

THE STUDY OF MATURITY MODELS
FOR SMALL AND MEDIUM ENTERPRISES



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INDEPENDENT STUDY TITLE THE STUDY OF MATURITY MODELS FOR
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ABSTRACT

Most Small and Medium Enterprises (SMEs) in Thailand aim for growth through business development projects. However, some of them failed to succeed partly because they are not aware of their strategic business processes, and their development needs. The Business Process Maturity Model (BPMM) is an effective tool to assess and improve business processes, and it has been used worldwide to aid in business process development. Even through, a limited number of studies showed that SMEs adopted the model to assess their current business processes. Therefore, this study focuses on the development of BPMM for use with SMEs in Thailand.

The researcher objectively selected three BPMMs based on Design Principles and an assessment of the models application with SMEs through literature review, and compared variables which impact on critical success criteria of the SMEs' business process models. The selected BPMMs were evaluated to determine the extent of effectiveness to measure the variables. The study discovered that the three BPMMs were based on similar Foundation Model Structure and assessment criteria, and included the necessary variables. The differences were the evaluation methods and their further use. The results suggested that Hammer's Process and Enterprise Maturity Model is suitable for general measurement and Business Process Maturity Model owned by the Object Management Group is designed for detailed assessment.

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CHAPTER 1

Introduction

1.1 Introduction

Having information available for every customer to reach when-and-wherever they want, causing a balance shifting in the customer expectation and the pricing of goods and services. Customers, both end-and-intermediary customers, are expecting “More”: more information, more speed, more flexibility, more co-operations and collaborations, and also, more services. They are also expecting on “Less”: lower cost, less documentary paper, fewer mistakes, and fewer hassles. In the digital economy, they have the full demanding power.

Information technology could lift the activity and process which may have taken days to complete to a minutes-taken. Through the IT advance, business could serve the customer a better effective and efficient customer services. Also, with the aid of IT, the businesses could analyze customer complaining trends to fulfill their demands. Fulfilling their expectations and demands would enhance the sell circulation and gain.

IT in small firms helps them enhancing their operational efficiency by driving the business growth and integrating their marketing operations and market strategies. The Software Industry Promotion Agency (SIPA), the Thailand public lead agency organization that develops plans and policies to advocate the Thai software industry, would like to increase SMEs competitiveness. SIPA focuses on using the information technology adoption to introduce the Thai SMEs to the global community. With the IT as the catalyst, the production and services could be improved with a lower cost but higher quality.

Achieving the information technology, new innovations, or even other high performance processes, SMEs need to take a loan from the bank. The banks, in the loan granter roll, need an assurance before granting the loan that every granted loan will be paid back with the least collateral effects. Financial assessment is one of the

important processes for both SMEs and the commercial lenders. Furthermore, before starting the businesses, a process of enterprise capability assessment is also needed for business processes to sustain the performance.

1.2 Background and Problem Statement

Comparing between small and medium size enterprises with the large size ones, SMEs have an advantage of the market liquidity over big companies. Though, they are in a high risk of traditional loans, yet, merely oversize to join the microfinance programs. A substantial portion of the SME may not have the security required for conventional collateral based bank leading, nor high enough return to attract formal venture capitalists and other risk investors [42]. In addition, markets may be characterized by deficient information, limiting the effectiveness of financial statement-based lending and credit scoring. This has led to claims of an SME finance gap particularly in emerging economics of developing countries.

Bill and John [2] said in his journal that the IT trade press is filled with many articles about failed enterprises attempting to apply the IT that wasted millions of dollar in this, but, yet failed. While they are blaming on technology issues, the real root cause of these failures is about the inner status of the organization which the application is being deployed. Many companies realized that they needed to change many things for the harness of the power of processes, but they were unsure about what, when, and how much of them should be done [15].

1.3 Objective of the Study

Study a Maturity Model of Business Process for the small and medium enterprises assessment in Thailand. Hence, the company would understand their current situation and maturity level which provide an effective way for companies to plan and lead to higher value-added products or services for both domestic and international consumers.

1.4 Scope of Study

- a. To suggest business process maturity models for Thai small and medium enterprises assessment.
- b. Detail of SMEs loan and finance are not included in the study.

1.5 Research Methodology

This paper is an analytical study based on current available facts and information to help the SMEs adopts either the new innovation or investment by assessing their process enable and enterprise capability, the study aims to answer these following question;

- The related problem and factor of implementing and innovating of the new processes in Thailand SMEs.
- Which appropriate business process maturity model for helping the Thai SMEs reduces the investment, innovation adoption, and process re-engineering problems?

The study is divided into two criterions:

- a. Comparison among maturity models by studying of the following;
 - Business process maturity assessment model designing
 - Deployment result of the business process maturity assessment model.
- b. Studying of the problems and factors related in the deployment of the Business process management in the SMEs through the global journal and comparing the Business environment among Thailand resemble ASEAN countries.

An observational data is discussed in chapter 3 and analyzed in chapter 4 in two topics

- (i) Summarizing the limitations and factors of SMEs transformation and compare problems among Thailand SMEs and others.
- (ii) Studying of Business Process Maturity Models which will be applied to help Thai SMEs evaluating their business process maturity.

The study result and recommendation are shown in chapter 5.

Chapter 2

Literature Review

2.1 Thai and Global SMEs Situation

2.1.2 Thai SMEs Situation

SMEs are compared as aorta of Thai economic system that portion is 37% of GDP or 3.7 billions baht. In 2010, Thailand enterprise numbers are 2.9 million whereas they are small and medium enterprise 2.89 million. The numbers of employees in SMEs are 2.89 million people or 70% of all Thai employees [58].

In 2011, financial institution increase SMEs loan to 4.4 thousand million baht, more than 15% of all. SMEs still need to gain more loan but commercial banks have limited credit to SMEs which credit analysis use high manpower and time. SMEs may not have the security required for conventional collateral based bank leading, nor high enough return to attract formal venture capitalists and other risk investors.

In 2011, the financial institution has grown 440 billion baht, which is 15% higher than the growth of expanded loan. SMEs credit is counted as a 34% portion of expanded loan, however, SMEs still need, but commercial banking has a limit, due to the manpower and time taken in analysis phase.

Related to the lack of reliable revenues and expenses data, the income statement of the SMEs is diverted from what it really is. The commercial bank credit officer needs to adjust the SMEs income statement to approach the fact before granting the loan. The activity causes a lot of money expense but the granted amount is low, so it is not worthwhile. This turns to be a main constraint effecting on the small SMEs intensive growth.

Although, Thailand has the SMEs Banks and Thai Credit Guarantee Corporate (TCG) to help the SMEs, but this results in only 3% of expanded loan.

2.1.2 Global SMEs Situation

In the era of global business, internationalization of firm has been a critical factor for companies and paid attention to small and medium sized enterprises (SMEs) as well as multinational enterprises (MNEs) [14]. Recently, the ratio of small and medium sized firms' in international foreign direct investment (FDI) has been very rapidly increasing Energetic business activities of SMEs in the global market have mainly focused on the internationalization process of SMEs. However, most of prior

studies conducted a comparative analysis with MNEs. They focused on internationalization process of SMEs in term of traditional theories.

The perspective contends that firms become international in a slow and incremental manner which may be due to lack of knowledge about foreign markets, high risk aversion, high perceived uncertainty, or similar factors. New empirical studies in recent years, reported that phenomenon of internationalization of SMEs showed different characteristics, compared with traditional firms. Instead of internationalization by incremental stage, firms often start their foreign business activities right from their birth and enter multiple countries in a very short time period.

2.1.3 Characteristics Distinguish SMEs from Large Enterprise

Related to their environment, structure, strategy and decision process, and psycho sociological context such as the dominant role of owner-manager, the following characteristics distinguish SMEs from large enterprises [18]:

- Specialization and Individuality. First of all, SMEs act on business markets that are not covered by large enterprises. Characterized by a high specialization and individuality many SMEs pursue a segmentation or niche strategy that leads to certain strength in competition.
- Proximity to markets. Compared with large enterprise, SMEs are strongly focused on their end-users allowing a high proximity to markets. Instead of focusing on exchangeable products or services for anonymous like large enterprises SMEs provide services oriented at the customer's needs.
- Flexibility. Quickness to react and reorient themselves on business changes is a major characteristic of SMEs [15]. This flexibility in decision making and implementing organizational changes is archived by preferring simplicity and flexibility regarding their processes and organizational structures [8].
- Limited resources. As mentioned before, SMEs are limited like all companies by tight resources, especially missing IT literacy and financial resources [15]. Missing know-how can be compensated with basis knowledge of many areas due to the fact that employees at SMEs are generally "all-rounders" and are good at multi-tasking.
- Technical heterogeneity. Smaller firms often lack coherent information and Communication Technology (ICT) strategy or the related skills. For instance, IT

landscapes consist of heterogeneous systems, reaching from Enterprise Resource Planning Systems (ERP) to spreadsheet based island applications for conducting their every-day business transaction [8].

- Globalization. The growing internationalization of markets since one decade affects the strategy of SMEs due to deregulation and liberalization of former barriers. The chance of new potential business partners involves an enormous adaptation pressure for SMEs which have less experience than large enterprises in global electronic business [19].

2.2 Critical Success Factors

Literature review on SME Access to Credit in South Africa [56] summarizes SME specific characteristics that affect access to financing are internal factors and external factors. Internal factors include the following:

- The size of SME
- Demand for loan
- Loan application rejections
- Experience of the small business owner
- Ownership of the SME
- Availability of information
- Registration and legal formality
- Age of the SMEs

The ability of SMEs to access finance by business environment that make firm difficult to forecast. Some of the external factors are briefly discussed below.

- Inefficient legal systems
- Crime and corruption

Rosemann and de Bruin's [46] BPM maturity model [6] separated business process factors in "The six core Element of Business Process management" research. This BPM maturity model is selected from a number of models to identify

comprehensively structure those elements of BPM that need to be assessed when following a holistic understanding of BPM because:

- First, it was developed on the contemporary understanding of BPM as a holistic management approach.
- Second, it is based on a sound academic development process. Starting with an in-depth and comprehensive literature review, the experiences and preliminary versions of three previous BPM maturity models have been consolidated. The model has been validated, refined, and specified through a series of international Delphi studies involving global BPM thought leaders. A number of detailed case studies in various industries further contributed to the validation and deeper understanding of the model.
- Third, the model distinguishes factors and capability areas on two levels of abstraction. This hierarchical structure allows different types of granularity in the analysis. As a result, definitions of the factors and capability areas are available and provide a basis for consistent interpretation.
- Fourth and finally, the model has been applied within a number of organizations by means of documented case studies including embedded surveys and workshops. Hence, the core elements have been validated and proven to be of practical relevance in real life projects.

