

## Enterprise Resource Planning Success Model in Vietnam

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### Abstract:

*This study makes an original contribution to both of theory and practice through forming and validating the ERP success model for accounting professionals only. In a little more detail, it provides empirical evidence regarding Hunton's accounting value chain (2002). In addition, it discovers and proves effective use as the most appropriate system-use concept so far. Moreover, it makes an effort to investigate outcomes of accounting benefits perceived from ERP system, which related-studies are much further under-researched. Last but not least, the research provides valuable implications for organization management on how they can successfully manage accounting department as well as accounting professionals in an attempt to maximize ERP's impacts on organizational performance, which executives have paid much attention to for recent years but have not yet found out the answer so far.*

**Key words:** ERP success model, accounting professionals, perceived accounting benefits, system use, the principle "fitness for use"

### 1. Introduction

With respect to a boom in ERP-adopted business organizations, research in the ERP has also increased over the past years. To acquire how the growth of publications about ERP is, the Google Scholar database is scanned for the term "Enterprise Resource Planning" in the period 1990-2016. The results of this searching are summarized in following bibliometric<sup>4</sup> graph (see Figure 1.2). This graph reveals the growing interest in ERP over the past 26 years. Accordingly, ERP (although a little decrease) is still a prominent field in the research community, with about 6000 search results on average in the 2009-2016 period (Google 2017).

Among ten topics above, ERP critical success factors (CSFs) has been the most prolific area in early ERP research (Grabski, Leech, & Schmidt, 2011). The reason of this may be that ERP is very expensive, complex system, impacts the entire organization, and if it fails, it seems likely to contribute to the failure of the firm itself (J. Scott, 1999). Moreover, many adopting enterprises realize that the deployment of such systems is not as effective as expected (E. T.G. Wang, Shih, Jiang, & Klein, 2008). Critical success factors (CSF) have thus constituted few things that must go well to ensure success of an organization (Boynton & Zmud, 1984).

CSF is investigated to identify essential areas of concern and provides measures that would aid in managing those areas (Boynton & Zmud, 1984). The CSF researches have typically addressed several different issues. In most cases, typical CSF studies have consistently identified a set of core factors critical to the success of ERP implementations including top management support, the implementation team, organization-wide commitment to the system, and fit between the ERP systems and the firm (Finney & Corbett, 2007; Hong & Kim, 2002; Murray & Coffin, 2001; Ross & Vitale, 2000; J. E. Scott & Vessey, 2000; Somers & Nelson, 2001; Somers & Nelson, 2003; Stefanou, 2000). In other cases, some papers have found that firm size is also an important factor related to ERP implementation success (Bernroider & Koch, 2001; Buonanno et al., 2005; Vincent A. Mabert et al., 2003; Muscatello, 2003; Snider, da Silveira, & Balakrishnan, 2009).

Alternatively, rather than focusing on identifying the factors critical for success in implementing ERP system, the few researchers are interested in building ERP success models as untypical CSF studies. For instance, H.-Y. Lin, Hsu, and Ting (2006) develop an ERP success model upon the DeLone and McLean's (1992, 2003) information system success model. Lin et al.'s (2006) model relates the individual impact to balanced scorecard measures (i.e., financial effectiveness, customer effectiveness, internal business effectiveness, and innovation

and learning effectiveness). They demonstrate that the success of any ERP system may be predicted by integration of the information system success model and balance scorecard constructs. Specifically, they suggest that the adoption of balance scorecard criteria will allow firms to more easily assess impacts of the ERP system is either positive or negative as well as to more effectively manage the ERP system implementation.

ERP CSFs research is crucial; however, quite mature for a certain period of time; therefore, a question is whether there still have the interesting research opportunities for ERP researchers.

