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33. Measuring the Use of Information Technology of Small- and Medium-sized Enterprises

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Abstract
This paper describes the evaluation of the use of information technology, efficiency of the use of computer, and the use of information technology for strategy of small- and medium-sized enterprises (SMEs). A framework, developed from previous research on information technology on organizational strategy, is used to exploring the use of information technology of SMEs. This study is based on survey with some SMEs in Thailand. The strategic variables in the model are then analyzed. The results of this research suggest the measurement of information technology and the efficiency in using information technology for SMEs. Finally, some implications are discussed.

Keywords: Competitive rivalry, Measurement, Information technology, Small- and medium-sized enterprises, Information technology strategy

Introduction

Nowadays, many companies use information technology (IT) as a competitive weapon to gain sustainable competitive advantage in their industry (Fraser and Wresch 2005; Saad and Zawdie 2005). In addition, it is widely accepted that information technology will enhance effectiveness and efficiency of products and services. Moreover, organizations can use IT as strategic business tools. For example, IT has influenced the products and services prices by reducing the prices and producing new products and services. Though Porter (1980) proposed several frameworks in strategic competitive advantage, none of these frameworks have made real progress towards realizing the potential that may exist for using information technology as competitive or strategic business weapons (Mahmood and Soon 1991). Furthermore, there are many research that mention the potential use of information technology as a competitive weapon. These research, however, have not been tested based on relevant theory (Bakos and Treacy 1986; Mahmood and Soon 1991). IT is still underutilized because of: (1) lack of understanding of the impact of IT on the organizations and strategic decisions, and (2) lack of guideline for identifying opportunities for competitive advantage (Porter and Millar 1985; Bakos and Treacy 1986; Mahmood and Soon 1991; Lind et al. 2000; Beheshti 2004). In addition, many research in strategic information technology have been designed primarily for use in a medium to large company. Small- and medium-sized enterprises (SMEs) exhibit distinct characteristics that differentiate them from their large organizations (Hudson et al. 2001; Reid 2004). Therefore, there is need to establish the relevance IT measurement for SMEs.

The purpose of this research is to propose the measurement of the use of information technology, efficiency of the use of computer, and the use of information technology for strategy of SMEs in Thailand. In addition, the result of this study will be used as a guideline in developing the efficiency for information technology of SMEs. The findings will benefit SMEs and educational institutes by helping the SMEs to gain a competitive advantage through measuring the use of information technology. Also, this study provides the

educational institutes and related organizations to arrange and reform the suitable study of information technology to make it suitable for developing information technology in Thailand. Based on the definition accepted by Ministry of Industrial in Thailand, Medium Enterprises are defined as organizations which have overall asset values less than or equal to 200 million baht for manufacturing and service firms, 100 million baht for wholesalers, and 60 million baht for retailers. Small Enterprises, however, are defined as organizations which have overall asset values less than or equal to 50 million baht for manufacturing, service, and wholesale firms, and 30 million baht for retailers. The number of employees also can be used to define the size of SMEs. SMEs have fewer employees than 200 (Lertwongsatien and Wongpinunwatana 2003).

The remainder of this paper proceeds as follows. The first section presents literature review and hypotheses. The second section describes the research method. The third section discusses the results and analysis. The last section provides conclusions, limitations of the research, and implications.

