Knowledge Management Strategyfor SMEs

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***Abstract*—In Thailand, as in other developing countries, the focus was on the large industry first, since governments assumed that large enterprises could generate more employment. However, there has been a realization that the SMEs are the biggest group in the country and are significantly important to the process of social and economic development. This realization has prompted Thailand to institute mechanisms to support and protect SMEs consist of manufacturing, merchandising (wholesale & retail) and service businesses. Unfortunately, most of these SMEs lack capability in operational areas such as technology, management, marketing, and finance when compared to large enterprises. In order to adapt and survive SMEs need full and proper support from the government. To aid in their adaptation and survival, SMEs and government must develop their knowledge management framework to effectively harness their past and present experiences, and anticipate the future evolution of their commercial environment. In most countries, SMEs are the biggest source of export even in normal circumstances. Consequently, the state and SMEs have to focus and work hard to their ensure survival.**

Keywords—Knowledge Management; Small and Medium Enterprice; SME;

I. INTRODUCTION

While knowledge management is recognized as management of the 21st century, there are many problems if people launch programs of knowledge management without due consideration to factors which facilitate or hinder the knowledge management process. Therefore, understanding the factors affecting success and failure of knowledge management processes is an important key to help managers identify and understand what is required to make knowledge management work. Once the factors are understood, they can develop related context that influences the effectiveness of their knowledge management processes [1].The knowledge diagnostic remains one of the least understood aspects of knowledge management, that is, how central a role knowledge assets, or lack thereof, play in people's capabilities to deliver quality work, or in the enterprise's ability to pursue and achieve strategic goals. Competent knowledge diagnostics rely on an integrated understanding of how competent intellectual work contributed, and how the myriad of knowledge management solution alternatives that are available can help conduct effective and systematic knowledge management [2].

Management scholars and writers, including Nonaka and Takeuchi, Drucker, Leonard-Barton, Senge, Quinn, and more recently, Davenport and Prusak made an impact in the 1990s through influential books with different points of view. Organizations are confused about where and how to start, even if they acknowledge that knowledge management could make a difference to their performance. There is a need for models, frameworks, or methodologies that can both help us to understand the sorts of knowledge management initiatives or investments that are possible and to identify types of knowledge management that make sense in each context.

Even though the utilization of knowledge has become a key factor for the success of organizations, management has found it difficult to transform their firm through programs of knowledge management. Many models and theoretical frameworks from various perspectives try to explain knowledge management, but empirical proof of knowledge related hypotheses are scarce; also there is a lack of coherence between different concepts of knowledge management. For practicing managers, there is a major gap between knowledge management theory and practice. It is therefore essential to gain a clear and comprehensive understanding of how knowledge works within the organization [3]. Research is needed to build a comprehensive model of the context of knowledge management strategy and more so how it applies to SMEs in the developing world. This research will examine knowledge management processes used by SMEs in Thailand and by doing so it will contribute towards the difficult problem of using knowledge management processes within a given context [4].

II. LITERATURE REVIEW

A. Knowledge Management View

There are many models which have been developed and published where knowledge management is concerned. However they tend to focus on large enterprises, while this research focuses on small and medium enterprises. Some of the terminology and theories will be borrowed from these models throughout this research. One such concept, developed by Nonaka, is 'ba'. Even though throughout the research this concept may not be specifically referred to, its theme will show up.

B. Knowledge Management Success Stories

Probably one of the most well know documented cases of knowledge management successes can be found in the works of the prominent Japanese author, Ikujiro Nonaka. In his book titled "The knowledge-creating company: how Japanese companies create the dynamics of innovation", Nonaka documents the knowledge management strategies of major Japanese companies in the automobile and electronics industries. Companies such as Honda, Canon, NEC and Nissan are analyzed to investigate the relationship between their knowledge management strategy and their success [5].

Other examples of documented successful cases can be found in the book "Leading with knowledge: Knowledge Management Practices in Global Infotech Companies" by Madanmohan Rao, where prominent companies such as Novell, Oracle and IBM are studied for links between their knowledge management strategies and their successes [6].

