A Review of Practice and Problems in Requirements Engineering in Small and Medium Software Enterprises in Thailand

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Abstract—This paper reports on a study investigating the current state of requirements engineering problems and practice amongst small and medium software companies in Thailand. The main objective of the study was to determine areas to improve in requirements engineering processes. Data was collected through semi-structured interviews with eleven small and medium enterprises (SMEs). Results show that software firms in Thailand encounter common problems such as clarity, correctness, completeness, change management, and customer communication. The result also shows the development needs in SMEs such as software process improvement, RE knowledge, requirements management tools, training, and knowledge transfer.

Index Terms—Software Engineering, Requirements Engineering, SMEs, Process Improvement.

I. INTRODUCTION

Understanding the current state of requirements engineering practice in software industry is an important step for researchers and practitioners in order to improve software process [1]. In spite of attempts to practice requirements engineering in small and medium-sized software enterprises in order to improve software quality, the significant issues relating to this area such as inconsistent and incomplete requirements, and inadequate requirements management tools still remain [2-6]. The motivation for carrying out research into the current state of practice in requirements engineering was to collect information from practitioners to understand what needs to be changed, and how to improve requirements process, in order to increase the quality of products and reduce development cost. To obtain information about the current state of practice, semi-structured interviews were used. This is a common method for research design to collect qualitative data from participants [7, 8].

The Western world has proposed improvement models such as ISO/IEC 15504 from the International Organization for Standardization (ISO) and, Capability Maturity Model Integration (CMMI) provided by SEI, the "Requirements Engineering – a Good Practice Guide" by Sommerville and Sawyer [9], IEEE recommended software requirements specification [10], and Volere Requirements Specification Template [11]. A number of studies have found that software process improvement models broadly deliver significant benefits such as increased product quality, reduced risk, and improved customer satisfaction [12-15]. However, those models are generally tailored for western cultures. Although Thailand has been making attempts to improve software quality by undertaking western software process improvement models in the last decade, less than five percent of the 380 companies in Thailand were successful [16]. According to Porrawatpreyakom, et al. [17] an efficient software process is influential in quality software development. One of the factors that play an important role for inadequate requirements engineering in Thailand is cultural differences.

To investigate the current state of practice in requirements engineering in Thailand, as well as current main issues in small and medium software firms, development need, and knowledge transfer, interviews were conducted with eleven companies. The questions addressed main four requirements processes, which consist of requirements elicitation, requirements analysis and negotiation, requirements validation, and requirements management [9].

This paper begins Section II with a background and related work in software engineering process and requirements engineering in SMEs in general. The research methodology is described in Section III. Section IV presents analysis and findings of the semi-structured interviews that was developed to question SMEs about their company background, process requirements engineering, and requirements problems in SMEs. Section V illustrates limitations of study methods. Section VI gives a summary of the discussion and conclusion and an outline of our future work concludes the paper in Section VII.

II. BACKGROUND AND RELATED WORK

A. The Definition of SMEs in Thailand

The definition of Small and Medium sized company is provided by the Ministry of Industry in Thailand. These companies can be divided into four categories: manufacturing industry, wholesale industry, retailing industry, and service

industry. Software development enterprises are included in the manufacturing and service industries categories. The manufacturing and service industries define a 'small' enterprise as one, which corresponds to any of the following; with employees of up to 50 or with assets of up to 50 million baht. For a 'Medium' enterprise, the manufacturing and service industries definition is an enterprise which corresponds to any of the following; with 51 to 200 employees or with assets of no less than 50 million baht and up to 200 million baths [18].