Literature Review and Hypotheses

Mahmood and Soon (1991) proposed a model for measuring the impact of IT on organizational strategic variables. This model derived from framework suggested by McFarlan (1984), Parsons (1983), Cash and Kosynski (1985), and Bakos and Treacy (1986) for the use of IT as competitive weapon. McFarlan (1984) adapted Porter's (1980) model of competitive advantage and proposed five variables: new entrants and entry barrier, competitive rivalry, products and services, switching costs, and suppliers. Meanwhile, Bakos and Treacy (1986) suggested concept of competitive advantage. This model is based on two factors: competitive efficiency and bargaining power. Competitive efficiency allows an organization to produce its goods and services cheaper than its competitors. Bargaining power allows an organization to resolve bargaining situations with its customers and suppliers to its own advantage. Competitive efficiency consists of internal and inter-organizational efficiency while bargaining power is determined by unique product, switching costs, and search costs. Johnston and Vital (1988) also found strategic importance for some of these factors. Parsons proposed that market, products and services, and economics of production may be affected by IT. Cash and Kosynski (1985) suggested that IT can provide entry and exit barrier by encouraging a large investment that may discourage potential new entrants. Based on the previous research, Mahmood and Soon (1991) divided strategic variables into 2 groups: organizational and industrial levels. The organizational-level variables consist of new entrants (Porter and Millar 1985), entry barriers (Rackoff et al. 1985; Vitale 1986), buyers and consumers (Clemons 1986; Rackoff et al. 1985), competitive rivalry (Rackoff et al. 1985), suppliers (Bakos and Treacy 1986; Clemons 1986; Rackoff et al. 1985), search and switching costs (Bakos and Treacy 1986; Rackoff et al. 1985), intra-organizational efficiency (Clemons 1986), and inter-organizational efficiency (Bakos and Treacy 1986; Porter and Millar 1985). The industry level variables include market (Porter and Millar 1985), products and services (Bakos and Treacy 1986; Porter and Millar 1985), and pricing (Beath and Ives 1986).

However, Mahmood and Soon tested their model by collecting data from 31 executives (primarily from Fortune 500 companies) using structured interview. The executives had used information technology for making at least one strategic decision to ensure that they were familiar with impact of information technology on organizational strategic variables. In addition, the sample includes strategic managers from a variety of industries such as manufacturing, telecommunication, financial, banking, food, utility and merchandising. The research results show that only 10 strategic variables impact IT strategy. These variables

include buyers and consumers, competitive rivalry, suppliers, search costs and switching costs, market, products or services, economics of production, internal organizational efficiency, inter-organizational efficiency, and pricing. Though the research failed to show any IT effect on new entrants and entry barriers, these two variables should be tested by future research. The reasons are (1) the tests used in the study by Mahmood and Soon could have failed to detect any significant relationships between the variables involved due to small sample sizes and (2) the variables are too important to be excluded based on an exploratory study. In addition, a large number of researchers and practitioners are interested in the relationships of these variables on the IT strategic organizations.

For SMEs, Hudson et al. (2001) conduct research to verify the appropriate of strategic performance measurement (PM) for SMEs. They proposed PM framework from current strategic theory by conducting semi-structured interview eight SME managers. The research results show that SMEs use differently strategic PM from the framework. Although there was widespread acceptance of the value of strategic PM among the managers of SMEs, none had taken steps to redesign or update their current PM systems. This suggests that there are substantial barriers to strategic PM system development in SMEs. In summary, SMEs should consider the following strategic variables: quality (includes product quality, process quality, defects, scrap, and suppliers), time (includes work in progress, output, lead times, and delivery time), finance (includes inventory, orders/receipts, profit, turnover, costs, cash flow, sales/value added, quotes converted, income, productivity, and expenditure), customer satisfaction (includes user problems, product, usage, service, returns, and complaints), and human resource (includes safety, staff turnover, and personnel). Moreover, performance measurement of competitiveness for SMEs requires not only cost control but also the full commitment to customer responsiveness in products and services (Lind et al. 2000; Levy et al. 2001; Apfel and Smith 2003).

The model in this research is derived from a comprehensive model for measuring the potential effect of IT on strategic variables suggested by Mahmood and Soon (1991). The strategic variables consist of new entrants, entry barriers, competitive rivalry, buyers and consumers, suppliers, market, products or services, pricing, economics and production, search costs and switching costs, internal organizational efficiency and inter-organizational efficiency. Table 1 provides definitions of strategic variables used in this study.

Table 1: The explanation of strategic variables

Strategic variables	Definitions
New entrants	New entrants mean make new businesses by creating derived demand for new products/services.
Entry barriers	Entry barrier is obstacles that a firm may face while trying to enter a market. It also refers to business practices or conditions that make it difficult for new firm to overcome in order to compete in a market.
Competitive rivalry	Competitive rivalry refers to make a first strike against firms' competitors (i.e., offer a product/service that their competitors cannot match or differentiate their products and services from their competitors).