Mires [33] also study about business process management in what are the keys to BPM project success. He said that it is necessary to find a neutral mechanism that does not necessarily favor one area over another. One approach is to develop a list of critical success factors (CSFs) for the organization and consider how many CSFs are supported or impacted by the process. CSFs are those things that must go right for the organization to achieve its Key Business Objectives (KBOs).

Each of the six core elements represents a critical success factor for Business Process Management provided a further level of detail, the so called Capability Areas. Both factors and capability areas are displayed in Table 2.1

Table 2.1: The Six Core Elements of Business Process Management [46] [6]

Strategic Alignment	Governance	Methods	Information Technology	People	Culture	Factor
Process Improvement Planning	Process Management Decision Making	Process Design & Modeling	Process Design & Modeling	Process Skills & Expertise	Responsiveness to Process Change	Capability Area
Strategy & Process Capability Linkage	Process Roles and Responsibilities	Process Implementation & Execution	Process Implementation & Execution	Process Management Knowledge	Process Values & Beliefs	
Enterprise Process Architecture	Process Metrics & Performance Linkage	Process Monitoring & Control	Process Monitoring & Control	Process Education	Process Attitudes & Behaviors	
Process Measures	Process Related Standards	Process Improvement & Innovation	Process Improvement & Innovation	Process Collaboration	Leadership Attention to process	
Process Customers & Stakeholders	Process Management Compliance	Process Program & Project Management	Process Program & Project Management	Process management Leaders	Process Management Social Networks	

2.2.1 People and Culture

People as a core element of BPM is defined as individuals and groups who continually enhance and apply their process, process management skills and knowledge in order to improve business performance. Consequently, this factor captures the BPM capabilities that are reflected in the human capital of an organization and its ecosystem.

BPM culture incorporates the collective values and beliefs in regards to the process-centered organization. Culture is about creating a facilitating environment that complements the various BPM initiatives.

2.2.2 Information Technology and Method

IT in small firms helps them enhance their operational efficiency to drive business growth and to integrate their marketing operations with marketing strategies. However, IT has not always delivered business value, and a key reason is the lack of synergy between a firm's business strategy and IT strategy. IT resources that are not embedded in firm level capabilities are open to competitive erosion, and hence not a sustainable source of competitive advantage [4].

Methods in the context of BPM are defined as the set of tools and techniques that support and enable activities along the process lifecycle and within enterprise-wide BPM initiatives. Six sigma is an example for a BPM approach that has at its core a set of integrated BPM methods.

2.2.3 Strategic Alignment

BPM needs to be aligned with the overall strategy of an organization. Strategic alignment (or synchronization) is defined as the tight linkage of organizational priorities and enterprise processes enabling continual and effective action to improve business performance. Processes have to be designed, executed, managed, and measured according to strategic priorities and specific strategic situations. In turn, specific process capabilities may offer opportunities to inform the strategy design leading to process-enabled strategies.

While the positive impact of strategic alignment has been studied relatively extensively in the large firm context, the topic has not been the subject of extensive study in small firms. While most strategic alignment studies focus examined the impact of process-level alignment on the business value, Gibson argues that since different firms have different strategic foci and business strategy is executed as a process. Many developing countries lack a vibrant small business sector, and, as a consequence, a growing middle income population. SMEs always in emerging market frequently suffer from insufficient access to financing, preventing these business from expanding their production and market a larger social and economic impact [12].

2.2.4 Governance

BPM governance establishes appropriate and transparent accountability in terms of roles and responsibilities for different levels of BPM. A further focus is on the design of decision-making and reward processes to guide process-related actions.

2.2.5 Environmental Effects

Some elements of the business environment, such as labor flexibility, low entry and exit barriers, and a reasonable protection from the "grabbing hands" of the government, seem to matter a great deal for most economies. Other elements, such as infrastructure and contracting institutions (courts and access to finance), hinge on their initial status and the size of the market.

2.2.6 Finance

To select the approach maturity model, financing gap is one factor of loan problem of SMEs. The term "financing gap" refers to a situation where a sizeable proportion of economically significant SMEs cannot obtain financing from bank, capital markets or other suppliers of finance[56]. Furthermore, it is often alleged that (i) many entrepreneurs or SMEs that do not currently have access to funds would

have the capability to use those funds productively if the funds were available (Industrial Systems Research); (ii) but due to structural characteristics, the formal financial system does not provide finance to such entities. There have been at least two distinctive approaches to try to overcome the so-called SME finance gap.

2.3 Business Process Maturity Model

Today, management has no standards by which to assess the maturity of their business processes. As a result, they have no method to assess the risk immature processes pose to enterprise projects, or to identify the causes of weaknesses in their process workflows that, if addressed, could reduce cost and increase operating efficiency [2].

Business describes an evolutionary improvement path that guides organizations as they move from immature, inconsistent business activities to mature, disciplined processes. A maturity model serves a descriptive purpose if it can be applied for as-is assessments. It serves a prescriptive purpose if it indicates how to identify desirable future maturity levels and if it provides guidance on how to implement according improvement measures. A maturity model serves a comparative purpose if it allows for internal or external benchmarking [45].

2.3.1 Maturity Model

Maturity model typically include a sequence of levels or state that form an anticipated, desired, or logical path from an initial state to maturity [1] [13]. An organization's current maturity level represents its capability as regards a specific class of objects and application domain [46]. Maturity models are used to assess as-is situations, to guide improvement initiatives, and to control progress [22]. In the Business Process Management (BPM), two types of maturity models can be identified: process maturity models and BPM maturity model (BPMMMs) [53]. The former refer to the condition of processes in general or distinct process types, the latter address a company's BPM capabilities [25] [45] [46].

As a matter of fact, the number of maturity models relate to the business process maturity (BPM) field is such high that practitioners and scholars run the risk of losing track, identify according research need, struggle with the conceptual enhancement of maturity models and brief list BPM-related maturity models. The corresponding stage model, however, has been widely adopted and led to hundreds of models based on a staged sequence of level. Only few maturity models follow

other structural design [10] [49]. Röglinger et al. [45] focuses on BPM maturity model as well as on their practical applicability and usefulness by research questions (RQ) are:

RQ1: What maturity models exist for BPM?

RQ2: To what extent do these models meet the requirements of applicability and usefulness?

2.3.1.1 Design Principle for Maturity Models

As for a maturity models as design product, qualities and components need to be considered. Whereas qualities represent desirable properties or dimensions of value, components and their interplay shape a maturity model's [34]. On the other hand, there are quality taxonomies that apply to conceptual modeling in general [1]. According to Simonsson et al. [52] postulate empirical foundation, software tool support, standardization, flexibility/adaptability, benchmarking applicability, certification, disclosure of potential for improvement, evidence of correlation between maturity model adaptation and performance.

The framework of general design principles (DPs) for maturity models comprises three nested groups of design principles. These are the basic principles, the principle for a descriptive purpose of use, and the principles for a prescriptive purpose of use. Detailed information and the justification of the individual design principles can be retrieved from the original publication [40].

Table 2.2: Framework of General DPs for Maturity Models [40]

Group	Design Principle	
(1) Basic	1.1	Basic information a) Application domain and prerequisites for applicability b) Purpose of use c) Target group d) Class of entities under investigation e) Differentiation from related maturity models f) Design process and extent of empirical validation
	1.2	Definition of central constructs related to maturity and maturation a) Maturity and dimensions of maturity b) Maturity levels and maturation paths c) Available levels of granularity of maturation d) Underpinning theoretical foundations with respect to evolution and change
	1.3	Definition of central constructs related to the application domain
	1.4	Target group-oriented documentation
	2.1	Intersubjectively verifiable criteria for each maturity level and level of granularity
(2) Descriptive	2.2	Target group-oriented assessment methodology a) Procedure model b) Advice on the assessment of criteria c) Advice on the adaptation and configuration of criteria d) Expert knowledge from previous application
	3.1	Improvement measures for each maturity level and level of granularity
(3) Prescriptive	3.2	Decision calculus for selecting improvement measures a) Explication of relevant objectives b) Explication of relevant factors of influence c) Distinction between an external reporting and an internal improvement perspective
	3.3	Target group-oriented decision methodology a) Procedure model b) Advice on the assessment of variables c) Advice on the concretization and adaptation of the improvement measures d) Advice on the adaptation and configuration of decision calculus e) Expert knowledge from previous application

Basic Design Principle

DP 1.1: Maturity model documentations have to provide basic information about the application domain (e.g., BPM), the prerequisites or limitations of application (e.g., certain conditions internal or external to the organization under assessment), the supported purpose of use, the target group and external to the organization under assessment), the supported purposes of use, the target group and audience (e.g., consultants or professionals within the organization) as well as the class of maturing

entities (e.g., operational processes or BPM capability). Differences compared to related maturity models should be disclosed as well. Moreover, the design process should to be documented including the extent to which the model has been subject to empirical validation.

DP 1.2: The central constructs related to maturity and maturation needs to be defined. This includes a definition of the underlying notion of maturity, available capability areas and maturity levels, descriptors for each capability area and maturity levels, possible maturation path, the rationale behind maturation as well as the levels of granularity on which maturation can be observed. Finally, maturity models should explicate their underpinning theoretical foundations concerning organizational capability evolution and change.

DP 1.3: Maturity models have to define the central constructs of the application domain they refer to. These include common terms and definitions that are relevant to the setting which the maturity models are supposed to be applied in (e.g., in the form of a glossary that defines terms like business process).

DP 1.4: The basic information and the central constructs need to be document in a target group oriented manner. That is, the documentation needs to be accessible and comprehensible for the maturity model's target group.

Design Principles for Descriptive Purpose of Use

A maturity models serves a descriptive purpose of sue if it is applied for as-is assessments where the current capabilities of the entity under investigation are assessed with respect to given criteria [1]. The maturity model is used as a diagnostic tool. The assigned maturity levels can then be reported to internal and external stakeholders.