Drawing on recent relevant literature, Mukti and Rawani (2016) as well as Grabski et al. (2011) assert that there exists a paucity of ERP success model research. Thus, this study is expected to increase insight regarding such an area. Another reason of choosing ERP success model to study in place of investigating single critical success factors is due to its advantages<sup>5</sup>. First, the ERP system causes complex and challenging tasks, and there are many integrated factors influencing the level of success, therefore identifying primary factors running organizational performance under a whole model is more appropriate. Second, the model forces researchers to be explicit about the way the problem is perceived. Thus, there is less room for sloppy or confused thinking when modeling. The act of systematically considering the impact of one variable on another forces researchers to make their logic more consistent when thinking about a problem. Third, model is effective and efficient way of organizing researchers' knowledge about a problem of interest. Hypotheses investigated in model will expand their knowledge about the phenomena. Finally, model provides a safe and economical way of testing relationships as it allows simulating the effect of making a change in one variable on other variables without actually making the change.

Finney and Corbett (2007) lament the fact that most of recent ERP CSF research (both typical and untypical CSF type) has generally taken from a macro perspective or a view of multiple top managers, the perspectives of key or single stakeholders are often missing. This proves that CSF research potentially still lies in either micro-level or target-level approaches. Likewise, Grabski et al. (2011) suggest that ERP research has yet to sufficiently investigate some issues such as how ERP influences stakeholders in accordance with stakeholders' insights; or whether stakeholders' performance can be effectively improved in organizations adopting ERP; or even whether the perceptions of stakeholders on the ERP system can enhance the organizational performance of adopting enterprises. To put it in other way, to comprehend positive impacts of the ERP system on stakeholders, a question is whether there is a model guiding stakeholders how to adopt ERP successfully in order to contribute to increasing organizational performance from stakeholders' perspectives themselves.

## 2. Literature review

### 2.1. Theories used in the ESMAP

D&M IS success model (DeLone & McLean, 1992)

This study chooses the D&M IS success model (1992) as an underlying model of the ESMAP due to five reasons as follows:

First, the D&M IS Success Model (1992) has enough important dimensions such as system quality, information quality, user satisfaction, and individual and organizational performances used for ERP system success measurement as mentioned previously (see Section 2.3.2).

Second, among the existing information system success models, the D&M success model (1992) is referred to the most prominent one. Since its introduction in 1992, the D&M- success-model-related paper has become one of the singly-most heavily cited articles in the literature on IS (Lowry, Karuga, & Richardson, 2007). The model's dimensions as well as the relations among them establish a board response from IS research communities. (Petter et al., 2008; Urbach, Smolnik, & Riempp, 2009). Therefore, it constitutes one of the most common IS theories. Furthermore, and the most important, not only out of its popularity in IS literature, the D&M success model (2003) is also adopted in an extremely numerous studies relating to ERP topics, such as

forming ERP success models (Chung, Skibniewski, Lucas Jr, & Kwak, 2008; Ifinedo, 2006; H.-Y. Lin et al., 2006); and investigating the D&M success model’s constructs and their relations in ERP environment (Hsu et al., 2015). In brief, the D&M IS success model (DeLone & McLean, 1992) is chosen because of its widespread application in both IS in generally and ERP in particularly.

Third, the D&M IS success model (version 1992 instead of version 2003) supports to overcome target-setting issue (see Section 1.3.3), which requires that both individual performance and organizational performance need to appear as dependent variables in the ESMAP.

Forth, it allows its constructs to either be measured obligatorily at organizational level (organizational performance) or be able to be measured reasonably at organizational level (system quality, information quality, use, satisfaction and individual performance). This means that the D&M IS success model (1992) helps to satisfy validity issue in designing the ESMAP.

Finally, adopting the D&M success model makes this study add more insights into filling cumulative tradition in IS research, which is the most strenuous Keen’s (1980) challenges<sup>10</sup> to the IS discipline. Indeed, given its high citation counts and the intense and broad application of the model in various contexts, Urbach and Müller (2012) believe that the D&M success model should be a part of a comprehensive compendium of IS theories.

To summarize, in the context of this research, the D&M IS success model (DeLone and McLean 1992) is considered as a basic model of the way in which ERP affects individual and organizational performance at organizational level.

