Evaluating ERP Satisfaction in Small and Medium-seized Enterprises

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Abstract

This study aimed at examining the satisfaction of users in small and medium-seized enterprises (SMEs) with ERP systems and at finding if user satisfaction is related to perceived usefulness (PU) and to various characteristics of the user, the organization and the system. In setting the background for the study, we reviewed the literature about ERP systems, Small or Medium-sized Enterprises (SMEs), and user surveys. In the first phase of the study, based on existing surveys of various researchers, we built a survey instrument to examine, in SMEs, ERP user satisfaction and PU, along with other factors: Information Content and Format, Accuracy, Ease of Use, Timeliness, Software adequacy, Security and Integrity, Documentation, Maintenance and Vendor Support, Training, and Productivity. In the second phase of the study, we conducted a survey in approximately 20 Israeli SMEs who implemented ERP systems from vendors such as Oracle, SAP, Integral, and Eshbel. In the third phase of the study, we analyzed the collected data in the SPSS statistics software, using one-way ANOVA and non-parametric tests. The results reveal a 3.26 level (on a 5-point Likert scale) of user satisfaction with ERP in SMEs and, as shown in previous research and a correlation between user satisfaction and PU, suggesting that PU is one of the factors affecting user satisfaction with ERP systems in SMEs. No supporting evidence was found for possible relationships between user satisfaction and organizational or user characteristics. However, we did find that the Vendor affects satisfaction through Training, Ease of Use, Maintenance, and Vendor Support.

1. Introduction

In the past, ERP systems were mainly used by large organizations. For SMEs, however, the role of ERP has increased in importance only in recent years. Extensive literature review has shown that not mush research has been done on ERP in SMEs and about the success of ERP implementations by SMEs. In this article we are going to measure satisfaction of ERP users in the context of SMEs since previous research has shown that user satisfaction is a good measure of success in ERP implementation. We developed a questionnaire, based on previous research, making some adjustments to fit SMEs user in the Israeli ERP market, to check if there is any relationship between user satisfaction and various variables that relate to the user, the organization and the system.

2. Literature Review

ERP systems are defined as "configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization" ([1], p.23). According to Loh and Koh ([2]), ERP gathers the functional modules together into a single integrated software program that runs off a single database. ERP systems can yield significant benefits: reduced inventory, faster information transaction, increased productivity; reduced logistics costs, and increased flexibility (Calisir and Calisir, [3]).

According to [4] (Palvia and Palvia,1999), although the use of ERP systems in SMEs is not as extensive as in larger organizations, it has become more common in recent years And according to Gable and Stewart [5], most ERP vendors increased their focus on SMEs due to market saturation since most large organizations had already implemented ERP systems.

Ideally one would like to evaluate ERP impact based on direct measures, such as cost and benefits, productivity improvements, and impacts of decision making and competitive advantages. Because of difficulty with direct measurement, however, researches have used surrogate indirect measures such as "user satisfaction" (Doll and Trokzadeh, [6] ; Palvia, [7] ; Wu et al., [8] ; Calisir and Calisir, [3]). The gain in popularity of user satisfaction as a measure of implementation success may be attributed to the absence of a comprehensive agreed-upon instrument and the intuitive connection to system success since, intuitively, if users are dissatisfied with an information system, it is difficult to consider its implementation a success (Zviran et al., [9]). [10] also claim that user satisfaction has become one of the main estimates of

success.

According to [11], Perceived Usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance", is especially important as a way of measuring user satisfaction, and is related strongly to user satisfaction. If a user finds the system useful and valuable s/he probably will be satisfied with it. In our research we will try to find out, in SMEs, if there is relationship between ERP user satisfaction and PU.

3. Research Model and Hypotheses

Based on the literature presented, and on [12]; [13]; [14], we put together an exploratory model of factors contributing to ERP satisfaction (Figure 1). The dependant variable in the model is user satisfaction with ERP in SMEs, and there are three categories of explanatory variables that may affect satisfaction, five user-related factors, three organization-related factors and one system-related factor, for a total of nine explanatory variables (Hypotheses 1 to 9), and also we consider the PU as an explanatory variable that may be related to ERP satisfaction (Hypothesis 10).

3.1 User-related variables: user characteristics have a significant influence on the success of ERP projects because the users have a dominant role in implementing the system and probably will be the main users. Five user-related factors have been examined.

