THE EFFECTS OF SOFTWARE FIT AND USER ADAPTATION ON THE SUCCESS OF ACCOUNTING PACKAGED SOFTWARE IMPLEMENTATION

by MEcon. BÙI QUANG HÙNG*

1. Introduction

One of central features of accounting in today's business world is the association of accounting with the computerized-base information system (IS). Many firms have changed their IS strategies by adopting application software packages such as accounting packaged software (APS) rather than in-house development because of reduced cost, standardization, rapid implementation and high system quality. Similarly, for many Vietnamese enterprises, which most of them are small and medium ones, APS is often one of the sound alternatives to apply information technology to their accounting activities.

However, implementing APS is not an easy job or like purchase of some favorite software from market. Reportedly, two thirds of the business packaged software implementation projects were judged to be unsuccessful (Griffith et al, 1999). The root of failure might be the differences in interests between customer organizations that desire business solutions and packaged software with a generic solution applicable to a broad market. Thus, packaged software implementation would be the mutual adaptation between packaged software and business characteristics and requirements for the success. This adaptation process depends on the certain fit level of software, the adaptations from both software and adopting firm. Firm adaptation to APS can be considered in terms of changes in the business characteristics and management process, and responses from its personnel to the software features regarding to the acceptance or resistance to new technology in their work.

In this research, we would examine the impact of APS fit and response of users as well as the interaction among them on the successful APS implementation and then, offer some suggestions about application of APS to business. The paper is based on an empirical study in HCMC.

2. Literature reviews

a. The success of business packaged software implementation:

Regarding success of business packaged software implementations, most of previous researches referred to Enterprise Resource Planning software (ERP) implementation such as in E. Ngai (2008), and Z. Zhang (2005), etc. Markus (2000) pointed out that people often mean different things when talking about the ERP success. People whose job was to implement ERP systems project often defined success in terms of completing the project plan on time and within budget. However, those whose job was to adopt ERP system and use them in achieving business results tended to emphasize improvements such as inventory reduction and gaining improved decision-making capabilities.

We could also consider business packaged software implementations as information system (IS) implementation process. In this perspective, information was considered as the output of IS and could be measured at different levels including technical level, semantic level and effective level. Based on this approach, Manson (1978) and Delone and Lean (2001) had defined and developed measuring categories and levels used for assessing IS success in terms of system, quality, information quality, user satisfaction, and impact on individuals and organizations.

b. Business fit of packaged software:

* University of Economics-HCMC

There were some definitions regarding the fit of a system or software to business or organization. Markus and Robey (1983) defined the organizational fit of ERP as the congruence between the original artifact of ERP and its organizational context of use. Soh et al. (2000) suggested that ERP misfit stems from the firm specific requirements that do not match the capabilities of ERP and examined organizational fit of ERP in terms of data, process and output. Weil and Olson (1989) categorized the contingency variables of IS fit into strategy, structure, size, environment, technology, task and individual characteristics. Henderson and Venkatraman (1993) emphasized the multivariate fit among business strategy, IT strategy, organizational infrastructure and process.

Many researches showed the positive impacts and importance of the level of fit, match of software to the successful implementation. Lamonica (1998) in the survey conducted by Forrester Research clarified that about 80% of different firms pursued different policies in its application software implementation project to have the certain level to fit their business and only 17% of firms did not give any policies and care about the fit. In the survey of small business, Marius and Ashok (1996) hypothesized that packaged software implementation success was positively associated with the degree of vendor fit for user organization and the degree of software fit for user organization respectively. Goodhue and Thompson (1995) reported that IT must be fully utilized and match with task characteristic to enhance individual performance. Chang (2003) concluded that the fit between task characteristics and specifications of accounting information systems (AIS) could really enhance the performance of AIS.

c. User adaptation in packaged software implementation:

The implementation of packaged software would make some changes in adopting firm and its personnel. Normally, change management is essential for preparing a company for the introduction of a system and its successful implementation, especially in people issues such as user acceptance or resistances to new systems. In AIS implementation, Romney (2008) identified major resistances that would affect negatively on the implementation in one of three forms: aggression, projection and avoidance.

