A Survey of Early Adopters of Agile Methods in Thailand

Nalinpat Porrawatpreyakorn
Faculty of Information Technology
King Mongkut's University of Technology North Bangkok, Thailand
nalinpatp@kmutnb.ac.th

Abstract— **For immediate and sustainable improvement, it is important to continually investigate the current usage of agile methods in several aspects. This study presents the findings of the current usage of agile methods in Thailand, which aims at providing a clearer picture for future directions in agile software development. Data were collected through online questionnaires from 63 agile practitioners during October 2012 to March 2013. The results reveal that Scrum and whole team are the most favorite used method and process; whereas personal interest and enterprise or team culture are key drivers of agile adoption and agile use, respectively. Inadequate training is a key impediment; while limited support for distributed development environment is the most critical limitation. Surprisingly, knowledge transfer is perceived as being potentially more important than improved software quality. Time is the most utilized as one of project evaluation criteria. Besides, a minority of respondents' organizations provided internal and external training courses to software development teams. In a nutshell, the results of this study have a great similarity with prior survey results.**

Keywords-agile, early agile adopters, agile adoption, survey

I. INTRODUCTION

Agile methods such as Scrum, eXtreme Programming (XP), Scrum/XP hybrid, Lean, Kanban, Test Driven Development (TDD), Feature Driven Development (FDD), and Behavior Driven Development (BDD), were created to cope with potential limitations in traditional software development such as the need for well-defined requirements, time-consuming process, excessive documentation, and high cost [1]. Agile methods have been recognized as effective methods due to their response to market expectation with high quality software [2] and their benefits such as improved software quality, faster time to deliver product, increased flexibility in development, and lower development costs [3]. Although this has been recognized in many countries for decades [2], agile methods have just been promoted in Southeast Asia such as Malaysia and Thailand [4, 5]. This is evidenced by only a small number of published studies on agile software development in Thailand.

To use agile and deal with any existing challenge effectively, the current usage of agile in several aspects need to be explored not only at the beginning stage of agile emergence but also continuity. For example, Vijayasarathy and Turk [3] investigated agile software development from early adopters in many countries such as the United States of America, Canada, India, the United Kingdom, Australia, and New Zealand. They found that Test-First and XP were the most extensively used. Personal interest and project turn-around time were key drivers of agile adoption and agile use, respectively; whilst organizational resistance was a major impediment in adopting agile. Moreover, better meeting customer needs was recognized as a major benefit which led to user satisfaction.

Asnawi et al. [5] addressed the perceptions on agile adoption from early agile software practitioners in Malaysia. They found that Scrum was widely used. Its processes, for example, the involvement from all parties from the beginning, daily standup meeting, and sprint and continuous integration, could deliver more benefits. However, there were numerous challenges encountered when introducing agile, e.g., a lack of awareness. Furthermore, agile practices were also identified from early agile adopters in Thailand [4]. Those practices include whole team, unit testing, sustainable pace, coding standards, small release, and acceptance testing.

In addition, VisionOne [6] investigated agile practitioners around the world in 2011 and found that Scrum continued to make up more than two-thirds of agile methods being used. Daily standup, iteration planning, and unit testing were recognized as core employed techniques; while a lack of experience with agile methods and a lack of understanding of broader organizational change were reported as leading causes of project failure. Accelerating time to market, increasing productivity, and more easily managing changing priorities were cited as the top three reasons for agile adoption. Besides, the ability to manage changing priorities, improved project visibility, and increased productivity were mostly realized as substantial benefits.

These existing surveys are evidence to show the necessity to pay continuous attention to agile usage. Consequently, this paper presents a survey of early agile adoption in Thailand, which aims to address its current usage and answer the following research questions. They are (1) what agile methods and processes are mostly used?, (2) what factors influence agile adoption decision and agile use?, (3) what agile problems and limitations do agile software practitioners face?, (4) what benefits are agile software practitioners perceived from using agile?, (5) what criteria do agile software practitioners use for project evaluation?, and (6) how much do organizations provide training to agile software practitioners? The results of this study provide directions for further research on agile software practices.

II. RESEARCH APPROACH

This section describes how the research is designed.

