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The Impact of Strategy for Building Sustainability on Performance of Software Development Business in Thailand

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Abstract: In the present business environments, balancing between the needs of a business enterprise and its stakeholders is recognized as a critical strategy for the success and long-term survival of any firm. However, the understanding of sustainable strategy on firm performance remains a key challenge for both academia and management alike. The purpose of this study is to examine the effect of strategy for building sustainability on performance. Data are collected from 122 managers of software development companies in Thailand. Results show that strategy for building sustainability positively affected Capability Maturity Model Integration (CMMI) level, financial performance, corporate image, and stakeholder satisfaction. Furthermore, results also show that the strategy for building sustainability had indirect effects on corporate image through the CMMI level and the stakeholder satisfaction had direct effects on financial performance.

Key words: CMMI, corporate image, financial performance, software development companies, stakeholder satisfaction, strategy for building sustainability, Thailand

INTRODUCTION

The serious environmental problems in the world today, including global warming, greenhouse gas emissions, massive flood, or biodiversity loss contribute to increasing awareness of the balance between ecosystem protection and continued use of natural capital. This leads to a business paradigm shift from traditional approaches to sustainability management. Underlying sustainability paradigm, business goals were inseparable from the societies and environments within which they operate. Whilst short-term economic gain could be chased, a failure to account for social and environmental impacts would make those business practices unsustainable (Wikipedia, 2010).

Currently, several strategies are proposed to building sustainability of companies. These strategies are attempted to create long-term consumer and employee value by not only creating a "green" strategy aimed towards the natural environment, but also taking into consideration every dimension of how a business operates in the social, cultural, and economic environment (Wikipedia, 2010). Sustainable strategic management theorists such as Epstein and Roy (2001) Stead and Stead (1995, 2008) have suggested that stakeholder relationship management is an important element for formulating and implementing sustainability strategy. From this perspective, developing a companies' business plan should concern expectations of shareholders, customers, employees, or other stakeholders that are affected by the decisions a company takes or have a strong view on its conduct. In Thai business context, Talerngsri (2010) defined strategy for building sustainability as the strategy that oriented to organizational identity development, strong leadership, long-term strategic plan, operational plan, and human development. This definition highlights the process of sustainability vision and mission communication to multiple stakeholders, setting long-term goals, improving the customer's satisfaction and employee's potential. Talerngsri (2010) beliefs that Thai companies are more likely to be sustainability if they effectively implementing these process. However, yet, no studies has examined the relationship between Talerngsri's (2010) strategy for building sustainability and firm performance, especially in Thai company context. This limits our understanding of how strategy for building sustainability affects firm performance.

For evaluating sustainability practices, Isaksson and Garvare (2003) have proposed three dimensions for measuring organizational performance. These include economy, environment, and ethics dimensions. Financial performance is an important indicator of economy dimension. Whereas corporate image is an important indicator of environment and ethics dimensions. In addition, Epstein and Roy (2001) and Berrone *et al*. (2007) suggested that the stakeholder satisfaction is the most important indicator for measuring sustainability of the company. The past studies consistently reveal that strategy for building sustainability positively related to financial performance (Goodman, 2000; Weber *et al*., 2005; Chang and Kuo, 2008), corporate image

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(Bieker, 2005), and stakeholder satisfaction (Berrone *et al*., 2007). Hence, the purpose of this paper is to explore the impact of strategy for building sustainability base on Talerngsri's (2010) framework on performance base on financial performance, corporate image, and stakeholder satisfaction. In addition, because this study investigated in the sample of software development companies. Thus, we also test the effect of strategy for building sustainability on the certification of CMMI level. Because the CMMI assessment processes is an important tool for building sustainability and the certification of CMMI level is treated an indicator of sustainability of Thai software development company.

