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Exploring the Relationship between User Empowerment and Enterprise System Success Measures

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ABSTRACT

This paper reports a study designed to investigate the concept of User Empowerment in the context of Enterprise Systems (ES) across three hierarchical levels of management of a higher education organization in Australia¹. The study focuses on how user empowerment can impact the potential components of Enterprise System Success (ESS) and the employee's immediate work environment. We have drawn from psychological and user empowerment theories to identify 6 components of empowerment that would, hypothetically, effect the individual's user empowerment experience: (1) meaning; (2) impact; (3) user autonomy; (4) computer self-efficacy; (5) self-determination; and (6) competence. To explore this conceptual user empowerment model, information was gathered from 154 respondents using Oracle Financials. The survey instrument included 55 questions based on the dimensions of psychological empowerment (Spreitzer, Kizilos and Nason 1997), dimensions of user empowerment (Doll, Deng and Metts 2003), and 28 measures of ESS (Sedera, Gable and Chan 2003).

Keywords

User empowerment, Psychological empowerment, Enterprise Systems Success, Enterprise Systems.

INTRODUCTION

This paper was stimulated by the experience of conducting a study concerning user empowerment in an ES context. We take a socio-technical design approach which is concerned with advocacy of the direct participation of end-users in the information system design process. Conger and Kanungo (1988); Forrester (2000); Quinn and Spreitzer (1997); Sundbo (1999); and Thomas (2000) conclude that employee empowerment acts as a catalyst in attaining competitive advantage and organizational performance. Furthermore, in order to tap the potential of the innovation and exploitation of the existing system, management must understand the enablers and inhibitors of user's intention to engage in a complex IT system such as ES. If such is the case, it becomes imperative to understand and capitalize on factors that contribute towards employee's empowerment. Several definitions of the empowerment concept have been produced and an extensive review of the literature, suggests two general perspectives of empowerment in the workplace context. However, the literature shows very little coverage of empowerment concept and a lack of depth and relevance to the unique context of ES.

When users engage actively during the early stages of ES adoption and implementation, presumably, user empowerment will enable users to develop a better understanding of the system, and it will be better tailored to their specific needs. Therefore they will be more inclined to adopt and adapt the system and be more satisfied with it than if they had not been involved in its implementation. The two key challenges associated with ES implementations as opposed to other systems are that packaged software or ES involve the whole organization and require a combination of technical and human expertise to select, develop and implement successfully. Secondly, ES involve re-engineering of the organization's business processes thereby resulting in organizational cultural change. Given this argument, companies adopting ES need to focus on specific aspects of technical and human factors in order to translate their efforts to anywhere close to an ESS. Besides, empowerment is not a global construct across all situations, but specific to the work context in organizations (Spreitzer 1995b). Therefore, a work-based

¹ Referred to as University X in the paper

measure of empowerment should be developed (Spreitzer 1996) for the measure of empowerment. Following Spreitzer's argument, it makes logical sense to investigate and develop ES work-based measure of user empowerment which focuses ES context specifically. Building on the Theory of Planned Behaviour, sets of salient behavioural, normative, and control beliefs are identified as determinants of the intention to explore. To engage in the successful use of complex processes of ES, users are required to overcome significant knowledge and motivational barriers. The concept of empowerment seems to assist in overcoming such motivational barriers.

From a conceptual standpoint, this study contributes to a more comprehensive understanding of the empowerment concept, adds to still scarce ERP post-implementation research, and differentiates from the predominant case studies of ERP success research by adopting a theory-driven approach and reporting the preliminary empirical results of the study.

From a practical standpoint, this study will show the relative importance of factors that managers can act upon and consultants can conduct an organization wide readiness check for the company, to get the most out of complex and expensive information technologies such as ES system.

