Determinants of User Involvement in Software Projects

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Abstract
The paper presents results of an empirical inquiry into factors that influence users’ involvement during custom software development project. Phase-1 of the study uses focus group interviews to understand the process of user involvement in a software project. This culminates into a “user involvement enabler model” which combines the related antecedents into a structural equation model in order to explain the process. In phase-2, the model is validated based on a questionnaire survey. Survey responses identify two sets of factors i.e. “perceived project importance”, and “perceived ease of user participation” to be the primary drivers behind “user intention towards participation” leading to involvement. Other significant antecedents influencing the process are also discovered. The outcome of this study is expected to guide level of user involvement towards reduction of project risk.

1. Introduction
The involvement of users in system development has been an important topic of information system research for the last 50 years [1]. Even though it is a widely accepted fact that user involvement is a pre-requisite behind obtaining project success, much remains unknown about when, how, and why user involvement works [2]. In order to effectively facilitate the process, project managers need pointers to specific characteristics of the software development process that are likely to influence user involvement during the project development stages. This study presents an integrated model by carefully combining the different positive and negative influencers’ of user involvement. This is expected to provide a better understanding of the phenomenon over different project settings. This paper looks into certain technical and behavioral characteristics, and investigates their contribution as enabler of user involvement.

The paper is organised as follows. Section 2 discusses on the relevant literature culminating into the research model that we propose in the paper. The research methodology is elaborated in Section 3, where we first summarize phase-1 of our research comprising of focus group interviews, then describe our research model, and finally detail on phase-2 (survey) in terms of purpose, sample, and study constructs. Section 4 presents the data analysis technique adopted in this study. The results are presented in Section 5 and discussed. Finally, Section 6 summarizes the study findings, addresses the limitations, and presents the future research opportunities.

2. Literature Survey
Prior research has looked into the different aspects of user involvement in software projects. These include both the process (how users get involved in a development process) and the determining factors that enable or inhibit user involvement. Ives & Olson [3] identified two different classes of conditional variables that affect the appropriateness of user involvement in any given situation. These were referred to as “Involvement Roles” (who participate and in what roles), and “Development Characteristics” (characteristic of the development process and the stage of the development process). Involvement was observed to be more for certain classes of users referred to as the primary users (i.e. who directly use system output). They observed that in projects they studied, involvement was higher in those where either user acceptance was very critical, or where information required to develop the project could only be obtained from users. Involvement was also significantly higher during the design and implementation stages of the project. Barki & Hartwick [4] tried to understand the process of user engagement in a project. They could identify two stages in which this happens. In the first stage, the engagement is at a shallow level. Nevertheless, this leads to formation of beliefs about the system in terms of whether it is good, important, and personally relevant. The belief so formed moderates the intensity of engagement in the second stage. The process of belief formation, according to them depends on individual characteristics like age, education, level of motivation, etc. Grudin [5] pointed...
out that identifying appropriate users, providing access to the users, motivating the developers to involve users, motivating the users to get involved in the project are some of the factors that enhance the level of user involvement. Wilson et al. [6] on the other hand identified that presence of too many user groups, lack of time availability with the users, them lacking confidence and motivation to talk to the designers, and users unaware of implementation and tasks assumptions and constrains are some of the barriers to user involvement. Gefen & Ridings [7] observed gaps in organizational norms as creating hindrance in user involvement in development projects.

From the findings of these studies it appears that user involvement in software project is akin to acceptance of a new technology where the acceptance depends on the following:

- Users seeing clear value in the project
- Behavioral attribute of the users (demographic characteristics, intrinsic motivation and confidence)
- Enabling conditions (time availability, type of project developed, project stages, project criticality, whether the project environment facilitates participation)

In terms of the process, it appears that user involvement evolves through multiple stages wherein each stage a user reinforces his/her beliefs about the enabling conditions and that decides his/her level of involvement in the next stage. The initial level of involvement therefore can lead to gradually increasing level of involvement or can result in gradual withdrawal depending on individual intent and enabling conditions.