LITERATURE REVIEW

Definition of strategy for building sustainability: The strategy for building sustainability in this study consistent with the sustainable development strategies that World Commission on Environment and Development (WCED, 1987) defined as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This definition is most cited in several literatures (de Graaf *et al*., 1996; Epstein and Roy, 2001; Steurer *et al*., 2005). For the business enterprise, sustainable development strategies means adopting business strategies and activities that meet the needs of enterprise and its stakeholder today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future (IISD *et al*., 1992). By definition, it recognizes that economic must meet the needs of a business enterprise and its stakeholders. The stakeholders may include shareholders, lenders, customers, employees, suppliers and communities who are affected by the organizations' activities. In Thai business context, Talerngsri (2010) defined strategy for building sustainability as the process that oriented to five activities. First, organizational identity development refers to the development and communication of sustainability vision and mission to the multiple stakeholders. Second, strong leadership refers to the orientation to building the corporate sustainability of the administrator. Third, long-term strategic plan refers to setting both the short-term (financial performance) and long-term (social performance) goals to be achieved in business plan. Fourth, operational plan refers to the consideration of the impact of each activity in operational plan on customer satisfaction, which, in turn contribute to the corporate image. Finally, human development refers to the orientation of a company to improving the knowledge and capability of employees in order to create innovation and adaptability for future needs. In this study, we test the impact of strategy for building sustainability on performance base on Talerngsri's (2010) definition. In the next sections, we will present the link between strategy for building sustainability and firm performance.

The impact of strategy for building sustainability on financial performance: According to Epstein and Roy (2001), the sustainability strategy that oriented to the evaluation of and respond to stakeholders' expectation can affect long-term financial performance of companies. This relationship often comes from positive and improved relations with regulators and other stakeholders. For example, regulators may ease the permitting process for companies who have consistently demonstrated a strong sustainability performance record, thus reducing the time and investment required to bring new products and services to market. Additionally, sustainability actions can also lead to cost reductions perhaps from material substitution or less packaging. Other cost reductions often include lower energy consumption during the production processes, reduce material storage, or reduced waste disposal. These actions not only generate cost reductions through improved efficiency but also create a positive reaction from customers who may benefit from these saving or product improvements. They may also send a positive message to financial analysts and investors in term of the company's manufacturing performance. Consistently, past research supports these arguments. For example, Goodman (2000), Weber *et al*. (2005), Chang and Kuo (2008) found that sustainability activities positively affect financial performance of companies. Watson *et al*. (2004) found that the implementation of an environmental management systems strategy does not negatively influence a companies' financial performance. Based on these arguments and evidences, we hypothesize that:

H_1: Strategy for building sustainability has a significant positive influence on financial performance.

The impact of strategy for building sustainability on corporate image: Corporate image is described as the overall impression made on the minds of the public about a firm (Barich and Kotler, 1991). It is the result of an individual experiences with a firm and from the processing of information on the attributes of the firm, such as business name and quality of products/services (Nguyen and Leblanc, 2001). As Epstein and Roy (2001) argued, corporate image is the one outcome of a company's stakeholder reaction to sustainability actions. If the stakeholders are satisfied with the sustainability actions, they will have a positive reaction to the company, lead to corporate image is improved. Likewise, Bieker (2005) suggest that strategy for building sustainability can enhance and foster corporate image. Because managing sustainability focus on reducing and managing risks, enhancing safety, and prevents business

from conflicts with authorities and other stakeholders. In addition, because it also aims at demonstrating their business (i.e., production site, technologies, products or services) as "green" and socially responsible to the public in order to maintain a "license to operate". Focusing on legal compliance and on regular dialogue with the public, therefore, this strategy enhances trust and acceptance both in public and politics. As argued above, strategy for building sustainability is more likely to positively affect corporate image. However, yet, only few studies have examined the impact of strategy for building sustainability on corporate image, particularly in Thai context. Hence, the following hypothesis will be tested:

H_2: Strategy for building sustainability has a significant positive influence on corporate image.

The impact of strategy for building sustainability on stakeholder satisfaction: In this study, stakeholder satisfaction is defined as stakeholders' feeling of happiness or pleasure because they got what they wanted or expected from the organization. Different stakeholder groups have a difference set of needs and expectations relating to an organization's activities. Base on the gap model, Strong *et al*. (2001) argued that stakeholder satisfaction is thought to be a two-phase process of: 1) communication accurate information regarding realistic expectations of the exchange or relationship, as accurate depictions of actual performance, and 2) providing actual performance, which equals or exceeds expected performance. In contrast, dissatisfaction may occur due to: 1) expectations are not clearly explained and understood, 2) actual performance is inappropriately assessed or disagreed upon, and 3) accurately assessed performance failed to meet clearly understood expectations (failure to perform). Therefore, a gap between expectations and performance will result in dissatisfaction. Similarly, Berrone *et al*. (2007) have stated that when there is congruence between corporate performance and stakeholder expectations, we can predict a greater degree of stakeholder satisfaction.