A. Data Collection

In this study, an anonymous online questionnaire in Thai language has been created for data collection from early adopters of agile methods in Thailand from October 2012 to March 2013. The questionnaire is based on survey studies on agile usage, especially [3], and discussions with a leading agile software coach and practitioner in Thailand.

B. Respondent Profile

We obtained 63 responses from agile software practitioners who have a median value of 5 years of software development experience as shown in Figure 1.

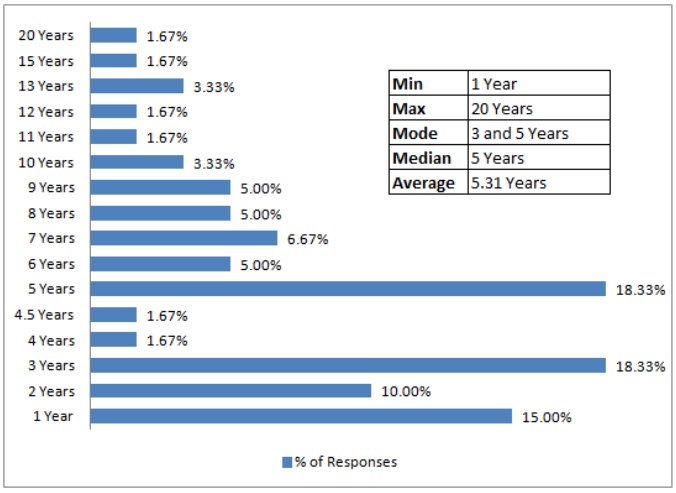

Figure 1. Years of software development experience

A majority of them have 1-6 months of agile software development experience; while three groups of them have experience time with agile software development equally as shown in Figure 2.

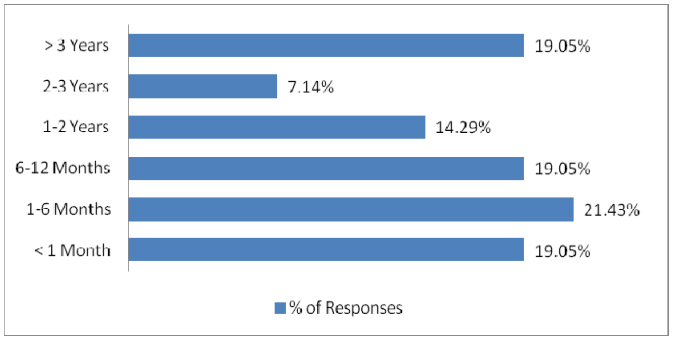

Figure 2. Years of agile experience

The majority of the respondents are male (68%) and have job titles as developer or programmer (42.86%). Some have job titles as team leader (14.29%), first-line manager (6.35%), system analyst (4.76%), top manager (3.17%), middle manager (1.59%), and others such as mixed role job, process specialist, and quality assurance (25.40%) as shown in Figure 3.

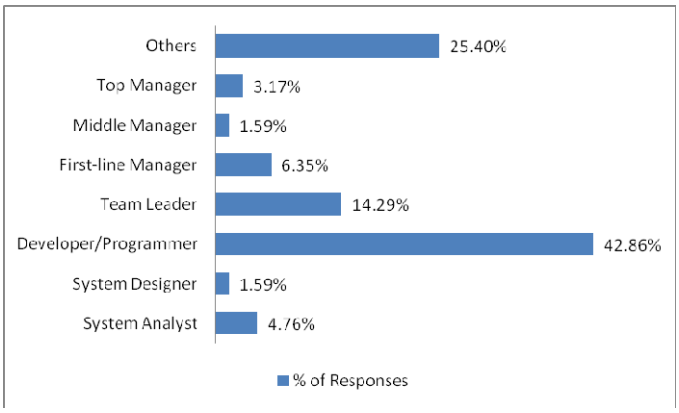

Figure 3. Job titles

The respondents' organizations cover a variety of industry sectors. Nevertheless, a majority of them are from Software and Information Technology (73.02%). Some are from Telecommunications (7.94%), Government (6.35%), Finance and Insurance (4.76%), and Education (3.17%). The respondents' organizations are shown in Figure 4.