DP 2.1: Maturity models intended for a descriptive purpose of use need to provide inter-subjectively verifiable assessment criteria for each stage and level of granularity. According to de Bruin et al. [7], maturity models can be structured hierarchically into multiple layers referring to different levels of granularity of maturation. A low level of granularity provides a simple means for comparing and documenting maturity levels (e.g., on corporate level) as it is often intended for the communication with external stakeholders. A high level of granularity enables to determine differentiated maturity profiles within complex application domains. This provides better help in

structuring assessment criteria and in choosing among improvement measures. The BPM Maturity Model (BPMMM) by Rosemann et al. [47], for instance, comprises three levels of granularity of BPM maturity, namely success factors, capability areas, and detailed questions.

DP 2.2: An assessment methodology needs to feature a procedure model as well as advice on how to elicit the assessment criteria and on how to adapt or configure the criteria according to organization specific situational characteristics. Assessment methodologies should also share knowledge from previous applications- if available.

Design Principles for Prescriptive Purpose of Use

A maturity model serves a prescriptive purpose of use if it indicates how to identify desirable maturity levels and provides guidelines on improvement measures.

DP 3.1: Maturity models following a prescriptive purpose need to include improvement measures in the sense of good or best practices for each stage and- if available- level of granularity.

DP 3.2: Prescriptive maturity models should include a decision calculus. According to decision theory [39], a decision calculus helps decision makers to evaluate different alternatives- i.e., different sets of improvement measures with respect to given objectives and to identify which alternative satisfies the objectives best. As most maturity models refer to a business context, it generally is corporate performance that determines the objective system of improvement measure selection.

DP 3.3: An adoption methodology needs to be provided that features a procedure model, advice on how to concretize and adapt improvement measures as well as on how to adapt and configure the decision calculus. It is expected to be accessible and comprehensible for the model's target group and favorably also reports knowledge gained from previous applications.

The nine DPs introduced above serve as main analytical lens for assessing the applicability and use fullness of BPM related maturity models below.

2.3.1.2 Identification of Relevant Literature

Specifically searched the online database of the Business Process Management Journal using “maturity” as search term [45]. In the following, they only considered maturity models that had been published in English language and for which a reasonable amount of documentation was freely available and kept those generic process maturity models that do not refer to a specific proves type and that cover the condition of BPM practices as well.



Table 2.3: Overview of Maturity Model Sample [40]

	Scope*	Lowest Maturity Level	Upmost Maturity Level
BPM Maturity Model (BPMMM) [46] [47]	BPM	Initial State: Attempt towards BPM are non-existent or much uncoordinated and unstructured (ad-hoc, individual efforts).	Optimized: BPM is core part of both strategic and operational management within the organization.
Process Performance Index (PPI) [49] [50]	BPM	Process Management Initiation: Organizations are “neophytes to process [management]”. There is a strong desire to learn about process management.	Process Management Mastery: BPM is a way of life for organizations, Process owners are rewarded on process performance. Every employee understands the process.
BPR Maturity Model (BPMM) [32]	BPM	Group1: Organizations are in the early phase of business process reengineering (BPR) project planning.	Group 5: Organizations use the knowledge gained from BPR project to re-engineer the whole business.
Business Process Maturity Model (BPMM-Fisher) [9]	BPM	Siloed: Individual groups work to optimize their own piece of the organization. Information tends to be siloed.	Intelligent Operating Network: Optimal efficiency throughout the end-to-end value chain and free of real-time information is achieved.
Process Management Maturity Assessment (PMMA) [43] [44]	BPM&P	Initial: Processes are not defined; success depends on certain specialists; schedule, quality and costs are not predictable.	Optimizing: Processes are analyzed, optimized and adjusted to changes in market requirements systematically. Benchmarking and mistake avoidance is pursued.
BPO Maturity Model (BPOMM) [29] [30]	BPM&P	Ad-hoc: Processes are unstructured and ill defined. No process measures exist. Organizational structures are based on traditional functions.	Integrated: The organization cooperates with vendors and suppliers on process level. Organizational structures are based on processes. These are deeply imbedded process measures.

Table 2.3: Overview of Maturity Model Sample (cont.) [40]

Process and Enterprise Maturity Model (PEMM) [15]	BPM&P	P-1/E-1: The process has not been designed on an end-to-end basis. Fragmented legacy IT systems support the process.	P-4/E-4: Process design fits with customer and supplier processes. Modular IT architecture exists.
Process Maturity Ladder (PML) [16]	BPM&P	Initial: Processes are not defined	Optimizing: Processes are measured and managed. Process improvement teams exist.
Business Process Maturity Model (BPMM-OMG) [57]	BPM&P	Initial: There is “fire-fighting management”. Successes depend on the competence and heroics of individuals and not on the use of proven processes.	Innovating: There is “change management”. Approaches to defect and problem prevention as well as continuous and innovative improvements are in place.
Business Process Maturity Model (BPMM-Lee) [25]	BP&M	Initial: processes are managed in an ad-hoc manner.	Optimizing: process are proactively monitored and controlled. Process performance data is systematically used for improvements.

BPM = Business Process Management, P = Processes in general

Organizations searching for an adequate maturity model must therefore be aware about their intentions, i.e., the purpose of use and the scope they want to apply the model for, as for descriptive uses, most models seem to be capable of providing a basic diagnosis of organizations and processes. However, organizations should consider in advance whether the condition of processes or the condition of process management practices is in scope.

2.3.1.3. Analysis, Interpretation and Discussion

Maturity model developers or the publishing institutions could state more clearly, for instance, in which settings, by whom, and how the models should be applied. Many assessment criteria are often only presented as textual descriptions and in not in the form of comprehensive, well-structured and easily applicable assessment checklist. As same as Looy et.al. [26] research, he creates 16 questions to find appropriate maturity model for each business. The emphasis is on who measures maturity, and how it is measured. Furthermore, the table clarifies what is measured as maturity. It is shown in table 2.4

Röglinger analyzed their sample of maturity models by means of the design principles framework as presented in table 2.5 and 2.6.

Table 2.4: The Table Clarifies What Is Measured as Maturity [40]

	Model 1	Model 2	Model ...
Assessors- Who <ul style="list-style-type: none"> - Assessment unit - Lead assessor - Other assessors and respondents 			
Assessment method- How <ul style="list-style-type: none"> - Data collection technique to obtain information to assess - Calculation to interpret the collected data as lifecycle levels - Representation to visualize lifecycle levels 			
Improvement method- What <ul style="list-style-type: none"> - Capability areas to assess and improve - Lifecycle levels - Architecture or road map, to link capability areas with levels. 			

Table 2.5: Maturity Model Synopsis [40]

Design Principles		BPMMM	PPI	PEMM	BPM-Fisher	PMMA
(1) Basic	1.1	Scope: BPM (BPM maturity); Descriptive (as-is assessment) and prescriptive PoU (roadmap for implement, future BPM strategy formulation); Design process is documented in res	Scope: BPM (process management in US firms); Descriptive PoU (evaluation of an organization's process management environment); Report commissioned by Rummler-Brache Group.	Scope: BPM (BPR project maturity); Descriptive PoU; was part of an empirical study on organizations that undertake BPR projects.	Scope: BPM (business process maturity, capabilities of any organization); Descriptive and prescriptive PoU (identify current gaps and specific actions to overcome these).	Scope: BPM&P (maturity of BPM and the processes); Descriptive PoU (assessment of the implementation of BPM); company-specific (Siemens AG); Comparison with other models: OMG BPM, BPMMM and PEMM
	1.2	5 stages; 6 factors with 5 capability areas each; Underlying theoretical model.	3 stages of process management maturity; 10 keys success factors (KSF).	5 groups of organizations with different BPR project maturity.	5 level; 5 levers of change (LoC).	5 maturity levels according to CMMI; 9 categories with 1-3 sub-categories each.
	1.3	BPM as a holistic management practice.	Not available.	BPR; Themes and dimensions of BPR; Types of BPR projects.	Not available.	BPM initiative at Siemens; BPM implementation topics.
	1.4	Research articles and PhD thesis.	Report.	Research article.	BPTrends article.	Research articles.

Table 2.5: Maturity Model Synopsis (cont. I) [40]

(2) Descriptive	2.1	Textual descriptions of stages, factors and capability areas.	Statements for the 10 key success factors.	Textual description of groups.	Textual description of levels; Maturity grid spanned by the level and levers of change.	Textual descriptions of all levels; Description of PMMA categories only given for maturity level 3.
	2.2	Detailed questions (assessment kit) to measure each capability area not available to public.	Process Performance Index (PPI) scorecard id provided; Maturity levels are assigned to score ranges.	Advice for assessments not available; Experiences made during the study are shared.	Assessment means to identify which cell description fits for each of the LoC.	No assessment questionnaire available; Experiences from first assessment at Siemens given.
(3) Prescriptive	3.1	Implicit to levels.	Not applicable.	Not applicable.	Implicit to cell descriptions.	Not applicable.
	3.2	Not applicable.	Not applicable.	Not applicable.	Eliminate the gaps between the current state and the desired state; Advance equally across LoC.	Not applicable.
	3.3	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.

Table 2.5: Maturity Model Synopsis (cont. II) [40]

Design Principles		BPOMM	PEMM	PML	BPMM-OMG	BPMM-Lee
(1) Basic	1.1	Scope: BPM&P (business process orientation maturity); Descriptive and prescriptive PoU (evaluate level of BPM and prescribe actions that could improve this level); Developed in the late 1990s.	Scope: BPM&P (individual processes and enterprise-wide capabilities); Descriptive (assessment) and prescriptive PuO (determination of where and how to improve).	Scope: BPM&P (maturity of an organization or process); Descriptive PoU (audit organizations to determine the current status of their BP efforts) De-formalization and interpretation of the CMM.	Scope: BPM&P (practices applied to the management of processes); Descriptive and prescriptive PoU; Foreword gives development history; Roots in CMM, CMMI and P-CMM; Different model uses given.	Scope: BPM&P (processes, product and/or service operations); Descriptive and prescriptive PoU (measuring and improving business process competence).
	1.2	4 stages; 3 components of maturity (process view, process jobs, process management and measurement).	Separation of 5 processes enables (PE) and 4 enterprise capabilities (EC).	Concept of maturity; 5 levels according to the CMM; Applicable to (sub-) processes and organizations.	5 stages similar to CMM; Process areas (PA); Informative content.	5 process maturity levels like the CMMI; Process areas (PA) are structured into input, output, mechanism and control quadrants.
	1.3	Business Process Orientation.	Process-based transformations.	Interrelations of functional units, value chains, and processes; Measurement issues.	Terms and definitions.	Not available.
	1.4	Book section; Research articles.	Harvard Business Review Article..	Book; BPTrends article.	496 pages of documentation.	Research articles.