B. Requirements Engineering Process in Small and Medium Enterprises

A number of surveys in the literature have focused on the challenges which relate to requirements engineering in small and medium software development enterprises. In 1988, Curtis, Krasner, and Iscoe provided information on designing problems in large software system. The authors state that the three main issues, which impact on project success, were change facilitation, broad communications and coordination, knowledge sharing, and integration [19]. Lubars, Potts, and Richer conducted a study of software system requirements activities in ten organisations [20]. The authors concluded that organizational solutions are preferred over technology and general-purpose tools such as spreadsheets, database management systems, and word processors were used to support requirements development [20]. Hall et al. report similar findings, that most of the requirements problems those companies face were organizational issues. Also, their findings suggest that organizational issues may exacerbate all types of requirements problem—in particular— insufficient skills and weak staff retention. Such problems have significant impacts on the capability of the requirements processes to produce good initial sets of requirements [2]. El Emam and Madhavji studied requirements engineering practices in Canadian organisations [21]. The authors identified seven key issues of concern in requirements engineering practice. Those issues consist of package consideration, managing the level of detail of functional process models, examining the current system, user participation, managing uncertainty, benefits of CASE tools, and project management capability.

A study on requirements engineering in German SMEs was presented by Kamsties et al. emphasizing that the specific problem in SMEs were concentrated on quality and process improvement and demand for knowledge transfer relevant to requirements engineering [3]. Similarly, Nikula et al. presented a state of the practice survey on requirements engineering in small and medium sized enterprises in Finland. The study focused on "current requirements engineering practices, development needs, and preferred ways of technology transfer" [22]. Nikula et al. discovered that there was low level in technology transfer from academic to enterprise and software companies desire to improve their requirements practices such as development of own requirements process adaptations, requirements engineering process improvement, and automation of requirements engineering practices [22]. Tahir and Ahmad discuss some problems in 27 software firms in Malaysia. They found that the Malaysian practitioners devoted more effort to coding and unit testing than to the requirements engineering phase by 32.9%. In addition, the study reveals that the Malaysian practitioners practice main requirements activities such as a feasibility study, requirements analysis, and requirements prioritization. However, the more subtle activities especially risk analysis and requirements inspections were not well performed [23].

Alves and Sotero presented their experience technology transfer project to improve the requirements engineering process in four small and medium Brazilian companies. Alves and Sotero stated that cooperation and interest of participants were important to technology transfer [24]. Solemon et al. describe the result of current state of requirements engineering problems and practice in Malaysia; they concluded that organizational and technical factors were challenged in requirements development [25]. Fernandez et al. conducted an international survey in consolidate association with several researchers in different countries such as Germany and Netherlands [6]. There has been some research which suggest that Thai culture impacts requirements elicitation [26], and requirements engineering [27]. The results indicate that the major problems were incomplete requirements, communication flaws with customers, moving targets, cultural problem, and time boxing.

In conclusion, although most existing research attempts to practice requirements engineering in small and medium software enterprises in order to improve software quality, the significant issues relating to this area remain. It has been noted that there are several factors affecting requirements engineering for small and medium software enterprises, including lack of knowledge and practice, technology transfer, organizational problems, and a need for new method and techniques. In Thailand, several software companies have lack of knowledge and skills in requirements engineering. The cultural context is another important issue for Thai developers. Therefore, this research studied requirements engineering practices in SME businesses in Thailand and propose and evaluate improvement.

C. Geert Hofstede's Cultural Dimension

In order to understand human behavior in different countries, the model of cultural differences has been broadly studied in social science. Geert Hofstede is a social psychologist whose cultural dimension theory has been accepted by many researchers in this area. Geert Hofstede's analysis defined six dimensions of national culture that were positioned against analysis of 40 initial countries [28].

The six dimensions of cultural differences consist of power distance, uncertainty avoidance, individualism versus collectivism, masculinity versus femininity, long term versus short-term orientation, and indulgence versus restraint [28].

Hofstede mentions that high power distance is common in the Thai culture. Hofstede states that "Power distance is defined as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally" [29]. In Thailand, directors are expected to be authoritative and inferiors are expected to be followed.