3. Research Methodology

The research described in this paper proceeded in two phases as described below. Phase-1 utilized focus group interviews in order to arrive at the User Involvement Enabler Model shown in Figure 1. The model was subsequently validated based on data collected through a web-based survey instrument in phase-2 of our research.

3.1 Overview of Phase-1: Focus Group

During August and September 2008, we carried out focus group interviews with project managers of four software organizations in order to gather the preferred notions regarding the various facets of user involvement during software development stages. The focus group interview was preferred over traditional one-to-one interview as the purpose of this research phase was to arrive at a general consensus among the participants regarding the different facets of user involvement. The focus group interviews provided the right platform to satisfy these objectives and in the process develop testable hypothesis for subsequent validation.

Four rounds of focus group interviews were conducted in separate organizations, and a total of 14 individuals (two groups each consisting of four members, and the remaining two groups each consisting of three members) participated in it. The focus group interviews were carried out within the subject’s office premises and were all recorded for subsequent transcription and analysis. The interviews lasted between one and one-and-half hours. The constant comparative method [11] was used for the analysis of the interview content. The analysis results apart from leading to the proposed User Involvement Enabler Model (described below), also provided with contextual interpretation of the model constructs as follows:

- User Intention towards Participation was considered to be an indicator of how hard the users are willing to try and of how much an effort they are planning to exert, to participate in the process of software development.
- User involvement was understood from the following four dimensions, i.e. quality of interaction (i.e. the quality of inputs the user is providing to the project team), nature of interaction (i.e. whether the interaction of the users’ with the project team is spontaneous), level of commitment (i.e. amount of commitment shown by the user representatives towards the project group), and psychological stance (i.e. the subjective psychological state of the users related to all the decisions and actions taken with respect to the project under consideration)
- Perceived Project Importance was defined as the extent to which the project is fulfilling the strategic plan and requirements or needs of its stakeholders. It was primarily assessed in dimensions of relevance (i.e. the relevance of the product or service rendered by the software development project to its end users), and perceived loss (i.e. the extent of possible loss (monetary for example revenue or non-monetary for example loss of reputation, brand image, etc) that is likely in case the project fails in its objectives).
- Perceived Ease of User Participation was interpreted as the extent to which the users feel that the project environment would facilitate their participation in the project.
- User Interest was interpreted as the eagerness or the resistance shown by the users towards implementation of the project, and the extent of contentment displayed by the users when they get the chance to participate in the project.
- Process Clarity was referred to as the extent to which the processes undertaken during software
development are transparent to the users. The positive contributors to process clarity were identified as awareness of project milestones and deliverables, transparency of project processes concerning users, and clarity of project metrics.

- **User Accessibility to Project** was defined as the extent to which the user representatives were approachable with respect to the different project functionalities that requires user intervention. Suggestive indicators of user accessibility were identified as average delay (i.e. the time lag between request send to the user representative with respect to certain task, and the fulfillment of the same by the user representative), ease of approach (i.e. the extent to which the users were considered approachable from the project organization), and provision of need based appointment (i.e. the extent to which appointment requests send by project members were adhered to by the user representatives).

- **Perceived Project Benefits** was interpreted as the benefits (either monetary or non-monetary) the project is likely to bring to the project organization who is executing the project, the users and other stakeholders, and the environment (i.e. society, government, public, etc).

- **Outcome Visibility** was defined as the extent to which the expected outcome of the project can be ascertained with certainty. Suggestive measures of outcome visibility were in terms of the extent to which the expected completion date of the project could be ascertained with certainty, and the amount of project deliveries made to the user organization.

- The term “Project Uncertainty” was interpreted in terms of risks (unforeseen events) facing a software project.

- The term “Project Complexity” was considered to be an indicator of the level of complexity associated with a project. This was viewed from two perspectives viz. managerial (i.e. comprising of all business and organizational aspects of the project like project staffing and management, etc) and technical (i.e. comprising of all technical aspects of the project such as number of technologies involved, etc).