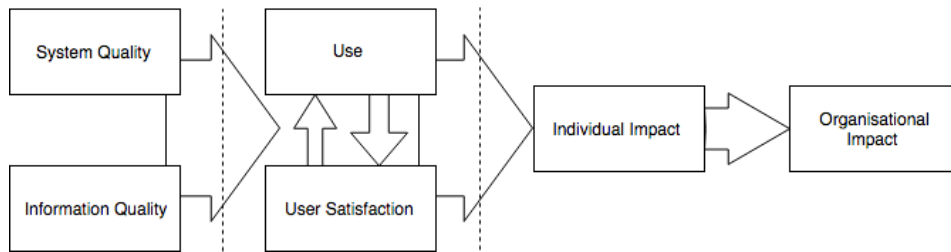


Figure 1: D&M IS Success Model (DeLone and McLean, 1992)

IS-continuance theory (Bhattacharjee, 2001) (Bhattacharjee, 2001)

The IS-continuance theory concentrates primarily on post-implementation context, stating that the intention of an individual to continue to use a particular IS directly depends on the following two variables: user satisfaction with IS and perceived usefulness.

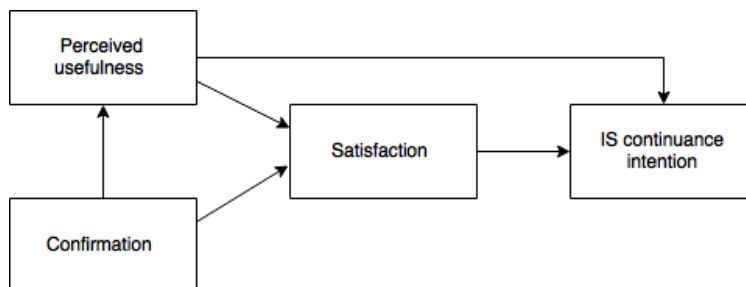


Figure 2: IS-continuance theory (Bhattacharjee, 2001)

Bhattacharjee (2001) has proposed IS-continuance theory based on the expectation confirmation theory (Oliver, 1980). The expectation confirmation theory is extremely widely adopted in behavior literature in term of approximately 14460 citation counts, meanwhile the IS-continuance theory is also numerously cited greater one

third of confirmation theory<sup>11</sup>. These numbers prove that IS-continuance theory has been valuable in user behavior research. For example, there are a numerous studies of predicting user's intentions to continue using IS by adding new constructs (Kim, 2012; Y. Lee & Kwon, 2011; J. Y. Thong, Hong, & Tam, 2006) or integrating the IS-continuance theory with other theories or models (M.-C. Lee, 2010; W.-S. Lin & Wang, 2012). However, few studies have examined continuous intentions toward ES, and most of them have been theoretical in nature. For example, Rezvani, Khosravi, Subasinghage, and Perera (2012) by proposing a theoretical framework, discuss what an antecedent of users' satisfaction and perceived usefulness is in ERP environment while Walther and Eymann (2012) combine IS-continuance theory with the D&M IS success model to formulate a theoretical model in which attempts to examine the drivers affecting an organization's intention to continue using ES. Rarely, Sun and Mouakket (2015) empirically investigate the technology-related factors influencing continuance intentions to use ES and continuance usage.

The IS-continuance theory is chosen because of four reasons. Firstly, it pays attention to post- adoption context while the dissertation also focuses on investigating ERP post implementation success. Second, this theory identifies that perceived usefulness is antecedent of continuous utilization of a specific IS. In the context of the research, system quality, information quality and most important, perceived accounting benefits are considered as usefulness perceived from ERP. Therefore, the IS-continuance theory supports to explain the relationship between system quality, information quality, perceived accounting benefits and ERP continuance, which possibly constitutes system use, as ERP system is mandatory. Third, likewise, it also supports to clarify the links between system quality, information quality, perceived accounting benefit and satisfaction. Finally, because of limitations of adopting it in ES context, this study will provide more insights of this phenomenon into ES literature.