III. RESEARCH METHODOLOGY

We conducted semi-structured interviews which include a mixture of open-ended and specific questions, designed to elicit information foreseen and unexpected types of information [7]. The interviews have provided a rich and detailed account of 11 software firms , 5 small companies and 6 medium companies, in Thailand. The objective of the interview was to collect practitioner's perspectives and their experiences.

A. Questions Design

A set of interviews questions was prepared, but the participants could be flexible depending on the conversation flow of each interview.

The interview questions guide was organized into three main parts. Part 1 contains questions that ask for the company backgrounds of our participants. Part 2 contain questions related to investigating the respondents' requirements engineering practices in software development projects. This part lists 30 requirements engineering practices which are grouped into 4 main processes: requirements elicitation, requirements analysis and negotiation, requirements validation, and requirements management. Part 3 contains a list of open-ended questions which are focused on requirements problems in SMEs, requirements management tools, and development needs. The questions were gathered from literature such as [5, 9, 22, 29, 30].

B. Data Collection

The main source of information to select the software development enterprises in Thailand is the list of software company in Thailand, available from the Software Park Thailand website. Software Park Thailand is an organization under the National Science and Technology Development Agency (NSTDA), and was established to stimulate the development of the Thai software industry [31].

The interviewees were selected based on their responsibilities in gathering requirements from users, and who were constructing requirements specification for the company.

Before starting the interview, a pilot interview was held by telephone with the 3 software firms to test validity and reliability. We then revised the interview guide and sent it with a collaboration letter, reference letter and consent form to the small and medium enterprises in three provinces of Thailand for scheduling an interview by e-mail and telephone. The data were collected by telephone interviews during 3rd May – 12th May 2013. The interviews took approximately 30 minutes to 1 hour. Each interview was tape recorded and transcribed for analysis.

C. Data Analysis

According to qualitative method was selected in order to provide rich description of phenomena, therefore the most suitable method of data analysis in this research was grounded theory which was presented by Glaser and Strauss [32]. Grounded theory was selected for a research study in order to analyze qualitative data, develop higher-order themes reports, and interpretations. The analysis in this research was implemented in order to summarise the current key issue of requirements engineering from the SMEs. The occurrence of problems in each interview transcript was recorded. Following Gillham [33], he analysis proceeded by highlighting essential statements in each transcript, determining categories for the questions and then creating an analysis spreadsheet, and inserting the reference against the statement on the original transcript. The results from the analysis are found in Section IV.

IV. ANALYSIS AND FINDINGS

A. Part 1: Company Background

The interview questions are divided into three main parts which are: general questions or company background, requirements engineering processes and current problem. There are two interviewees who come from the same organisation and they play different role in the company. This study interviewed software engineer, IT manager, system analysts, project managers, testing engineer, chief operating officer, team leader network programming, senior programmer, programmer, and system architect. The company characteristics are summarised in Table I.

TABLE I. COMPANY CHARACTERISTICS

Company	Business Size	Domain	Development Process
A	Medium	Business Information System	Waterfall & Agile
B	Small	Office Automation	Waterfall
C	Small	Business Information System	Waterfall & Agile
D	Small	Multimedia, animation applications, and web applications	Waterfall
E	Medium	Traffic management.	Waterfall & Agile
F	Medium	Customization, Mobile applications	Rapid prototyped
G	Medium	Business Information Systems	Waterfall
H	Small	Customizing Application	Waterfall
I	Small	Business information system and system integration (SI) Telecommunication	Waterfall, Rapid Prototype, and Agile
J	Medium	Web application, and embedded application	Waterfall & Agile
K	Medium	Business information system	Waterfall & Agile

The eleven organizations developed software in the following domains: business information systems, office automation, multimedia, animation applications, web applications, traffic management, mobile application, system integration, telecommunications, customizing application, and embedded application. The most commonly used of development life cycles was the Waterfall model [34], which was used by nine companies. Five companies are using a mix of Agile and Waterfall. Only two companies used rapid prototyping. The respondents were asked about the process maturity. Most of the companies did recognize CMM (The

Capability Maturity Model), however, only three medium-sized companies obtained CMMI (Capability Maturity Model Integration) level 2 and level 3. Those companies were also certified to ISO 9001, ISO 20000, and ISO 20001. One other interviewee clarified that their company attempted to obtain ISO and CMMI certification, however, the problem was the small number of employees available to implement it.