LITERATURE REVIEW

In a climate of economic uncertainty organizations embrace change management initiatives in order to adapt and remain a performance driven business (Psoinos, Kern and Smithson 2000). Empowerment is seen as one such practical solution to manage the change as it is often considered to be an integral part of a business process re-engineering (BPR) or total quality management (TQM) change initiative (Psoinos et al. 2000). In fact employee empowerment has been identified as one of the critical success factors for a TQM program (Lawler 1992). Although there have been extensive studies in ES implementation success, critical success factors of ES (Holland, Light, Beck, Berdugo, Millar, Press and Setlavad 2000) and measuring ES benefits (Shang and Seddon 2002; Staehr, Shanks and Seddon 2002), there has been no prior significant research that analyses empowerment in the context of ES. It is this gap in the research that this research program addresses. The literature review to date has enabled understanding of existing models, theories and frameworks on empowerment in workplace.

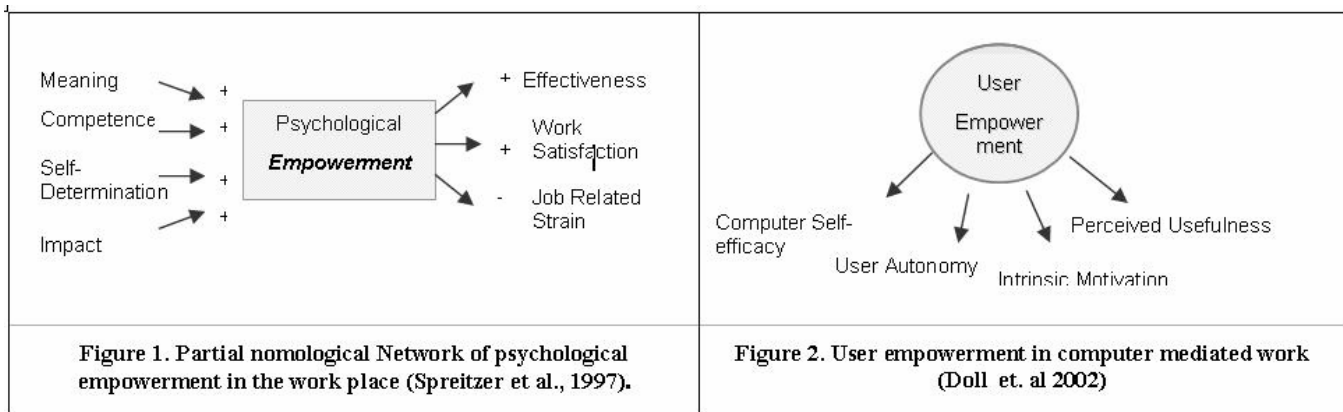
Spreitzer's (1995b) study was one of the first consolidated studies on individual empowerment. Spreitzer suggests this definition: "psychological empowerment is defined as a motivational construct manifested in four cognitions: meaning, competence, self-determination, and impact. Together these four cognitions reflect an active, rather than a passive, orientation toward a work role.

Spreitzer's (1995b) dimensions of psychological empowerment echo some similarities to Hackman and Oldham model. Meaning is synonymous with their 'experienced meaningfulness'. Competence involves their 'knowledge and skill', although Hackman and Oldham are concerned with objective knowledge and skill, rather than perceived knowledge and skill which the competence dimension reflects (Spreitzer 1996). Self-determination refers to their 'autonomy'. Nevertheless, Hackman and Oldham's (1980) model does not involve the impact dimension of empowerment. Thus, workers may perceive meaningfulness, competence and self-determination, but may not perceive that they can have an impact on organizational outcomes. To summarize, the four dimensions of meaning, competence, self-determination and impact, multiplicatively combine to create high psychological empowerment (see figure 1) (Spreitzer and Quinn 2001), which leads to the positive outcomes of effectiveness, work satisfaction and reduced job related strain.

Before we proceed to a formal definition of the user empowerment notion, it is worthwhile to distinguish the meaning of empowerment from similar concepts like authority delegation, job enrichment, autonomy, self-determination, self-management, self-control, self-influence, self-leadership, employee involvement, and participative management.

Empowerment extends the notions of job enrichment in the following ways (Spreitzer 1996). First, the impact dimension of empowerment extends the notion that subordinates have some control over their own jobs to the implication that they have some influence over organizational activities (Ford and Fottler 1995). Second, the job enrichment framework focuses mainly on the job characteristics whereas empowerment emphasizes the perception of subordinates and the interpersonal relationships as well. That is, job enrichment does not necessarily reflect the relationship between a superior and subordinates, but empowerment means being influenced by the behavior of a superior.