Table 1: (Continued)

Strategic variables	Definitions
Buyers and consumers	Buyers and consumers are a person who buys goods or services. The buyers and consumers include the benefits of information technologies in dealing with customers (i.e., help firms to create billing and collection to customers.).
Suppliers	Suppliers refer to improve the firm's bargaining power with person or company that gives or provides something. While, bargaining power is the ability of a firm to make a sales agreement or contract to exchange goods or services at a favorable price.
Market	Markets are the benefit of information technologies on improving productivity of products/services and develop new and profitable markets (which are places where people go to buy and sell things).
Products and services	Products and services are firms' opportunities for products or services innovation.
Pricing	Pricing is the ability to track the amount of money that someone must pay in order to buy something. It also includes pricing information to the organizations.
Economics and production	Economics and production are costing less time, money, fuel in producing products or services (i.e., reduce the cost of designing new products/services).
Search costs and switching costs	Search costs are the time, effort, and money involved in obtaining and comparing the available brands and features of products from various sellers. While switching costs are the economic penalties and the other expenses associated with finding, evaluating, and replacing a current supplier with a new one. It also refers to make it difficult for customers to change suppliers.
Internal organizational efficiency	Internal organizational efficiency means the ability to work well without making mistakes or wasting time and energy (i.e., reduce inventories or purchasing costs).
Interorganizational efficiency	Interorganizational efficiency refers to coordinate firms' activities regionally, nationally, and globally with customers and suppliers.

This study differs from previous studies on measuring the impact of information technology on strategy in several ways. First, this study collects data from SMEs that have different characteristics from large organizations. The strategic variables for SMEs may differ from large firms. In addition, the previous studies typically used data from 31 executives whereas this study used data from more than 150 organizations. Using more sample sizes may increase the statistical power. Second, this study analyses data by using more complex statistic (factor analysis) for construct validity than previous study. The previous research employs the correlations between total scores and item scores to examine the model. Finally, this study examines both perception and expectation data on IT strategy from SMEs. The model of evaluating the use of IT of SMEs is shown in figure 1.

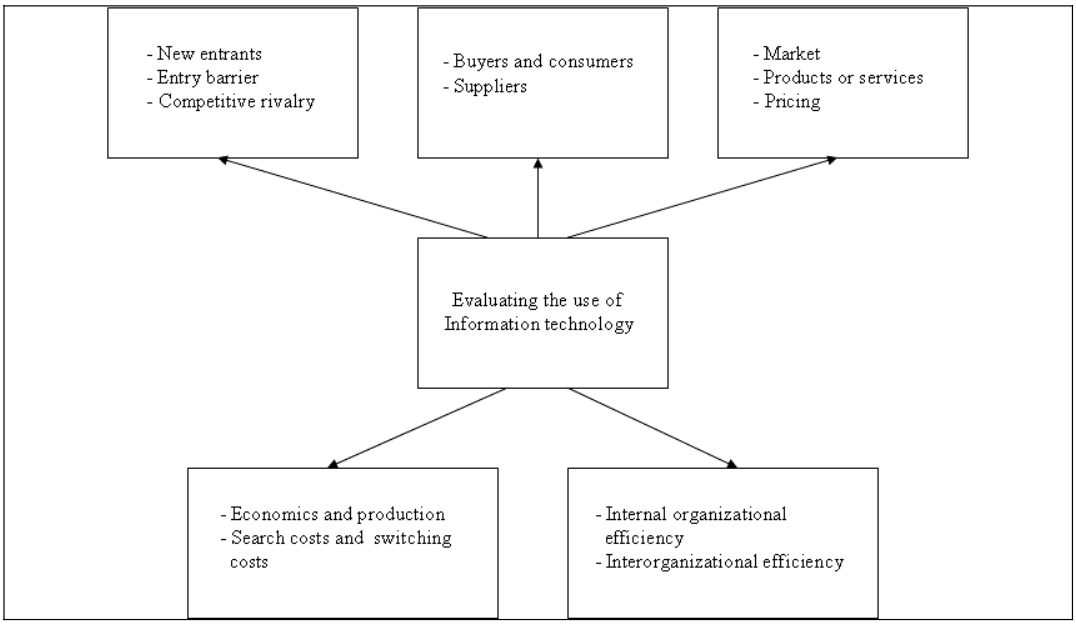

Figure 1: A Model of Evaluating the Use of IT of SMEs

Mahmood and Soon (1991) suggested that the variables used to measure IT strategy included 12 variables as stated above. In addition, numerous researchers such as Vitales (1986), Noh and Fitzsimmons (1999), Apfel and Smith (2003), and Beheshti (2004) found strategic importance of these variables. Therefore the hypothesis will be:

Hypothesis 1: the strategic variables of new entrants, entry barriers, buyer and consumers, competitive rivalry, suppliers, search costs and switching costs, market, products or services, economics of production, internal organizational efficiency, inter-organizational efficiency, and pricing can be used to measure the use of IT of SMEs.