Table 2.5: Maturity Model Synopsis (cont. III) [40]

(2) Description	2.1	Textual descriptions of maturity state.	Level statements for fine-grained enable components (#13) and elements (#13)	Textual description of levels.	Statements of goals/practices (these can be true or false).	Characteristics of maturity levels; Process areas are structured by levels and quadrants.
	2.2	Assessment guide to determine maturity score is not available; Specific model available for supply chain maturity.	Self-assessment sheets are provided; Evaluation to which degree statements is true; Example of application in practice is given.	Checklist; Work sheet template.	4 types of appraisals; Process area templates are provided; Creation of domain-specific BPMMs is explained.	Not applicable.
(3) Prescriptive	3.1	Implicit to levels.	Implicit to levels.	Not applicable.	Practices of process areas are described.	Implicit to levels.
	3.2	Not applicable.	Companies must focus on tackling the red areas first.	Not applicable.	Process areas indicate where an organization should focus to improve its processes.	Not applicable.
	3.3	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.

As for the evaluation of these models, they find that the basic principles and those for the descriptive purpose of use are covered sufficiently in general. Nevertheless, there is room for improvement with respect to more detailed descriptions of appropriate application setting and the provision and documented guidance could be identified. This means that maturity model adopters from practice still face a challenging task when searching for the right measures to improve their BPM capabilities from the level they already have achieved.

2.3.2. Detail of Selected Maturity Models

2.3.2.1 Process and Enterprise Maturity Model

Michael Hammer found the answer that how redesigning business processes work end to end across an enterprise which can lead to dramatic enhancements in performance. He observed in more hundreds of companies which little progress in redesigning business process. To make new processes work, he said that company must redefine jobs more broadly, increase training to support those jobs and enable decision making by frontline personnel, and redirect reward systems to focus on processes as well as outcomes.

Many companies need to change many things to harness the power of processes, but they are unsure about what exactly need to be changed, by how much, and when. Moreover, executives, especially when they work in different functions, often disagree about the factors that aid process-based transformations. Each has a pet idea based on his or her expertise. Like the six blind men and the elephant, one focuses on technology, another on human resource issues, a third on organizational structure, and so on, creating confusion and conflict.

Hammer's aim was to create a framework that would help executives comprehend, plan, and assess process-based transformation efforts. Certainly, companies can use techniques such as Six Sigma and TQM to ensure that employees execute processes correctly. However, redesigning processes is often the only way to improve their performance dramatically. Over time, he identified two distinct groups of characteristics that are needed for business processes to perform well and to sustain that performance "The Process and Enterprise Maturity Model". One set of features applies to individual processes. These process enablers determine how well a process is able to function over time. They encompass the comprehensiveness of a process's design, the abilities of the people who operate the process, the appointment of a top-level process owner to oversee the process's implementation and performance that match between the organization's information and management systems and the process's needs, and the quality of the metrics that the company uses to measure process performance. His research shows that not all organizations are equally prepared to put these enablers in place. Companies that are able to do so possess important enterprise-wide capabilities. Their senior executives support a focus on processes; their employees greatly value customers, teamwork, and personal accountability; they employ people who know how to redesign processes; and they are well organized to tackle complex projects.

Together, the enablers and capabilities provide an effective way for companies to plan and evaluate process-based transformations. The PEMM discusses the five process enablers and four enterprise capabilities.

There are five process enablers

Design: The comprehensiveness of the specification of how the process is to execute.

Performers: The people who execute the process, particularly in terms of their skills and knowledge.

Owner: A senior executive who has responsibility for the process and its results.

Infrastructure: Information and management systems that support the process.

Metrics: The measures the company uses to track the process's performance.

And four enterprise capabilities are

Leadership: Senior executives who support the creation of processes.

Culture: The values of customer focus, teamwork, personal accountability, and a willingness to change.

Expertise: Skill in, and methodology for process redesign.

Governance: Mechanisms for managing complex projects and change initiatives.

He identified and defined four levels of process enabler strength (P-1, P-2, P-3, and P-4), each of which builds on the preceding level. Organizations need basic competence in all the enterprise capabilities to get started on process redesign projects; they need greater competence if they are to progress with them. Just as there were levels of process enabler strength, there are four levels of enterprise capability: E-1, E-2, E-3, and E-4. Stronger organizational capabilities make for stronger enablers, which allow for better process performance. Thus, when an enterprise has E-1 level capabilities in leadership, culture, expertise, and governance,

it is ready to advance all its processes to the P-1 level; when all four capabilities reach E-2, the company can move along its processes to P-2; and so on.

Hammer tested PEMM in many American companies. For instant, Michelin that launched a process redesign effort to help increase customer focus and reduce costs. Michelin found that the human resource systems that supported the new process were below P-2 level. They had not redefined managers' jobs and the scope of their activities clearly enough. CSAA (the AAA club for northern California, Utah, and Nevada) conducted an analysis to figure out why some of its processes were performing better than others, it found that the problem lay in its enterprise capabilities. The cross-functional teamwork was not strong in the company's culture, so processes that resided largely within a single division. For instance, at Tetra Pak, the packaging equipment and materials giant, the unit's capabilities were more mature than the company's, partly because of the passionate commitment of unit's then head to process-based transformation. When the unit's redesigned its processes, its performance picked up; for instance, the accuracy of new products' delivery dates rose sharply, from 13% to 85%.

2.3.2.2 Business Process Maturity Model of OMG

Adoption of the Business process Maturity Model of OMG or BPMM-OME is expected to fill an unmet market requirement which strongly supports the OMG's mission as well as the products and services offered by vendors that implement the existing set of OMG standards. Organizations need a comprehensive and principled method for evaluating their business processes and organizational environment to determine the risks to successfully implement enterprise applications. Introducing BPMM as a standard will address at least five current challenges to the success of

1. Management has few standards for appraising the maturity of their business process workflows and needs proven methods for identifying risks process weaknesses pose for deploying enterprise IT projects and achieving business objectives.

2. Management has few proven methods for appraising the fidelity between how tasks are actually performed and how they are described in model-based representations of process workflows. This problem compromises the validity of system requirements, the accuracy of use cases and model-based representations, and the effectiveness of the application in use.

3. Management is often unaware of the extent to which organic growth or acquisitions have resulted in multiple ways of performing similar tasks. The creation of standard, tailor able processes simplifies the requirements for enterprise applications and as a result will reduce the complexity of enterprise systems.

4. Organizations have few proven methods for appraising a supplier's capability for delivering outsourced IT and other business services within the parameters claimed in a proposal. Further they need a proven basis for specifying contractual requirements for improvements in a supplier's business processes.

5. Monument needs guidance on how to implement the business process foundations required for organizational agility and lower operating costs.

The foundational principles are:

- Attributes of a process can be evaluated to determine its capability to contribute to organizational objectives.
- Capable processes cannot survive unless the organization is mature enough to sustain them.
- Process improvement is best approached as an organizational change program that staged the improvements to achieve successively more predictable states of organizational capability.
- Each stage or maturity level lays a required foundation on which future improvement can be built.

The Business Process Maturity Model rigorously follows the principle of Humphrey's Process Maturity Framework and was developed by co-authors of the CMM for Software, CMMI and the people CMM. The BPMM can be mapped to CMMI, but has been written to guide improvement of business processes which tend to more transactional and are better characterized as workflows across organizational boundaries rather than the more bounded project orientation of CMMI.

Effective appraisal techniques gather multiple, overlapping forms of evidence to evaluate the performance of the practices contained in the BPMM.

Compliance can be evaluated using following forms of evidence:

1. Review of artifacts that are produced by performing a process.
2. Review of artifacts that support performing a process.

3. Interviews with individuals or groups who perform a process.
4. Interviews with individuals who manage or oversee the performance of process.
5. Interviews with individuals who support the performance of the process.
6. Quantitative data used to characterize the state of the organization and/or the attitudes and behaviors of those in it.
7. Quantitative data describing the performance of a process, its outcomes, and business results.

There are four types of appraisals envisioned for the BPMM with varying levels of assurance that the practices of the model have been implemented in ways that achieve the intent of the practices and the goals of their associated process areas. These four appraisal forms are starter appraisal, progress appraisal, supplier appraisal, and confirmatory appraisal.

There are four primary ways in which the BPMM will be used and each will have different requirement for appraisals.

Guiding business process improvement programs- The BPMM is designed to guide improvement programs, and this is anticipated to be its most frequent use. Improvement programs should be initiated with an evaluation of the organization's current strengths and weaknesses.

Assessing risk for developing and deploying enterprise applications - The BPMM will be used to identify risks to the successful implementation of systems and to provide guidance on the actions to be taken to improve them prior to system deployment.

Evaluating the capability of suppliers- The CMM for software was originally developed to help DOD move beyond using lowest price as the basis for selecting among bidders. Similarly organizations need a trusted and open standard against which to evaluate the capability of their vendors for meeting their service level, quality, price, and functionality commitments.

Benchmarking - Management may want to evaluate where they stand relative to the maturity of business processes in their industry segment.

2.3.2.3 Business Process Maturity Model of Fisher

Devid M. Fisher [9] tried to provide balance between a simple representation to which everyone could easily relate vs. a model that contains sufficient detail as to provide insights for specific action for those organizations wishing to progress up the value chain, that an appropriate model for Business Process maturity must be (1) multi-dimensional and (2) non-linear.

From a dimensional perspective, he settled on two areas. The first selected dimension break down to the following components that represent the core of most organizations. It is called the “Five Levers of Change” that are Strategic, Process, Technology, Controls and Governance. The key to the Five Levers is the ability to achieve consistent alignment across all five. When that is achieved, then the organization is operating at a level where it can achieve optimal results.

The “Five Levers of change” dimension provides the components about which organize can assess the capabilities of any particular organization. As those capabilities advance, the company can progress through the second dimension of the model; that is, the States of Process Maturity. These states are as follows: Siloed, Tactically Integrated, Process Driven, Optimized Enterprise, and Intelligent Operating Network.

His model objective is to help companies identify their own gaps from where they are today across each of the five Levers of Change, and therefore identify specific actions that can take to overcome current limitations and ultimately achieve the benefits waiting for them as they move up the maturity mountain.

CHAPTER 3

Research Methodology

Since many years ago, Business Process Maturity Assessment model has been used to evaluate the maturity of large, medium and small-sized SMEs in many countries to conform the rapid changes of situations of global markets, which most of them are newly-formed industrial markets to high growth rate in the aspect of both social activities and business.