Constructs such as self-determination, self-management, self-control, self-influence including autonomy branch within the organizational literature (Deci and Ryan 1985; Luthans and Davis 1979; Manz and Sims 1991; Mills 1983) and are all directly relational to making decisions for self. A jist of these above cited constructs can conceptually come under the umbrella of the self-determination dimension of empowerment. Lee and Koh (2001) present a simple scenario to further illustrate this point. For instance an employee has been bestowed with decision making power but is incompetent, and does not perceive impact and meaningfulness. Further, self-related dimensions can be independent of manager's empowering behavior, whereas, the concept of empowerment necessarily involves the relationship between a manager and his/her subordinates. In summary, autonomy and self-related constructs are to be distinguished from empowerment.



Empowerment has its roots in the theories of participative management where managers share goal-setting, information-processing and problem-solving activities, as well as decision making power with employees (Wagner 1994). Participative management techniques include objectives based management, total quality management and goal setting by employees (Conger et al. 1988; Wilkinson, Godfrey and Marchington 1997). Another closely related concept is, employee involvement which emphasizes cascading power, rewards, and training to all levels of employees including junior staffs with the aim of increasing worker discretion. Thus, the key overlap between empowerment notion, involvement, and participative management is encouraging and championing employees to actively participate in decision-making processes. A participatory climate fosters the meaning component (Spreitzer 1996) by emphasizing on personal contributions and proactive behavior rather than exercising control (Lawler 1992). Due to these, employee participation is often equated to empowerment (Likert 1967). Furthermore, it is often mixed with the concept of power or control and increased responsibility. Traditional participative techniques are especially weak on the competence dimension; they are centered on fostering employees' suggestions (Evans and Fischer 1992).

Conger and Kanungo (1988) were among the early researchers who brought the empowerment notion to the management literature and proposed that empowerment is 'to enable' rather than simply 'to delegate'. The focal point in authority delegation is usually the behavior of the manager and often neglects the psychological state of the delegated employee. As a result the employees fail to perceive the psychological states of meaning and impact. For instance, if the delegated employee does not perceive the work as meaningful or influential in the organization, he/she cannot be empowered, regardless of the designated authority.

Doll et al. (2003) claim that user empowerment is also a multifaceted concept and is an adaptation of Psychological Empowerment theory from the management literature where empowerment has been identified in the context of managerial effectiveness (Conger et al. 1988; Spreitzer 1995b; Thomas and Velthouse 1990). Their model of user empowerment consists of a second-order factor with four first-order factors (user autonomy, computer self-efficacy, intrinsic motivation, and perceived usefulness) is hypothesized (see figure 2). It is validated using a sample of 192 knowledge workers doing engineering design work. User empowerment is found to predict the effective use of complex IT for problem solving/decision support better than its first-order factors. Empowered employees display greater initiative (Thomas et al. 1990), and are more willing to change and innovate (Spreitzer 1995b). Our study uses their user empowerment instrument along with Spreitzer's instrument to develop a more complete understanding of the user empowerment concept.

What Role May User Empowerment Play in ES Success?

Enterprise Systems are a socio-technical process, affecting tasks, people, technology and structure (Leavitt 1964). Markus and Tanis (2000) also identify this element and proposed the engagement of the users as a key variable. Many authors identify change management as a critical success factor for ESS, but fail to clearly articulate the means of engaging the user. Empowerment theory seen above may assist here. Markus and Tanis (2000) give a phased approach of an organization's experience with an ES, which Holland, Light and Gibson (1999) echoed. The characteristics of an infused organization appear to be related to the constructs of empowerment. Models of Information Systems success have been developed (DeLone and McLean 2002) and exploited in the ESS area (Sedera et al. 2003; Shang et al. 2002). This research will use the established models as the dependent variable in the main study. The ESS measurement instrument used in this study validates that there exist four independent dimensions; System quality (i.e. how a system performs from a technical and design perspective), Information quality (here the focus is on the quality of system outputs: issues as the relevance, timeliness and format of reports, and the accuracy of information generated by the system), Individual Impact (i.e. how the ERP system has influenced the performance of individual users), and Organizational impact (i.e. overall objectives of the organizational

performance). These dimensions are posited to be correlated and are additive measures of ERP impact or ESS (Sedera et al. 2003).