The issue of IT benefits is of growing concern today (Hudson et al. 2001; Saad and Zawdie 2005). The most obvious reason for this is the rocketing level of IT expenditure (Remenyi and Money 1991). Meanwhile, SMEs that want to use IT for their business process need to spend some money on IT implementation, maintenance, and investment (Wongpinunwatana and Achakulwisut 2000). Therefore, SMEs will expect to receive more benefit on using IT for strategy than the real performance. Furthermore, the high expectation of strategic IT is SMEs lack knowledge in using IT for strategy. In addition, SMEs are also cannot afford to hire IT staffs. Therefore the hypothesis will be:

Hypothesis 2: there is different between performance and expectation from the twelve strategic variables: new entrants, entry barriers, buyer and consumers, competitive rivalry, suppliers, search costs and switching costs, market, products or service, economics of production, internal organizational efficiency, inter-organizational efficiency, and pricing.

Research Methods

Description of the Instrument

The instrument is adopted from Mahmood and Soon (1991). This questionnaire is used to evaluate the performance and expectation of the IT strategy. The questionnaire comprises three parts, background information of respondent, background information of enterprise, and the use of IT on strategy. The background information of respondent captured position in the enterprise, decision making in IT, knowledge in IT, and years of work experience with management position. This is followed by background information of enterprise. The background information of enterprise captured type of business, number of employees, revenue, asset, IT department within organizations, IT investment on the total annual budget, and type of information system. The last part of questionnaire captured the expectation and performance of IT strategy, barrier in using IT as strategic tools, and general comments on the questionnaire. The expectation and performance of IT strategy were measured on a 6-point scale ranging from 1= very poor to 6= very good.

Data Collection

The questionnaire was sent to a random sample of entrepreneurs and senior managers in 800 small- and medium-sized enterprises. The enterprises encompassed manufacturing, service, retail, wholesale, information technology, agriculture, import, export, and others. The respondents were asked to indicate the performance and expectation of IT implementation in their organizations for each IT strategic items on the questionnaire. In this research, the first scale is referred to as the performance scale and the second is referred as the expectation scale.

Data for testing the hypotheses were collected through a survey in two major cities in Thailand including Khon Kaen (north-eastern city) and Bangkok (the capital city). The reason for limiting the study to these cities was that SMEs in these main cities normally use and understand information technology much better than SMEs in the small cities. After two data collections, a total of 197 questionnaires were returned and usable, representing a 24.63 percent response rate. Table 2 presents the responses by industry. In all, 71.60 percent of the respondents were entrepreneurs. A total of 72.10 percent of the respondents reported that they had responsibility to make decision on IT. The most common industry of the respondents was manufacturing with 38.07 percent of the respondents. Enterprises in the return sample were relatively small (42.60 percent of the enterprises reported less than 10 employees and the average revenues was 35.24 millions baht).

Table 2: Responses by Industry

Industry	Number of questionnaires	
	Sent	**Received**
Manufacturing	143	75
Service	186	58
Retail	279	34
Wholesale	131	19
Information technology	8	4
Agriculture	9	1
Import	9	1
Export	13	4
Others	22	1
Total	**800**	**197**

In this study, factor analyses were applied to determine and verify the underlying dimensions of IT strategy. A factor analysis was performed on both the expectation and performance data to determine and verify the components of IT strategy.

Results and Analysis

Reliability of Instruments

Reliability of instruments was assessed by computing the internal consistency, Cronbach's alpha coefficient, for each of the dimensions determined from the factor analysis. The reliability coefficients for eight factors of performance data were above 0.8, with one above 0.8 and seven above 0.9, thus indicating acceptable reliability (Nunnally 1967 cited in Lewis and Byrd 2003). For expectation data, all reliability coefficients for seven factors were above 0.9. Therefore, it also indicates acceptable reliability.