3.1.1 Gender: Differences between men and women in terms of computer attitudes, computer use and computing practices are widely reported. However, this variable has seldom been examined in SMEs with respect to ERP systems.
3.1.2 Age: Older people are more likely to have fear of technology. Also they were generally educated and trained without the benefit of computer technology. By contrast, younger generations were often introduced to computer technology in their high school years, or even earlier. It is, therefore, postulated that older users will have less satisfaction with ERP systems.
3.1.3 Education: The user's education as an explanatory variable in SMEs computing has been examined in select studies. The obvious hypothesis is that users with more formal education will tend to use computers more and will have greater ERP satisfaction.
3.1.4 Computer skills: We assume that a higher level of the user's computational skill will lead to a lesser frustration and greater ERP satisfaction.
3.1.5 Management level: In general, managers require more integrated and summarized information than non-managers, thus it is reasonable to expect that ERP system satisfaction might be higher for managers than for others.
3.2 Organizational-related variables: the organization characteristics have influence on its strategy and

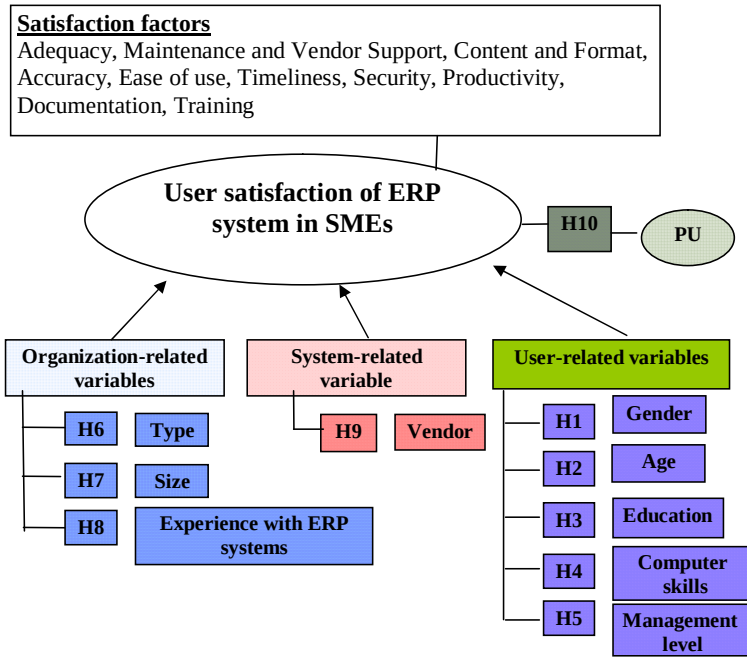


Figure 1 – A model of SMEs user ERP satisfaction

procedures and that might affect the organization coping with ERP implementation and by that user satisfaction.
3.2.1 Type: the type of the organization probably affects the technology level that it needs and the ERP system he will adopt, and by that affects the user satisfaction.
3.2.2 Size: Size is a variable of considerable importance that affects the nature of the organization, the environment and the resources, and probably the size differences between the various SMEs will affect the user satisfaction level.
3.2.3 Experience with ERP systems: as much as the organization use ERP system longer, probably the user becomes more experience and skilled and will have greater level of ERP satisfaction.
3.3 System-related variables: different vendors have different procedures and service and training levels that characterizes them. We assume that there is relationship between user satisfaction and the vendor that implementing the ERP system
3.4 Perceived Usefulness: previous research have found that there is strong correlation between PU and user satisfaction, and that in the ERP context, PU affects directly on user satisfaction. We will examine it in the context of ERP.

4. Research Method

To test the hypotheses we conducted a quantitive survey among SMEs. A pilot questionnaire was composed and

distributed among a small sample of ERP users and information systems experts. Based on their remarks and suggestions, we finalized a 41-item questionnaire instrument, using a 5-point Likert scale. The first part of the questionnaire included general questions about demographic variables. The second part included specific questions about user satisfaction and characteristics.

We contacted 40 SMEs, 51.28% of which have allowed us to distribute questionnaires to their employees. Our original intention was to visit every willing organization in order to explain the purpose of the research and its importance to us and to distribute the questionnaire manually. However, most of the organizations preferred the fax and e-mail way of questionnaire distribution. The questionnaires were distributed to approximately 430 users of which 95 users responded (21.93% response rate). Fourteen questionnaires were not usable, bringing the number of useable responses to 81 (18.7% response rate).