Many research papers mentioned about the importance of the adaptation for growth and survival of SMEs. For example, the research paper of Patrick et.al. [35], said that many companies had already started using process management techniques because they wanted to improve their business. Moreover, the paper of Perry [38] and Fu et al. [11], said that SMEs had deployed BPM to improve their customer services and increase the potency of their own business. While another paper [51], said that changing economic situations had led to an increasing interest among SMEs in improving their organizations. They began to aware of the potency of the organization, which affects the coordination of processes within the organization and the positive compatibility of it.

Finding appropriate business process assessment model for Thai SMEs, questions are listed below:

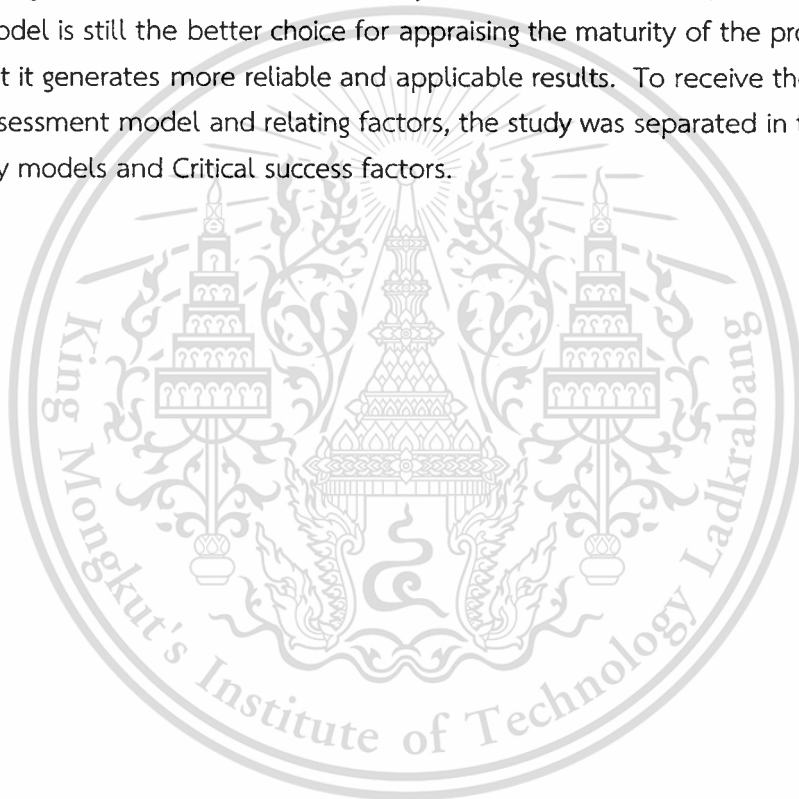
- What are the problems and factors affecting the implementation of business processing to small and medium-sized organizations in Thailand and how are they different from other countries?
- Which maturity model can be applied to small and medium-sized Thai SMEs by assessing current business process maturity in order to prevent and reduce some problems before the investment, innovation adoption, and process reengineering and how is it different from other models?

To find the answer for the questions, it is necessary to define the relationship between process-relating factors, assessing methods, and the assessment model so as to understand the overview of contents before studying the details of each.

Miers' Business Process Management Project Delivery Framework [33] was used in this study, acting as a model for constructing business-processing project successfully in order to attain the objectives. In addition, it also stipulates that each of the methods be followed consecutively, guaranteeing the results for both the owner of the business and

his partners, thus, complying with a theory that says “Before leaping into the implementation, it is necessary to spend your time understanding the process and looking for any chances available for the most effective development of the project”.

The next step is called “Identifying suitable project”, which helps evaluating current situations, as a result, perceiving the definite problems and being available to solve them reasonably by finding any factors whose characteristics are “relatively associated to lower level of maturity, high impact, and low complexity”. A matrix was created to compare and contrast the factors using the three dimension- maturity, impact, and complexity. For the maturity dimension, Miers agreed on five definition of maturity that range from the worst (1) to the very best (5). Nevertheless, BPM maturity assessment model is still the better choice for appraising the maturity of the process for the reason that it generates more reliable and applicable results. To receive the appropriate assessment model and relating factors, the study was separated in two topics; Maturity models and Critical success factors.



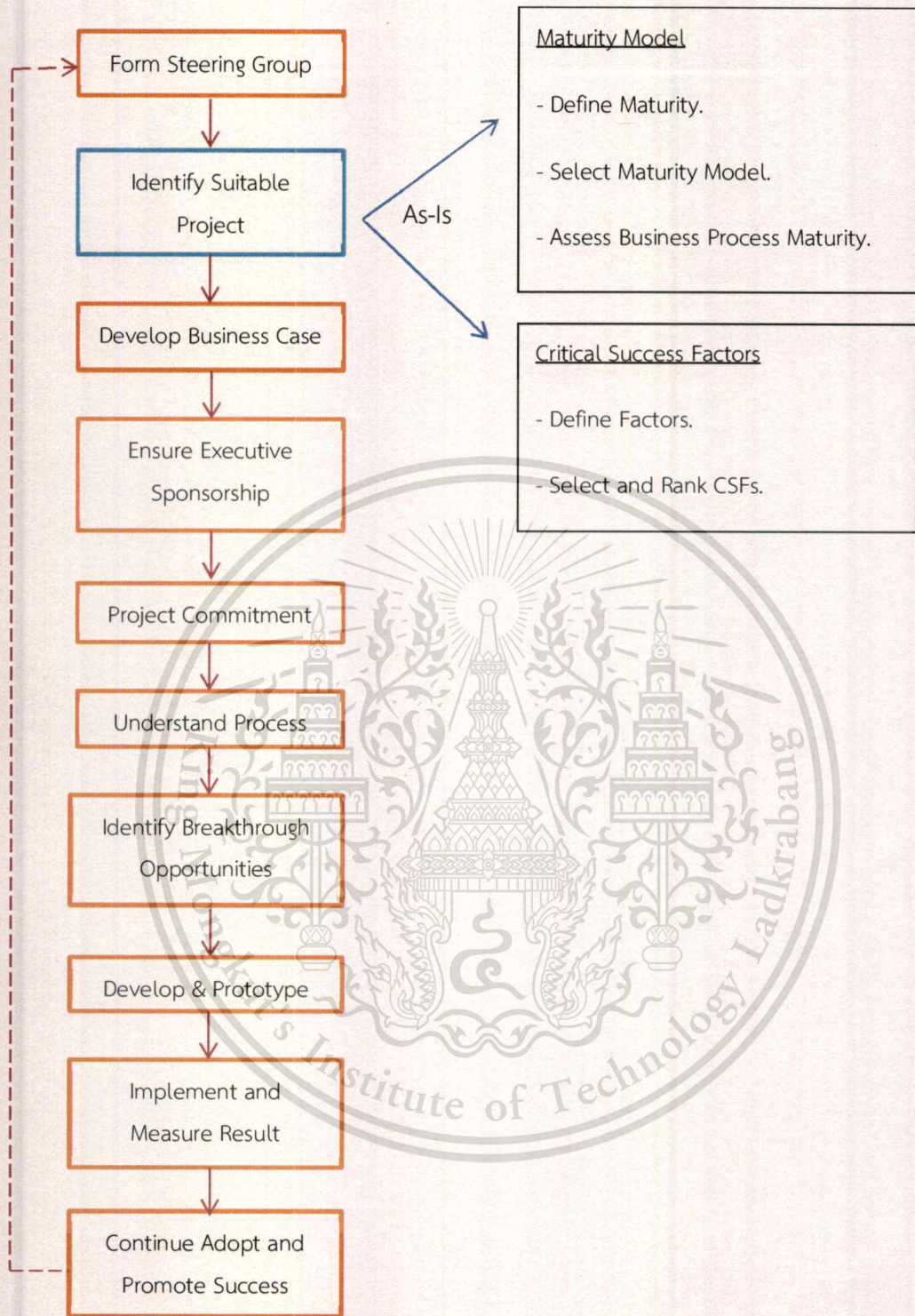


Figure 3.1: Business Process Management Project Delivery Frameworks with Maturity Model and Critical Success Factors

Within the maturity assessing model step in figure 3.1, many sub-steps are defined including 1. Define the level of maturity 2. Select a maturity model and 3. Assess

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business process maturity. Among these three steps, the second one is primarily emphasized. Regarding factors affecting the success of the project, many steps are listed as 1. Define factors 2. Select critical success factors. Yet, the proper analysis of suitable factors for assessing each type of organization is an essential topic to concern due to the difference in giving precedence to any factors within each organization.

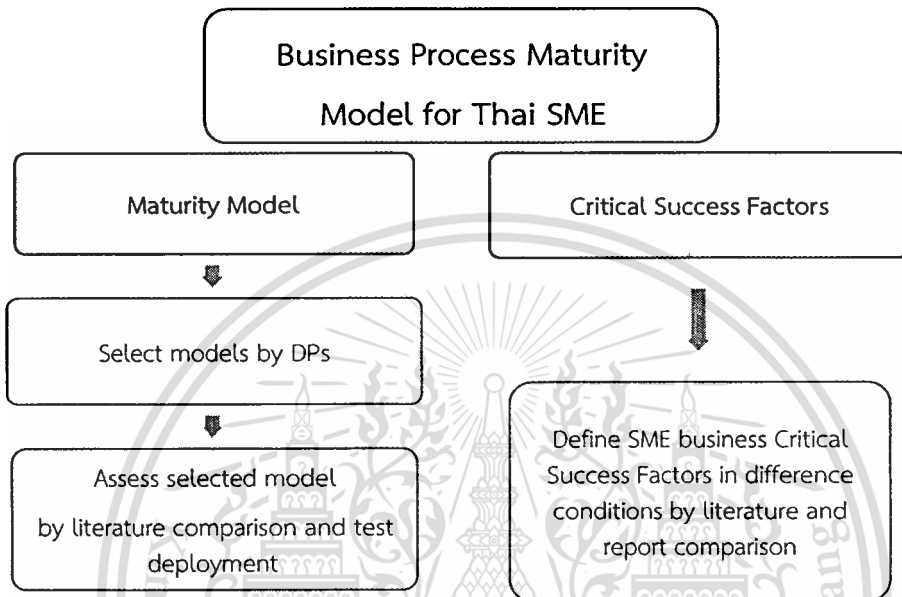


Figure 3.2: Methodology of Business Process Maturity Model for Thai SMEs Study

Methodology of Business Process Maturity Model for Thai SMEs study (figure 3.2) is separate to two topics. The first topic, Maturity Model, appropriate models matching with this study objective and conditions is defined by using Design Principles (DPs) theory and. After that, models are assessed the result of BPM adoption in SME by using comparison analysis method with international literatures and test deployment. The second, Critical Success Factors are defined by comparing literatures which adopt BPM in SME with business factors of SMEs in ASEAN countries to show the effects from differentiation business.