Organizations tailor their business processes to fit the ES packages. Further the configurations made to suit the needs of a particular organization are undertaken by key teams of users which build the argument that ES relies heavily on acquiring new IT skills. In other words engaging and relying on these users at such a pivotal point with no prior involvement in the implementation process itself poses a question. Does empowering the users during early phases of ES implementation impact on ESS? It is this question that the study sets out to explore and to find linkages in existing literature of empowerment.

RESEARCH METHODOLOGY AND INITIAL ANALYSIS

The aim of this study was to explore the relationships between employee empowerment and ERP success measures. Data for this study was collected using a questionnaire survey. It has three parts: psychological empowerment, user empowerment, and the four sub sections relating to ESS measurement. The survey methodology was approached by framing a set of issues such as population and its accessibility, sampling, question, content, bias, and finally administrative issues. A drop-off survey type was opted where a researcher goes to the respondent's business and hands the respondent the instrument. This approach enabled us to blend the advantages of the mail survey and the group administered questionnaire i.e. the respondent could work on the instrument in private, when it's convenient and the personal contact with the respondent, helped to increase the percent of people who were willing to participate in the study. The target respondents are specialized staff working actively on Oracle Financials ES which was first implemented in 1996. The total number of Oracle Financial users is close to 800. However, only quarter are reported to be active users of the system. The acting director of financial services division at University X was approached to endorse and support the study. The official email briefly explained the project, attached a detailed conduct of the study, and asked for volunteers. This email list provided a sample of over 200 employees using Oracle Financials at University X faculties and divisions. Volunteers indicated their initial willingness to participate, either directly to the research team or through the financial services division. 154 usable surveys (83%) were returned.

Instrument Development

The instrument for this study includes a paper survey divided into four (4) sections. The following sections explain the different parts of the survey and justify the adaptation of items (questions) as required. The instrument measures the level of empowerment of active Oracle Financial users, doing varying degree of knowledge work, in natural work groups in the organization. This step will be repeated for fine tuning of the survey instrument during the subsequent confirmatory survey study based on the lessons learnt during this study.

The Exploratory Survey

Having identified possibly relevant models and frameworks from review of the literature, the main purpose of the initial survey was to identify the key user empowerment dimensions to include in the preliminary user empowerment model in ES context. In October 2003, the survey was conducted to list impact of user empowerment, as perceived by staff at all three hierarchical levels of a University X. This survey was anonymous and confidential consisting of four main instrument sections querying: (1) respondent demographics; (2) psychological empowerment; (3) user empowerment; and (4) ESS measures. In order to effectively delineate the subjects based on organizational unit, experience with the target ES system (Oracle Financials), type of work they do with the system, and education level, demographic considerations for this study included these four questions at the beginning of the survey, and a brief description of their involvement with the Oracle system. The study was positioned as one that enables in understanding user empowerment conceptually and its relationship with the dependent variable of ESS measures rather than purely focusing on 'levels of ESS'. The ESS measure instrument is based on the classical framework of DeLone and McLean (2002). One hundred and fifty-four responses were received by November 2003. The section below briefly outlines the survey sections.

Section A: The 12 questions from Spreitzer's (1995a) psychological empowerment instrument measure meaning, competence, impact and self-determination constructs.

Section B: A total of 10 questions from Doll et al. (2003) user empowerment instrument measure computer self-efficacy, user autonomy and problem solving/decision support construct. The questions have been adapted slightly in order to focus on the target system (Oracle Financial) context. For example words like system or application are reworded to Oracle Financials. Problem solving/decision support is the outcome variable in the original standardized solution proposed by the authors. We have retained it in the instrument to explore the link between user empowerment and problem solving/decision

support. This analysis will be useful since both user empowerment and ESS models bear relevance to problem solving/decision support as an outcome variable. Doll's (2003) user empowerment model builds from Spreitzer's comprehensive model and has been adapted to suit their context – computer mediated environment.

