

# Determinants of Perceived Job Satisfaction From ERP-enabled Emergency Service Adoption: An Empirical Study

*Full papers*

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## Abstract

The present study applies partial least square (PLS) algorithm to identify key antecedents that influence perceived job satisfaction due to the implementation of an ERP-enabled shared platform by emergency services organizations. Using data collected from 193 ERP users we developed and tested two research models primarily based on extending technology acceptance (TAM) model taking contextual task characteristics into account. From the results we found that perceived ease of use, perceived usefulness, and compatibility positively influence users' behavioral attitude toward ERP system which in turn positively influence users' perceived job satisfaction. Finally, the implications of the study as well as future research directions are presented.

## Keywords

Technology Acceptance Model, perceived ease of use, perceived usefulness, task characteristics, ERP, job satisfaction.

## Introduction

Enterprise resource planning (ERP) systems enable organizations to achieve business process integration and realize strategic and operational business value. Such enterprise systems can provide competitive advantage to organizations through reduced cost and improved responsiveness to customers. Despite having great potential to improve business operations there has been considerable uncertainty about the value that ERP systems add to organizations. There are many reports of difficulties in implementing ERP 2006 and it was expected to grow at a compounded annual growth rate of 11% annually until 2011 (Jacobson et al. 2007). However according to (Chang 2004; Panorama Consulting 2012) it is reported that 67% of ERP projects fail in achieving corporate goals and are considered unsuccessful, 90% of ERP implementations are delivered late or are over budget, and 40% of all large scale ERP projects fail. Thus, despite its popularity and promise ERP implementations suffer high failure rates and inability to realize promised benefits. A major reason for failure of ERP systems has been identified to be end user resistance to change (Lapointe and Rivard 2005). Since ERP systems require significant business process reengineering across the organization involving different stakeholders, even though such systems could be implemented successfully from a technical perspective, real business benefits could only be realized through user acceptance of the system. It is thus extremely important to conduct research on the antecedents that impact end user acceptance and use of ERP systems. Furthermore, it is important to study ERP usage within work settings in order to maximize its power in organizations thus contributing towards increased usage and assessing the impact of such usage on outcomes such as users' job satisfaction and performance gains (Sun et al. 2009). ERP system implementations are different from other IT implementations because it is not "built to order" but bought "as is" which makes it further complicating to be accepted by its organizational users (Basu and Kumar 2002). Organizational impact of ERP systems can both be tangible and intangible. Tangible benefits could be reduced cost, reduction of

employees, improved productivity etc. whereas intangible benefits could be improved customer responsiveness, improved information sharing, improved or new business processes etc. (Chien and Tsaur 2007). Although user satisfaction and organizational impact are viewed as separate measures Jones et al. (2008) viewed customer satisfaction as a part of organizational impact because such user satisfaction affects organizational performance.

Most prior studies on ERP systems have focused on the adoption, use, and impact of the system at a single organization (Markus 2006) and very few studies have been conducted on the implementation of ERP-enabled shared platform by government agencies particularly in emergency services. Our study thus aims to identify the key antecedents of ERP-enabled perceived job satisfaction in the emergency services. We believe that conducting ERP adoption studies across different sectors can add more valuable and rich information that can contribute toward ERP implementation project success.

We seek to answer the following research question in this study: What are the key antecedents that influence perceived job satisfaction due to the implementation of an ERP-enabled shared platform by emergency services organizations?

To explore this question, we collected data through a web based survey within an Australian state emergency service. To the best of our knowledge this study is the first empirical study that specifically studied the ERP system adoption in a multi-organization emergency service sector.

## **Theory and Research Model**

To improve ERP system adoption organizations there is a need to research the factors that impact user satisfaction. In this area technology acceptance (TAM) is the most widely used models that explain behavioral intention and actual use and can improve our understanding of how influence on actual use could improve overall ERP adoption. TAM is the most widely used theory primarily because of its empirical support, parsimony, and robustness (Davis 1989; Scott 2008). The research model that we propose and test in this study is based on TAM and diffusion of innovation (DOI). We propose that the key constructs of TAM which are perceived ease of use and perceived usefulness along with compatibility which is a key construct from the theory of DOI can influence users' attitude toward ERP implementation which further influence users' job satisfaction gained from using ERP system. We also propose that task specific contextual factors such as task feedback and task significance have moderating effect on users' attitude on perceived job satisfaction.

