

# Factors That Improve the Quality of Information Technology and Knowledge Management System for SME(s) in Thailand

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Information technology and knowledge management play a vital role in increasing corporate performance. The quality of information technology and knowledge management is very important and can cause the business to be failure. This study investigated those factors which help to improve the quality of information technology and knowledge management system. A survey was conducted by a sample of Thailand SME(s) ( $n = 770$ ) from a cross-section of industries. After the questionnaires were analyzed, the authors concluded that the most important factors in improving a business' quality are accuracy and timeliness of information, followed by the availability of information analysis, the usage of information technology in storing day-to-day operations and use it for performance management, the effectiveness of knowledge sharing and management system, the effectiveness of acquiring and using external information and, last but not least, the effectiveness of acquiring and using internal information.

*Keywords:* information technology, knowledge management, internal data, external data, performance management

## Introduction

Information technology can help the firm aiming to gain a competitive advantage and many studies have proven that business values become attainable primarily from intangible assets, such as knowledge (Tseng, 2008). Knowledge is built by the available information within an organization. Currently, knowledge management has become popular and many organizations in Thailand are seriously looking forward to creating a knowledge management system. Information technology is seen as a key tool in the knowledge management creation process (Mercader, Cerdan, & Sanchez, 2006). It plays an important role in determining the success or failure of the implementation of a knowledge management system (Johannessen, Olaisen, & Olsen, 2001). Despite the unexpected number of failures with knowledge management, there is valuable evidence of its positive influence on organizational performance (Mercader et al., 2006). Knowledge management

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performance can affect the efficiency of work processes and performance of management activities (Nicolas & Cerdan, 2011). Every organization has its own way of dealing with data, information and knowledge, and creates its own structures, jobs and systems for that purpose (Nonaka, Toyama, & Konno, 2000). In a knowledge-based society, the ability of a firm to create, sustain, and transfer knowledge has a very great impact on that firm's performance (Du, Ai, & Ren, 2007).

### **Factors That Improve the Quality of Information Technology and Knowledge Management**

Since knowledge management is important and has become a key contribution to business performance; we recognize the need for information technology to sustain and support it. Information technology is a generic term for the convergence of computer, hardware, software, telecommunications, internet, electronics and the resulting technologies (Mercader et al., 2006). The nature of the work performed in small businesses within higher knowledge intensity sectors required higher level of use of information technology as well as larger implementation of practices that improved learning at the organizational level (Mercader et al., 2006). Information technology is usually designed to support organizational learning and knowledge management by enabling memory/database to record strong historical information to be useful as long as the assumption on which they are built do not become obsolete (Robey, Boudreau, & Rose, 2000). Organizational learning can be boosted through investing in information technology as well as encouraging individual learning (Mercader et al., 2006). Advances in information technology have provided tools for creating powerful and user database-backed applications but these tools cannot succeed if they are deployed upon the weak foundation of a poorly designed database (Nelson, Reisinger, & Henry, 2003). Many other factors are important to boost the quality of information technology and knowledge management. Firstly, the easy access to internal and external information is relevant to firm's critical success factors (Walters, Jiang, & Klein, 2003). Secondly, the data integrity and accuracy are essential for a company's success (Flowerday & Solms, 2005). When the small businesses make accurate use of the tools, they will produce a synergetic effect on individual learning and will impact organizational performance (Mercader et al., 2006). Thirdly, quality can be improved by aligning IT strategy with business strategy, using data mining techniques to improve business intelligence and using data warehousing techniques to aid business decision-making can enhance business performance (Gorla, Somers, & Wong, 2010). Most organizations agree that information and communication technology (ICT) and information management (IM) are enablers to knowledge management, supporting the position that IM and ICT are prerequisite to knowledge management (Kruger & Johnson, 2010). Moreover the importance is how ICT applications can support knowledge exchange between organizations (Bolisani & Scarso, 1999). Last but not least, the competence of knowledge management not only depends on the abundance of information, but includes the effectiveness of the user computer interaction (Wang & Ariguzo, 2004).

### **Theory and Hypothesis**

From the literature review and summary written above, the quality of information technology and knowledge management is improved the effectiveness of acquiring and using internal and external information, the accuracy and timeliness of information, the usage of information technology in storing day-to-day operation

and its use for performance management, the availability of tools helping in data and information analysis and the effectiveness of knowledge sharing and management system.