Data Analysis

Reduced variables. A varimax-rotated factor analysis was conducted on data from performance and expectation scales to assess the construct validity of the questionnaire. The sample size of 197 was deemed adequate for factor analysis because Cattell (1978 cited in Lewis and Byrd 2003) suggested that three to six times as many respondents as variables indicated desirable lower limit. In this study, the ratio was above three. The result was a solution with eight factors derived from expectation scale and seven factors derived from performance scale, each with eigen values greater than 1.0. Items were dropped from further analysis if their factor loading were less than 0.50 or if they loaded on two factors with loadings greater than 0.50. The underlying factors were determined through the principal component factor analysis of the statistical software package.

For expectation scores, eight factors with eigen values greater than 1 were extracted from the expectation data, accounting for 78.830 percent of the overall variance. Pricing emerged as the factor explaining most of the variance. The remaining factors (new entrants and entry barriers, competitive rivalry, suppliers, inter-organizational efficiency, products or services, search costs and switching costs, and internal organizational efficiency) explain the variance in order. These factor and the attributes loading on them are given in Table 3. The Kaiser-Meyer-Olkin (KMO) measure for these factors was 0.942 with Bartlett's Test of Sphericity of $p < 0.000$. Therefore this procedure is appropriate (Kerlinger 1969 cited in Remenyi and Money 1991).

Table 3: Factor Analysis of Expectation Scores of IT Strategy

Items	Factor loading
Factor 1: Pricing (16.870 percent of variance, α = 0.9529)	
Track market response to samples or premium pricing	.808
Provide a more precise, complete and detailed break down of pricing by product/service components	.765
Provide market demand in order to aid price setting	.736
Change an organization's pricing strategy	.733
Track market response to promotional or introductory pricing	.724
Provide pricing information in an orderly fashion	.699
Notify distributors and customers of a significant price change in a timely manner	.690
Help price setters identify the price of competing products/services	.678
Track market response to discounts	.671
Factor 2: New entrants and entry barriers (10.742 percent of variance, α = 0.9128)	
Help firms penetrate a new industry by focusing on an unique industry niche	.801
Spawn new businesses by creating derived demand for new products/services	.744
Make new businesses technologically feasible	.727
Raise the barrier to delay competitor entry into new products/services through large investments in complex software and hardware	.714
Serve as an entry barrier by providing new service or product features that appeal to customers	.711
Capture distribution channels and thereby increasing the cost and difficulty to enter a new or existing market segment	.664
Factor 3: Competitive Rivalry (10.007 percent of variance, α = 0.9242)	
Help firm match an existing competitor's offering	.785
Help firms improve or reduce distribution costs	.717
Help firms find a better way of doing business	.695
Help firms make a first strike against their competitors (i.e., offer a product/service that their competitors cannot match)	.665
Help firms differentiate their products and services from their competitors	.632

Table 3: (Continued)

Items	Factor loading
Factor 4: Suppliers (9.722 percent of variance, α = 0.9395)	
Help firms locate substitute products/services	.749
Help firms identify alternative sources	.742
Reduce uncertainty in lead time	.701
Enhance firms "make versus buy" decisions	.671
Monitor the quality of products and services received from suppliers	.635
Factor 5: Inter-organizational efficiency (9.038 percent of variance, α = 0.9473)	
Coordinate firms' activities regionally, nationally, and globally	.799
Help firm coordinate closely with their customers and suppliers	.772
Enhance geographical inter-organizational communication pattern	.771
Provide the leverage to expand new business regionally, nationally or globally	.756
Factor 6: Products and Services (8.152percent of variance, α = 0.9172)	
Help firm speed up sale for products/services	.738
Enhance products/services efficiency	.707
Speed up the life cycle of products/services	.704
Contribute to high quality through the use of quality control systems	.594
Factor 7: Search costs and switching costs (8.147percent of variance, α = 0.8891)	
Help firm implement complex and useful software into customer's system	.818
Increase customers' switching costs (make it difficult for customers to change suppliers)	.749
Help firm provide training to customers for using firms' order entry systems	.696
Encourage customers to rely increasingly on firms' electronic support system (for example, order entry terminals, phone bank)	.594
Factor 8: Internal organizational efficiency (6.152percent of variance, α = 0.9252)	
Improve strategic planning	.651
Increase firms' market share	.648
Increase firms' profit margins	.628
Provide better creation of financial statement	.520
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .942 Bartlett's Test of Sphericity: Approx. Chi-Square = 8176.273 df 820 Sig. .000	