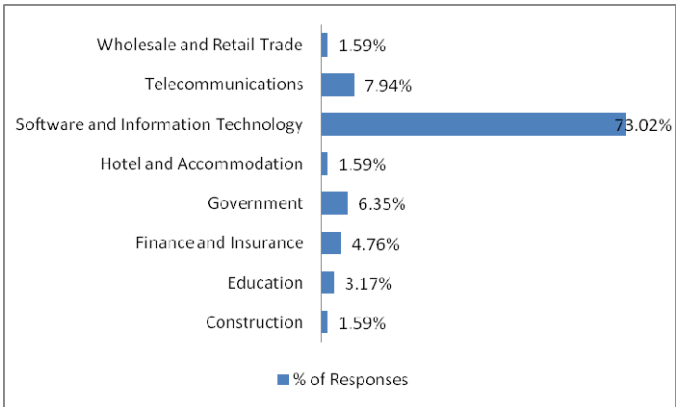

Figure 4. Industry sectors

Within those organizations, 40.43% are large organizations (more than 200 employees), 36.17% are small organizations (1-50 employees), and 23.40% are medium organizations (51-200 employees) as shown in Figure 5.

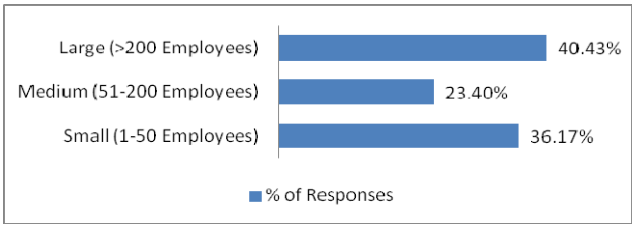

Figure 5. Organization sizes

As agile software development in Thailand is in the beginning stage [4], there are a small portion of agile software

practitioners. This study has extracted responses from individuals who have agile software development experience. They can thus be representatives of early agile adopters.

III. RESULTS

This section presents the survey results which answer the research questions of this study.

A. What agile methods and processes are mostly used?

1) Agile Methods

In line with prior worldwide survey results [5, 6], Scrum is the most popular agile method with 75% usage. TDD (30%), Scrum/XP hybrid (23%), XP (16%), Kanban (16%), and Agile Modeling (14%) are slightly less extensively used; while the others (e.g., Scrumban and Behavior Driven Development) are rarely used as presented in Table I.

TABLE I. AGILE METHODS

Agile Methods	No. of Responses	% [a]
Scrum	43	75%
Test Driven Development	17	30%
Scrum/XP	13	23%
Extreme Programming (XP)	9	16%
Kanban	9	16%
Agile Modeling	8	14%
Feature Driven Development	4	7%
Lean	4	7%
Scrum with Lean	3	5%
Scrumban	2	4%
Behavior Driven Development	1	2%

a. Percentages add up to more than 100% because each respondent can answer more than one item.

2) Agile Processes

Table II shows that whole team (66%) is the most extensively used. It is followed by face-to-face communication (54%), less documentation (51%), and release early and release often, simple design, and working with customers (equally 49%), and individuals and interactions (48%). On the other hand, sustainable pace and some other agile processes (e.g., using Scrum board or real whiteboard to get more fun, unit testing, and acceptance testing) (equally 11%) are the most rarely used.

TABLE II. AGILE PROCESSES

Agile Process	No. of Responses	% [a]
Whole team	40	66%
Face-to-face communication	33	54%
Less documentation	31	51%
Release early, release often	30	49%
Simple design	30	49%
Working with customers	30	49%
Individuals and interactions	29	48%
Refactoring	26	43%
Coding standards	24	39%
Continuous integration	24	39%
Pair programming	24	39%
Collective code ownership	23	38%
Responding to change	23	38%
Self-managing teams	21	34%
Supportive agile environments	18	30%
Motivated individuals/teams	17	28%
Sustainable pace	11	18%
Others	11	18%

a. Percentages add up to more than 100% because some organizations use more than one agile method.

B. What factors influence agile adoption decision and agile use?

1) Factors Influencing Agile Adoption Decision

Table III shows that personal interest (58%) is the most significant factor influencing the decision to adopt agile methods. It is followed by organizational demand (53%), peer groups, social networks, or communities, and quest for productivity, value, and success (equally 37%), and agile experience and customer demand (equally 27%). On the other hand, some other factors (e.g., directions of senior management) (3%) are the least influential factors.