#### **The Effectiveness of Acquiring and Using Internal Information**

This refers to end-to-end, from data scrubbing to data acquisition. The quality of information technology and knowledge management will depend on how organizations scrub, store and use. An effective use of data/information helps organizations to improve quality of information and knowledge management which will ultimately contribute to the corporate performance. The assumption can be made as follows:

Hypothesis 1: The effectiveness of acquiring and using internal information has a positive impact on the quality of information technology and knowledge management.

#### **The Effectiveness of Acquiring and Using External Information**

External information is essential for most of the functions. For example, marketing departments need external information for their competitive analysis and production departments need external information to benchmark production costs to ensure their cost competitiveness. Acquiring external information involves the acquisition costs and therefore most SME(s) do not make it their priority. However external information can fulfill the completeness and capability of knowledge management. The assumption can be made as follows:

Hypothesis 2: The effectiveness of acquiring and using external information has a positive impact on the quality of information technology and knowledge management.

#### **The Accuracy and Timeliness of Information**

Accuracy and timeliness of information is an important determination of information technology and knowledge management system's quality. The assumption can be made as follows:

Hypothesis 3: The accuracy and timeliness of information has a positive impact on the quality of information technology and knowledge management.

#### **The Usage of Information Technology in Storing Day-to-Day Operation and Use it for Performance Management**

Not so many SMEs are implementing a performance management system and use it for business performance monitoring and tracking. However there is tendency of adoption. The assumption can be made as follows:

Hypothesis 4: The usage of information technology in storing day-to-day operation and use it for performance management.

#### **The Availability of Tools Helping in Data and Information Analysis**

SMEs' employees are very busy by nature. Tools helping in analyzing data and information are very crucial. Without helping tools, employees would spend most of their time getting information manually. The assumption can be made as follows:

Hypothesis 5: The availability of tools helping in data and information analysis has a positive impact on the quality of information technology and knowledge management.

#### **The Effectiveness of Knowledge Sharing and Knowledge Management System**

Since Thailand has an unfavorable history of knowledge sharing and transferring, information technology is incisive to implement as a mediation or tool for employees to share and use.

Hypothesis 6: The effectiveness of knowledge sharing and knowledge management system has a positive impact on the quality of information technology and knowledge management.

## Research Design

### Research Framework

On the basis of literature review and hypothesis the theoretical framework can consist of six factors (observed variables) as shown in Figure 1. The quality of information technology and knowledge management improves the effectiveness of acquiring and using internal and external information, the accuracy and timeliness of information, the usage of information technology in storing day-to-day operations and its use for performance management, the availability of information analysis tools and the effectiveness of knowledge sharing and management system are observed variables while the quality of information technology and knowledge management is considered a latent one. This paper attempts to analyze the relationship between observed variables and latent ones through the confirmatory factors analysis (CFA).