Many ERP implementation failures had been caused by the lack of focus on the "soft issues" of change process such as business process and people adaptation (Kelly et al. 1999; Summer, 1999). Pawlowski and Boudreau (1999) pointed out that almost half of ERP projects fail to achieve expected benefits because the managers underestimate the efforts involved in change management. Bancroft et al. (1998) and Gupta (2000) pointed out that the resistance to change is one of the main hurdles faced by the most companies. Martin and Ching (1999) suggested that to decrease resistance to change, people must be engaged in the change process and helped to see how the change profits them.

d. Linking APS implementation with ERP implementation:

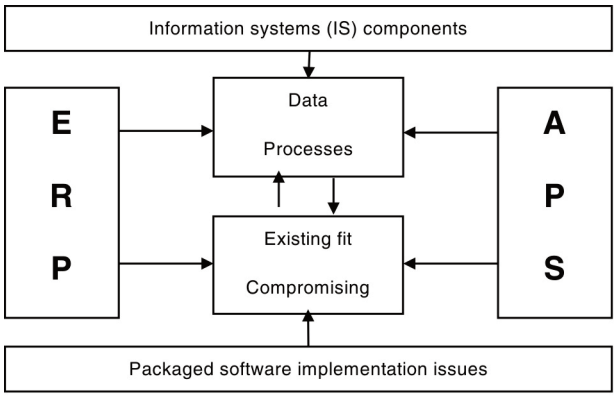

Figure 1: Common features between ERP and APS

From previous studies, we could see that there were a few researches on APS implementation. Most of them focus on ERP, which is the highest level of APS. However, regardless to the difference in size characteristics, both of them are information processing systems with three important components such as system data, system processes (including control and feedback processes) and system outputs (Romney, 2008). In addition, as the package software, both ERP and APS must bring one typical characteristic in implementation of this kind of software. That is the existing gap between what the software provides and what the adopters need in using EPR and APS because software package is functioned not only for one user but also for many users with standardized operations. Both EPR and APS implementation processes should be the compromising processes between software vendors and adopters. This compromise process is influenced by many factors:

the existing fit of software to business needs, the adaptable ability of software, business process and the human factor (See Figure 1).

3. Research hypotheses

The previous researches showed the important role of software fit and user adaptation in packaged software implementation success. These are our hypotheses:

(1) There is a positive relationship between the APS fit and its implementation success.

(2) There is a positive relationship between the user adaptation and APS implementation success. The higher the user acceptance, the better the chance of implementation success.

In addition, APS fit is considered as the objective factor that has existed before the APS implementation; while user adaptation is a subjective factor that could be controlled. The expectation here is that the interaction between the objective and subjective factors may affect the implementation success level. Here is our hypothesis for this interaction:

(3) There is an interaction effect between the user adaptation and the APS fit on APS implementation success.

4. Research methodology

a. Measurement of model variables:

- APS implementation success

In this study, we used the project approach to measure APS implementation success in terms of the deviation from the expected project goals such as cost overrun, schedule overrun, system performance deficit and failure to achieve the expected benefits (Table 1).

Table 1: Measured items in APS implementation success

Measured factor	Items	Objective	Method
APS implementation success (SUC)	Cost (SUC1)	Compared to expected cost	Reverse seven-point Likert scale
	Time (SUC2)	Compared to scheduled time	
	System performance (SUC3)	Compared to expected level	
	Benefit (SUC4)	General evaluation of benefit to the company	

- APS fit

The previous studies defined business fit of packaged software as the congruence between "ideal profile" of packaged software and existing business or organizational contexts. In addition, as mentioned in Figure 1, APS implementation was basically characterized by the integration of data, processes and outputs within the organizations. Thus, our definition of APS fit was the match or congruence of APS to the adopting company in terms of data, processes and outputs between them (Table 2).