For performance scores, seven factors with eigen values greater than 1 were extracted from the performance data, accounting for 76.338 percent of the overall variance. Pricing also emerged as the factor explaining most of the variance. The remaining factors (new entrants and entry barriers, market, economics of production, suppliers, internal organizational efficiency, and buyers and consumers) explain the variance in order. The final 40-item, seven factors, for performance scale is reported in Table 4. The Kaiser-Meyer-Olkin (KMO) measure for these factors was 0.954 with Bartlett's Test of Sphericity of $p < 0.000$. KMO from both expectation and performance scores is quite similar. However, the KMO from performance scores is slightly higher than expectation scores. Therefore this procedure is more appropriate than for the expectation data (Kerlinger 1969 cited in Remenyi and Money 1991). In addition, results from factor analysis partly support hypothesis 1.

From the statistical results, SMEs evaluate the use of information technology by applying some parts of the twelve strategic variables such as pricing, new entrants and entry, suppliers, and internal organizational efficiency. However, some factors of five forces model (industrial rivals, powerful suppliers, powerful customer, threat of potential entrants, and substitutes), which apply to large organizations, can be used as the evaluation of the use of information technology of SMEs.

Table 4: Factor Analysis of Performance Scores of IT Strategy

Items	Factor loading
Factor 1: Pricing (15.078 percent of variance, α = 0.9544)	
Provide a more precise, complete and detailed break down of pricing by product/service components	.759
Track market response to samples or premium pricing	.757
Provide pricing information in an orderly fashion	.732
Change an organization's pricing strategy	.729
Provide market demand in order to aid price setting	.726
Help price setters identify the price of competing products/services	.720
Notify distributors and customers of a significant price change in a timely manner	.707
Factor 2: New entrants and entry barriers (13.498 percent of variance, α = 0.9335)	
Help firms penetrate a new industry by focusing on an unique industry niche	.806
Spawn new businesses by creating derived demand for new products/services	.784
Raise the barrier to delay competitor entry into new products/services through large investments in complex software and hardware	.777
Make new businesses technologically feasible	.763
Serve as an entry barrier by providing new service or product features that appeal to customers	.749
Capture distribution channels and thereby increasing the cost and difficulty to enter a new or existing market segment	.742

Table 4: (Continued)

Items	Factor loading
Factor 3: Market (11.311 percent of variance, α = 0.9403)	
Provide direct access to previously inaccessible markets	.702
Help firms provide price reduction	.671
Generate high demand on electronic-based products/services	.640
Facilitate distribution channels for existing or new market segments	.631
Enhance sales forecast accuracy	.630
Improve competitive efficiency of the firm	.626
Help firms reduce marketing costs	.565
Factor 4: Economics of production (10.146 percent of variance, α = 0.9210)	
Improve the utilization of machinery	.691
Improve productivity of labor through automation	.664
Reduce the cost of tailoring products/services to market segments	.657
Achieve economies of scale in marketing	.616
Maintain or reduce unit cost	.603
Reduce the cost of designing new products/services	.558
Factor 5: Suppliers (10.066 percent of variance, α = 0.9209)	
Help firms identify alternative sources	.737
Enhance firm "make versus buy" decisions	.730
Help firms locate substitute products/services	.725
Reduce uncertainty in lead time	.672
Monitor the quality of products and services received from suppliers	.647
Factor 6: Internal organizational efficiency (8.373 percent of variance, α = 0.9075)	
Speed up delivery times	.721
Reduce inventories	.694
Reduce purchasing costs	.620
Provide better creation of financial statement	.562
Provide better evaluations on annual budget reporting	.561
Factor 7: Buyers and consumers (7.866 percent of variance, α = 0.9079)	
Make the products/services database available to customers	.769
Reduce customer's telecommunication costs	.752
Help the company deal with powerful buyers by providing resources to develop buyer information systems	.678
Help the company learn more about its customers	.611
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .954 Bartlett's Test of Sphericity: Approx. Chi-Square = 7641.97 df 780 Sig. .000	

Difference between groups. To test the differences of the twelve strategic variables between expectation and performance data, Paired-Sample T Test was employed. Results from statistic analysis supported hypothesis 2 with p-value =0.000 for all variables. Detailed analysis of the mean of performance and expectation data suggested that organizations had more expectation than performance of the use of IT in strategy for all strategic variables. Therefore, SMEs do not use IT in efficiency. Hypothesis 2 is supported. Table 5 shows the result of Paired-Sample T Test.