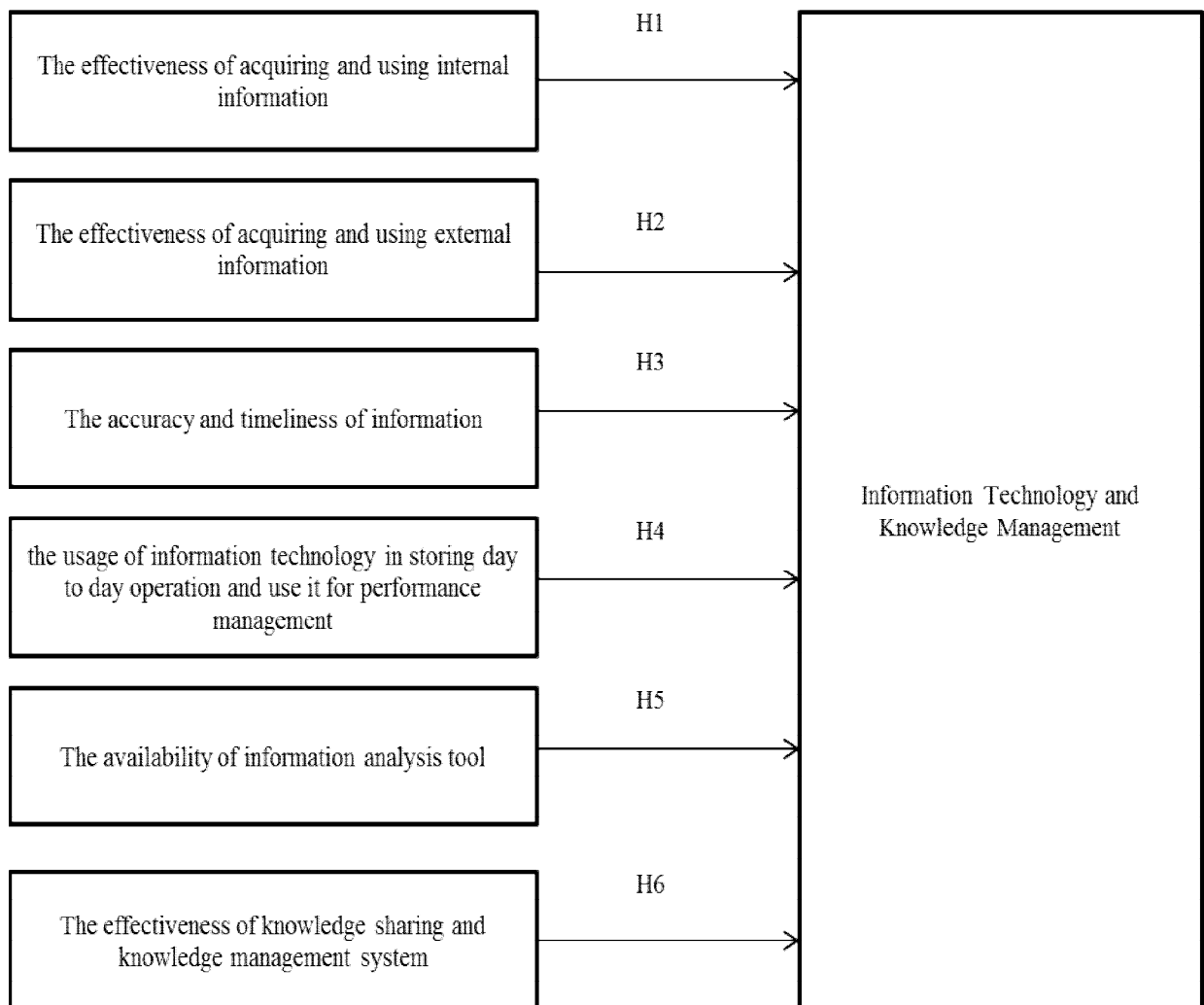


Figure 1. Structural path diagram of theory and hypothesis.

## Research Method

The research will be conducted quantitatively by finding the sample size of SME in Thailand. The definition of SME characterized by the Office of Small and Medium Enterprise Promotion (OSMEP) is in Table 1.

Table 1

### *SME Definitions*

Type of SME	Small enterprise		Medium enterprise		Large enterprise	
	Assets (MB)	Employees (people)	Assets (MB)	Employees (people)	Assets (MB)	Employees (people)
Manufacturing/Service	< 50	< 50	50-200	51-200	> 200	> 200
Trading	Wholesaler	< 25	50-100	26-50	> 100	> 50
	Retailer	< 15	30-60	16-30	> 60	> 30

Note. Source: OSMEP website.

Table 2

### *Numbers and Proportion of Enterprise in Thailand in 2009, the Numbers and Portions of SME Are Identified in Figure*

Type of enterprise	Numbers	Proportion
Small enterprise	2,884,041	99.4
Medium enterprise	12,065	0.4
Large enterprise	4,653	0.2
SME	2,896,106	99.8
Total	2,900,759	100.0

Note. Source: OSMEP.

From the total number of SME shown in Table 2, the researcher uses 5% confidence interval (margin of error) with 95% confidence level, the sample size of 384 respondents is required to be surveyed (creative research system). The formula used in the tool is as follows:

$$\text{Sample Size} = Z^2 * (p) * (1-p) / c^2$$

where:

$Z$  =  $Z$  value (e.g., 1.96 for 95% confidence level);

$P$  = percentage picking a choice, expressed as decimal (0.5 used for sample size needed);

$C$  = confidence interval, expressed as decimal.

However for the structural equation model (SEM) analysis, the sample size calculation is done by using 10 times the numbers of variables/items and therefore the sample size will be as follows:

Sample size = 10 × numbers of variables/items: 10 × 77 = 770 respondents.

Since the result of the above calculation is between 384 and 770 respondents, we choose the higher numbers. Therefore the respondents for this survey will equal to 770. The respondents will be dispersed to cover all types of SME and industry sectors.

## Survey Results

### Respondent Demography

The quantitative analysis is conducted to prove the hypothesis on whether factors and variables derived from

literature review have correlation to corporate performance. Seven hundred and seventy respondents were surveyed. Thirty percent of respondents (231 respondents) were distributed to manufacturing type of SMEs, 31 percent of respondents (239 respondents) were distributed to service type of SMEs and 300 to trading companies.