Based on the core constructs of TAM, DOI, and the task specific contextual factors our proposed research models are shown in Figure 1 and 2. Model 1 as shown in figure 1 is a parsimonious model that only includes key constructs from TAM and DOI and model 2 has contextual factors task feedback and task significance influencing users' perceived job satisfaction. Our objective is thus to extend basic TAM with more generic contextual factors and examine their influence on perceived ERP usefulness and perceived ERP ease of use in order to better fit ERP adoption for multi-organization emergency services.

The hypotheses corresponding to the models that we are testing in this study are presented below:

According to Davis (1989), perceived ease of use influences perceived usefulness while both perceived usefulness and perceived ease of use influence attitude toward using the system (Po-An Hsieh and Wang 2007).

H1: Perceived ERP ease of use has positive impact on users' attitude toward ERP.

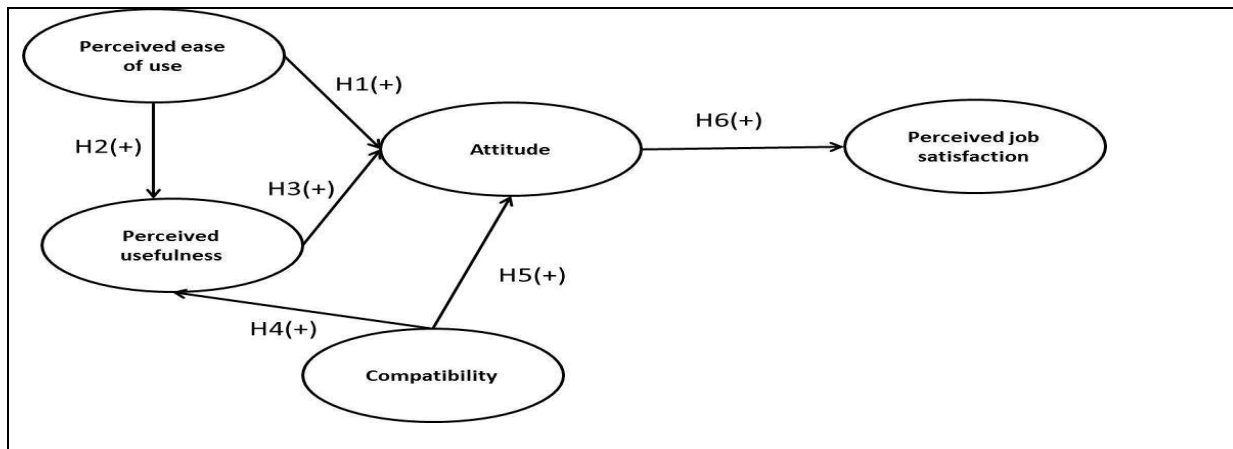
H2: Perceived ERP ease of use has positive impact on users' perceived usefulness of ERP.

H3: Perceived ERP usefulness has positive impact on users' attitude toward ERP.

According to Rogers theory of DOI compatibility influences perceived usefulness and attitude towards a system (Rogers 2003). We thus hypothesize:

H4: ERP compatibility has positive impact on users' perceived usefulness of ERP.

H5: ERP compatibility has positive impact on users' attitude toward ERP.