C. Small and Medium Enterprice (SMEs) in Thailand

Small and medium enterprises in Thailand are defined according to a regulation passed by the Ministry of Industry in September 2002. The Ministry defines SME by business sector and, within each sector, by the number of employees or value of fixed assets (excluding land). The four business sectors are as follows:

TABLE I. CLASSIFICATION OF SMES IN THAILAND [7]

Type	Small		Medium	
	No. of Employees	Fixed Assets (THB million)	No. of Employees	Fixed Assets (THB million)
Manufacturing	Not more than 50	Not more than 50	51-200	51 - 200
Services	Not more than 50	Not more than 50	51-200	51 - 200
Wholesale	Not more than 25	Not more than 50	26-50	51 - 100
Retail	Not more than 15	Not more than 30	16-30	31 - 60

Ministry of Industry, 2002

Manufacturing enterprises defined in terms of permanent assets and include the value of the land are classified into:

- Small Enterprises – fixed assets not more than 50 million Bath and number of employees not more than 50
- Medium Enterprises – fixed assets above 50 & up to 200 million Bath and number of employees above 50 & up to 200

Service enterprises defined in terms of permanent assets and include the value of the land are classified into:

- Small Enterprises – fixed assets not more than 50 million Bath and number of employees not more than 50
- Medium Enterprises – fixed assets above 50 & up to 200 million Bath and number of employees above 50 & up to 200

Wholesale enterprises defined in terms of permanent assets and include the value of the land are classified into:

- Small Enterprises – fixed assets not more than 50 million Bath and number of employees not more than 25
- Medium Enterprises – fixed assets above 51 & up to 100 million Bath and number of employees above 25 & up to 50

Retail enterprises defined in terms of permanent assets and include the value of the land are classified into:

- Small Enterprises – fixed assets not more than 30 million Bath and number of employees not more than 15
- Medium Enterprises – fixed assets above 30 & up to 60 million Bath and number of employees above 15 & up to 30

In various countries, either classified as developed or developing ones, the definition and the importance of SMEs are similar. However, the intention in looking for new approaches in order to make SMEs a genuine source of national revenue might be different.

III. RESEARCH METHODOLOGY

This research covers the methodology employed in this study. It includes a description of the sample, sample size and the population, the scope of the study, the data collection methods, tools used and methods of statistical analysis to investigate the research hypothesis presented in chapter one.

A. Population and Sample

The population of the study consisted of Small and medium enterprises (SMEs) which manufacture automobilecomponents in Bangkok, Thailand. The companies which register their company names with the Department of Industrial Works, Ministry of Industrial, Thailand, were considered. The number of registered companies manufacturing automobile components in the entire country is 1,724. According to the Department, the number of companies which manufacture automobile components of SMEs in Bangkok is 430.

The sample was selected based on the willingness of companies to participate in the study. A preliminary meeting was held with the respective Chambers of Commerce in Bangkok to establish willingness and whether companies met the criteria for the study. Based on these meetings, 20 companies were selected from Bangkok.

The sample size of 20 may seem small when compared with a true population size of > 6,000 and 430, however many of the companies which comprise the whole population were not classified as SMEs (either micro or large enterprises) and hence were not suitable for this study. The sample size of 20 from Bangkok was deemed appropriate when this fact was taken into consideration.

B. Construction of the Questionnaire

The questionnaire had seven parts; each part consists of groups of questions as follows:

Part 1Demographic data of the interviewee
Part2 Characteristics of company
Part 3Strategy, management style and IT investment
Part 4 Knowledge management process of the company
Part 5 Customer factors considered by thecompany
Part 6Attitude of the company towards government
Part 7 Private and international organization's support

C. Data Collection

The owners or chief executives of the enterprises were interviewed and the questionnaires were filled during the

interview process. The data were collected between the months of April – July, 2008 in Bangkok.

D. Data Analysis

The data were analysed in three stages which are listed

As; Preliminary and summary analysis, Framework analysis, and Correlation analysis.

IV. Research Objectivge

Considering the need for research, the objectives for the proposed research are identified as:

To identify a relationship, if any, between theknowledge management processes of these companies and their sales performance.