- User adaptation

Table 2: Measured items for APS fit

Measured factor	Items	Objective	Method
APS fit (FIT)	Data (FIT11,12,13,14)	The level of correspondence in meaning, format, input, output	Seven-point Likert scale
	Process (FIT21,22,23,24)	The correspondence of design and sequence to present and business need	
	Output (FIT31,32,33)	The correspondence of structure to work, user capability, business needs	

The user adaptation to APS implementation could be seen as the acceptance or resistance from user to the new system. We used Romney's approach (Romney, 2008) to identify and measure user adaptation reversely in forms of user resistance i.e. aggression, projection and avoidance. The higher user resistance could be understood as the lower user adaptation (Table 3).

Table 3: Measured items for user resistance

Measured factor	Items	Objective	Method
User adaptation	Aggression (UAD1, 2)	The degree of intention to destroy and weaken project	Seven-point Likert scale
(UAD)	Projection (UAD3)	The degree of intention to blame the project	
	Avoidance (UAD4,5)	The degree of intention to use the traditional practices or resistance to change	

b. Sample and data collection:

The target of this study was the APS adopting companies that have implemented APS in HCMC. We used the key informant method for colleting information on a social setting by interviewing or email surveying a selected number of participants through a questionnaire. The companies were selected randomly from this list of customers from software vendors or from other sources that make sure that these kinds of companies are using the APS. Thus, the sample size of survey was not specified in advance. We tried to contact as much companies as possible. But, for the significance of sample and statistical analysis, we set the minimum size of sample at 30 firms. Finally, the survey has attracted 68 respondents; most of answers were collected through direct interviews, the rest via email. The limitations might appear in this method of data collection and research sample. First, it was very difficult to identify key persons in adopting companies. The respondent was usually assigned by the company and as a result, the information provided might be subjective. Second, it was not easy to secure the approval from the selected companies and the interviewed persons, so the size of surveyed sample is not as large as expected.

5. Results and discussion

a. Instrument reliability and validity:

The reliability and validity results of constructs measurement were summarized in the Table 4. We could see that the internal consistency (Cronbach's alpha) of construct was above the common applied standard of 0.70, suggesting reasonable item convergence. The correlation of each item with item-to-total score was greater than the common applied score (0.4); the factor loading column could also show items for each variables loaded onto single factors with loadings of greater than 0.5. Therefore, the convergent and discriminant validity of this study instrument is reasonable.

Table 4: Reliability and validity analysis

	Correlation of item with total score-item	Factor loadings	Cronbach's alpha
FIT of Packaged software (FIT)			0.8665
FIT11	0.6163	0.803	
FIT12	0.5195	0.763	
FIT13	0.4509	0.658	
FIT14	0.5931	0.805	
FIT21	0.656	0.831	
FIT22	0.6001	0.78	
FIT23	0.6668	0.822	
FIT24	0.5805	0.758	
FIT31	0.632	0.845	
FIT32	0.571	0.803	
FIT33	0.6272	0.842	
User adaptation (UAD)			0.9587
UAD1	0.8945	0.933	
UAD 2	0.8881	0.930	
UAD 3	0.8739	0.920	
UAD 4	0.8688	0.917	
UAD 5	0.8970	0.935	
APS implementation success (SUC)			0.7864
SUC1	0.645	0.820	
SUC2	0.6468	0.818	
SUC3	0.5345	0.732	
SUC4	0.5638	0.756	

b. Results of tests of hypotheses:

(1) The relationship between APS fit and APS implementation success

The results extracted from SPSS in tables 5 and 6 indicated that the positive relationship between APS fit and APS implementation success was significant. Independently, the more APS fit is, the more chances of APS implementation success we have. (The negative sign "-" in tables 5 and 6 means that SUC variable was measured in reverse scale).

