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A Survey-based Analysis of Agile Adoption on Performances of IT Organizations☆

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ABSTRACT

Numerous IT organizations and companies around the world aspire to improve the efficiency and general standard of their software development. The IT organizations want to seize the opportunities and take advantages of new development processes and methodologies. These advantages include higher customers' satisfaction and better software quality among many. In order to achieve them, different agile software methodologies such as scrum, Feature driven development, eXtremeProgramming (XP), Dynamic system development method, Kanban and others have been frequently adopted by IT organizations across the world. Several studies have shown that agile software development methods are effective in a lot of settings. This study, in which 40 agile practitioners from Malaysia participated, additionally confirms the effectiveness of agile development methods. Furthermore, this paper presents some of the critical barriers not well-known by IT-organizations. The results of this analysis can be used to guide IT organization from the obstacles they may face while adopting agile in their environments.

☞ keyword : Agile, Scrum, eXtreme Programming (XP), DSDM, FDD, Kanban, Agile Adoption

1. Introduction

Agile software development method is relatively a newly formed upcoming field of software engineering[1]. Agile is define as iterative and incremental software development approach which is performed in a very high collaborative way within an effective framework that can produce a very high qualitative software to meet continues changing requirements of customers within prescribe time [2]. Traditionally waterfall process has been used to develop software by small and big companies. However, now, agile development methods are considered as more reliable and reasonable methods to develop, maintain, and support software systems worldwide [3]. The agility is now becoming a buzz word in today's world. There are several agile development methods such as Scrum, eXtreme Programming (XP), Featured Driven Development (FDD), Dynamic System Development Method (DSDM) and Kanban [4][7][8][9][10]. Scrum, FDD and DSDM are planning-based methods. XP is a practice-based method. Kanban is used as a hybrid method including planning-based and practice-based approaches. Some IT organizations only use planning-based method, some use practice-based approaches. Some other use hybrid approaches. This research attempted to analyze the impact on the effectiveness of agile adoption (including these agile methodologies) on the performance of IT organizations. Agile software development method's with their characteristics those are fast development, dynamic, lightweight process, alert and nimble to changes are better development methods if compared to the traditional approach that is waterfall model [2][11][12][13]. However, in the current work we move ahead and try to find out barriers that have impact on the performance of IT organizations using agile methodologies such as Scrum, FDD, DSDM, XP and Kanban. This research also discusses which agile model is mostly adopted and which one is least adopted. Next section discusses barriers to further agile adoption in organizations.

2. BARRIERS TO FURTHER AGILE ADOPTION IN ORGANIZATIONS 2008

Rico [5] Figure 1 presents barriers to further agile adoption in 2008. It shows that changing of organizational culture was

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the number one barrier to further agile adoption. Moreover, it has been realized that the general resistance exceeds further when trying to fit agile elements into a non-agile structure and staff's experience with agile methodologies. Perceived time to agile transition and budget constraints had the lowest impact on further adoption.

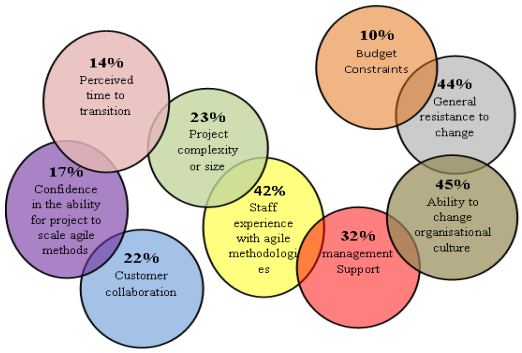

Figure 1. Barriers to further agile adoption in organizations(5)

2.1 BARRIERS TO FURTHER AGILE ADOPTION IN ORGANIZATIONS 2013.

According to Bulgaria [6] 2013 Figure 2 presents barriers to further agile adoption in 2013. However, we can deduce that the changing of organizations culture was still the number one barrier to agile adoption; followed by general resistance to change and trying to fit agile elements into a non-agile structure. Whereas perceived time to transition and budget constraints had the lowest impact on further adoption.

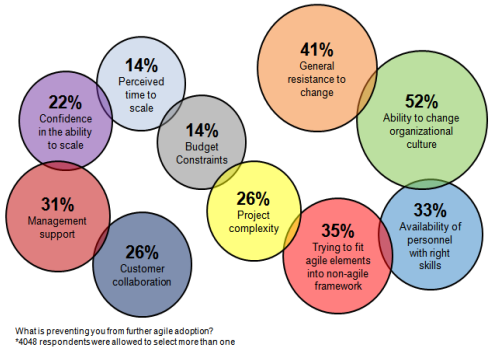

Figure 2. Barriers to further agile adoption in organizations(6).

2.2 BARRIERS TO FURTHER AGILE ADOPTION IN ORGANIZATIONS 2014

Figure 3 below indicates the lack of experience with agile methodologies in the IT organizations was the first and foremost barrier to further agile adoption. This was followed by the ability to manage changes and to fit agile elements in to non-agile framework (Co-located agile teams). Confidence in the ability for project to scale had the lowest impact on further adoption. These results are from our survey conducted in agile conference UTM-KL campus and agile practitioners conference, Kuala Lumpur Malaysia, in 2014.

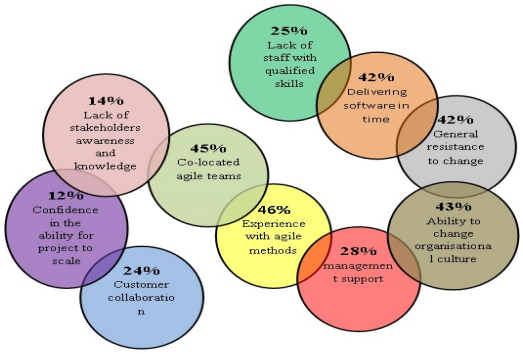

Figure 3. Barriers to further agile adoption in organizations 2014.