According to Isaksson and Garvare (2003) and Sangle and Babu (2007), stakeholder satisfaction is the important indicator of sustainability practices success. Because of strategy for building sustainability aims to improving the stakeholder relationships. By focusing stakeholders' expectations and attempts to satisfy these diverse interests of multiple stakeholder groups simultaneously. Rather than viewing this stakeholder pressure as a threat on corporate management. Underling this assumption, the sustainability strategy will help the company to reduce or minimize expenditure on social and environmental initiatives not meeting the stakeholders' demands (Sangle and Babu, 2007). The internalizing needs of stakeholder groups that are present across the life cycle stages of products and services will lead to better satisfaction amongst stakeholders. This consistent with Berrone *et al*. (2007) study found that corporate ethical identity (perform according to stakeholders' ethical expectations) positively affect stakeholder satisfaction. From theoretical views and evidence above, we expected strategy for building sustainability positively affect stakeholder satisfaction. Hence, the following hypothesis will be tested:

H_3: Strategy for building sustainability has a significant positive influence on stakeholder satisfaction.

The impact of strategy for building sustainability on CMMI level: Capability maturity model integration (CMMI) is a level of certification provide by Software Engineering Institute at Carnegie Mellon. This certification validates improved delivery, operational excellence in software development and improved risk planning and management. Also, this prestigious certification guarantees reduced variation and cycle time through the plan-do-check-act cycle. CMMI range from level 0 (non-existent) to level 5 (optimum), with 5 being the highest. At the level 0, non-existent means that the company has little or no evidence of a systematic approach is present. In contrast, at the level 5, the company has continually improving process performance through both incremental and innovative technological changes/improvements (CMMI product team, 2006).

The purpose of CMMI for development is to help organizations improve their development and maintenance processes for both products and services. Improved visibility into the product life cycle and engineering activities to ensure that the product or service meets customer expectations (CMMI product team, 2006). This imply that the company is received the certificate of CMMI in higher level can develop the products and services meets customer expectations more than. From this perspective, the assessment of CMMI is closely related to the stakeholder relationship management. It is possibility that strategy for building sustainability that consideration of the impact of each activity in operational plan, reducing and managing risks, enhancing safety, and focuses on human development in order to create innovation, may affect the certification of CMMI level of the company. To test this possibility, we conducted an exploratory analysis of the relationship between strategy for building sustainability and the certification of CMMI level. Thus,

H_4: Strategy for building sustainability has a significant positive influence on the CMMI level.

The impact of CMMI on corporate image: Due to the CMMI certification is an internationally used and

accepted standard that focuses on the quality improvement at the organizational level. The successfully pass of CMMI certification demonstrates a company's commitment to consistently deliver high quality and reliability of software products and related professional services. Goldenson and Gibson's (2003) study found that the company has received the CMMI certification achieve better project performance, produce higher quality products and customer satisfaction. Therefore, we believe that obtaining the CMMI certification will boost customer confidence and satisfaction and ultimately upgrade the corporate image. To test this possibility, we conducted an exploratory analysis of the relationship between the CMMI level and corporate image. Thus,

H_5: The CMMI level has a significant positive influence on corporate image.

MATERIALS AND METHODS

Sample: This study was carried out in 2010. The sample of this research includes 122 participants. These participants were randomly drawn from 385 managers of software development companies in Thailand. A total of 280 surveys were distributed and 122 completed surveys were returned, a response rate of about 43%. Forty seven percent of the total samples were package software development companies, 43% were applying software development companies, and 10% were applying and package software development companies. For the duration of operation of sample companies, 40% being in operation for over 10 years, 32% being in operation for under 5 years, and 28% being in operation ranged from 5 years to 10 years. The number of employees varied from approximately 1 to 100, with 68 percent of the total sample having less than 50 employees, 25 percent having 50 to 100 employees. Most sample companies (83%) received the CMMI level 0 rating, 12% received the CMMI level 3 rating, 3% received the CMMI level 2 rating, and only 2% received the CMMI level 5 rating.
For the demographic of participants, about 46 percent of the participants were between 36 and 45 years of age and 38% were between 25 to 35 years of age. Eighty eight percent (88%) were male, 57% had bachelor degree education and 41 had education higher than bachelor degree, 40% having less than 5 years of tenure and 33% having 5 to 10 years of tenure.