3.1 Maturity Model Selection

In order to generate an assessment model that is appropriate to the business situation in Thailand, it is decided to compare the BPM models which were usually used for only large-sized companies, making an insufficiency of appropriate evaluating tools

for other SMEs. In this study, the differences between SMEs and large-sized companies are mentioned. Moreover, the result from using the different methods in managing the business by each organization is noted as well. All of these are studied by comparing pros and cons from the difference between each of them and by finding BPM models that is congruous to the characteristics of Thai SMEs.

3.1.1 Model Selecting Method

According to Roglinger's the BPM assessment model, he decided to analyze the models made from the education system and the others by using the Design Principles (DPs) which is a method that generates assessment models following the three objectives and uses the well-founded checklist to assess the characteristics of the models.

The framework of general design principles (DPs) for maturity models comprises three nested groups of design principles. These are the basic principles for a descriptive purpose of use, and the principles for a prescriptive purpose of use. After analysis ten public maturity models, it has few numbers of models that have the principles for a prescriptive purpose of use, room for improvement with respect to more detailed descriptions of appropriate application settings and the provision of easy-to-use assessment guidelines. It is necessary for SMEs because they lack of assessment specialist.

3.1.2 Models Assessment Method

The assessing process is manipulated by implementing the results from researches to SMEs in order to find the problems while the model is in the assessing process. Then, models selected from the pre-existing topics are to be compared to find out if it can solve the problems and deployed to test run in real situation.

3.2 Critical Success Factors Defining Method

To find out factors having an impact on the implementation of the BPM, Many researches are studied, including native and foreign theses. Moreover, the common problems of SMEs among other AEC countries, which resemble Thailand in the aspect of social and economic status, are also analyzed. These factors are generally separated into six topics;

1. People and Culture
2. Methods and Information Technology
3. Strategic Alignment
4. Governance
5. Environmental effects
6. Finance

The first four topics (People and Culture, Methods and Information Technology, Strategic Alignment, and Governance) are considered to be factors generated inside the organization. Meanwhile, the last two topics (Environmental effects and Finance) are noticed as factors from outside the organization, which are uncontrollable. Actually, the financial topic was intentionally separated from the environmental topic because of the fact that it is the important problem that Thai SMEs are to be confronted with.

Each internal topic comes from adaption of Rosemann and Brocke's journal [48] which studies the six core element of business process management. The framework highlighting essential building blocks of BPM can particularly serve the following purposes: Project and Program Management, Vendor Management, Complexity Management, Standards Management, and Strategy Management from using Rosemann and de Brurin's [46] and BPM maturity model [6]. The consolidation of related literature, the merge of existing BPM maturity models the subsequent international Delphi studied and the case studies led to a set of well-defined factors that together constitute a holistic understanding of BPM [6]. For this study, environmental effects and finance are including for comparing factors in different situation.

Chapter 4

Analysis

4.1 Models Assessment

1. BPMM – Fisher

Fisher has compared each maturity level as a mount climbing with a different inclination level. The detail of the model, called “Capability Maturity Model” rather employs the information technology in an organization, this model is based on the software process assessment. Fisher’s model is lacked of a clear source structure origin and no practical feedback. The model has five assessment topics, including three fundamentals of process management, which are; Personnel, Processing, and Technology. Moreover, to cover the overall enterprise capability, Fisher has included the Strategy and Control topics.

2. BMPP- OMG

BPMM of the Object Management Group (OMG) was improved from the beginning model whose objective is to support the software adoption in enterprise. An application description has been written in details, digested into; definition, origin, reference, and work method, to improve hierarchic maturity level for assessor to immediately use it. There are four types of appraisals envisioned for the BPMM related to an associated implementing objective. Comparing to others, based on the “Best Practice” standard, the BPMM of OMG has a conceptual model. The concept of this model is to create a more general Business Process maturity Model (BPMM) which could be deployed in any fields of domain. It comes up with a visually clear relation diagram and linkage, but there is also an inconvenience, the point is that an assessor needs to study almost 500 pages of the assessment manual.

3. PEMM – Hammer

The Hammer’s PEMM model comes from an origin of the five years continuously study and analysis in numbers of company. It has a clearly highlighted difference between the Process Maturity and the Enterprise Capability, but, no given advices on the adaptation in each particular situations of the organization. The adoption practical results of the large size enterprises are shown in Harvard Business Review journal.

The comparison of each model has been spited and shown in three tables:

4.1 Details of the Model Criteria

4.2 Maturity Model Criteria Comparison

4.3 Maturity Model Description

4.4 Model Target

Table 4.1: Details of Model Criteria

Model	BPMM-OMG	PEMM		BPMM-Fisher
		Process Enable	Enterprise Capabilities	
1	Organizational Management	Design	Leadership	Process
	-Organization Improvement Planning -Organization Performance Alignment -Organizational Resource Management -Organizational Process Improvement Leadership	The comprehensiveness of the specification of how the process is to be executed.	Senior executives who support the creation of processes.	Operating methods and practices, including policies and procedures, which determine the way activities are performed.
2	Organization Process Improvement	Performance	Culture	Strategy
	-Organizational Product and Process Innovation -Organizational Improvement Deployment -Organizational Process Capability Management -Organizational Common Assets management -Organizational Process Management	The people who execute the process, particularly in terms of Their skills and knowledge.	The values of customer focus, teamwork, personal accountability, and a willingness to change.	Strategic understanding of the role, positioning and focus for enterprise-wide decision-making in support of overall company objectives.
3	Service Operation Management	Owner	Expertise	People
	-Quantitative Service Management -Service Management -Work Unit Requests Management -Work Unit Plan and Commit -Work Unit Monitor and Control -Sourcing Management	A senior executive who has responsibility for the process and its results.	Skills in, and methodology for, process redesign.	The human resource environment, including skills, organizaional culture, and organizational structure.
4	Service Operations Work Performance	Infrastructure	Governance	Controls
	-Continue Capability Improvement -Defect and Problem Prevention -Quantitative Process Management -Service Process Integration -Service Development -Service Deployment -Service Delivery -Service Maintenance and Support -Work Unit Performance	Information and management systems that support the process.	Mechanisms for managing complex projects and change initiatives.	The governance model for the management, administration, and evaluation of initiatives, with a strong focus on the appropriate metrics applied for measurement.
5	Service Operations Support	Metrics	-	Technology
	-Organizational Competency -Configuration Management -Process and Product Assurance	The measures the company uses to track the process's performance.	-	Enabling information systems, applications, tools, and infrastructure.

Table 4.2: Maturity Model Criteria Comparison

Strategic Alignment	Governance	Methods	Information Technology	People	Culture	Factor
Process Improvement Planning	Process Management Decision Making	Process Design & Modeling	Process Design & Modeling	Process Skills & Expertise	Responsiveness to Process Change	Capability Area
Strategy & Process Capability Linkage	Process Roles and Responsibilities	Process Implementation & Execution	Process Implementation & Execution	Process Management Knowledge	Process Values & Beliefs	
Enterprise Process Architecture	Process Metrics & Performance Linkage	Process Monitoring & Control	Process Monitoring & Control	Process Education	Process Attitudes & Behaviors	
Process Measures	Process Related Standards	Process Improvement & Innovation	Process Improvement & Innovation	Process Collaboration	Leadership Attention to process	
Process Customers & Stakeholders	Process Management Compliance	Process Program & Project Management	Process Program & Project Management	Process management Leaders	Process Management Social Networks	
PEMM						
	P-Design	P-Infrastructure	P-Performance, Owner		-Leadership -Governance -Culture -Expertise	
P-Metric						
E-Leadership	E-Governance, Methods	E-Expertise	E-Leadership			
BPM-Fisher						
Strategy	Process, Control	Technology	People	Strategy and Control		
BPM-OMG						
Organization Management; Improvement planning, Performance alignment, Resource management, Improve leadership						
Organization Process Improvement; Product and Process Innovation, Improvement development, Process Capability						
Service Operation Management; Quantitative service management, Service management, WU requests management, WU						
Service Operations Work Performance; Continue capability improvement, Defect and problem prevention, Quantitative process						
Service Operation Support; Organizational Competency, Configuration management, Process and product assurance						

Table 4.3: Maturity Model Description

Topic	Maturity Level Description		
Model	BPMM-OMG	PEMM	BPMM-Fisher
LV5	Organization's processes are continuously improved.	A process is the best in class, transcending the company's boundaries and extending back to suppliers and forward to customers.	All five Levers of Change must be in alignment throughout the entire ecosystem in order to share in the benefits available to companies.
LV4	Work process are managed quantitatively to establish predictable results.	A process delivers optimal performance because executives can integrate it. Where necessary, with other internal process to maximize its contribution to the company's performance.	The Optimized Enterprise has leveraged a commitment to continuous improvement, utilizing business-focused metrics to reach new levels of both efficiency and effectiveness.
LV3	Organization establishes standard processes and assets for performing the product and service work.	A process delivers superior results because the company has designed and implemented it from one end of the organization to the other.	The organization mind-set shift, as it must build the bridge that can get its across the gap from part of its mountain to the higher elevations on the back half.
LV2	Managers establish a stable work environment in their work unit.	A process is reliable and predictable. It is stable.	Companies have begun the effort to integrate the organization, and the typical leader in kind of initiative is the IT Department.
LV1	Individual efforts with no explicit process or organizational support.	Organizations have not focused on developing their business process. Process work erratically.	The organization operates silo.

Table 4.4: Model Target

Topic	Targets		
Model	BPMM-OMG	PEMM	BPMM-Fisher
LV5	- Planned innovations. - Change management. - Capable processes.	-	Intelligent Operating Network
LV4	- Real-time corrections. - Reduce/knowledge mgt. - Predictable results.	-	Optimized Enterprise
LV3	- Productivity growth. - Effective automation. - Economy of scale.	-	Process Driven
LV2	- Repeatable practices - Reduced rework. - Satisfied commitments.	-	Tactically Integrated
LV1	Hero worship.	-	Siloed

Table 4.1 shows the criteria and detail of maturity models. BPMM-OMG separates criteria in each maturity level by Role Responsibilities to link process areas that are organizational management, organization process improvement, service operation management, service operations work performance, and service operation support.