V. Hypothesis of the Study

This research intended to test the hypothesis - sales performance of SMEs is related to the knowledge management process adopted by SMEs. Statistically this hypothesis was stated as:

H0 = Sales performance of SMEs is not related to the knowledge management strategy adopted by SMEs.

H1 = Sales performance of SMEs is related to the knowledge management strategy adopted by.

To test this hypothesis two variables were identified. The first variable (V1) was the sales performance of the SMEs in the sample while the second variable (V2) was a measure of the knowledge management strategy used by the SMEs in the sample, based on the parameters investigated by questionnaire which were combined using a model presented in this research.

VI. Knowledge Management Framework

Often SMEs overlook simple solutions which would increase their productivity and competitive advantage. SMEs fail to devote enough attention to technologies and tools such as groupware, data mining, semantic networks, knowledge maps and content management systems which provide the technological foundation for a knowledge management process. Many times it's the case that these tools and technologies may be freely or cheaply available, but because the interest is not there within SMEs these tools are not used [8]. In the book Knowledge Integration it is suggested that SMEs need to work smarter and should spend some effort educating professionals in the use of tools which may potentially tap their knowledge reserves [9]. But in order to use knowledge management software tools the requisite information technology (IT) infrastructure must be in place. Having good IT infrastructure upon which knowledge management software tools can be deployed as well as having company policies which are conducive for knowledge creation and sharing combined with other relevant factors yields a good knowledge management process for SMEs. The diagram in figure 1 summarizes this point and is used as the framework for analyzing the knowledge management strategies of the sample.

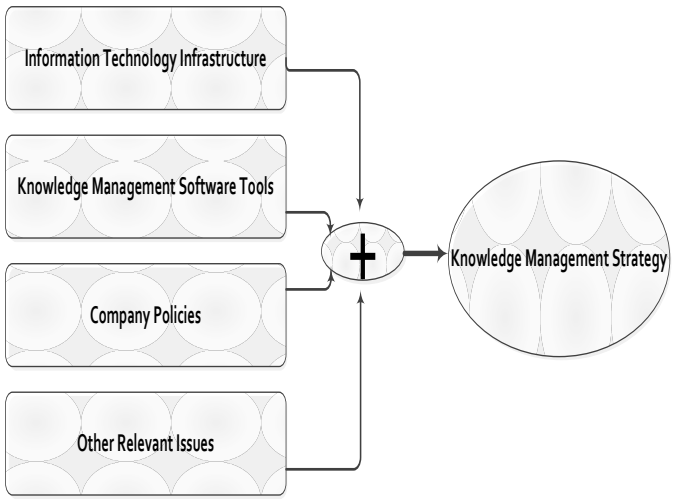

Fig.1. Knowledge Management Framework for SMEs

The model consists of four components which when effectively combined produces a solid knowledge management strategy for SMEs. Below is an explanation of each component:

A. Information technology infrastructure

This component primarily focuses on the computerhardware, software, storage, and networking setup of the organization. It is the foundation for the knowledge management software tools component of the model. Issues such as operating systems, network speeds and data storage capacity is addressed by this component. It is absolutely essential that the companies' IT infrastructure meets the requirements for running and supporting the knowledge management software tools.

B. Knowledge management software tools

This component comprises of a variety of software and tools; some of which are described in the following list:

- Groupware (collaborative software) - is software designed to help people involved in a common task achieve their goals. Groupware may include software that ranges from simple messaging, emailing and conferencing software to full project management tools [10].
- Data mining software – is software which analyzes data to determine whether useful patterns exist which may be exploited by a company to gain a competitive advantage. There are many open packages, such as the WEKA tool kit or Rapid Information Miner, which may be utilized by a company with little effort or training [11].
- Semantic networks- is a network which represents semantic (refers to meaning) relations between the concepts (and idea) [12].
- Knowledge maps- A knowledge map portrays a perspective of the players, sources, flows, constraints and sinks of knowledge within an organization. It is a

navigation aid to both explicit (codified) information and tacit knowledge, showing the importance and the relationships between knowledge stores and the dynamics. The final 'map' can take multiple forms, from a pictorial display to yellow pages directory, to linked topic or concept map, inventory lists or a matrix of assets against key business processes.[13]

- Content management systems- is concerned with content, documents, details and records related to the organizational processes of acompany. The purpose is to manage the organization's unstructured information content, with all its diversity of format and location [14].