Principle “fitness for use” (J. M. Juran, 1988)

Under a complete different approach, the ESMAP is developed based on a principle “fitness for use”, defined by J. Juran and Godfrey (1999)<sup>12</sup> for product and service quality. The author argues that to effectively use the ERP system with a goal of improving accountant performance, which in turn advance organizational performance, a prerequisite is the quality of the ERP system. There are two reasons for this. First, the quality of ERP system is basically dependent on how that the system will be used. Second, if the quality of the running ERP system is poor, the success will be also poor in most cases (Kronbichler et al., 2010), while ERP success is what the ESMAP aims for. In other words, willingness to adopt ERP system successfully needs to pay attention to the quality of the ERP system. That is a reason why a principle “fitness for use” is applied in this study. In IS literature, this principle is commonly adopted to examine the data and data quality (Laudon, 1986; Neely & Cook, 2008; Redman, 1995; Strong, Lee, & Wang, 1997; Vermeer, 2000; R. Y. Wang & Strong, 1996). In like manner, this study adopts it to clarify system and system-related qualities.

The enterprise system (i.e., ERP systems) and other goods have the distinct differences. First, an enterprise system is created by acquiring or self-designing while organizations can produce products or service by themselves. Second, a product or service is possibly exhausted in its use while the enterprise system is not depleted in its use. The elements such as system-related quality, system-related perceived benefits can be exploited simultaneously by multiple users and still be available for employment within a different context by subsequent users. These characteristics are significant in the “fitness for use” discussion.

The principle “fitness for use” involves developing a short list of inputs that companies, organizations, and individuals can use for determining a product or service's fitness for use. These questions for considerations (J. Juran & Godfrey, 1999; J. M. Juran, 1988) are:

- Who are the users of the product or service? (Who)
- What are the economic resources of both the producer and the user? (What)

- How will the product or service be used? (How)
- What are the users' specific determinants of a product or service's fitness for use? (Economic benefits)
- What is the possibility and/ or probability of endangering humans? (Privacy and security)

This study is not interested in privacy and security aspect of adopting the ERP system so that it applies four of five above queries to explain the appearances and connections of the whole constructs in the ESMAP.

- **Who:** accounting professionals in this study are expected as the most deep and effective users of the ERP system
- **What:** the system-related qualities (including system quality and information quality) and the perceived accounting benefits are the economics resources of both the producer and the user of the enterprise system.
- **How:** Effective use and satisfaction are to answer the question of how the system will be used.
- **Economic benefits:** Accountant performance (benefits at individual level) and organizational performance (benefits at organizational level) are specific determinants of the system's fitness for use.

The author assumes that the ESMAP aims to guarantee ERP system quality in order to enable to maximize ERP's "economic benefits". For this assumption, accounting professionals ("who"), based on system quality, information quality, perceived accounting benefit ("what" available), exploit effectively ERP system ("how" element, which refers to its use and satisfaction – users' feeling when using ERP system) to achieve "economic benefits", including improved accountant performance (ERP's impacts on accounting experts) and enhanced organizational performance, (ERP's impact on organizations) that accountants expect when using the ERP system. Accordingly, system quality, information quality and perceived accounting benefit are antecedents of use and satisfaction while accountant performance and organizational performance are their outcomes.