**Figure 1. Research model 1**

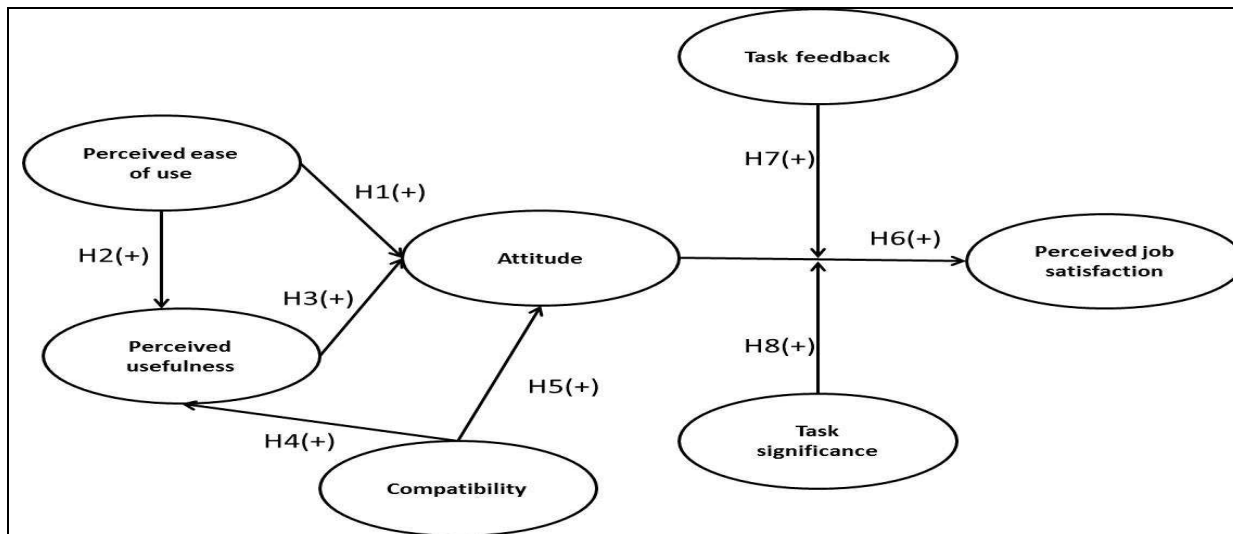
A positive relationship between attitudes toward using a technology and intentions to use it has been found in prior studies (Schierz et al. 2010; Yang and Yoo 2004). In this study we extend TAM into the ERP context by using the performance impact of ERP usage as the main dependent variable. We thus propose the following hypothesis:

H6: Attitude toward ERP system has positive impact on users' perceived job satisfaction upon using ERP.

This study investigates the attitude and usage of ERP systems in an organizational environment. Thus the task characteristics of ERP users are very important and relevant for individual users' performance and thus satisfaction. The result is an extension of basic TAM to include task-technology fit construct. The integrated model can provide greater explanatory power. Since ERP system usage drastically changes users' jobs it is logical to assume that the incorporation of ERP systems will change how users' perceive their jobs and how satisfied they are with their work. Two of the job characteristics, task significance and task feedback are specific to the nature of the work and the day to day tasks that users' do as part of their overall job. Task characteristics have been identified to be important moderating factors on the relationship between users' system use and their performance (Rice 1992). In this study, we identify two important task characteristics for ERP users': task significance and task feedback. Task significance is the degree to which the job has a substantial impact on the lives or works of other people (Hackman and Oldham 1974, p. 5). Task feedback is the degree to which carrying out the work activities required by the job results in workers' obtaining direct and clear information about the effectiveness of their performance (Hackman and Oldham 1974, p. 5). We thus propose the following hypotheses:

H7: Task feedback positively moderates the relationship between attitude toward ERP and perceived job satisfaction upon using ERP.

H8: Task significance positively moderates the relationship between attitude towards ERP and perceived job satisfaction upon using ERP.



**Figure 2. Research model 2**

### Research Methodology

In this study, a web-based questionnaire was used to collect data within an Australian state emergency service that operates in an area of approximately 800 642 sq. km. This agency is in charge of providing support to the community facing disasters including storms, and tsunami. It also provides services in resupplying the communities affected by disasters; launching air, flood, and road crash rescue operations; and developing community responder, vertical rescue, land search, evidence search, logistics support, and primary industries. The agency relies heavily on volunteers (about 10,000) to conduct its operations across the state. It also has about 250 staffs. The agency completed the first implementation phase of an emergency services shared SAP system in December 2009 to support firm daily operations. More precisely, an invitation letter explaining the research objective as well as the approximate time to complete the questionnaire was sent to employees via the intranet in May 2013. The survey was closed in the beginning of September 2013. 313 employees agreed to participate to the study. After the analysis of all responses, 193 were identified as properly filled out and suitable for further analysis, yielding a response rate of 61.7%. The choice of a Web-based questionnaire for our quantitative data collection allowed us to save time during the data collection process, to reduce missing values whereas keeping a response rate comparable to traditional paper-based instruments (Boyer et al. 2002; Singh et al. 2009). In addition, the use of survey method is appropriate for research that encompasses hypotheses testing, populations description, theoretical model building and measurement scales development (Lee and Shim 2007). Finally, all constructs included in this study were drawn from prior studies, and adapted to fit the emergency service context. To measure our items, a 7-point Likert scale with anchors ranging from Strongly Disagree (1) to Strongly Agree (7) was used.