**User involvement enabler model.** We incorporate relevant findings from prior research into a comprehensive model of constructs and relationships in order to explain user involvement in software projects. Specifically we focus on the “Technology Acceptance Model (TAM)” developed by F.D. Davis [8]. TAM attempts to provide explanations of the determinants of acceptance of technology that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified [8]. TAM posits that “Perceived Usefulness” and “Perceived Ease of Use” determine an individual's “Behavioral Intention to Use” to use a system, with “Behavioral Intention to Use” serving as a mediator of “Actual System Use”. “Perceived Usefulness” is defined as the users’ “subjective probability that using a specific application system will increase his or her job performance within an organizational context” [8]. “Perceived Ease of Use” refers to “the degree to which the user expects the target system to be free of effort” [8].

TAM also suggests “Perceived Ease of Use” to positively affect “Perceived Usefulness” implying if a system is easy to operate with, it will be perceived as more useful compared to others even though “objectively” it may not be so.

Based on the emerging studies, TAM evolved into TAM2 [9], which combined the general determinants of perceived usefulness. This subsequently led to TAM3 [10], which extended TAM2 by combining the determinants of perceived ease of use. The objective of TAM3 was to serve as a nomological framework to aid managerial interventions of employee adoption and use of IT.

Drawing a parallelism with TAM3 (elaborated later in ‘Measurement of Constructs’ section), we propose the “User Involvement Enabler Model” (Figure 1) which we believe models the antecedents of user involvement in a software project. The causal relationships shown by the arrows (Figure 1) describe our hypothesis about how different constructs (shown within oval) influence user involvement. The evidences in favor of the different linkages were derived based on the analysis of four focus group interviews discussed above. The eleven hypotheses implied by the model diagram are paraphrased below:

**H1:** **User Intention towards Participation (UIP)** causes **User Involvement (UI)**

**H2:** **Perceived Project Importance (PPI)** causes **User Intention towards Participation (UIP)**

**H3:** **Perceived Ease of User Participation (PEUP)** causes **User Intention towards Participation (UIP)**

**H4:** **User Interest (UsI)** causes **User Intention towards Participation (UIP)**

**H5:** **Perceived Ease of User Participation (PEUP)** causes **User Intention towards Participation (UIP)**

**H6:** **Process Clarity (PC)** causes **Perceived Ease of User Participation (PEUP)**

**H7:** **User Accessibility to Project (UAP)** causes **Perceived Ease of User Participation (PEUP)**
3.2. Phase-2: Survey

A web-based survey instrument validated against Straub’s [14] guidelines was utilized in phase-2 in order to validate the proposed User Involvement Enabler Model. Pre-testing was carried out in order to improve the reliability of the survey questionnaire and to assess the content validity (i.e. the extent to which a measure represents all facets of a given construct). The final questionnaire contained four sections. The first section (introduction) contained information on the purpose of the research. The second section requested demographic details from the respondents. The third section requested for specific project details, and also contained questions related to respondents experience and perception regarding involvement in software projects grouped according to the eleven identified constructs that the model portrays. The questions on response precision and comments were placed in the final section.

3.2.1. Phase-2 Sample Selection. The survey was targeted at individuals who have participated as users (business user, academic user, project client or equivalent) in a software development project. The participation may have been for providing inputs and suggestions to the software development team, for checking the project status, or because of general curiosity. A combination of convenience sampling and chain sampling strategy [12] was adopted as the research group faced problems accessing the study sample. Invitations were sent to software professionals with request of forwarding to their project user groups, and to prospective candidates fitting the sample criteria with forwarding requests to their acquaintances. An access counter on the survey page indicated a total of 373 individuals to actually view the survey, out of which 78 finally went on to finish it (20.9% response rate). The low response rate explains the difficulty encountered in the process of contacting the population base as many were reluctant to share their experiences on projects, citing the information to be confidential.