5. Research Results

The statistical analysis, using the SPSS software package, included: a parametric one-way analysis of variance (ANOVA), Kruskal – Wallis for a nonparametric one-way analysis of variance, Least Significant Difference (LSD) for homogeneity, Pearson, Spearman, and linear regression

The analysis revealed that the overall evaluation of user satisfaction stands on 3.334 and the level of PU at 3.185. Table 1 summarizes the main and significant results, with significance levels of 0.10 and 0.05 denoted by ** and *, respectively.

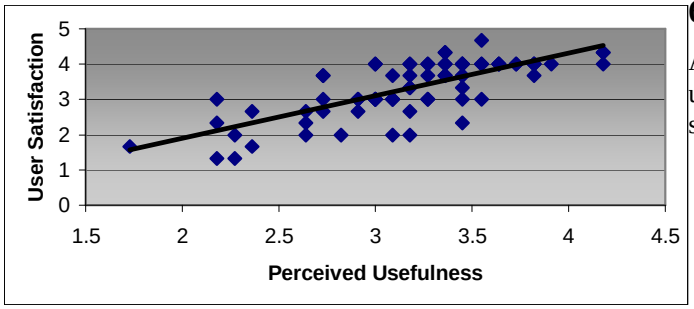
Figure 2 – Correlation between PU and user satisfaction

Apperantly, only one of the five user-related variables – gender –, has some but hardly significant (p<0.10) impact on the overall evaluation of satisfaction. Among organization-related variables, only the variable organization-type affects the overall evaluation of satisfaction (p<0.10) and also affects four other sub-factors of user satisfaction: software adequacy, information content and format, ease of use, and productivity.. For all the factors, production-oriented organizations had the highest level of satisfaction and service-oriented organizations the least. The system-related variable shows no significant impact on the overall evaluation of satisfaction. However, it has significant impact (p<0.05) on three of the satisfaction factors: maintenance and vendor support, ease of use, training and education. Figure 2 provides a graphical presentation of the correlations between PU and user satisfaction.

Table 1 – Statistics tests of ERP satisfaction *p* values

satisfaction factors	user-related variables			organization-related variables	system-related variables
	gender	age	education	type	vendor
software adequacy	0.050*	0.369	0.516	0.012*	0.250
maintenance and vendor support	0.688	0.037*	0.096**	0.166	0.006*
information content and format	0.641	0.556	0.629	0.023*	0.837
ease of use	0.926	0.490	0.893	0.097**	0.016*
security and integrity	1.000	0.094**	0.027*	0.479	0.990
productivity	0.096**	0.058**	0.887	0.003*	0.276
training and education	0.497	0.175	0.525	0.158	0.013*
overall evaluation	0.070**	0.252	0.662	0.088**	0.356

* Significant at 0.10 level
** Significant at 0.05 level



6. Conclusions

Although the findings of this research contribute to a better understanding of the variables affecting ERP user satisfaction among SMEs, this research has several

limitations. First, the sample was relatively small, both in organizations and users numbers, because of difficulties with the questionnaires distribution. Second, the instrument was relatively long and therefore the users showed high level of impatience and perhaps didn't pay enough attention as we wished. Also, some respondents felt threatened by some of the questions. These limitations may bias the.

This study used a survey instrument to measure user satisfaction with ERP in the SMEs context and found a strong relationship between PU and user satisfaction that has been previously documented in the non-ERP and non-SME contexts. Our finding that gender may affect the overall evaluation of ERP satisfaction calls for a more rigorous investigation. Our finding that organization type affects the overall evaluation of satisfaction and four satisfaction sub-factors: software adequacy, information content and format, ease of use and productivity, is opposed to previous research ([4]) and also requires further research.

Another significant finding in our research, the relationship between the vendor and ERP user satisfaction sub-factors: maintenance and vendor support, ease of use, training and education, suggests that SMEs need to conduct an extensive market survey before deciding which ERP system to implement.

In conclusion, this research is of value for both research and practice. Research-wise, it can be good starting point for a future investigation of user satisfaction and its relationship with various variables, in the context of ERP systems among SMEs, such as user involvement, top management support and user attitude. Practice-wise, it shows that ERP decision-making for SMEs is not that much different than for larger organizations and requires management attention.

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