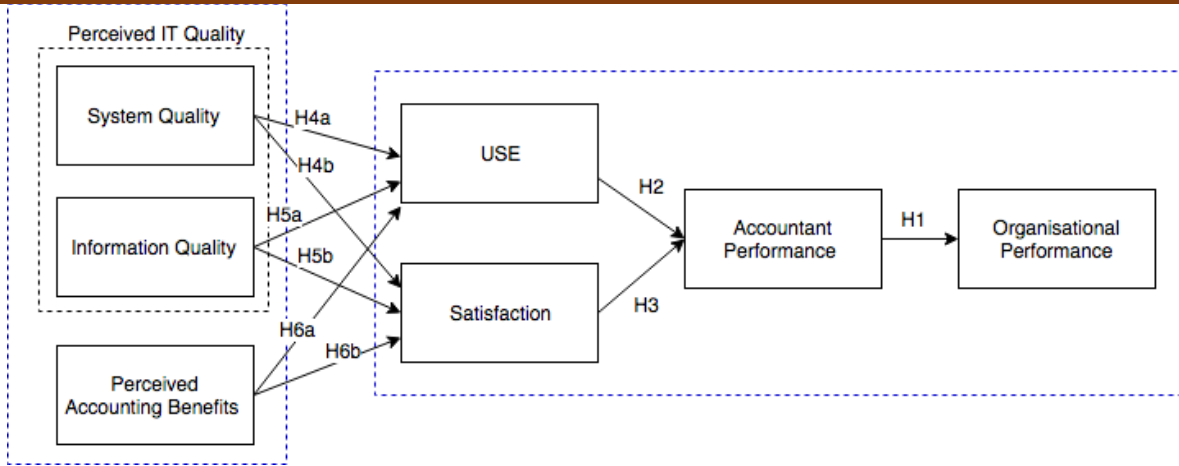
Feasibly, this is the first time that the principle "fitness for use" is applied to explain D&M IS success model's path relationships. However, the author strongly believes that it supports to increase exploratory power of the D&M IS success model in general and the ESMAP in particular.

### 3. Methodology

This study makes use of positivism paradigm<sup>7</sup> and quantitative research method, as it is appropriate for validating a new theories-based-formed ESMAP against empirical data. This study is divided into two phases: (1) forming the ESMAP, and (2) validating the ESMAP. To start with, it reviews related literature and finds suitable foundational theories to propose the ESMAP with its 9 hypotheses and its constructs-conceptualization. Then, the empirical survey data is obtained from an expected sample of 300 organizations<sup>8</sup> in Vietnam adopting the ERP system for at least one year. The ESMAP's constructs operationalization and their validation are subsequently conducted via SPSS 24.0 and AMOS 20.0 software packages. Finally, the theoretical model and hypotheses of the ESMAP are tested using PLS-SEM analysis technique with the support of Smart PLS 3.2.7 software.

Research model





ERP success model for accounting professionals. The research model consists of seven main constructs that are categorized into two groups: (1) one group for perceived usefulness from the ERP such as system quality, information quality and perceived accounting benefit; (2) the others for ERP’s impacts on organizational-level users (use, satisfaction, accountant performance) and on organizations (organizational performance). By taking into account both the characteristics of the implemented ERP systems and characteristics of accounting experts, the current framework examines how two perceived IT quality constructs (system quality and information quality) as well as perceived accounting benefit construct, independently and through their interaction, affect use and satisfaction, accountant performance. In addition, this model also posits that use and satisfaction will influence accountant performance, which leads to organizational performance

**4. Results**

Principal axis factoring with oblique rotation such as Promax (Hendrickson & White, 1964), reflects the underlying data structure more precisely than PCA (J. C. Anderson & Gerbing, 1988). Hence, this study chooses them with minimum eigenvalue of 1 as conditions for factor extraction.

Table 1 Summary of The Factor Analysis Appropriateness Criteria

	Require ment (Hair et al., 2006)	Research constructs										Require ment
		SQ	IQ	PAB	USE	SAT	AP	OP	ExU	ITU		
Barlett’s test (sig.)	p value = 0	0	0	0	0	0	0	0	0	0	0	Y
KMO	> 0.50	0.829	0.874	0.932	0.904	0.807	0.84	0.90	0.77	0.77	Y	