C. Company policies

This component refers to what mechanisms, culture andrules the company has which affects the creation, distribution and management of knowledge.

D. Other relevant issues

This component is a bit dynamic since it can include factors like expert consultation, customer related activities,government support, relevant laws and assistance schemes, private and international organizations support, global market trends and a host of other issues. It is up to the SMEs to be cognizant of their working environment and capitalize on opportunities which may sporadically arise.

VII. Assessment of the Knowledge Management Strategy of the Sample

The sample seemed to demonstrate the superior IT infrastructure. All the companies had at least one IT professional on staff. However, it was found that the sample was neglectful in areas such training and investment in training.

In the sample 90% of the companies used specialized software which supports component two of the analysis framework. However, coupled with the fact that there was little IT training or investment in IT training suggests that only the IT professionals have knowledge of the use of the specialized software and time is not taken to teach other employees. There may be several reasons for this, such as trust issues, however this type of approach is not conducive to a healthy knowledge management strategy.

On the issue of company policies, the sample demonstrated they have the policies in place to support a strong knowledge management process. The sample under utilized private and international organizations services as well as government services. This is a trend that should be remedied once cost is not prohibitive. The companies need to invest time in investigating what services are available which could lead to a competitive advantage.

On the issue of advertising the companies recognized the need for a strong advertising program and this contributes positively to their knowledge management strategy.

All in all the companies have demonstrated a slightly above average knowledge management strategy. However they need to explore the possibility of using government and private and international organizations support as well as look into training other staff in IT technology.

VIII. Analysis of The Knowledge Management strategy of the Sample Against Sales

In this part the model and the results were used to perform correlation analysis between the knowledge management strategy of the SMEs and their previous year's sales performance. This analysis investigated the statistical stated hypothesis:

H0 = Sales performance of SMEs is not related to the knowledge management strategy adopted by SMEs.

H1 = Sales performance of SMEs is related to the knowledge management strategy adopted by.

To analyze whether the knowledge management strategy is indeed a factor which can stimulate an SME's sales performance the following steps were taken:

1) The attributes which comprised each component of the analysis framework and produced an overall objective component score. Each component score was tested against the previous year's sales performance for correlation. The analysis was performed on the sample as a collective for thoroughness.

2) Lastly and most importantly an objective assessment of the knowledge management strategy of each company in the sample were obtained, by combining each of the four components of the framework, and tested for correlation with their sales performance. This analysis was also performed on the sample as a collective for thoroughness.

Even though correlation does not imply causation [15], using well established works, presented in the literature review of this research, which show good knowledge management strategies create a competitive advantage which translates into profits, it would be reasonable to conclude that at least part of the SME's success is as a result of its knowledge management strategy. If it is shown that the sales performance of the sample was not significantly correlated to its knowledge management strategy, then the question that would be answered by this study is why, in this case, the results differ from theoretical and empirical results from the established literature on knowledge management.

B. Framework Components and Sales Performance Correlation Analysis

TABLE II. Framework Components Correlation with Sales Performance the Sample

No	Parameters	Thailand	
		rho	Sig(2-tailed)
1	Information technology infrastructure	0.403	0.078
2	Knowledge management software tools	-0.304	0.193
3	Company policies	0.378	0.100
4	Other relevant factors	0.124	0.604

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.01 level (2-tailed)

Table II.Shows that none of the Framework Components had a 2-tailed level of significance less than or equal to 0.05 when tested for correlation with sales performance. This observation indicated that none of the components were

significantly correlated with the sales performance of the sample.

C. Knowledge Management strategy Estimate and Sales Performance Correlation Analysis

TABLE III. KNOWLEDGE MANAGEMENT STRATEGY ESTIMATE CORRELATION WITH SALES PERFORMANCE THE SAMPLE

No	Parameters	Thailand	
		rho	Sig(2-tailed)
1	Knowledge management process estimate	0.411	0.072

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.01 level (2-tailed)

Table III.Shows that the knowledge management strategiesestimate did not have a 2-tailed level of significance less than or equal to 0.05 when tested for correlation with sales performance. This observation indicated that the knowledge management strategy estimate was not significantly correlated with the sales performance of the sample.