Measures: All constructs in this study, respondents indicated their agreement with each item on a five-point Likert scale (1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree). The other details are described in the section below.

Strategy for building sustainability was assessed by a 18-item scales that were developed by the researchers. Organizational identity development was measured by four items (β = 0.68). One item was "The social and environmental visions of our enterprise were clearly established and communicated to employees and customers." Strong leadership was measured by five items (β = 0.81). One item was "Our top management is strongly oriented toward innovation development to enhance the enterprises' sustainability." Long-term strategic plan was measured by three items (β = 0.72). One item was "Our enterprise oriented toward continuous planning for new products development in order to respond to market trends." Operational plan was measured by three items (α = 0.83). One item was "The operational plan of our enterprise oriented toward creating customer satisfaction through high quality products and services of employees. Finally, human development was measured by three items (α = 0.71). One item was "Our enterprise strives to develop the capacity of employees with respect to services and sales in order to increase customer satisfaction."

CMMI level was assessed by single-item self report of receiving the CMMI certification, from level 0 (lowest level) to 5 (highest level).

Financial performance was assessed by three item scales that were adapted from Knight (2000). This scale measures the profitability of companies comparing the last three years. One item was "Average net profit margin of our enterprise over the last three years has been. Reliability of the measure was acceptable (α = 0.68).

Corporate image was assessed by four item scales that were adapted from Nguyen and Leblanc (2001). One item was "I believe that this company has a better image than its competitors. Reliability of the measure was acceptable (α = 0.90).

Stakeholder satisfaction was assessed by four item scales that were developed by the researchers. One item was "I think that employees in this company satisfied with their work environment. Reliability of the measure was acceptable (α = 0.74).

RESULTS

Table 1 presents means, standard deviations, and zero-order correlation among variables. The results from Table 1 suggest that strategy for building sustainability correlated positively and significantly with CMMI level, financial performance, corporate image and stakeholder satisfaction. Thus, the hypothetical model was tested and developed further by using path analyses.

Table 2 presents the standardized path coefficients for the initial model (hypothesized model), modified model and its statistics of goodness of fit. Result show that the goodness of fit statistics includes the chi-square/df ratio is greater than 2, the RMSEA and SRMR is much greater than 0.05, and the NNFI is lower than

Table 1: Mean, standard deviation, and correlation matrix among variables

	1	2	3	4	5
Mean	3.78	1.50	3.15	2.87	3.56
SD	0.42	1.17	0.70	0.68	0.48
1. Strategy for building sustainability	1.00				
2. CMMI level	0.28*	1.00			
3. Financial performance	0.54*	0.15	1.00		
4. Stakeholder satisfaction	0.63*	0.02	0.48*	1.00	
5. Corporate image	0.46*	0.62*	0.32*	0.34*	1.00

N = 122, *: p<0.05.

Table 2: Standardized path coefficients and goodness of fit statistics

	Standardized coefficients	
Path	Initial model	Modified model
Strategy for building sustainability--> CMMI level	0.28**	0.28**
Strategy for building sustainability --> Financial performance	0.54**	0.42**
Strategy for building sustainability --> Corporate image	0.31**	0.31**
Strategy for building sustainability --> Stakeholder satisfaction	0.63**	0.63**
CMMI level --> Corporate image	0.53**	0.53**
Stakeholder satisfaction --> Financial performance	-	0.19*

Goodness of Fit Statistics

	Chi-square/df ratio (p-value)	RMSEA	SRMR	CFI	NNFI
Initial model	3.43 (.004)	0.14	0.04	0.94	0.89
Modified model	1.28 (.650)	0.00	0.02	1.00	1.00