Table 5: Correlations between FIT and SUC

		SUC	FIT
Pearson Correlation	SUC	1	>.472*
	FIT	>.472*	1
Sig. (1>tailed)	SUC	.	0
	FIT	0	.

Table 6: Model of relationship between FIT and SUC

	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
(Constant)	5.843		7.866	0
FIT	-0.61	-.472*	-4.355*	0

Dependent Variable: SUC, R^2 = .223, R^2 (adj) = .211

(2) The relationship between user adaptation and APS implementation success

Tables 7 and 8 indicated that the positive relationship between user adaptation and APS implementation success was very strong (correlation 0.98). Nearly 96% of the APS implementation success variances were explained by the user adaptation factor in the model. Independently, the more value of UAD variable would lead to the more SUC variable. It meant that the higher the level of user adaptation, the higher the chances of APS implementation success we could get. (Please note that UAD and SUC variable were both measured in reverse scale).

Table 7: Correlations between UAD and SUC

		SUC	UAD
Pearson Correlation	SUC	1	0.98
	UAD	0.98	1
Sig. (1-tailed)	SUC	.	0
	UAD	0	

Table 8: Models of relationship between UAD and SUC

	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Beta		
(Constant)	0.392		6.249	0
UAD	0.653	0.98	39.565	0

Dependent Variable: SUC, R^2 = .96, R^2 (adj) = .959

(3) The interaction between APS fit and user adaptation on APS implementation success

To measure the interaction between APS fit and user adaptation on APS implementation success, we used the multiple regression models. The results of the multiple regression models from SPSS in table 9 showed that the interaction between APS fit and user adaptation was significant. The standardized multiple regression models could be built as follows:

$$SUC=0.037FIT+1.328UAD-0.360FIR \times UAD \quad (1)$$

Table 9: Model of interaction between FIT and UAD on SUC

	Mean	SD	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
(Constant)			0.218		0.629	0.531
FIT	5.2412	0.8295	4.71E-002	0.037	0.753	0.454
UAD	3.4529	1.6058	0.885	1.328	10.222	0
Interaction	17.4353	7.669	-5.02E-002	-0.36	-3.018	0.004

Dependent Variable: SUC, R^2 = 0.971; Adj R^2 = 0.969; F = 708.287, Sig = 0.000

To obtain the additional insight of the nature and direction of the interaction effects between APS fit and user adaptation, we computed the partial derivative of (1) to one factor and fixed another in model:

The partial derivative of (1) to FIT

$$\frac{\delta SUC}{\delta FIT} = 0.037 - 0.360UAD \quad (2)$$

The partial derivative of (1) to UAD

$$\frac{\delta SUC}{\delta UAD} = 1.328 - 0.360FIT = 0 \quad (3)$$

The equation (2) would be zero when UAD had the value of 0.1027 (0.037/0.36), the original UAD value from standardized multiple regression models will be 3.617 [0.1027 x 1.61 (SDUAD) + 3.45 (MeanUAD)]. If UAD variable were more than 3.617, the relationship between FIT and SUC would be negative, that is, the higher the FIT variable, the lower the SUC variable. It should be noted that SUC variable was measured in reverse scale. Thus the more APS fit we had, the more chances we could succeed in APS implementation.

Conversely, if UAD variable was less than 3.617, the relationship between FIT and SUC was positive. The more APS fit would lead to the more SUC variable or the less chance we could succeed in APS implementation. The result showed that the relationship of APS fit and APS implementation success would change positively or negatively depending on the certain level of user adaptation.

The value 3.617 of UAD was rather higher mean value (3.45). It suggested that if the level of resistance was rather high (above average level), or low user adaptation, we could need the higher APS fit level to have the more chances of implementation success. However, if user resistance were low, or high user adaptation, the low APS fit level would not lead to the low chances of APS implementation success, and the high APS fit could make the low chance of APS implementation success.