Section C: This section contains 4 questions and has been adapted to tap into the user's need for empowerment. A selected set of 4 questions from the existing Spreitzer's (1995a) instrument have been modified to meet the objective. This section uses a different scale ranging from low importance to high importance as perceived by the respondent.

Section D: In this section, the statements are grouped within the following four (4) categories for ease of understanding: a) Individual Impacts, b) Organizational Impacts, c) Information Quality, and d) System Quality. The questions in each category are designed with the objective that the respondents' answers must relate to their own experiences and perceptions of the target system (Oracle Financials) in their faculty/division. Besides these four (4) measures there are two overall criterion measures at the end.

Data Collection and Survey Protocol

The volunteering respondents were handed a blank envelope and a survey by their senior manager (Faculty administration manager in University X faculties or executive officers in divisions). The participants were given clear instructions for completion and submission of the survey in a sealed collection box located within their office.

Data Analysis

This step was to analyse the construct validity of items and reliability. Individual item reliability is assessed by examining the loadings and cross-loadings of each of the construct indicators. The research variables were measured using multi-item indicators. All the variables were measured using a 7 point Likert-type scale. Data on user empowerment and ESS measurement was captured for three broad sets of employees – senior employees, clerical and administrative staff and middle managers. Contrary to expectations and prior research, a sense of meaning did not explain any significant variance above and beyond the other three dimensions. Further, a cluster analysis will be done to identify groups (clusters) of management levels who have similar abilities or common views with regards to the ES being used in the organization.

Following the data collection, the instrument items were tested for construct and criterion validity and reliability. The section pertaining to need for empowerment was not included during this round of factor analysis. The statistical analysis is limited to descriptive statistics, factor analysis, correlations and some limited regression analysis. The 154 responses received so far meet the rule of 150: Hucheson and Sofroniou (1999) recommend at least 150 - 300 cases, more toward the 150 end when there are a few highly correlated variables.

The preliminary correlation matrix shows some crude indication of the relative strength of the relationships between the variables. The correlation matrix apparently shows no significant correlation between ESS and the overall psychological empowerment dimensions. However, a pattern of significant correlations amongst ESS measures and most of the user empowerment dimensions especially user autonomy is observed.

A potential interpretation of the results points in the direction that a generic psychological empowerment of employees does not completely capture the extent of user empowerment as regards a specific ES and in fact the level of user empowerment may vary depending on the specific system being used. One must be system-specific with the context when measuring psychological empowerment i.e. to gauge user empowerment instead. Alternatively, user empowerment may be described as a measure of the extent to which the user has been empowered by the system, rather than the extent to which user empowerment has led to the system success. Data mining is ongoing and will guide further in refining the instrument for the subsequent study.

Correlations between all of the user empowerment dimensions are next largest with the combined ESS constructs. From the ESS perspective, this may be further evidence of the value of measuring, then combining the ESS dimensions to yield an overall measure of success. The user empowerment correlations with this combined construct are larger than those with the individual criterion items or their combination. This may be due to the fact that the combined ESS constructs include Individual Impact construct as well.

Prior to statistical testing, principal component factor analysis with varimax rotation was used to test the validity of our constructs and measures. Except for a few items in Systems quality, all the other items loaded as expected. The results of our factor analysis are shown in table 1 and table 2 below. All inter-correlations amongst the ESS dimensions are larger than 0.5 and significant at the .01 level yielding further evidence of the convergent validity of these dimensions supported by the 2nd-

order factor analysis results from ESS side. The psychological and user empowerment dimensions are larger than 0.5 and significant at the .01 level when run individually. However, there might be some overlaps within the psychological and user empowerment since the latter is based on the former.