Out of the final sample (78), 40% of the respondents indicated having three or more years of experience with respect to prior usage of applications similar to what provided by the software project. Also 78% of the respondents were found to have some level of familiarity with the domain of the project. All these indicated that most of the users who participated during the software development process had some level of competency in the application that was being developed. The impact of local biases (like any particular event influencing subsequent actions) on survey response was likely to be low in this case. Finally, a majority (56%) of the respondents were internal users implying MIS category of applications [13] was developed for internal use within the

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**Figure 1: User Involvement Enabler Model**

- **H8:** Perceived Project Benefits (PPB) causes Perceived Project Importance (PPI)
- **H9:** Outcome Visibility (OV) causes Perceived Project Importance (PPI)
- **H10:** Project Uncertainty (PU) causes Outcome Visibility (OV)
- **H11:** Project Complexity (PC) causes Outcome Visibility (OV)
organization, with the users belonging to different departments of the software organization executing the project.

3.2.2. Measurement of Constructs. The eleven structural constructs shown in the model (Figure 1) were measured in this study as described below. In each case we wanted to gauge the participant’s belief about whether the measurement construct truly reflected the structural construct.

User Involvement. This construct corresponds to the “Actual System Use” construct of TAM3 [10]. In this study, we explain user involvement determinants like TAM3, which explains system usage behavior. Prior research has mostly measured user involvement as a single-item or multi-item constructs based on Likert type scales [15]. During phase-1 of our study, the participants’ mentioned of four different perspectives of user involvement i.e. quality of interaction, nature of interaction, level of commitment, and psychological stance. Accordingly, a 4-item composite construct was derived to measure user involvement as described below:

- **Interaction Quality**: If quality of inputs provided to the project organization is an indication of user involvement.
- **Interaction Nature**: Whether the user role and their assigned responsibility with respect to the project tasks are instrumental behind user involvement in the project.
- **Commitment Level**: If level of commitment of the users is an indication of increasing user involvement.
- **Psychological Stance**: If increase in importance and relevance of the project to the users is an indication of increasing user involvement.

The level of agreement of the respondents for each of these four items ranged from (1) “Strongly Disagree” to (5) “Strongly Agree”.

User Intention towards Participation. The behavioral intention of the users to participate in the software development project is measured by this construct. Measurement items for behavioral intention has been adopted from Davis [8], and then modified to match the study context. The 3-item composite construct, given below, was conceived to measure users’ intention:

- **Plan to Communicate**: The extent user’s plan to communicate with the software development team
- **Representation Intent**: Desire to be one of the key users in software development projects

- **General Participation Intent**: User’s general intention to participate in a software development project

The level of respondent’s agreement to these items has been measured on the 5-point scale ranging between “Strongly Disagree” and “Strongly Agree” as indicated above.

Perceived Ease of User Participation. The perceived ease of use items was also adapted from prior research [8], and modifications were done so that it reflected our study context. The measurement items for this are given below:

- **Ease of Selection**: Whether easy selection as participant in the software development project was an indicator
- **Ease of Participation**: Whether smooth and well defined interaction of users with the software development organization was an indicator

Respondents were asked to indicate the extent of agreement or disagreement with the items on the 5-point Likert scale as mentioned above.

User Interest. User Interest parallels the “Perceived Enjoyment” (i.e. the extent to which the activity of using a specific system is perceived to be enjoyable in its own right) construct of TAM3 as both of these constructs imply a sense of enthusiasm in committing to the activity. The measure of User Interest was derived from phase-1 results as follows:

- **Participation Eagerness**: Whether the respondent was eager to participate in the software development project
- **Pleasure in Participating**: Whether the respondent took pleasure in participating in software development project
- **General Interest**: If general interest level contributes to users’ interest in participating in software projects

Each of these three items was measured on the 5-point agreement/disagreement scale as discussed above.