Table 5: Statistical Analysis Result

Variables	T-value	df	Sig (2-tailed)*	Mean	
				Expec-Tation	Perfor-mance
New entrants	-16.071	196	0.000	3.95	2.91
Entry Barriers	-15.812	196	0.000	3.80	2.72
Buyers and consumers	-15.835	196	0.000	4.07	3.12
Competitive rivalry	-18.017	196	0.000	4.13	3.01
Suppliers	-17.573	196	0.000	4.00	2.89
Search costs and switching costs	-16.339	196	0.000	3.83	2.81
Market	-19.499	196	0.000	4.15	2.98
Products or services	-20.230	196	0.000	4.01	2.97
Economics of production	-19.627	196	0.000	4.11	3.02
Internal organizational efficiency	-15.029	196	0.000	4.21	3.22
Inter-organizational efficiency	-18.738	196	0.000	3.85	2.86
Pricing	-18.147	196	0.000	4.10	2.96

Conclusions

Results from statistical analysis reveal factors that can be used to evaluate the use of IT of SMEs in Thailand. Overall, the results partly and strongly support hypothesis 1 and 2 respectively. In addition, the results suggest that seven factors (pricing, new entrants and entry barriers, market, economics of production, suppliers, internal organizational efficiency, buyers and consumers) are measurement of the use of IT of SMEs. The results are consistent with prior studied of performance measurement of strategic IT (for example, Mahmood and Soon 1991; McFarlan 1984). However, contrary to Mahmood and Soon, this study shows that new entrants and entry barriers variables affect the measurement of strategic IT. Moreover, the study suggests that there is difference between expectation and performance data. The expectation scales have higher mean than performance scales. Therefore, SMEs still need to improve their efficiency in using information technology.

Limitations

This research has five limitations. First, although the sample size in this research is minimally adequate, other researchers might take exception to the research small sample size. Second, the survey data for this research were collected exclusively from SMEs in only Khon Kaen and Bangkok, in Thailand. They may not be representative of SMEs in other provinces throughout Thailand. Third, due to the nature of the hypotheses formulating in this study, they do not allow testing on the effect of the independent variables. Therefore, the ability to determine the predicting power of independent variables for use of IT in strategy is limited. Fourth, the variables included in the research model are not intended to be comprehensiveness. The model include key theoretical factors potentially affecting SMEs on

strategic IT. Therefore, the finding should be viewed with caution. The other important factors may exclude from the model. Finally, this study used single respondent to evaluate various constructs. The use of single respondents helped in obtaining the necessary response rate. However, the results would have been more rigorous if multiple respondents had been used to measure the research constructs (Lertwongsatien and Wongpinunwatana 2003). However, the measurement developed in this study provides a starting point for further investigation of the evaluation of the use of IT of SMEs.

Implications

This study has implications for both research and practice. For research, this study can be used as a guideline for future research in strategic performance measurement of IT in SMEs. Future studies may expand the measurement by incorporating various variables to cover a more comprehensive model. In addition, further study may apply a more sophisticated technique in testing the relationships in this research model by using confirmatory factor analysis. Also, Mahmood and Soon (1991) suggested investigating the relation between IT investment and organizational strategic performance. The researchers can utilize the measurement verified in this study to explore the relationship between these two variables.

For practitioners, the measurement provides a set of strategic IT variables. These variables may be used to initially assess the overall potential impact of IT on SMEs. This would allow entrepreneurs to determine whether IT can be used for competitive advantage. The results of this study reveal that the use of IT of SMEs in strategy is still in the initial stage. SMEs need to pay more attention in using IT in strategic aspects. Since the SMEs are a key organization driving businesses in a current competitive environment, the government has to educate entrepreneurs in strategic business especially in using IT for strategy. In addition, educational institutions also have to prepare their students to have more knowledge on impact of IT on strategy.

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