Items	Loadings			
	Self-determination	Competence	Meaning	Impact
SD2	.913			
SD1	.888			
SD3	.880			
CO2		.959		
CO3		.939		
CO1		.879		
ME2			.917	
ME1			.912	
ME3			.897	
IM2				.902
IM1				.901
IM3				.844

Table 1. Factor Solution for psychological empowerment-varimax rotation

Items	Loadings		
		Autonomy	Computer Self-Efficacy
AU1	.261	.909	.202
AU2	.304	.905	.180
AU3	.308	.876	.140
CSE1	.180	.173	.946
CSE2	.174	.141	.946
CSE3	.242	.172	.890

Table 2. Factor Solution for user empowerment-varimax rotation

DISCUSSIONS AND POSSIBLE IMPLICATIONS

The paper validates the instrument for measuring user empowerment in ES System context. Given past ESS studies have lacked theoretical grounding, the selection of constructs in this study was based on the survey aimed at confirming the relevance and completeness of the most widely cited empowerment model. The findings of this study suggest that considering a few of the constructs of user empowerment explored so far will only explain a subset of variance in the anticipated framework of user empowerment in ES context. This implies that it is only through the combined experience of all user empowerment constructs that each of the anticipated outcomes of user empowerment can be achieved. Thus, further exploration of related constructs is needed to reveal the most complete set of constructs that may be applicable to any ES context.

As discretionary work behaviour, the constructs of user empowerment are not part of formal job expectations, but may contribute to the successful use of the system. To have the users trained on the appropriate business processes running on the system (procedural, application concepts, and business context skills), to develop their psychological ownership of the system, and to identify personally innovative users (if possible) may be implications of this study for management. In this way, management may lower the burden of organizational learning and increase the propensity for innovation, making the best potential of an ES by tapping on users’ unique insights into the business. Such a study will undoubtedly highlight the suitability for innovation and change and help in identifying any obstacles in implementing empowerment. Participation in these projects will benchmark current practices within participating organizations.

Furthermore, this study revalidated two prominent empowerment models in the ES context. The literature review conducted on the research topic gave evidence of a lack of research on user empowerment in ESS context. No other study, to the best of our knowledge, has quantitatively evaluated the ‘goodness’ of above empowerment frameworks in the context of ES. The empirical results obtained so far, suggest that meaning, competence, impact, self-determination, computer self-efficacy and autonomy constitutes user empowerment. However, as part of future work more detailed exploration is needed to complete the salient dimensions of user empowerment in ES context. A finer grained analysis and further validation of the constructs will provide more confidence regarding the constructs that constitute user empowerment in ES context.

Implications for Practitioners

This study has yielded several insights that could be useful to practitioners who will be faced with implementing an ES in the future, as well as for those who may be undertaking any kind of far-reaching, large scale complex IT system implementation such as those that will be necessary to conduct e-business. Following are some of the implications for managers and consultants.

- Ability to conduct an organization wide readiness check for by consultants, to get the most out of complex and expensive information technologies such as ES system.

- Recognize the importance of empowerment of employees; foster an open environment of open communication to facilitate user empowerment.

Finally, we believe that ES not only enable in achieving current strategic business benefits, but also for embarking on competitive inter-organizational systems, and building a proactive and high performance workforce that will further foster growth. We hope that this study will enable readers to better understand how to achieve this complex ES phenomenon through user empowerment.

CONCLUSION AND OUTLOOK

The purpose of this paper was to develop an instrument to measure user empowerment in ES context and to gauge the potential relationship amongst user empowerment and ESS measures. All inter-correlations amongst the ESS dimensions are larger than .5 and significant at the .01 level yielding further evidence of the convergent validity. The findings of the study have been encouraging so far and would form a solid grounding during the model building phase.

A subsequent survey instrument will be used to further assess the extended constructs. Data will be collected through surveys from firms that have implemented ES for at least 2-3 years. Then the survey will be sent to the adopting organizations. Senior executives such as CEO, CIO, or ES project managers and selected middle managers will be targeted.

Future research will also extend this study by examining the extent to which our research approach can predict the success of large and complicated ES as a function of user empowerment. Furthermore, the models in this study will also open an avenue exploring the reasons leading to ES benefit realisation occurring in the Information Systems field.

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