Process Clarity. This construct resembles the “Objective Usability” construct of TAM3. Objective Usability provides a measure of the extent of actual effort requirement in carrying out a task [10]. Evaluation of the actual effort is linked to “Process Clarity” which would enable better assessment of the status. Based on phase-1 findings, a 3-item construct was devised to measure Process Clarity, which captured the awareness of project milestones (“Milestone Awareness”), the comprehensibility of the project metrics to the participant users (“Well Defined Metrics”), and a composite measure (“Transparent
Processes’). The response options ranged between (1) “Strongly Disagree” and (5) “Strongly Agree”.

**User Accessibility to Project.** This construct resembles “Perception of External Control” of TAM3. Both of these provide an indication of the extent to which resource are available when they are needed in performing an activity. Based on phase-1 findings, User Accessibility was measured in terms of average delay, ease of approach, and provision of need based appointment. Of these, delay was measured on a 5-point scale between (1) “Very High” to (5) “Very Low”. For the second and the third items, the respondents were asked to indicate their level of agreement / disagreement based on the 5-point scale (5: Strongly Agree).

**Perceived Project Importance.** This corresponds to the “Perceived Usefulness” construct of TAM3. Similar to “Perceived Usefulness”, “Perceived Project Importance” provides reasoning behind the benefit of committing to an activity (in this case, the benefits associated with participating in the project). This was assessed in terms of relevance and perceived losses based on phase-1 findings. Each of these two items was rated on the 5-point agreement / disagreement scale (5: Strongly Agree) as discussed earlier.

**Perceived Project Benefits.** This construct resembles the “Output Quality” (i.e. a measure of the degree to which an individual believes that the system performs his or her job tasks well) construct of TAM3. The extent of increase of “Output Quality” in relation to some activity could be considered as an indicator of the likely benefits that are associated with successful completion of that activity. Considering the monetary and non-monetary aspects of Project Benefit, a 2-item measure consisting of “Overall Usefulness” and “Cost Reduction” was constructed. This would help assess users’ belief on whether the product/service rendered by the software project would be useful to its users, and would assist in cost reduction.

**Outcome Visibility.** This construct is analogous to the “Result Demonstrability” (i.e. the degree to which an individual believes that the results of using a system are tangible, observable, and communicable) construct of TAM3. “Result Demonstrability” provides the assessment of the results which is facilitated through increased outcome visibility. The measure of Outcome Visibility constituted of the following items:

- **Progress Visibility:** Extent to which presence of milestone deliverables assisted in estimation of the final completion date of the project
- **Functionality Visibility:** Extent to which presence of milestone deliverables assisted in comprehension of delivered functionality of the work product

These two items identified based on phase-1 analysis were judged on the 5-point agreement / disagreement scale as discussed earlier.

**Project Uncertainty.** This can be thought of as the antecedent to the “Result Demonstrability” construct of TAM3. Obviously in presence of higher uncertainty the “Result Demonstrability” is likely to be lower. Focus group interviews suggested identification of project uncertainty in terms of the risk associated with the project. Keil et al. [16] has suggested measuring the level of uncertainty in four dimensions comprising of:

- **Stakeholder Uncertainty:** Uncertainty governing users and other stakeholders in the project (related to top management support, user cooperation, commitment, attitude towards change, conflict, etc)
- **Scope Uncertainty:** Uncertainty associated with the inability of project manager of software development organization to judge the project’s scope (it also includes the risks associated with project’s required functionalities)
- **Execution Uncertainty** : Uncertainty associated with the execution of the project (related to inadequate project staffing, inappropriate development methodology, failure to define roles and responsibilities, and poor project planning and control, etc)
- **Environmental Uncertainty:** Uncertainty associated with the project environment (like changes in organizational environment, external party dependencies, corporate politics, etc)

The measurement scale comprised of one item to measure each of these four dimensions. Respondents were asked to indicate the level of uncertainty associated with each dimension between (1) “Very Low”, and (5) “Very High” as experienced in the projects’ concerned.