For data analysis, we used XLSTAT-PLS, version of 2013.6.04. XLSTAT-PLS is a statistical Excel add-in with advanced modeling tools that has various components including Partial Least Squares (PLS), Path Modeling and PLS Regression. 59.1% of the sample was males. 82.4% of the overall sample attended college. The age range was 18-84 (with a standard deviation of 12.07).

### Results and discussion

Table 1 shows the descriptive statistics for all the manifest variables in the model. Mean values and standard deviations are presented for the two models (Model 1 and Model 2).

From Table 2, we can see that all Cronbach's alpha, composite reliability and the average variance extracted (AVE) from the two models are greater than the respective threshold of 0.7, 0.7 and 0.5, thus confirming the internal consistency reliability, and the convergent validity of our constructs (Bagozzi and Yi 1988; Hair et al. 2012; Wong 2013). Most of our factor loadings are higher than the acceptable threshold of 0.7, except for PU4 (0.522) and JSAT2 (0.695). However, we kept these two items as their

loadings are moderate (values > 0.3). Factor loading with a value > 0.6 is considered as high loading, while a loading with a value > 0.3 is considered as a moderate loading, and with a value < 0.3 is considered as a low loading (Kline 1993). According to Hair et al. (1983), factor loadings greater than 0.3 are considered as significant; factor loadings greater than 0.4 are considered to be moderately significant; and factor loadings greater than 0.5 are considered to be very significant. The standard criteria of factor loadings greater than 0.5 and an adequately explained factor structure were used in the analysis (Zeller and Carmines 1980).

In Table 3 and Table 4, we calculated the square root of the AVEs in the diagonals of the correlation matrix. All calculated values exceed the inter-correlations of the construct with the other constructs in the two models, and thus confirming the discriminant validity (Chin 1998; Chin 2010; Fornell and Larcker 1981).

From Figure 3 we can see that all the standardized path coefficients are significant at a level of 0.001, except for one of the relationship between PU and ATT, which is significant at a level of 0.05, thus supporting all our hypotheses for the first model (Table 6). Model 2 exhibits similar values for its shared segment with model 1. However, the moderation effects of both task feedback and task significance were not significant (Figure 4; Table 6). The coefficient of determination,  $R^2$  is 0.600 for both of perceived usefulness and attitude in the two models. While the value of the coefficient of determination,  $R^2$  for perceived job satisfaction jumps from 0.076 in the first model to 0.205 in the second model (Figure 3 and Figure 4).

Table 5 shows that the absolute goodness of fit (GoF) of Model 1 and Model 2 are respectively 0.546, 0.587, thus suggesting that our two models seem to fit the data well enough. An absolute GoF greater than 0.5 is considered satisfactory. In addition the value of the relative GoF for the Model 1 (0.881) and the Model 2 (0.895) are close 0.90 which is considered as a great fit of a model (Fosso Wamba 2012).

Even if the literature on ERP adoption and use is large, diverse and mature, the implementation process remains a challenging task for many firms (Hung et al. 2012; Panorama Consulting 2012). For example, a recent study reported that while 65% of ERP projects go over budget and 93% take longer than expected, only 22.7% of ERP adopting firms realize at least half of the business benefits they primarily expected from ERP (Panorama Consulting 2012). In addition, while many research studies focus either on the manufacturing (Boersma and Kingma 2005; Ioannou and Dimitriou 2012; Koh and Saad 2006; Mabert et al. 2003) or services (Azevedo et al. 2014; Botta-Genoulaz and Millet 2006; Kilic et al. 2014), very few of them are being directed to adoption and use of ERP by emergency service organization dominated by volunteers. The results of this study indicate that (i) perceived ease of use will have a significant positive impact on attitude (H1) and perceived usefulness (H2), which in turn will have a significant positive impact, on attitude (H3). These findings are consistent with prior studies on IS adoption and use (Chung et al. 2014; Davis 1989; Venkatesh 2000).