The revenues of respondents are spread from less than 50 million baht per year to more than 500 million. Forty percent of respondents (308 respondents) have less than 50 million baht of revenues per year while 18.7 percent (144 respondents) earn between 50 and 100 million baht a year. Ten percent of respondents (77 respondents) have revenues between 101 and 200 million baht per year. The last two groups are 12.6 percent (97 respondents) and 18.7 percent (144 respondents) earn 201-500 million baht and more than 500 million baht per year respectively.

The numbers of employees in SME respondents are also spread over the range. Forty four point nine percent (346 respondents) are having less than 50 employees while 20.0 percent (154 respondents) are having between 50-100 employees. Fourteen point three percent (110 respondents) are having between 101 and 200 employees. Twelve point seven percent (98 respondents) are having between 201 and 500 employees while more 8.1 percent (62 respondents) are having more than 500 employees.

The respondents who contributed to the survey are mostly top management however it depends on the judgment of Managing Directors. During the face-to-face survey, Managing Directors assigned the responsibility to the appropriate people. Twenty percent of respondents (144 people) are Managing Directors. However, the remainder of respondents are selected by Managing Director to respond to the survey due to appropriateness.

### **Confirmatory Factors Analysis (CFA)**

This study adopts Confirmatory Factor Analysis (CFA) by using software AMOS 18. In testing the result of AMOS, we chose maximum likelihood (ML) to prove that our model has the said relationship. The output of AMOS is shown in Figure 4.

### **Model Fit Summary**

From the analysis, the author can confirm that the model of quality of information technology and knowledge management is reliable.

- The quality of information technology and knowledge management is from the effectiveness of acquiring and using internal information with regression weight of 0.576, the effectiveness of acquiring and using external information with regression weight of 0.681, the accuracy and timeliness of information with the regression weight of 0.890, the usage of information technology in storing day-to-day operation and its use for performance management with the regression weight of 0.841, the availability of information analysis tools with the regression weight of 0.850 and the effectiveness of knowledge sharing and management system with the regression weight of 0.788 (regression weights are shown in Table 8). The accuracy and timeliness of information has the highest regression weight while the effectiveness of acquiring and using internal information has the lowest regression weight;

- *P*-value (see Table 3) is equal to 0.066 (more than 0.05) which implies that this model is goodness of fit;
- *GFI* = 0.996 (see Table 4), *IFI* = 0.998, *CFI* (see Table 5) = 0.998 (higher than 0.90) which imply that this model is good;
- *RMSEA* = 0.04 (see Table 6) is a good value;
- *CMIN/DF* = 2.205 (see Table 3) is a good value.