TABLE III. FACTORS INFLUENCING AGILE ADOPTION DECISION

Factors Influencing Agile Adoption Decision	No. of Responses	% [a]
Personal interest	36	58%
Your organization	33	53%
Peer groups, social networks, or communities	23	37%
Quest for productivity, value, and success	23	37%
Agile experience	17	27%
Customer demand	17	27%
The failure of traditional development methods, e.g., Waterfall	15	24%
Education/training/seminar	14	23%
Project success by agile individuals or groups	10	16%
Books or seminars by leading proponents of agile	6	10%
Others	2	3%

a. Percentages add up to more than 100% because each respondent can answer more than one item.

2) Factors Influecing Agile Use

Table IV shows that corporate or team culture (67%) is the most significant factor influencing agile use. It is followed by improved communication and collaboration (49%), size of project team (43%), size of project (36%), and project turn-around time (31%); while others are slightly less significantly influent factors.

TABLE IV. FACTORS INFLUECING AGILE USE

Factors Influencing Agile Use	No. of Responses	% [a]
Corporate/team culture	41	67%
Improved communication and collaboration	30	49%
Size of project team	26	43%
Size of project	22	36%
Project turn-around time	19	31%
Software complexity	17	28%
The failure of traditional development methods, e.g., Waterfall	16	26%
Distributed software development	15	25%
Stability of requirements	14	23%
Project complexity, e.g., organizational structure, high risk, and high impact	13	21%
Availability of required skill-sets	12	20%
Building reusable artifacts	10	16%
Use of sub-contracting	6	10%
Others (e.g., the need to learn new software development methods)	1	2%

a. Percentages add up to more than 100% because each respondent can answer more than one item.

C. What agile problems and limitations do agile software practitioners face?,

1) Problems in Using Agile

Table V shows that inadequate training and a lack of self-management skill (equally 42%) are the most critical problems in using agile. They are followed by actual process not being conformed to agile processes due to strong familiarity with traditional software development (38%), a lack of peer support (33%), impact on development time (29%), a lack of discipline (27%), and incompatibility between organizational culture and agile (25%). On the other hand, some other problems (e.g., increasing stress due to timebox systems, and agile gaining less acceptance in an organization) (5%), team having agile knowledge but not implementing it and inadequate requirements (equally 4%) are the most rarely faced problems.

TABLE V. PROBLEMS IN USING AGILE

Problems in Using Agile	No. of Responses	% [a]
Inadequate training	23	42%
Lack of self-management skill	23	42%
Actual process not being conformed to agile processes due to strong familiarity with traditional software development	21	38%
Lack of peer support	18	33%
Impact on development time	16	29%
Lack of discipline	15	27%
Incompatibility between organizational culture and agile	14	25%
Individual resistance	13	24%
Lack of team decision making authority	13	24%
Inadequate testing	12	22%
Organizational resistance	12	22%
Lack of rewards	11	20%
Misconception of matching agile to traditional practices, resulting in the actual processes not being conformed to agile processes	11	20%
Lack of guidelines	10	18%
Low quality of project documents	9	16%
Financial impact	6	11%
Increased risk of project failure due to no successful agile projects being able to be used as prototypes	6	11%
Micro-management	6	11%
Team having agile knowledge, but not being able to adapt it in real-life practice	5	9%
More defects/bugs	4	7%
Others	3	5%
Team having agile knowledge, but not implementing it	2	4%
Inadequate requirements	2	4%

a. Percentages add up to more than 100% because each respondent can answer more than one item.

2) Limitations of Agile

Table VI shows that limited support for distributed development environments (38%) is reported to be a potential agile limitation. It is followed by limited support for development involving legacy systems (37%) and large teams (33%), and for sub-contracting (31%). On the other hand, limited support for building reusable artifacts (6%) is the least recognized as agile limitation.

TABLE VI. LIMITATIONS OF AGILE

Limitations of Agile	No. of Responses	% [a]
Limited support for distributed development environments	20	38%
Limited support for development involving legacy systems	19	37%
Limited support for development involving large teams	17	33%

Limitations of Agile	No. of Responses	% [a]
Limited support for sub-contracting	16	31%
Limited support for developing large, complex software	12	23%
Lack of perfect compatibility with CMMI	10	19%
Limited support for developing safety-critical software	10	19%
Lack of standards	7	13%
Limited support for building reusable artifacts	3	6%

a. Percentages add up to more than 100% because each respondent can answer more than one item.