Latent variable	Manifest Variables Or Items	Model 1		Model 2	
		Mean	Std. deviation	Mean	Std. deviation
Perceived ease of use (PEOU)	PEOU1	3.689	1.750	3.689	1.750
	PEOU2	4.415	1.738	4.415	1.738
	PEOU3	4.079	1.841	4.079	1.841
	PEOU4	4.667	1.732	4.667	1.732
Perceived usefulness (PU)	PU1	4.637	1.652	4.637	1.652
	PU2	3.793	1.754	3.793	1.754
	PU3	3.693	1.756	3.693	1.756
	PU4	2.689	1.611	2.689	1.611
Attitude (ATT)	ATT1	4.979	1.757	4.979	1.757
	ATT2	4.912	1.760	4.912	1.760
	ATT3	4.642	1.850	4.642	1.850
	ATT4	3.385	1.803	3.385	1.803
compatibility (COMP)	COMP1	3.870	1.712	3.870	1.712
	COMP2	3.902	1.708	3.902	1.708
	COMP3	3.762	1.649	3.762	1.649
Perceived job satisfaction (JSAT)	JSAT1	5.466	1.243	5.466	1.243
	JSAT2	5.497	1.558	5.497	1.558
	JSAT3	5.658	1.146	5.658	1.146
	JSAT4	5.314	1.302	5.314	1.302
	JSAT5	5.435	1.338	5.435	1.338
	JSAT6	4.684	1.631	4.684	1.631
Task feedback (TFEDB)	TFEDB1			4.917	1.578
	TFEDB2			5.083	1.426
	TFEDB3			5.332	1.452
Task significance (TSIG)	TSIG1			5.917	1.273
	TSIG2			6.000	1.296
	TSIG3			5.938	1.262

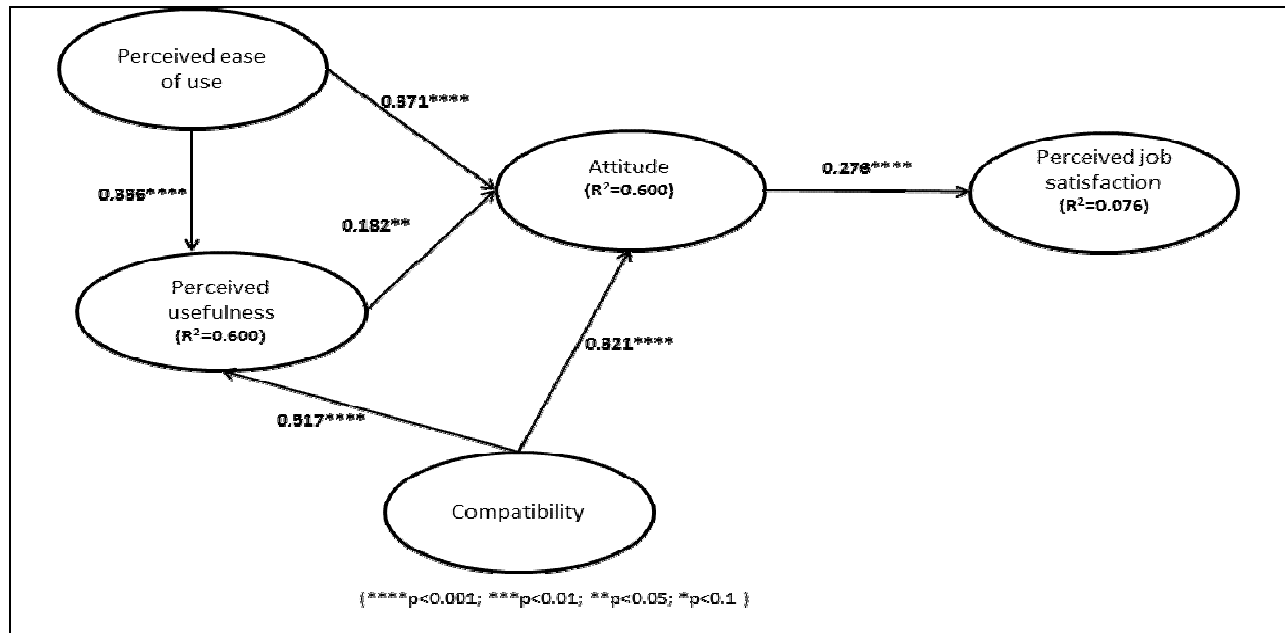
**Table 1. Descriptive Statistics of Measurement Manifest Variables**