**Project Complexity.** Similar to “Project Uncertainty”, this construct can also be visualized as antecedent to “Result Demonstrability”. Increased complexity is likely to negatively influence the perception of the extent to which the result could be comprehensible to its recipient. The two dimensions of project complexity which emerged from phase-1 analysis were technical complexity and managerial complexity. Each was measured using a single item. The response options were anchored on a 5-point scale ranging between (1) “Very Low”, and (5) “Very High”.
4. Data Analysis

The analysis involved first an assessment of the measurement model and next an evaluation of the structural model. It may be recalled that the constructs in the structural model are not directly observable and has to be evaluated in terms of associated measurement construct (e.g. user involvement measured by interaction quality, interaction nature, commitment level, psychological stance). The structural equation modeling literature refers to the relationships among the measurement constructs as the measurement model.

Evaluating the model consists of the following:

- Assessing the individual item loadings (i.e. the strength of the association between an item and the corresponding construct which it related to)
- Estimating the internal consistency coefficients (measure of reliability) for each block of indicators (a block refers to a set of items which are associated with a particular construct that these items measure)
- Evaluating construct validity – the extent to which the operationalization of a construct actually measures what it purports to measure. This is achieved through evaluation of content validity (defined earlier), convergent validity (i.e. the degree to which the measures that should be related are in reality related), and discriminant validity (i.e. the degree to which items differentiate among constructs or measure distinct concepts)
- Estimating path coefficients – This provides an estimate of the strength and the sign of the relationships among the different constructs

We used partial least squares (PLS), a multivariate technique that facilitates testing of the psychometric properties of the scales used to measure a construct. It simultaneously estimates the parameters of the structural model - that is, the magnitude and direction of the relationships among the model constructs [17]. The following characteristics of PLS made it suitable given the study purpose [18].

- The technique is particularly applicable in exploratory research where relationships may exist among the constructs
- The technique is known to perform well even for a relatively small sized sample.
- The technique does not require the data points to be normally distributed.

The evaluation of the model was conducted with the overall survey sample. The SMARTPLS 2.0 software was used for this analysis. The estimated path coefficients of the model were calculated using the bootstrapping technique [18]. The results are discussed below.

5. Results

5.1. Assessment of the Measurement Model

Assessment of individual item loadings indicated whether the measurement items loaded sufficiently on the corresponding constructs. The item loadings of each of the measurement items are shown in Figure 2. Each oval in the figure represents one construct. The rectangles associated with a construct show the corresponding measurement items and their respective item loading measure. The loadings of the 30 measurement items shown in Figure 2 were found to be more than 0.50 which was significant based on the guidelines provided in Hair et al. [19].

In the next level of assessment the reliability and validity of the model was evaluated. The internal consistency of the measurement model was assessed by computing the composite reliability (CR). Except Project Uncertainty (PU), the value of CR for all the other constructs were above the minimum value of 0.70 (not shown) [19]. The Cronbach’s alphas of the constructs were also found to be in the acceptable range i.e. above 0.50 (not shown) [20].

Convergent validity was assessed based on reported average variance extracted (AVE). Here also except Project Uncertainty (PU), all the other constructs met the guideline of AVE greater than 0.50 (not shown) [19], and hence were considered to be satisfactory. The measure of the discriminant validity was also found to be satisfactory for all the constructs (not shown).

The construct Project Uncertainty failed to satisfy the minimum requirement guidelines of CR and AVE. However we retained the construct as it was derived from literature evidences [16], and its Cronbach Alpha coefficient was satisfactory (0.796).