B. Part 2: Process Requirements Engineering

The second part of the questions concerned the practice in requirements processes. We report our results collected from the questions (Q2.1-Q2.30) formulated in order to explore which of the practices are most adopted by the small and medium software companies. Questions in this section were divided into four main requirements engineering processes of elicitation, analysis and negotiation, validation and management. Also, requirements management tools and development needs were also elicited from participants.

TABLE II.   REQUIREMENT ELICITATION PRACTICES

ID	Question	Percent	
		Yes	No
Q2.6	Poorly requirements are prototyped?	100	0
Q2.7	Set of scenarios are developed?	92	8
Q2.1	Feasibility study is conducted?	83	17
Q2.2	Organisational actors are concerned?	83	17
Q2.4	Domain constraints are studied?	83	17
Q2.5	Multiple viewpoints are collected?	83	17
Q2.3	Business concerns?	75	25
Q2.8	Requirements are reused?	75	25

The first set of process questions (Q2.1-Q2.8) were formulated in order to know which elicitation practices are most applied by the software companies. The results are ordered by highest percentage. Table II shows that the most important activity for small and medium business in requirements elicitation was to "prototype poorly understood requirements" (100%). The practitioners in software companies also practice other activities as shown in the table such as "developing a set of scenarios" and "conducting feasibility studies". The lowest scores for an elicitation process were in using business concerns to drive requirements elicitation and in reusing requirements, both with 75%.

TABLE III.   REQUIREMENT ANALYSIS AND NEGOTIATION PRACTICES

ID	Question	Percent	
		Yes	No
Q2.14	Multidimensional approach to classification?	92	8
Q2.10	Checklists are used?	83	17
Q2.13	Priorities are assigned?	83	17
Q2.9	System boundaries are defined?	75	25
Q2.16	Risks are assessed?	75	25
Q2.12	Conflicts are arranged?	58	42
Q2.11	Negotiation tools are provided?	42	58
Q2.15	Interaction matrices are used?	17	83

Table III illustrates the percentage of requirements analysis and negotiation practice in software companies (Q2.9-Q2.16). The top three practices in requirements analysis and negotiation were "classifying requirements using a multi-dimensional approach" (92%), "using checklists for requirements analysis" (83%), and "prioritising requirements" (83%). In contrast, small and medium software enterprise less concerned about conflicts and negotiation. As can be seen from table III, almost sixty percent software companies did not provide negotiation tools to support requirements analysis and negotiations process.

TABLE IV.   REQUIREMENT VALIDATION PRACTICES

ID	Question	Percent	
		Yes	No
Q2.20	Validation checklists are defined?	100	0
Q2.22	Requirements test cases are proposed?	100	0
Q2.17	Standard Document checked?	92	8
Q2.19	Multi-disciplinary teams are reviewed?	83	17
Q2.21	Prototyping to animate is used?	67	33
Q2.18	Formal inspections are organized?	42	58

Table IV shows our interviews collected from the next six questions (Q2.17-Q2.22). The questions related to practice in requirements validation. "Validation checklists" and "Prototyping to animate requirements" both have 100%, but it is interesting to note that more than fifty percent of the interviewed companies do not have organized formal requirements inspections.

TABLE V.   REQUIREMENT MANAGEMENT PRACTICES

ID	Question	Percent	
		Yes	No
Q2.23	Each requirement is uniquely identified?	92	8
Q2.28	Change management policies are defined?	83	17
Q2.27	A database to manage requirements is used?	67	33
Q2.30	Rejected requirements are recorded?	67	33
Q2.24	Policies for RM are defined?	58	42
Q2.26	Traceability manual is maintained?	58	42
Q2.25	Traceability policies are defined?	50	50
Q2.29	Volatile requirements are identified?	42	58

Table V represents the result of requirements management practice (Q2.23-Q2.30). We can note that result of the requirements management practice was that traceability policies are not commonly defined (50%), An interesting result, however, the participants indicated that they achieved in change management in absence of traceability (83%).