Latent variable	Manifest variables	Model 1				Model 2			
		Standardized loadings	Cronbach's alpha	D.G. rho (PCA)	AVE	Standardized loadings	Cronbach's alpha	D.G. rho (PCA)	AVE
PEOU	PEOU1	0.854	0.910	0.937	0.787	0.854	0.910	0.937	0.787
	PEOU2	0.920				0.920			
	PEOU3	0.924				0.924			
	PEOU4	0.848				0.848			
PU	PU1	0.812	0.833	0.894	0.685	0.812	0.833	0.894	0.685
	PU2	0.956				0.956			
	PU3	0.946				0.946			
	PU4	0.522				0.522			
ATT	ATT1	0.923	0.900	0.932	0.774	0.923	0.900	0.932	0.774
	ATT2	0.920				0.920			
	ATT3	0.913				0.913			
	ATT4	0.751				0.751			
COMP	COMP1	0.853	0.904	0.940	0.839	0.853	0.904	0.940	0.839
	COMP2	0.962				0.962			
	COMP3	0.929				0.929			
JSAT	JSAT1	0.707	0.827	0.874	0.533	0.721	0.827	0.874	0.535
	JSAT2	0.695				0.708			
	JSAT3	0.751				0.761			
	JSAT4	0.744				0.747			
	JSAT5	0.739				0.721			
	JSAT6	0.746				0.729			
TFEDB	TFEDB1					0.889	0.880	0.926	0.806
	TFEDB2					0.929			
	TFEDB3					0.874			
TSIG	TSIG1					0.925	0.911	0.944	0.849
	TSIG2					0.939			
	TSIG3					0.899			

**Table 2. Factor Loadings, Cronbach's Alpha Values, Composite Reliability and AVE**

	PEOU	COMP	PU	ATT	JSAT
PEOU	<b>0.887</b>				
COMP	0.634	<b>0.916</b>			
PU	0.664	0.730	<b>0.828</b>		
ATT	0.696	0.689	0.663	<b>0.880</b>	
JSAT	0.170	0.233	0.275	0.276	<b>0.730</b>

**Table 3. Correlations for model 1** (The bold values on the diagonal are the square root of the AVE)



**Figure 3. Research Results: Model 1**

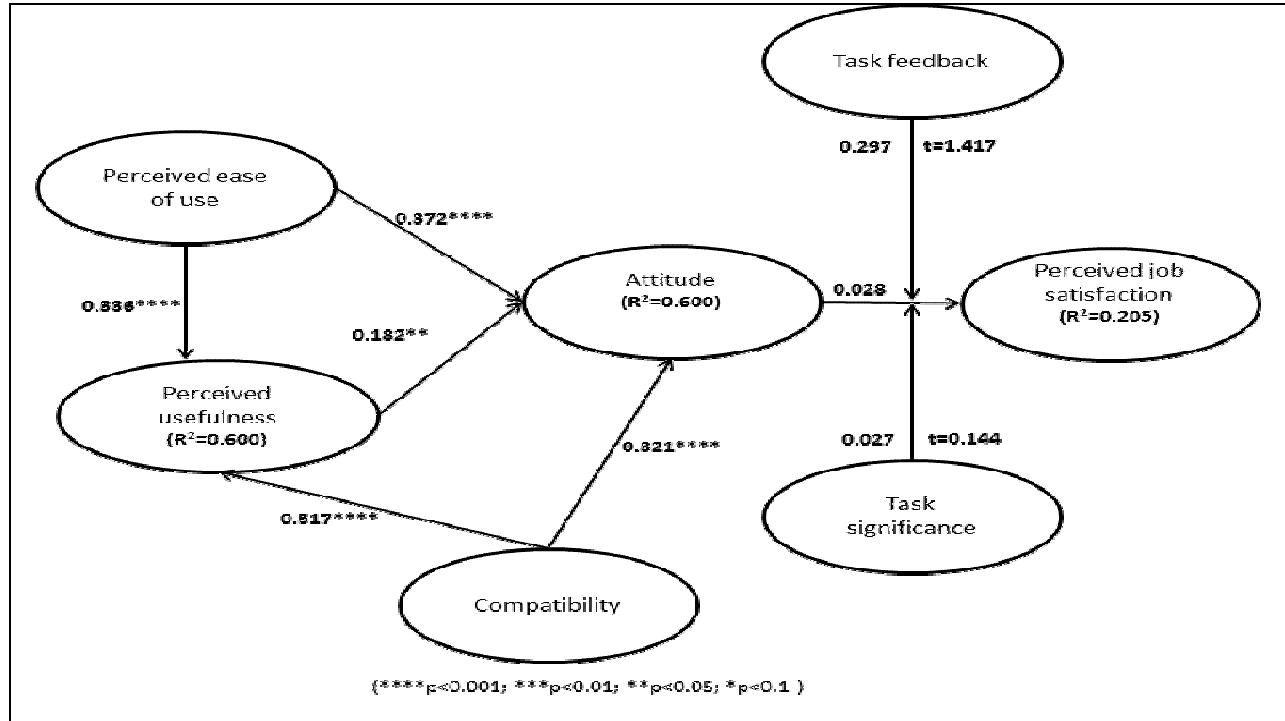
	PEOU	COMP	PU	ATT	TFEDB	TSIG	JSAT
PEOU	<b>0,887</b>						
COMP	0,634	<b>0,916</b>					
PU	0,664	0,730	<b>0,828</b>				
ATT	0,696	0,689	0,663	<b>0,880</b>			
TFEDB	0,097	0,165	0,178	0,180	<b>0,898</b>		
TSIG	-0,022	0,060	-0,017	0,040	0,436	<b>0,921</b>	
JSAT	0,168	0,230	0,277	0,272	0,398	0,222	<b>0,731</b>