IX. CONCLUSIONS, EXPLANATIONS AND IDEAS

This provides explanations, conclusions and ideas for the significant results obtained and the significant results following:

1) The individual attributes which had a 2-tailed level of significance less than or equal to 0.05 when correlated with the sales performance of the respective samples.

2) The framework components correlation analysis with the sales performance of the respective samples.

3) Most importantly, the knowledge management strategy estimate correlation analysis with the sales performance of the respective samples. Validation of the hypothesis occurs in this section.

B. Explanation of the significantly correlated individual attributes

TABLE IV. SIGNIFICANT CORRELATION WITH SALES PERFORMANCE FROM THE SAMPLE

Parameters	Spearman rank correlation coefficient	Sig.(2-tailed)
Investment in IT Infrastructure.	0.628	0.003
Your knowledge management process gives advantages to your company.	0.487	0.030
An application of your knowledge management process helps your management	0.487	0.030

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.01 level (2-tailed)

Table IV. Shows that there were three attributes which demonstrated noteworthy 2-tailed levels of significance. Based on the 2-tailed significance of Spearman rank correlation coefficient (rho) between the investment in IT infrastructure and sales performance for Thai companies it has been established that there is a positive relationship between the two variables. This same relationship was dealt with for the combined sample and the inferences and thoughts expressed while analyzing that phenomenon are equally applicable here.

The responses to the statements "your knowledge management strategy gives advantages to your company" and "an application of your knowledge management strategy helps your management" were identical and will be analyzed together. Based on the 2-tailed level of significance of the Spearman rank correlation coefficient between these statements and sales performance it has been established that there is a positive relationship between each statement and the sales performance. From this observation the inference can be made that these two aspects of the Thai sample's perception of their knowledge management strategy were reflected in their sales performance. However, all other perceptions were not reflected in their sales performance. This phenomenon indicates that there may be some facets of their perception of the knowledge management strategy which contributes positively to their sales.

C. Framework components analysis with sales performance

TABLE V. FRAMEWORK COMPONENTS CORRELATION WITH SALES PERFORMANCE FROM THE SAMPLE

Parameters	Spearman rank correlation coefficient	Sig.(2-tailed)
Information technology infrastructure	0.403	0.078
Knowledge management software tools	-0.304	0.193
Company policies	0.378	0.100
Other relevant factors	0.124	0.604

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.01 level (2-tailed)

Table V. Shows that none of the Framework Components had a 2-tailed level of significance less than or equal to 0.05 when tested for correlation with sales performance. Based on this observation it can be concluded that none of the framework components were correlated to sales performance of the sample.

D. Knowledge management process estimate analysis with sales performance

TABLE VI. KNOWLEDGE MANAGEMENT PROCESS ESTIMATE CORRELATION WITH SALES PERFORMANCE

Parameters	Thailand	
	rho	Sig(2-tailed)
Knowledge management strategy estimate correlation with sale performance	0.411	0.072

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.01 level (2-tailed)

As seen from table VI. Above, the observed 2 tailed level of significance when the knowledge management strategy estimate was analyzed with the sales performance of the sample, using the Spearman rank correlation coefficient (rho) was 0.072. This observation provides statistical evidence to accept H0. Which meant variable 1 (V1 – sales performance) and variable 2 (V2 – knowledge management strategy estimate) were not related. Hence H0 which states sales performance of SMEs is not related to the knowledge management strategy adopted by SMEs in Thailand was validated. Therefore the null hypothesis has been statistically tested and validated.

E. Insights for results

This research has in this instance statistically validated the hypothesis – H0: sales performance of SMEs is not related to the knowledge management strategy adopted by SMEs in

developing countries. There are two factors among others which standout as an explanation for the results.