PEMM separates criteria in two main parts which are process enable and enterprise capability. Process enable have five criteria are design, performance, owner, infrastructure, and metric. Enterprise capabilities have four criteria are leadership, culture, expert, and governance for supporting all business processes.

BPMM of Fisher model has five assessment topics, including three fundamentals of process management, which are; Personnel, Processing, and Technology, Strategy and Control topics.

Comparing in Table 4.2 the six core-criteria of the Business process management study [46]; it is noticeable that the model description is similar in all criterions. For BPMM of OMG, process area cannot be separated into Rosemann's criteria.

Maturity level description of each Maturity model in table 4.3

The first level: Organization operates individual and not focused on developing their business process. OMG compare this maturity level with fire extinguish operation. It is natural state of affair in PEMM and solo operation in BPMM-Fisher.

The second level: Both OMG and Hammer focus on stable processes which OMG emphasizes on work environment in work unit by manager. Reliable and predictable processes in PEMM, but Fisher focus on organize integration together with IT.

The third level: Stabilization in process which link to others in OMG model. Hammer focus on end-to-end processes and filling in the gaps in BPMM-Fisher.

The forth level: This maturity level of OMG model is to build predictable results in processes. Both PEMM and BPMM-Fisher focus on optimization, process performance optimization in PEMM and enterprise optimization with continuous improvement in Fisher model.

The fifth level: Organization's processes are continuously improved in OMG model. Organize coordinates with suppliers and customers in Hammer model and all process must be in alignment in Fisher model.

Hammer's model does not clearly specify the target in each maturity level, despite an overview, shown in table 4.4. All three models have similar objective which is an awareness of the current situation, planning for all over big and small projects, and finally is to lead to the clear and direct business process improvement.

The Organization capability and other theoretical models have been used as a model prototype supporting part of the selected models. Starting from the Hammer's PEMM, the process enabling and organization capability separation has gotten a link with the Six Sigma, shown in table 4.5 and 4.6. The OMG's BPMM is the combination of the three business management tools; Business Process Management, Total Quality Management, and Organization Change and Development, shown in figure 4.1

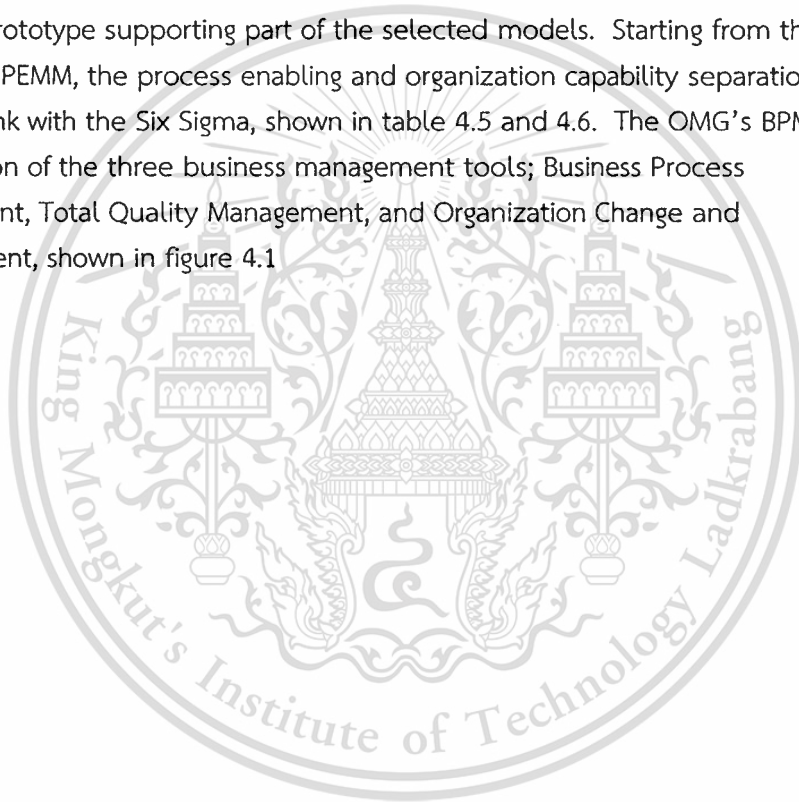


Table 4.5: Process and Enterprise Maturity Model with Six Sigma

Process Enablers		P-1	P-2	P-3	P-4
Design	Purpose				
	Alignment				
	Documentation				
Performance	Knowledge				
	Skills				
	Behavior				
Owner	Identify				
	Activities				
	Authority				
Infrastructure	Information systems				
	Human Resource Systems				
Metrics	Definition				
	Uses				
Enterprise Capability					
Six Sigma	Initiate				
	Define				
	Measure				
	Analyze				
	Implement				
	Control				

Considering on original model, Watts Humphrey's model creation called "Process Maturity Framework" in 1980s at the software Engineering Institute in the late 1980s is the original model of BPMM-OMG and PEMM. Moreover, the Humphrey's framework was elaborated into the Capability Maturity Model for Software and being improved to the Capability Maturity Model Integration, lately. The Fisher's BPMM does not have clarified source origin information; it is only known that it came from the CIMM.

Six Sigma concepts has been employed in the description of PEMM process maturity seeking to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes.

BPMM of OMG composed of the three business process management tools, which are Business Process Management (BPM), Total Quality Management (TQM), and Organizational Change and Development (OCD). TQM is defined as a continuous effort by the management as well as employees of a particular organization to ensure long term customer loyalty and customer satisfaction). It views an organization as a collection of process [31]. The concept of organizational change is in regard to organization-wide change, as opposed to smaller changes such as adding a new person, modifying a program, etc. Examples of organization-wide change might include a change in mission, restructuring operations (e.g., restructuring to self-managed teams, layoffs, etc.), new technologies, mergers, major collaborations, "rightsizing", new programs such as Total Quality Management, re-engineering, etc. Some experts refer to organizational transformation. Often this term designates a fundamental and radical reorientation in the way the organization operates (Carter M).

Method of process maturity assessment, Fisher and Hammer emphasized in creating a rapid assessing model by comparing short fundamental condition in each minor maturity level. PEMM is different, it uses percentage assessing method; largely true, somewhat true, and largely untrue. The BPMM-Fisher is just divided into all true or not. It helps an assessor to delicately define an improvement priority.

After assess prescriptive in the BPMM by DPs, "specific practices" of new process areas have to be implemented at each maturity level to guide improvement way for specific organize. It hold true for the PEMM, too. Hammer gives the additional advice that organization "must focus on tacking the red areas [...] first. Moreover, the BPMM-OMG report also includes guidelines for organizational change management. Finally, The Fisher's BPMM suggests providing a simple vehicle to

assess the current state across all five Levers of Change, identify the gaps between the current state and the desired state, and then develop a top-down action plan to eliminate those gaps and provide the opportunity to achieve the desired benefits.

4.2 Models Result Assessment

4.2.1 Literature Comparison

There is only little online information of BPM model adoptions results in the SMEs researches. Only one research study of Patrick and colleagues shown below involves in the business process assessment using a Hammer's maturity model.

Hammer's research has only been adopted in a large size enterprise. Later, Patrick and colleagues has employed the PEMM to test in the small and medium size enterprises because of an uncomplicated assessing method and the open-end description which could go together along with an interview process.

From the poll interviews conducted in 11 out of 20 small and medium enterprises in the manufacturing and service sector in Austria, the poll shows that even the Initial Maturity Level of the assessment has not been achieved yet. Patrick has modified the Hammer's model by increasing five more sub-initial levels prior to the Hammer's model starting level whose main three sub-initial criteria are Performance and Culture, Leadership, and Processes. Result shows that SME is still lack of a clarified process maturity, documentation, and process design. Many processors think that the documentation is not need because of the time taken; moreover, most of them are family businesses or too small size business.

Growing to the global market, the organization could not expand to the global market without the documentation and the business process management in their enterprise, which help them to negotiate and deal with the complexion of the organization. This adversity could results as a survival of the organization. The study result conforms to the research data, called "Organizational capability in SMEs: Performance measurement as a key in supporting company development", which had interviewed over five years in a hundred of Italian companies. It show that the organizational capability of the small and medium size organization is poor but, yet, good enough for the firms survival. Finally, the firms have all overcome an organizational crisis in the last five years and are still on the competitive market.

4.2.2 Test Deployment

The proper Business maturity model selection for Thai SME is the Hammer's Performance and Enterprise Maturity Model (PEMM). The model was deployed to the 18 SMEs, supplier of the Siam Michelin Co., Ltd. Limitation of the test is that all the result could be shown only in a summary data, relating to the company regulations. Suppliers are all medium size enterprises with a number of less than 200 operators and the maximum fixed asset of less than 200 million baht. All of the companies are the steel industrial who support either raw material or parts for the tire mold-production.

Most of the selected SMEs, 76% of them have gotten a maturity level P-0 in process enable assessment and 24% have gotten maturity level P-1 in process enable. Over 61% of enterprises got the level E-0 in the enterprise capability assessment, and the rest are in level E-1. The major inhabiting factors, over than 70%, of the BPM adoption in SME are stated below;

- Lack of senior manager/leader support.
- Lack of strategic level clarity.
- Lack of well-defined responsibility of accountability.
- Lack of information technology expertise.
- Lack of diversity skill.
- Poor performance evaluation.
- Lack of financial resources.

The feedback from operational part, staff and leader assessors shown that the PEMM assessing method is easy to understand with a tighten description. In the meanwhile, assessors should also have overview knowledge of the enterprise. The basis of business management and English skills are also required for a better understanding of the assessment model and negotiation.

4.3 Critical Success Factors

Samples of business process management adoption in SME come from literatures observation in each area environment. Many literatures focus on assessing BPM in either software or information technology adoption. The selected literatures in this study aim to develop the maturity model to be applicable in all SME fields. Information below is the literature sources comparison;

1. Imanipour and team [20] deployed a mixed method research to find out a factor from 122 questionnaires in 28 unique businesses to define list factors, with their important perception.

2. Chong's research [5], interviewing 10 Australian Wine SMEs, has transcribed and analyzed in detail using the qualitative data analysis tool NVivo 2.0. Result shown is in the five most important factors which have an effect on the BPM implementation in SME.