The study included information about requirement management tools adopted by SMEs. The most commonly used tool was Microsoft Excel, which was used by fifty percent of the eleven companies (Figure 1). Although there are many requirements management tools encourage managing effectively requirements, Microsoft Office is still widely used in software enterprises in Thailand. However, some medium sized companies do attempt to use appropriate tool support for requirement management activities. For example, thirty-three percent of the interviewed companies used IBM Rational (DOORS) to manage their requirements. In contrast, some

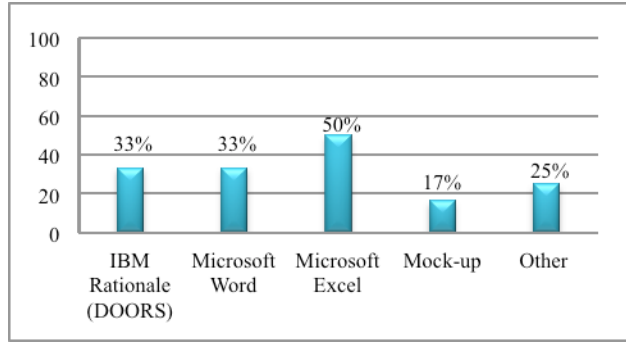small companies selected open source requirements management tools such as the Mike tool [35].

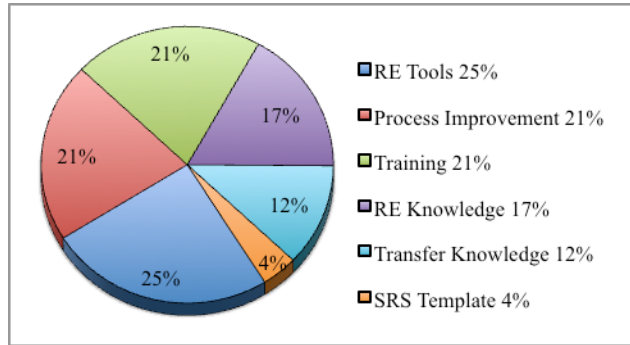Fig. 1. Requirement Management Tools used by SMEs.

Fig. 2. Development Needs in RE.

The survey also looked at development needs in SMEs. It was found that the highest priority development needs in SMEs business were software process improvement, RE knowledge, requirements management tools, training, and transfer knowledge. As can be seen from Figure 2, twenty-five per cent of the eleven companies found requirements management tools essential for their business success. The most important reason why those companies need requirements management tools was the lack of support for requirements engineering activities in current tools. In order to improve software development work the companies also considered their requirements process improvement activities and training.

In summary, although there are many requirements management tools that support requirements management, Microsoft Excel is still the most popular tool for small companies to manage their requirements. However, several medium companies used IBM Rational DOORS to support requirements traceability. These results also indicate that the training requirements engineering knowledge was needed by software developers in SMEs.

C. Part 3: Requirements problems in SMEs

To examine the different perspectives and experiences of practitioners, we explored current requirements problems through qualitative questions. Interview questions were developed based on some of the problems identified in related literature [5, 9, 22].

The following are some of the most important RE problems faced by small and medium enterprises in Thailand gathered from twelve interviewee's perspectives. The practitioners of software development companies participated in semi-structured interviews. The importance of the problem was determined based on the frequency in which they appeared in the interview transcripts. A summary of problems, in order of their frequency is presented in Table VI.