First order factor	Indicator	Loading <sup>a</sup>	Composite Reliability <sup>b</sup>	AVE <sup>c</sup>	First order factor	Indicator	Loading <sup>a</sup>	Composite Reliability <sup>b</sup>	AVE <sup>c</sup>
SQ_task	SQ5	0.908	0.894	0.739	USE_work	USE5	0.905	0.930	0.769
	SQ6	0.892				USE6	0.810		
	SQ8	0.773				USE8	0.918		
		USE11	0.869						
SQ_system	SQ2	0.863	0.898	0.746	USE_decision	USE1	0.785	0.900	0.692
	SQ1	0.880				USE3	0.851		
	SQ7	0.847				USE4	0.875		
IQ	IQ1	0.748	0.928	0.682	SAT	USE7	0.813	0.955	0.892
	IQ2	0.792				SAT1	0.945		
	IQ3	0.857				SAT2	0.951		
	IQ4	0.902			SAT3	0.922			
	IQ5	0.810			SAT4	0.959			
	IQ6	0.838							
PAB_oganzational	PAB11	0.838	0.935	0.646	AP	AP1	0.896	0.940	0.797
	PAB12	0.891				AP2	0.887		
	PAB13	0.867				AP3	0.917		
	PAB14	0.781				AP4	0.870		
	PAB15	0.830			OP	OP1	0.770	0.935	0.642
	PAB16	0.799				OP2	0.846		
	PAB17	0.762				OP3	0.794		
	PAB18	0.637				OP4	0.747		
PAB_operational	PAB6	0.951	0.949	0.842	OP5	0.817			
	PAB7	0.956			OP6	0.818			
	PAB8	0.950			OP7	0.834			
	PAB9	0.929			OP8	0.777			
	PAB10	0.857							

Table 2. Internal consistency, indicator reliability and convergent validity analyses of the first-order measurement model

Table 3 Discriminant validity

	AP	IQ	OP	PAB_oganzationl	PAB_operational	SAT	SQ_task	SQ_s system	USE_work	USE_d ecision
AP	<b>0.893</b>									
IQ	0.493	<b>0.826</b>								
OP	0.632	0.477	<b>0.801</b>							
PAB_oganzational	0.607	0.695	0.663	<b>0.804</b>						
PAB_operational	0.539	0.634	0.465	0.734	<b>0.929</b>					
SAT	0.684	0.679	0.657	0.761	0.627	<b>0.944</b>				
SQ_task	0.414	0.741	0.476	0.642	0.541	0.726	<b>0.86</b>			
SQ_system	0.369	0.577	0.308	0.495	0.507	0.483	0.519	<b>0.864</b>		
USE_work	0.467	0.395	0.387	0.558	0.424	0.501	0.333	0.37	<b>0.877</b>	
USE_decision	0.556	0.521	0.492	0.695	0.53	0.558	0.379	0.408	0.636	<b>0.832</b>

Table 4. Direct relationships for hypothesis testing

H:	Relationship	Std Beta	Std Error	[t - value]^	Decision	f <sup>2</sup>	q <sup>2</sup>	95% CI LL	95% CI UL
H1:	AP -> OP	0.638	0.065	9.658***	<b>Supported</b>			0.523	0.735
H2:	USE -> AP	0.253	0.073	3.453***	<b>Supported</b>	0.08350305	0.04967949	0.133	0.373
H3:	SAT -> AP	0.535	0.071	7.598***	<b>Supported</b>	0.38492872	0.22115385	0.415	0.647
H4a:	SQ -> USE	0.01	0.12	0.107	No	0	0	-0.191	0.206
H4b:	SQ -> SAT	0.28	0.085	3.322***	<b>Supported</b>	0.08310249	0.05285412	0.142	0.418
H5a:	IQ -> USE	0.054	0.115	0.425	No	0.00180832	0	-0.131	0.242
H5b:	IQ -> SAT	0.128	0.104	1.218	No	0.01385042	0.00634249	-0.05	0.295
H6a:	PAB -> USE	0.622	0.11	5.695***	<b>Supported</b>	0.31283906	0.12417437	0.436	0.794
H6b:	PAB -> SAT	0.473	0.102	4.624***	<b>Supported</b>	0.27146814	0.17124736	0.309	0.646