*: p<0.05; **: p<0.01

Table 3: Direct, indirect, and total effects of independence variables on the outcome variables

	Outcome variables											
	CMMI level			Financial performance			Stakeholder satisfaction			Corporate image		
Independence variables	DE	IE	TE	DE	IE	TE	DE	IE	TE	DE	IE	TE
Strategy for building sustainability	0.28**	-	0.28**	0.42**	0.12^{ns}	0.54**	0.63**	-	0.63**	0.31**	0.15*	0.46**
CMMI level	-	-	-	-	-	-	-	-	-	0.53**	-	0.53**
Stakeholder satisfaction	-	-	-	0.19*	-	0.19*	-	-	-	-	-	-

*: p<.05; **: p<.01; ns: non-significant; DE = Direct effect; IE = Indirect effect; TE = total effect

0.90. This suggested that the fit of an initial model is not good. Therefore, we consider modifying the initial model in order to get a better fitting model. From the inspection of the modification indices and theoretical reasons, we decided to free the path between stakeholder satisfaction and financial performance. In addition, we also specified two error variance correlations between stakeholder satisfaction and corporate image, stakeholder satisfaction and CMMI level, and re-estimate the model. These error variances may be correlated because of it is the unexplained part by the same independent variables (strategy for building sustainability). From Table 2 the goodness of fit statistics of the modified model include the chi-square/df ratio is lower than 2, the RMSEA and SRMR is near 0, and the CFI and NNFI is 1. This reflects the much better fit of the model to the sample data.

Figure 1 illustrated the diagram of relationships of the modified model. As shown in Fig. 1 that the strategy for building sustainability accounts for 8 percent of variance in the certification of CMMI level and for 40% of variance in the stakeholder satisfaction. The model accounts for 31 and 47% of variance in the financial performance and corporate image respectively. Based on the modified model, in Table 3, testing the indirect effect show that strategy for building sustainability positively and significantly affect corporate image through CMMI level. However, the indirect effect of strategy for building sustainability on financial performance through stakeholder satisfaction is non-significant.

DISCUSSION AND CONTRIBUTION

Results add our understanding about the nature of relationship among the strategy for building sustainability, CMMI level, financial performance, corporate image, and stakeholder satisfaction, which has not been widely studied in software development industry, especially in Thai context. Our findings show that strategy for building sustainability had direct effect on all outcome variables and had indirect effect on corporate image through CMMI level. Findings in this study consistent with previous study (Goodman, 2000; Weber *et al*., 2005; Chang and Kuo, 2008) and Bieker (2005) had argued that managing sustainability aim at reducing, avoiding, or having control of risks, which could affect the financial (by reducing cost) and image of a company. Likewise Epstein and Roy (2001) argued, strategy that oriented to sustainability (e.g., environmental R&D, investment in cleaner technology, training) will induce a positive reaction of stakeholders to a company, which, in turn, contributes to