5.2. The Structural Model

The structural model consists of the constructs and the relationships among them. This was assessed here with respect to the statistical significance of the estimated path coefficients. The significant relationships which emerged out of the study are shown as “**” in Figure 2. The findings provided evidences in favour of the hypothesized relationships: H1, H2, H3, H5, H8, and H11.
Contrary to our hypothesis, the relationship between Project Uncertainty and Outcome Visibility (H10) emerged as negative. This can be explained by considering that the perception of project uncertainty (viewed as risk) by the user organization and the project organization can be different. The measurement items for Project Uncertainty were arrived at based on how risks were perceived from the purview of the project organization. However, our study targeted project users. This suggests the need to refine the construct in order to capture the intended perspective.

The contribution of Outcome Visibility to Perceived Project Importance was positive but not statistically significant (H9). Outcome visibility was assessed in our model in terms of visibility of project deliverables and project deadlines. The result does not undermine the importance of these two attributes that indicate project status, but highlight that this factor might not be an important determinant when it comes to assessing the importance of the project. The rejection of hypothesis (H6) similarly points to a different set of determinants of the ease of getting involved in the project than what has been captured using the Process Clarity construct in our study.

User Accessibility to Project did not contribute as a significant determinant of Perceived Ease of User Participation (H7). This could be because a high proportion of the survey respondents were internal project users (i.e. internal departments acting as users to the project in concern like the finance department, human resource management department, etc) and they did not foresee accessibility as an obstacle towards participating in the software project.

The direct relationship between User Interest and User Intention towards Participation did not emerge as significant (H4). However, hypothesis H5 (User Interest $\rightarrow$ Perceived Ease of User Participation) was accepted. The users who were interested to participate were expected to commit to the behavior just for the sake of doing it. Such users tend to underestimate the difficulty associated with participating in the process because they enjoy performing it. For this reason the relationship between User interest and User Intention

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**Figure 2: Assessment of User Involvement Enabler Model**

Contrary to our hypothesis, the relationship between Project Uncertainty and Outcome Visibility (H10) emerged as negative. This can be explained by considering that the perception of project uncertainty (viewed as risk) by the user organization and the project organization can be different. The measurement items for Project Uncertainty were arrived at based on how risks were perceived from the purview of the project organization. However, our study targeted project users. This suggests the need to refine the construct in order to capture the intended perspective.

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towards Participation was found to be mediated by Perceived Ease of User Participation.

6. Conclusion

The importance of understanding the potential enablers of user involvement during software development is critical given the appreciation of the fact that lack of user involvement is likely to result in unsuccessful endeavours. Results from this research identify certain enabling conditions and behavioral characteristics that influence user involvement during the project. Findings indicate intention towards participation to be one of the drivers influencing user involvement. The formation of intentions was in turn found to be affected by the importance of the project to the users, and how much they perceived the project environment to be conducive to participation. These two were again found to be driven by the perception of project benefits and the level of user interest respectively. The results help to explain the transition of user involvement with time and in the process addresses limitations of earlier studies [3, 4] which viewed user involvement as a static process. By integrating the different factors into a comprehensive framework we are able to explain the variation (or the lack of it) in user involvement over time under different project setting.

The work is not without limitations. A low response rate and small sample size were attained for this study which might limit reliability of findings. Self reported measures were used which is vulnerable to subjective biases. Possibility of measurement errors is also there given that some of the constructs were derived based on reported literature which mostly focused on the project organization side, and hence their interpretation to the user organization is likely to be different. The causality effects cannot be clearly explored because of the cross-sectional nature of the study. The findings may also have a sampling bias as the data collection was restricted to India only. Further generalisations can only be made confidently through replications and extensions of the study.

The findings have implications for project management. The study outlines the preferred ways of defining and measuring some of the constructs captured in this research (e.g. project uncertainty, process clarity, user interest, etc), and hence is likely to be beneficial to organizations in terms of identifying improvement opportunities. The significant antecedents to user involvement that emerged from the results are specific handles that can be used to manage the level of user involvement in projects.

Apart from addressing the limitations, future research can look into the non-significant relationships that could not be validated in our study, and in the process derive the underlying causes. Low explained variances in our study indicate presence of other factors influencing the studied phenomena, which can also be explored in future endeavours.

7. References