D. What benefits are agile software practitioners perceived from using agile?

The most astonishing part of this survey is that 62% of all respondents perceived knowledge transfer as the most valuable benefit perceived from using agile, as presented in Table VII. It is followed by faster time to delivery (58%), improved software quality (53%), greater team morale, job satisfaction, and fun (48%), reduced development time (47%), increased flexibility in development and increased predictability of schedule (equally 42%), and lower risk of project failure (35%). On the other hand, increased predictability of cost (17%) and no cost overrun (15%) are perceived as the least valuable benefits.

TABLE VII. BENEFITS PERCEIVED FROM USING AGILE

Benefits Perceived From Using Agile	No. of Responses	% [a]
Knowledge transfer	37	62%
Faster time to delivery	35	58%
Improved software quality	32	53%
Greater team morale, job satisfaction, and fun	29	48%
Reduced development time	28	47%
Increased flexibility in development	25	42%
Increased predictability of schedule	25	42%
Lower risk of project failure	21	35%
Better meeting customer needs	19	32%
Increased productivity	17	28%
Improved second skills	16	27%
Increased predictability of quality	14	23%
Increased production of reusable code	13	22%
Increased predictability of cost	10	17%
No cost overrun	9	15%

a. Percentages add up to more than 100% because each respondent can answer more than one item.

E. What criteria do agile software practitioners use for project evaluation?

Table VIII shows that time (75%), quality and user satisfaction (equally 71%) are the most used as project evaluation criteria. They are followed by delivery of business value (53%), cost (39%), and frequency of delivery (36%); while some other criteria (e.g., return of investment and ability to have multi-skills to work for any team member in his/her absence) are the least used.

TABLE VIII. PROJECT EVALUATION CRITERIA

Project Evaluation Criteria	No. of Responses	% [a]
Time	44	75%
Quality	42	71%
User satisfaction	42	71%
Delivery of business value	31	53%
Cost	23	39%
Frequency of delivery	21	36%
Documentation	5	8%
Maintainability	5	8%
Others	2	3%

a. Percentages add up to more than 100% because each respondent can answer more than one item.

F. How much do organizations provide training to agile software practitioners?

The results reveal that a large majority of respondents' organizations provided neither internal nor external training courses to their employees. A minority of them provided 1-5 internal training courses for a period of about 1-5 days (22%); whilst some provided approximately once a month (3%) as presented in Table IX.

TABLE IX. INTERNAL TRAINING

	No. of Responses (%)				
	1 Time	**2 Times**	**5 Times**	**Others**	**No Training**
1 Day	3 (5%)	1 (2%)	1 (2%)	-	-
2 Days	1 (2%)	2 (3%)	-	-	-
3 Days	4 (6%)	1 (2%)		-	-
5 Days	1 (2%)	-	-	-	-
Others	-	-	-	2 (3%)	-
No Training	-	-	-	-	47 (75%)

Within those organizations, some provided few external training courses for a period of about 2-5 days (10%) and twice a year (2%) as presented in Table X.

TABLE X. EXTERNAL TRAINING

	No. of Responses (%)				
	1 Time	**2 Times**	**5 Times**	**Others**	**No Training**
1 Day	-	-	-	-	-

	No. of Responses (%)				
	1 Time	**2 Times**	**5 Times**	**Others**	**No Training**
2 Days	1 (2%)	-	-	-	-
3 Days	2 (3%)	-	-	-	-
5 Days	2 (3%)	1 (2%)	-	-	-
Others	-	-	-	1 (2%)	-
No Training	-	-	-	-	56 (89%)

Unexpectedly, an overwhelming 75% of all respondents reported either nothing on this question or having no self-learning by doing in real-life practice; whereas 11% of them practiced agile every day as presented in Table XI.

TABLE XI. SELF-LEARNING BY DOING

	Time Spent on Self-Learning by Doing				
	1-10 Days	11-20 Days	21-30 Days	Every Day	No Self-Learning
No. of Responses	5	3	1	7	47
%	8%	5%	2%	11%	75%

Concerning agile consultants in respondents' organizations, only few of them had agile experts to consult their teams to apply agile practices in their introductory software projects and contexts (5%) as presented in Table XII.