The first and most influential factor is the SMEs' understanding of the knowledge management strategy. Knowledge management and its potential benefits are still in its infancy stages in developing countries. Due to this immaturity there is significant naivety in the understanding and implementation of knowledge management strategies in the context of SMEs. The samples' perception of their knowledge management strategies was adequate, but their perceptions were not reflected in their sales performance. This mismatch is attributed to the fact that their understanding and thus the implementation of the knowledge management strategy was flawed. From this conclusion the recommendations of this research are abundantly applicable.

The second factor which most likely had an effect on the results of the study was the state of the economy at the time of conducting the study. There was a boom in the auto components industry. The economic climate created a condition where manufacturers could sell their products and services without having to invest in the machinations which produce a competitive advantage. This type of climate obscured the weaknesses in the SMEs' management and knowledge management strategy and thus created the perception that the knowledge management strategy was functioning effectively.

REFERENCES

[1] Gold, Andrew H., Malhotra, Arvind and Segars, Albert H. "Knowledge Management: An Organizational Capabilities Perspective," Journal of Management Information Systems, 18.1 (2001), pp. 185-214.

[2] Wiig, Karl M, "The knowledge," Inside Knowledge 6.2 (25 September. 2002),available online at www<http://www.ikmagazine.com/xq/asp/ sid. 0/articled.FD0C4391-F53F-4F27-8B45-CE89C7EEC7D/eTitle.The_knowledge_Karl_Wiig/qx/display.htm>.

[3] Reinhardt, Rudiger, "Knowledge Management: Linking Theory to Practice. In: Knowledge Management: Classic and Contemporary Works," Daryl Morey, Mark Maybury and Bhavani Thuraisingham, India: Universities Press, 2001, pp. 187-221.

[4] K Choochote. " An Analysis of Knowledge Management Process for SMEs in Developing Countries: A Case Study of SMEs in India and Thailand." International Journal of Information and Education Technology (2012): 239-242. Print.

[5] Nonaka, Ikujiro, "The Knowledge-Creating Company (Harvard Business Review Classics)," Boston: Harvard Business School Press, December 2008, pp. 23-56.

[6] Rao, Madanmohan, "Leading with knowledge: Knowledge Management Practices in Global Infotech Companies," New Delhi: Tata McGraw-Hill Publishing Company, 2003, pp. 339-532.

[7] Ministry of Industry Thailand, Office of Small and Medium Enterprise Promotion. Definition of SME in Thailand. OSMEP., 2002. available onlineat www.http://cms.sme.go.th/cms/c/portal/layout?p_l_id=47.105

[8] K Choochote and R Nurse. "A Simple Knowledge Management Strategy Model for SMEs in Developing Countries." World Academy of Science, Engineering and Technology. International Journal of Medical and Biological Engineering, April 11-13, Venice: Italy, 2012. 189-192. Print.

[9] Wijnhoven, "Knowledge integration [electronic resource]: the practice of knowledge management in small and medium enterprises," Springer, 2006, pp. 2.

[10] Rao, Madanmohan, " Knowledge Management Tools and Techniques: Practitioners and Experts Evaluate KM Solutions," New Delhi: Elsevier Inc., 2006, pp. 9-12.

[11] Witten, Ian H., and Frank, Eibe, " Data Mining: Practical Machine earning Tools and Techniques, Second Edition," San Francisco: Morgan Kaufmann, 2005, pp. 4-9.

[12] Deliyanni, Amaryllis., and Kowalski, Robert A, "Logic and Semantic Networks: Communications of the ACM, Artificial Intelligence/ Language Processing," March, 1979, pp. 184-192.

[13] Subrt, T., and Brozova, H, "Knowledge Maps and Mathematical Modelling." The Electronic Journal of Knowledge Management," Vol.5 Issue 4, pp. 497 - 504, available online at www.ejkm.com.

[14] Bluebill, ADV, "The Classification & Evaluation of Content Management Systems," The Gilbane Report 11.2 (March, 2003), pp. 2-5.

[15] Myers, Jerome L., and Well, Arnold D, " Research Design and Statistical Analysis," 2nd ed. Mahwah, New Jersey: Lawrence Erlbaum, 2003, p. 508.