TABLE VI. SUMMARY OF RE PROBLEMS AFFECTING SMEs IN THAILAND

Number	RE Problems	Occurrence in interviews (n = 12)	
		Frequency	(%)
1	Changing requirements	8	67
2	Requirements are inconsistent or incomplete	8	67
3	Lack of user involvement	8	67
4	Lack of communication with customer	7	58
5	Scope creep	7	58
6	Inadequate tools support	4	33
7	Lack of RE knowledge in development team	4	33
8	Stakeholder Issues	3	25
9	Poor requirements documents	2	17
10	Time Limit	2	17
11	Cultural	2	17
12	Inadequate requirements management	1	8
13	Lack of cooperation with business partner	1	8

The table demonstrates that top three current main issues in requirements engineering were changing requirements, requirement inconsistency or incompleteness, and lack of user involvement (all with 67%), followed by lack of communication with customer, and scope creep (58%). We review the top 5 issues identified below.

1) *Changing Requirements:* One of the three most frequent problems identified was requirements change. To develop the software, project teams have to manage their requirements changes with change management control during development life cycle. Requirements changes with the initial design phase of requirement processes might be acceptable to a project team, but can still have an impact on the quality of the product. When these changes take place in the coding or testing phase the result can be very costly. As a result, software companies were greatly concerned about change management, although it was difficult to deal with customer's satisfaction. Requirements volatility describes the changes to requirements that occur during system development, which typically lead to a significant growth in requirements size [36]. The causes of volatile requirements raised by practitioners were government regulations, lack of technical knowledge of clients, lack of experience to the project development team professionals, technology changing, and

poor communication between customers and project team. As can be seen from table VI causes of changing requirements problem associated with lack of requirements knowledge in development team with 33% and lack of communication with customer with 58%.

2) *Requirements Are Inconsistent or Incomplete:* Poor requirements quality is often defined as requirements being with inconsistent, incomplete, incorrect, and ambiguous requirements. Inconsistent and incomplete set of requirements may be caused by a lack of training and experience, requirements engineers who are inadequately trained, are unable to contact stakeholders or gather good quality requirements from other sources [37]. From the practitioner's perspective, it was impossible to gather completed requirements from the users. Although requirement engineers attempt to elicit customer's need as much as possible, changing requirements mean that the companies have to deal with eliciting activities many times.

3) *Lack of User Involvement:* User involvement is an important factor that impacts the software project. According to software development team's perspective, most of the users do not have background or any knowledge about system analysis. It was difficult to elicit requirements from the users at the initial phase because they cannot explain what they want or what the system should do. Although the development team attempts to arrange meeting at initial phase with users in order to gathering requirements and negotiating with them, users do not participate in the system development process to the extent that they should. As a result, misunderstandings of user requirements between stakeholders will cause problems in requirement process. The finding of the current study is consistent with that of Wiegers (2000) who found during gathering requirements phase, users generally claim to be too busy to clarify the requirements [38]. The endeavour of the SMEs companies to deal with this problem was to schedule meeting several times in order to gather requirements as much as possible. In addition, the users usually request a user interface or prototype rather than consider a full SRS. Development team also provided user interface (UI) in order to support customer satisfaction, because it was easier for user to clearly understand the system requirements.

4) *Lack of Communication with Customers:* Communication between development team and customers is a vital activity to elicit effective requirements in software development processes. Typically, developers are familiar with representing requirements information as diagrams or flowcharts, whereas customers prefer to communicate in term of natural language. Consequently, when stakeholders involved with the project use the different forms of requirements to communicate, confusion is inevitable. A related factor is misunderstanding of technical terminology in computing from users, because they do not have the computing background. In order to mitigate communication obstacles with customers, prototype and graphic user interface were represented. Rawas and Easterbrook noted that the

important factors affecting the success of requirements engineering process and the effectiveness of communication are organizational and social issues [39].