TABLE XII. CONSULTANTS

	No. of Responses	**%**
Organizations having agile consultants	3	5%
Organizations not having agile consultants	60%	95%

The reasons for not hiring consultants, at the reported time, consist of high consulting fee (3%), lack of management support (2%), and already having knowledgeable management as an agile coach in their organization (2%). However, some reported three reasons for probably hiring agile consultants in the future. Those reasons include gaining a better understanding of agile practices (8%), facilitating better implementation of agile practices (3%), and increasing software development performance (2%) as identified in Table XIII.

TABLE XIII. REAONS FOR NOT HIRING AGILE CONSULTANTS

Reasons	**No. of Responses**	**%**
Gaining a better understanding of agile practices	5	8%
Facilitating better implementation of agile practices	2	3%
Increasing software development performance	1	2%
High consulting fee	2	3%
Lack of management support	1	2%
Management having agile knowledge and acting as an agile coach	1	2%
No any given reason	51	81%

The three identified reasons for intentionally not hiring agile consultants in the future with an equal percentage of 5 include already having agile teams, the need of self-learning and self-implementing agile in an organization, and high consulting fee. They are followed by unsuitability for the education sector and being in the starting state of agile implementation with an equal percentage of 2 as presented in Table XIV.

TABLE XIV. REASONS FOR INTENTIONALLY NOT TO HIRE AGILE CONSULTANTS IN THE FUTURE

Reasons	**No. of Responses**	**%**
Already having agile teams	3	5%
The need of self-learning and self-implementing agile in an organization	3	5%
High consulting fee	3	5%
Unsuitability for the education sector	1	2%
Just starting to implement agile	1	2%
No any given reason	52	83%

IV. RESEARCH LIMITATIONS

There are two limitations based on the collected data. The first limitation is the possible biases of the respondents' subjective experience and perceptions on encountered problems or benefits as almost half of the respondents (40.48%) were in a very early stage of agile implementation (less than 6 months). The second limitation is the small sample size due to an introductory stage of agile promotion in Thailand. This leads to somewhat less robust analysis. Therefore, the readers should be aware when interpreting the survey results of this study.

V. POSSIBLE IMPLICATIONS FOR PRACTITIONERS

There are some interesting implications for practitioners. Albeit the empirical analysis was conducted almost from very early agile adopters in Thailand, it provides some good unexpectation. First of all, the results are consistent with the Manifesto ways for agile software development and many agile principles behind the Agile Manifesto [7] that practitioners follow. Those agile ways consist of individuals and interactions, working software, customer collaboration, and responding to change. Those agile practices, for example, include face-to-face communication, early and frequent delivery, and working together with customers.

Secondly, knowledge transfer is surprisingly realized as the most valuable benefit, unlike the substantial ones cited in previous survey results (e.g., better meeting customer needs [3] the involvement from all parties [5], ability to manage changing priorities, improved project visibility, and increase productivity [6]). This implies that agile practitioners in Thailand pay attention to building team capacity via knowledge sharing more than related-commercial benefits.

Thirdly, even though the organizational demand is one of the most significant factors influencing the decision to adopt agile methods, those organizations still provide insufficient training.

Finally, inadequate training, lack of self-management skill, and actual process not being conformed to agile processes due to strong familiarity with traditional software development are the top three challenges in using agile methods. This implies that practitioners who plan to adopt agile methods in the future should either take these challenges into account or have agile mentors in order to help teams to achieve successful agile transformation.

VI. Conclusion

This study set out to use survey data to explore experience and perceptions of early agile adopters in Thailand. The data obtained from 63 respondents from various organizations, industries, and sizes provided sufficient empirical information for the analysis. Albeit several studies regarding suggestions on how to transition from traditional to agile software development or how to deal with potential challenges in adopting or using agile methods have been published for years, the survey results reveal early agile adopters are still facing some of such challenges without exception even for countries having world-class agile professionals. Moreover, the survey results in other aspects (e.g., favorite agile methods and processes, critical factors leading to agile adoption and agile use, and potential agile limitations) are very similar to the prior survey results.

Acknowledgment

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