Similarly, when value of FIT variable was 3.689 (1.328/0.36), i.e the original FIT value from standardized multiple regression models was 8.3 (3.689 x 0.829(SD) + 5.24), the equation (3) would be zero. Because the value of FIT variable was ranged from 1 to 7, so that equation (3) was always greater than zero with any value of FIT. Thus the relationship between UAD variable and SUC variable would be always positive under any values of FIT. In other words, no matter how the APS fit level was, the user adaptation was always important; and the higher the level of user adaptation, the higher the chances of success we had in APS impelementation and vice versa.

The interaction relationship of APS fit and user adaptation to the APS implementation success could be demonstrated in figures 2 and 3.

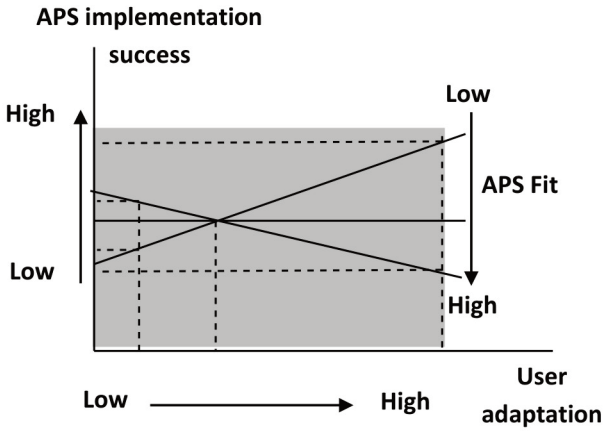

Figure 2: The relationship of APS success and user adaptation at each level of APS fit

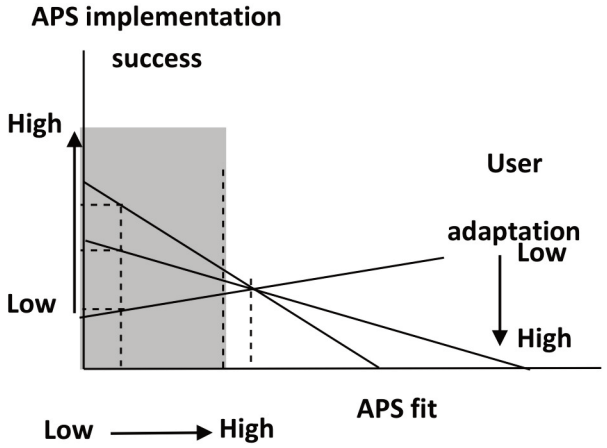

Figure 3: The relationship of APS success and APS fit at each level of user adaptation

6. Conclusions and implications

In the empirical study of 68 APS adopting firms in HCMC, we found that the APS fit and

user adaptation had a significant effect on the APS implementation success. It also found these factors influence each other in the degree of APS implementation success. At any APS fit level, user adaptation always had a positive impact on the APS implementation success. In addition, one interesting result from the study was that the APS fit level should be considered in the interaction with a certain level of user adaptation to have APS implementation success. If the level of user adaptation was low, the higher level of APS fit would make more chances of APS implementation success. In other situations, however, when the level of user adaptation was high, the lower APS fit level could lead to a positive impact on APS implementation success.

For those companies that need to adopt APS, they should not spend much time on selecting the best fit APS to its business without caring of attitudes, perceptions or behaviors of their software users. For the higher chance of APS implementation success, the manager, implementers, vendors and other APS implemented parties should pay attention to role of APS users in APS implementation. Encouragement to user participation is very important. It might promote interaction between users and APS implementation teams through which both parties can learn about each other's expectation, requirements and hence increase user adaptation.

In the APS implementation strategy, the related user analysis should be conducted before deciding to implement and select an APS. With the certain user adaptation level from careful analysis and evaluation, the adopting firms can choose a suitable APS selection strategy. With a low level of user adaptation, it is better to find a best fit APS. However, with a high level of acceptance, the firm does not need to invest in a best fit APS, but look for an unfit APS that could make innovative changes in its business and management possible. This is a time for the firm to align to new IT for further development■

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