user participation is essential in Information Systems developmental activities is not seen to be particularly relevant to EC developers. Nearly half of all organisations (43%) either did not involve customers in requirements or were not influenced by their input. End-user input to requirements is either not augmenting what the organisation already knows about the site content and functionality, or is being discarded for reasons that may include it being outside of desired scope. The major activity that customers provided input to in the design phase was a walk-through of the design prototype; in other words providing feedback after a preliminary design had already been done. A developmental phase specifically designated for user participation, usability testing had a participation rate of only 61% of organisations, with beta testing down to 50%. Post-implementation review relied more on passively providing a link for interested customers to make comment (73%), than actively seeking their input (23%). It appears that despite the necessity of customers being positive about the EC experience for its survival, their involvement by project leaders is not seen to be particularly important. It may be that developers of EC systems are in fact users themselves and see themselves as such, therefore the need to involve "outsiders" is lessened. Also these developments are seen as more evolutionary in nature with shorter than traditional time frames for upgrades after the system has been implemented.

Myers et al (1996) state that "users expect highly efficient and easy-to-learn interfaces and developers now realize the crucial role the interface plays" (p. 794). The isolation of the user from the developer in EC and the proliferation of EC in Australian society may have blurred the once clear roles of user as specifier, and IT professional as developer of systems.

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Biography

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