**Table 4. Correlations for model 2** (The bold values on the diagonal are the square root of the AVE)



	Model 1	Model 2
	GoF	
Absolute	0.546	0.587
Relative	0.881	0.895

**Table 5. Goodness of Fit Values**



**Figure 4. Research Results: Model 2**

## Conclusions

The primary purpose of this paper was to enhance the understanding of the key antecedents of users' acceptance of ERP systems. Our model studied a new set of antecedents in the presence of task specific moderating factors and outcome variable involving ERP systems. The research model provides empirical evidence that perceived ease of use and perceived usefulness of ERP systems positively impact users' attitude toward it which in turn positively impacts their job satisfaction. Another noticeable aspect of our results suggests that compatibility positively impacts perceived usefulness of ERP systems and users' attitude which in turn positively impacts users' perceived job satisfaction. Thus users' perceive ERP systems as more useful if such systems are consistent with their existing values, previous experiences, and needs. We attempted to extend TAM by taking task specific contextual characteristics which are relevant for ERP systems into account. However we could not find empirical support for the significance of the task specific moderating factors. Our attempt makes contributions to the area of ERP system adoption and strengthens our knowledge regarding the impact of ERP systems in organizations, particularly for emergency services, their acceptance by users', and the role of task specific contextual factors. In our attempt we also made contribution to the general IT adoption literature. Our findings could be extended for other organizational IT systems which changes how jobs are done in an organization. The findings in our study could also be used by practitioners to put together best practices to enhance ERP system

acceptance, usage, and adoption by their users'. In future we plan to extend our research model by adding other relevant contextual factors like users' ERP training, educational background, age, and gender. We also plan on studying the effect of organizational factors such as size and readiness. We believe that our attempt can contribute toward better understanding of ERP system adoption and to unveil why such systems fail. One limitation of our study is that the context was ERP usage in an Australian state emergency service; this makes our findings less generalizable to firms in developing countries. Second, as we collected the data for this study using a single self-reported questionnaire our findings may be susceptible to common method bias which is unavoidable in cross-sectional surveys.

Hypotheses	Supported	
	Model 1	Model 2
H1: Perceived ERP ease of use has positive impact on users' attitude toward ERP.	Yes	Yes
H2: Perceived ERP ease of use has positive impact on users' perceived usefulness of ERP.	Yes	Yes
H3: Perceived ERP usefulness has positive impact on users' attitude toward ERP.	Yes	Yes
H4: ERP compatibility has positive impact on users' perceived usefulness of ERP.	Yes	Yes
H5: ERP compatibility has positive impact on users' attitude toward ERP.	Yes	Yes
H6: Attitude toward ERP system has positive impact on users' perceived job satisfaction upon using ERP.	Yes	No
H7: Task feedback positively moderates the relationship between attitude toward ERP and perceived job satisfaction upon using ERP.		No
H8: Task significance positively moderates the relationship between attitude towards ERP and perceived job satisfaction upon using ERP.		No

**Table 6. Results of hypothesis testing**

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