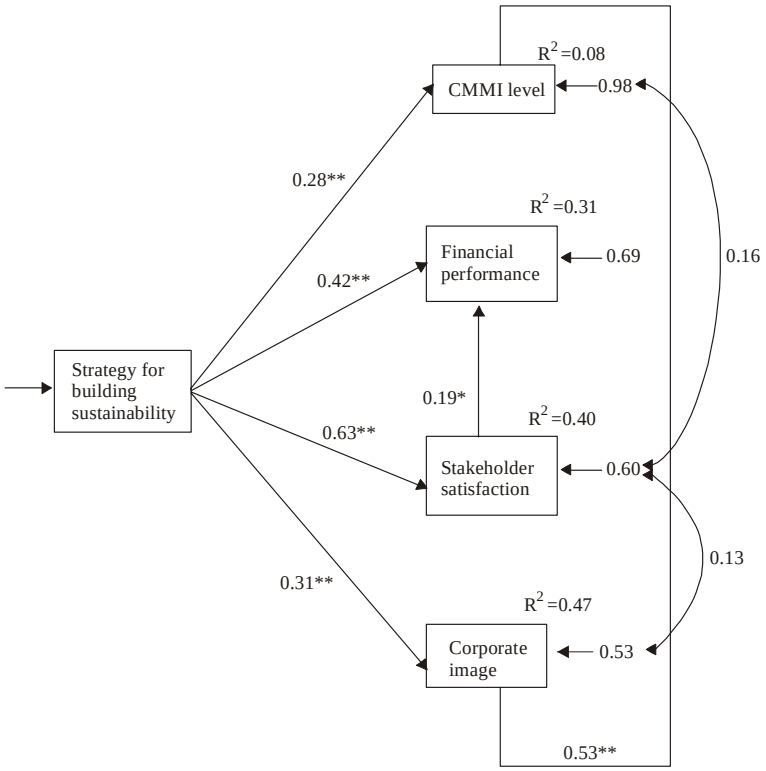

Fig. 1: Path model of the causal relationships between strategy for building sustainability, CMMI level, financial performance, stakeholder satisfaction, and corporate image

a corporate image. For software development company, the procedure obtaining a CMMI certification is closely related to the quality control, risks management, reliable performance, and innovation development. It is possibility that strategy for building sustainability that consideration of the impact of each activity in operational plan, reducing and managing risks, enhancing safety, and focuses on human development in order to create innovation, may affect the certification of CMMI level of the company. The finding form this study support that strategy for building sustainability affects obtaining the CMMI certification that in turn affect the corporate image.

Based on the analysis of stakeholders' expectation, strategy for building sustainability prevents company from conflicts with authorities and other stakeholders. For example, the orientation of human resource development make it can attract talent employees or the concentration of safety and quality of products make it satisfy customers' demand. This leads to increased stakeholder satisfaction. As Sangle and Babu (2007) have stated that because of focus on stakeholders' expectations and attempts to satisfy these diverse interests of multiple stakeholder groups simultaneously. The strategy for building sustainability will help the company to reduce or minimize gap between stakeholders' expectations and their performance. Ultimately, it will result in satisfaction. Additionally, result also show that stakeholder satisfaction had a positive direct effect on financial performance. Consistent with Berrone *et al*. (2007) study found that stakeholder satisfaction has a positive influence on the firm's financial performance. They explain that if key stakeholders are satisfied with companies' performance, they will be more willing to offer their resources for building competitive advantage, which, in turn, will result in better financial performance. For instance, shareholders more willing to invest their money, or customers more willing to pay a higher price, or employees attempted to utilize their full potential in alignment with the organization's goals.

Our findings provide important practical implications for enhancing sustainability of Thai software development company. Results indicated that the strategy for building sustainability positively affect all the outcomes variables which, in turn, contribute to sustainable of company. This suggests that management should engage in sustainability practices in order to fostering the stakeholder satisfaction, corporate image, financial performance, and CMML level. Top management must develop and communicate the sustainability vision and mission to key stakeholders of company. Strategic plan should emphasize on stakeholder participation in goals setting both short- and

long-term goals. Performing a stakeholder analysis in order to identify and survey expectation of all the parties that are directly affected by companies' operations is necessary for this stage. In the operational plan, management must emphasize on increasing the understanding and awareness of employees with the impact of their performance on customer satisfaction that in turn affect corporate image. Quality control and risks management system are critical factor for this stage. In addition, planning and implementing the project of creativity and innovation development for responding to the future needs of the society should also be included strategic plan of company.

LIMITATION AND FUTURE RESEARCH

Although we have achieved some useful results, we never forget about important limitation of this study. Firstly, this study employed a cross-sectional design and tested hypothesis in which we assumed a causal relationships based on the past research and conceptual literature. In order to confirm a causal relationship between strategy for building sustainability and performance outcomes, an experimental study or longitudinal study in the same and other samples needed to replicate. Nevertheless, such studies are extremely costly and timely to implementation. Secondly, another limitation of the present analysis is its relatively small sample size and the resultant lack of statistical power to detect any true effects. The small sample size also limited the ability to generalize the findings, and interpretation of the study results was done within the context of this limitation. Finally, the corporate image and stakeholder satisfaction were a self-reported measure. The company tends to over report their image and satisfaction under the influence of social desirability bias. Future research should strive to obtain corporate image and stakeholder satisfaction from multiple raters, including customers, employees, or shareholders, high correlation among corporate image and stakeholder satisfaction from these source of rating will make us more confidently conclude our results.

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