5) *Scope Creep:* Even if project scope has been clearly defined at the beginning, scope creep can still occur. During development uncontrolled changes or continuous growth in a project's scope usually happened, particularly when prototype or user interface are proposed. Although scope creep can have very serious effects on the overall development project, project teams have to allow for scope change because the satisfaction of the customers is the most important to SMEs. The effects of scope creep are late delivery, increased cost and rework. Managing scope creep in development project is a challenging situation in small and medium company because of limitations of finance and resources. Negotiation between software firms and customers is normally used to solve the problem, for example to reschedule the delivery date in case of a minor change or offer the next phase development in case of major change.

The other requirements engineering issues in SMEs should be considered is cultural problem. Two interviewees explained that national culture in a country is important and influence the requirements development. Thai culture is associated with power distance [28] in decision-making because the subordinate would not to take responsibility in unsuccessful implementation of a decision that may bring uncertainty for job security and blame. In order to avoiding mistakes subordinates tend to avoid decision- making [27]. This problem disadvantages practitioners by slowing down development, because the developers could not move to the next phase until the requirements specification is approved by executive level. Understanding Thai culture and its implication toward requirements engineering influences successful design and acceptance of new information system [26].

V. LIMITATIONS OF STUDY METHODS

In this study we have presented detailed data collected from 11 software companies. It may not be appropriate to generalise from such a relatively small sample, although our data should provide potential start-points for further study in the area of requirements processes.

The results we present are perceptions from the development organization. We did not elicit contributions from users and customers who may perceive quite different problems. This would be a very worthwhile extension to this study.

VI. DISCUSSION AND CONCLUSION

This current state of practice and problem survey investigated requirements engineering knowledge and development needs in eleven small and medium software enterprises. The investigation was conducted as semi-structured interview covering RE practice, the company background, RE process in general, RE tools, and current key issues in requirements engineering in Thailand. The questions were a combination of close-ended questions and open-ended

questions. Qualitative data were collected with eleven Thai software development firms, comprising five small companies and six medium companies in Thailand.

The result indicates that SMEs in Thailand considered requirements engineering practice essential to improve development process. The four main processes consist of elicitation, analysis and negotiation, validation, and management well practiced by interviewed companies. Although Waterfall model is widely used in those companies, it is noticed that five companies are using a mix of Agile and Waterfall. Microsoft Excel is still the most popular tool for small companies to manage their requirements. However, the first priority development need was to have a requirements management tool.

The current key issues related to requirements engineering in small and medium businesses in Thailand have been identified such as changing requirements problem, requirements inconsistency or incompleteness, lack of user involvement, lack of communication with customer, scope creep, inadequate tools support, lack of RE knowledge in development team, stakeholders issues, poor requirements documents, time limit, cultural problem, inadequate requirements management, and lack of cooperation with business partner.

These findings, suggests that even though small and medium software enterprises in Thailand are well practiced in requirements engineering process, software companies still challenges with organizational and technical issues. Thus, they need requirements engineering knowledge and training in order to improve practitioner's skills. Moreover, specific requirements tools should be provided to encourage software development team to improve software quality and customer satisfaction.

Also, we found out that cultural context is should be considered in Thailand, because understanding Thai culture will benefit software development companies in understanding their users' behavior and work practice in order to improve their requirements engineering processes.

In summary, it is important to investigate small and medium software enterprises in Thailand, and integrate the approaches into those companies in order to encourage software developers' adoption of requirements engineering practice.

VII. FUTURE WORK

The results from this study were focused on current state of practice in requirements engineering in Thai small and medium software enterprises. Several challenges emerge as future work. For example, to investigate how SMEs use requirements management tools to support their requirements activities, to explore the communication issues are made worse by cultural issues. We will perform further analysis on the agile development process to investigate the potential to reduce problems such as lack of user involvement and cusotomer communication. Furthermore, those companies were concerned about development needs in software process improvement and training requirements engineering knowledge. Therefore, the future work will attempt to conduct an industrial case study with Thai SMEs contacts to identify improvements on requirements engineering practice. In addition, we will endeavour to propose some improvement to requirements engineering practice and evaluate the result.

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