3. Quantitative data from the ASEAN Small and Medium Enterprises Promotional Office [59], showing the SMEs problems in all 10 ASEAN countries are analyzed and shown in percentage of numbers of problem having countries among all countries.

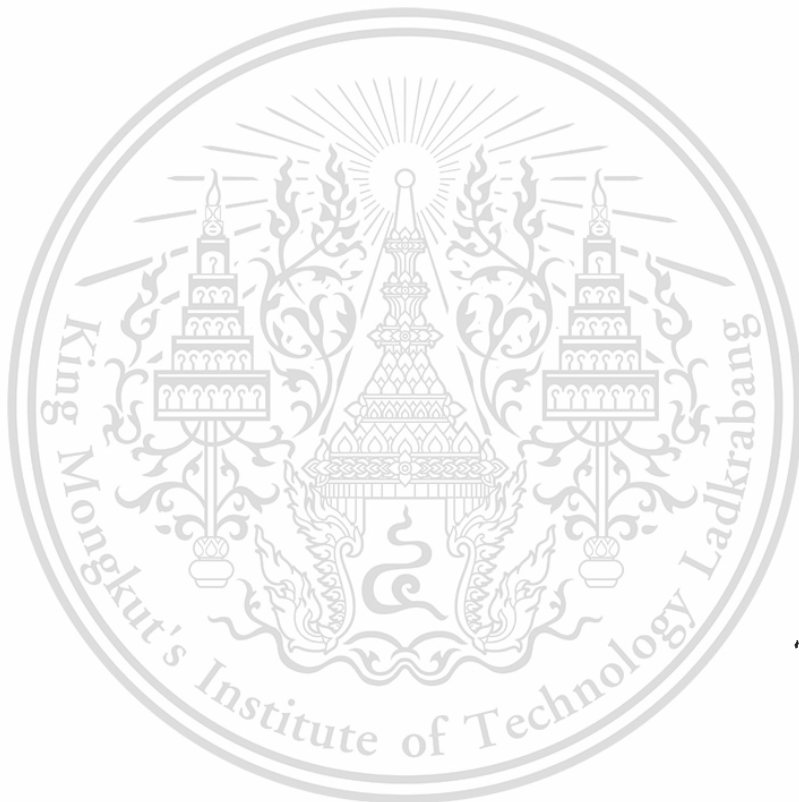


Table 4.7: Critical Success Factors in Each Literature

BPMM	Wine industry	BPM implementation and adoption in SME	ASEAN	Thailand
People and Culture	Support from Senior Manager	Lack of understanding of the BPM technology and its perceived advantages and/or believe in BPM's unnecessary and ineffectuality in top management. The absence of a cross functional mind set amongst top management	50%	
	-	-	Lack of foreign language skills. 30%	
	-	Resistance to change because of fear of technological change (change process and utilization consequences)	10%	
	Poor Knowledge of Process Oriented Approaches	Poor knowledge of process oriented approaches and lack of BPM education in employees.	-	
	-	Lack of human resource and multiple roles of employees	50%	
Methods and Information Technology	Information Technology Expertise	Poor external (Software as a service or outsourcing the project) implementation and/or Improper BPM software or service for SMEs.	70%	
	-	Lack of BPM project support in implementation and adoption (supervisors, top management).	60%	
	-	Lack of defined business metrics and/ or measurement protocols for assessing process management performance.	-	
	-	Poor internal (by firm's employees) implementation and/or lack of methodological rigor in execution.	-	
Strategic Alignment	-	Underestimation of work flow disruptions due to change.	10%	
	-	Lack of companies offering BPM software and services.	50%	
	Time	Lack of time and pressure stemming from it.	-	
Governance	-	Lack of clarity on a strategic level.	10%	
	-	BPM's Intrinsic complexity and lack of standard and specific methodology.	10%	
(Environmental effect)	-	Lack of government support/involvement and not taking a leading/guiding role.	30%	
Finance	-	Pressure from stakeholders to preserve current firm structure.	-	
	Finance Resources	Lack of financial resource and the pressure stemming from it. Lack of affordability due high cost of implementation, start up or usage.	80%	
Business Process Inbound Others			Has effect in Thailand	

After collecting the data from different sources which have different business conditions, problems were separated to each critical success factor (chapter 3) for comparing effect. Comparison results in table 4.7 show that criteria in maturity model cover all internal criteria. Criteria of "BPM Implementation and Adoption" literature quite same as ASEAN Small and Medium Enterprises Promotional Office literature which a most importance problem is lack of project support in implement and adoption. Moreover, the critical problem of all literatures is poor external implementation and/or improper BPM software or service. The other main problems are absence of a cross functional mind set amongst top management to adopt BPM in their business, same as the research result of Miers literature which active him to create Project Delivery Framework, and the language difficulties in negotiation in many ASEAN countries include with Thailand.

External criteria, other than politic or culture which are specific in each area, a main point is lack of government or private support that affect SME business lack of information. Government is always short of awareness to solve problem directly. Other huge problem is poor finance. SME lacks of financial resource and the pressure stemming from it and lack of affordability due high cost of implementation, start up, and usage. The standards developing organization with clear current situation and prospects of mutual are needed to reduce the problems.



Chapter 5

SUMMARY AND SUGGESTION

This study emerged due to the lack of data assessing the SMEs, the merging of the Business managing process with the small and medium SMEs - together with the Business process maturity, prior in Thailand.

The Business maturity assessment adoption depends on the readiness and requirement of the organizations. The SMEs is inclined to the lack of the business assessment and prototype experts who could counsel and suggest the appropriate prototype for the organizations to aim their goals.

From the comparison of the three adopted prototypes, based on the design principle, prototypes were selected to assess the factors effecting Business process assessment adoptive in Asian SMEs. The analysis and comparison results of these prototypes show that they all have a resemble factor of the Business assessment and all also cover the most affective factor of the SMEs Business process management. Hammer's prototype is the most proper and forthright to the criterion. In the other hand, if the SMEs are able to assess the organizations in detail, the OMG's Business assessment prototype would be a good choice of adoption because of the details robustness. The last prototype, the Fisher's - the inferiority of this prototype is the lack of the prototype structure explanation and the practical adopting data, so this is not meet the study objective.

The most affective factor related to the Business process management in Thai from could be studied from the BPM adoptive journal in the small and medium size organizations. The research could be concluded that each SME is facing similar problems;

- The unrealized of the BPM importance in Manager's vision.
- The lack of the information technology knowledge and experts.
- The lack of public and private sponsors.
- The lack of Business process improvement fund.

Rather than these, many Asian SMEs are facing the language difficulties in negotiation, the process standard improvement for data tracking and the business process development. The prototype choosing should be studied further in practical use, together with the data collecting and analyzing to adjust the prototype to fit with the Thailand SMEs conditions.

Suggestion: Before adopting the maturity assessment of process management, the explanation of the definition, importance, and the advantages. Moreover, most of the factors identifies, are common between different industries in different environments. Some of the factors are industry specific or region specific or at least have different impact in different situations. There is a danger of organizations believing that once they have purchased a process-modeling tool, it will solve all their problems and the process improvements will just follow. Nothing could be further from the truth. A process-modeling tool is just a piece of software, and without a methodology or framework, skilled sources to use it and a genuine commitment from organizational leadership, it is useless, and should also be aware of the misunderstood of the BPM. John and Johan [24] had analyzed on the misunderstood of the BPM implementation in the medium and big organization, likewise;

1. BPM is better than the part options for process improvement. BPM has certainly raised the visibility of process improvement for many organizations. BPM has also focused many academic and consultants back onto processes and several organizations have been created solely to focus on process. This is definitely a good thing, as the discussion on standards and BPM in general continues to raise its profile and maturity in the marketplace. Learning from past experience, such as BPR, has also been taken into consideration.

Real: The key point is that BPM is only as good as the buy-in you get from the organization and management.

2. BPM uses new and better technology. There are far too few full automated enterprise-wide BPM implementations to validate this claim at this point in time. In our experience, technology should not be the initial focus in a BPM

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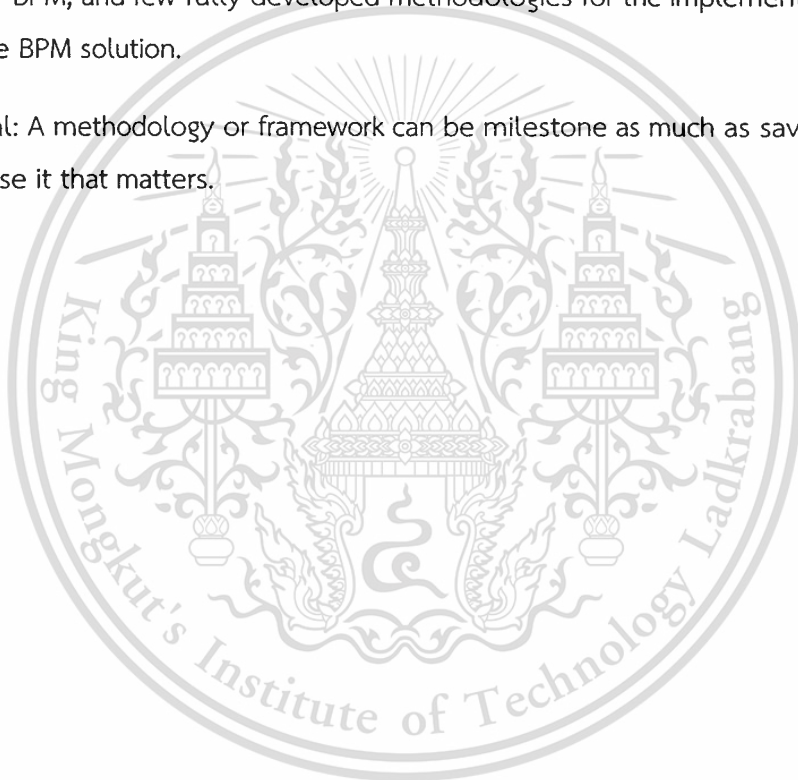
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implementation. The initial work should relate to reviewing the current processes with a goal of increased efficiency and effectiveness. While these new improved process could contain suggestions for automation, significant process improvements can be achieved without the use of technology.

Real: People become carried away with the ‘bells and whistles’ and look at what technology could do for organization, rather than what it needs to do for the organization.

3. There is a robust methodology to support BPM. There are methodologies for parts of BPM, and few fully developed methodologies for the implementation of a complete BPM solution.

Real: A methodology or framework can be milestone as much as savior; it is how you use it that matters.



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