As Vietnam does not have a primary database about all ERP adopting firms in Vietnam, it is much more difficult for the author to assess whether the collected organizations reflect the sampling frame. Vietnamese E-commerce Indicator Report in 2018 of Vietnamese E-commerce Association indicates that the number of large-size enterprises adopting ERP system in Vietnam is to three times medium-and-small firms. This rate is calculated for the total of 4147 surveyed organizations in Vietnam in 2018. For the population, it can be concluded that the majority of ERP adopting organizations in Vietnam have large size. Based on this evaluation, the sample of this study, in which the numbers of ERP-adopting-large-sized firms are significantly massive, to 5 times small-and-medium-sized-firms, is reasonable.

### 5. Conclusion

Today, in the world of constant changes such as globalization, popularization of witnessing, which in turn is creating the revolutions of the social customers, especially, impacts of industry 4.0, either positive or negative, business environment is increasingly fierce competitive than ever. To exist and develop in this growing uncertainty marketplace, business organizations need to more use technology solutions to maximize their resource and creates products that satisfy fastest requirements of customers. For almost enterprises, ERP, until at present, is still one of the most trustworthy management tools. In terms of its importance in firms, studies of



ERP have been paid a great deal of attention from both practical participants and academic research communities. Nevertheless, several research gaps have been noted in the existing literature (see Section 1.3 and Section 2.3) that limit researcher's understanding of success of ERP system.

For example, only a few studies have attempted to consider ERP success model at organizational level (Chien & Tsaur, 2007; DeLone & McLean, 1992, 2003; G. Gable et al., 2003; G. Gable & Sedera, 2008; Ifinedo, 2006; H.-Y. Lin et al., 2006; Rosemann & Wiese, 1999; Smyth, 2001; Stefanou, 2001). However, of these studies, or some have only provide conceptual frameworks that have not been empirically tested or some develops ERP success model instrument only instead of building up ERP success model with casual paths (see Table 2.5). Furthermore, the most important thing is that there exists the serious lack of studies of how to make accountant professionals successfully adopts the ERP system at organizational level while their role in creating organizational value is indisputable (J. E. Hunton, 2002). Therefore, this study aims to address these gaps by focusing on developing the ERP success model for accounting professionals (ESMAP) only. In doing so, it needs to answer two main research questions of (1) how the ESMAP is formed in order to improve accountant performance, which in turn enhance organizational performance, and (2) how the ESMAP is validated.

Both of two motivations for the research mentioned above suggest a demand for developing a model measuring ERP success from accountants' perspective with a goal of making organization increasingly efficient. Therefore, the objective of this research is to examine how an ERP success model for accounting professionals (ESMAP) can be designed in an effort in order to improve their organizational performance. More specific, while issues of ERP (Aloini, Dulmin, & Mininno, 2007, 2012; Bernroider & Koch, 2001; Cegielski, Jones-Farmer, Wu, & Hazen, 2012; Dey, Clegg, & Cheffi, 2013; Grabski et al., 2011; Haddara, 2014; Hakim & Hakim, 2010; Hedman & Borell, 2004; Kanellou & Spathis, 2011), its impacts at individual level (Amoako-Gyampah & Salam, 2004; Bueno & Salmeron, 2008; Buonanno et al., 2005; Chou, Chang, Lin, & Chou, 2014; Costa, Ferreira, Bento, & Aparicio, 2016; Hsu, Yen, & Chung, 2015; Kositanurit, Ngwenyama, & Osei-Bryson, 2006), accounting practices and functions in ERP environment (Aryani, 2014; Daoud & Triki, 2013; G. Sutton, 2006; Kihn & Lepistö, 2011) have received growing attention from researchers, little is known about how ERP success model for accounting professionals can be designed to support managers to better manage as well as helping accountants to better conduct their work in the ERP context in order to achieve the goal of improvement on organizational performance, which is the focus of this thesis. In short, the primary objective of this research is to develop and test ERP success model for accounting professionals at organizational level.

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