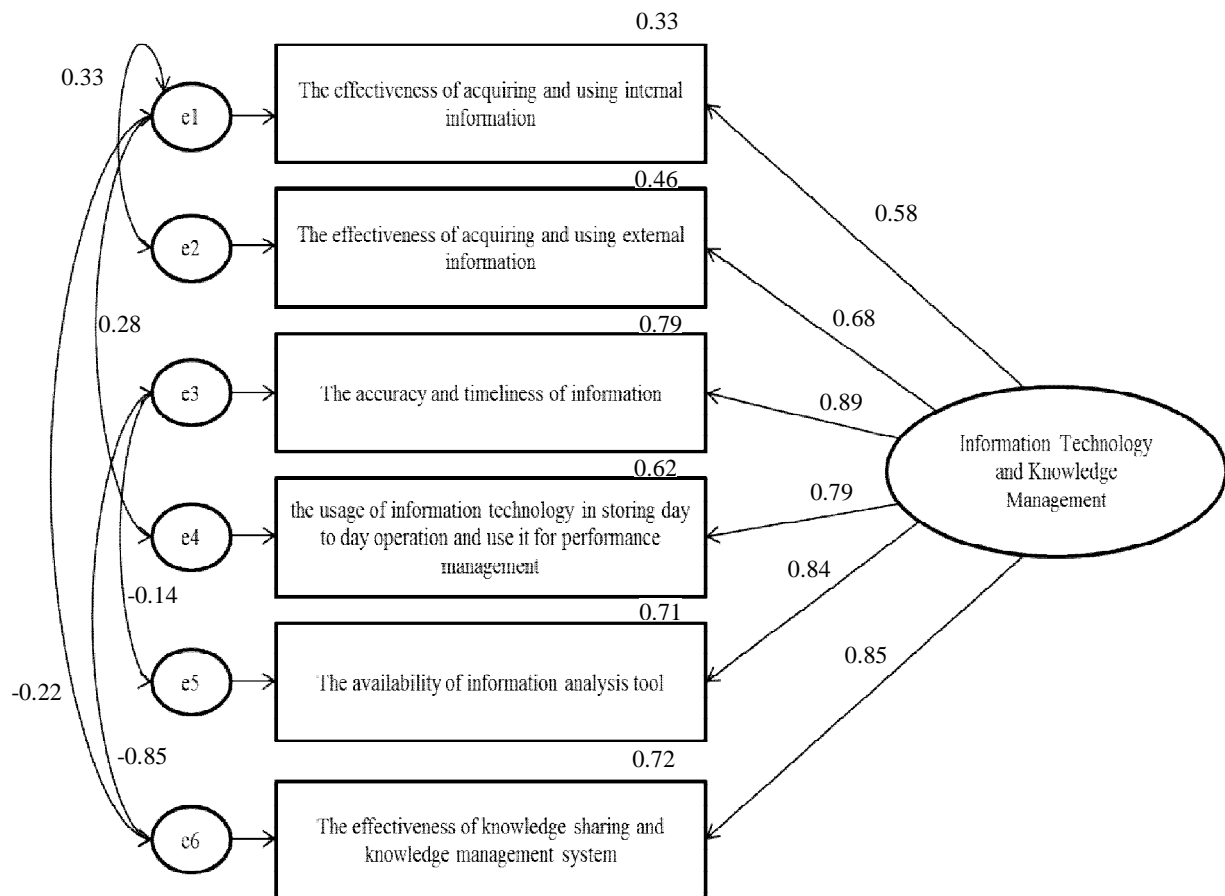


Figure 2. One factor congeneric model. Chi-square = 8.820;  $df = 4$ ;  $p = 0.066$ ; RMSEA = 0.040; GFI = 0.996; IFI = 0.998; CFI = 0.998.

Streamline the goodness of fit index: AIC = 42.820, CAIC = 138.809 (see Table 7), Goodness of fit index has basically reached the accessible range, indicating the high availability of this model. The results can be used to validate the research hypotheses and therefore supporting all hypotheses (H1, H2, H3, H4, H5, H6).

Table 3

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	17	8.820	4	0.066	2.205
Saturated model	21	0.000	0		
Independence model	6	2,709.649	15	0.000	180.643

Table 4

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	0.012	0.996	0.980	0.190
Saturated model	0.000	1.000		
Independence model	0.560	0.362	0.106	0.258

Table 5

*Baseline Comparisons*

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.997	0.988	0.998	0.993	0.998
Saturated model	1.000		1.000		1.000
Independence model	0.000	0.000	0.000	0.000	0.000

Table 6

*RMSEA*

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.040	0.000	0.075	0.632
Independence model	0.483	0.468	0.499	0.000

Table 7

*AIC*

Model	AIC	BCC	BIC	CAIC
Default model	42.820	43.133	121.809	138.809
Saturated model	42.000	42.386	139.574	160.574
Independence model	2,721.649	2,721.759	2,749.527	2,755.527

Table 8

*Standardized Regression Weights*

			Estimate
Internal information	<---	IT_KM	0.576
External information	<---	IT_KM	0.681
Accuracy and timeliness	<---	IT_KM	0.890
Use IT to store data	<---	IT_KM	0.841
Information analysis tool	<---	IT_KM	0.850
Knowledge sharing and KM	<---	IT_KM	0.788

**Conclusion**

The quality of information technology and knowledge management is able to be improved by six observed variables and the model was proved to be fit by conducting confirmatory factor analysis. Below is the interpretation of the results:

(1) The accuracy and timeliness of information is the most important factor for improving the quality of information technology and knowledge management. In order to ensure that the quality of information technology and knowledge management will highly contribute to corporate performance, the data/information used in the analysis and study must be accurate and real time. Thus, the authors can conclude that the accuracy and timeliness of information, likely, benefits employees or management to work more effectively and boost the performance of SME(s);

(2) The availability of information analysis tools is the second most important factor for improving the quality of information technology and knowledge management. The authors can conclude that SME(s) needs to have data/information analysis tools to support their works;



(3) The usage of information technology in storing day-to-day operation, and its use for performance management, is the third important factor. SME(s) must have sufficient database for storing the information and need to use it for their performance management;

(4) The effectiveness of knowledge sharing and management system is in the fourth rank of importance. We can surmise that SME(s) currently see the importance of knowledge sharing and would like to have knowledge management systems in organizations;

(5) The effectiveness of acquiring and using external information is in the fifth rank of importance. SME(s) would like to have external information for their uses;

(6) The least important factor is the effectiveness of acquiring and using internal information.

The model is proved to be favorable and all six factors are important with the goal to improve quality of information technology and knowledge management which will ultimately boost corporate performance.

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