3. RESEARCH ANALYSIS

Towards making rational development in this area, we have created a survey questionnaire. A total number of 100 questionnaires were distributed among 40 agile experts and practitioners at Agile Practitioners Conference in Malaysia 2014 and Agile conference UTM-KL campus 2014. There were 34 questions asked that reflect success factors considers in adoption and implementation of agile software development methods. Example questions asked in the surveys are as follows:

1) What was the success rate for co-located agile teams?
2) How many people work in the IT/systems/development department within your company/organization?
3) How do you choose Agile Methods as the way for organization to develop software?

4) What Factors do makes you want to use agile methods?
5) What are the advantages that you obtained from Agile Methods used in your project?
6) Can you provide your opinion about agile methods?
7) How have agile approaches increased or decrease Customer satisfaction?
8) What was the success rate for co-located agile teams?
9) Have you ever been involved in co-located agile teams?
10) What is the largest team size which your organization has been successful with agile approaches?

After obtaining the answers to the questionnaire, our analysis shows that agile adoption has impacted positively in IT organizations. As a result, organizations have siginificant achievements in terms of return of investment, reduce cost, increase efficiency and improve customer's satisfaction in general.

3.1 POPULAR ADOPTED AGILE METHODOLOGY

Preponderance of respondents from Figure 4 below shows that Scrum is the most popular agile methodology with 54.16% respondents. However, it followed by XP with 20.83% of respondents while FDD got 12.51% of the respondents. Moreover, all the remaining methods have less than 5% of respondents.

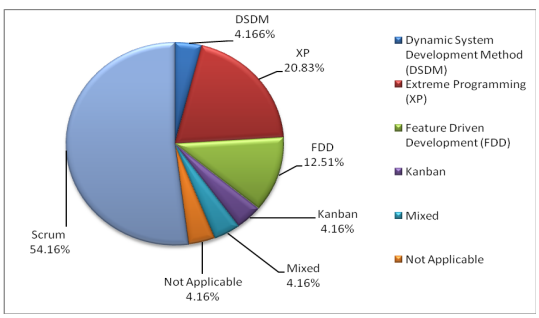

Figure 4. Popular adopted agile methodology(N=40).

3.2 AGILE APPROACHES INCREASE MANAGERS' SATISFACTION

Most of the respondents from Figure 5 within the range of 50% to 90% of respondents said that agile approaches have increased managers satisfaction significantly. Furthermore, those within the range of 90% to 100% of respondents said agile approaches have increased managers' satisfaction generally. However, all the remaining ranges have recorded satisfaction.

Figure 5. Agile approaches increase managers satisfaction (N=40).

3.3 AGILE APPROACHES INCREASE DEVELOPERS' SATISFACTION

Most of the respondents in Figure 6, within the range 50% to 90% said that agile approaches have increased developers' satisfaction reasonably. However, those within the range of 30% to 50% and 90% to 100% have recognized agile approaches have increased developers satisfaction positively. Moreover, 0% to 10% said they didn't use it directly.

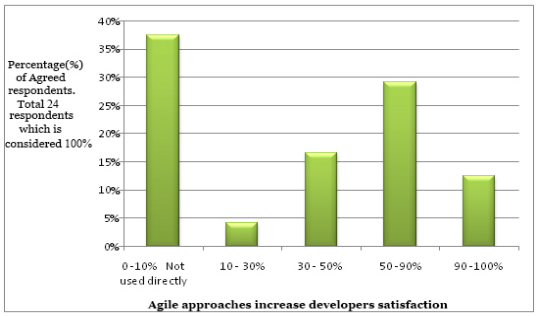

Figure 6. Agile approaches increase developers satisfaction (N=40).

3.4 AGILE APPROACHES INCREASE CUSTOMERS' SATISFACTION

Most of the respondent from Figure 7 within the range of 50% to 90% said that they have witnessed agile approaches

have increased customers' satisfaction. However, those within the range of 30% to 50% said agile approaches have increased customers satisfaction in general. Furthermore, it is imperative to note that all the remaining ranges have testified that there is an increase in customers' satisfaction overall.

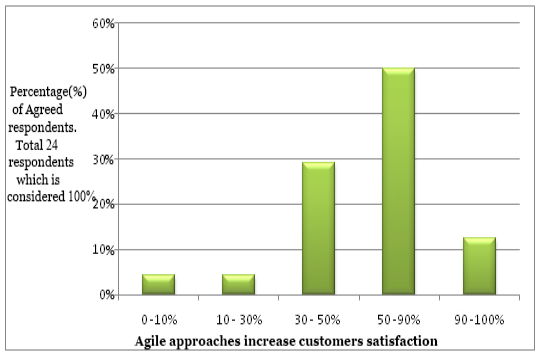

Figure 7. Agile approaches increase customers satisfaction (N=40).

3.5 DELIVERING SOFTWARE ON TIME

Most of the respondents from Figure 8, within the available options (SA = Strongly Agree, A= Agree, SWA = Somewhat Agree, UnD = Undecided, DA = Disagree), strongly agreed that they delivered software within shortest time recoded. It means 62.50% respondents are very satisfied with agile methods in terms of on-time delivery. However, those that somewhat agree said that agile approaches increased delivery of software within shortest time period contributes 16.66%. While just agreed were 12.50% and the remaining available were less than 5% in each.

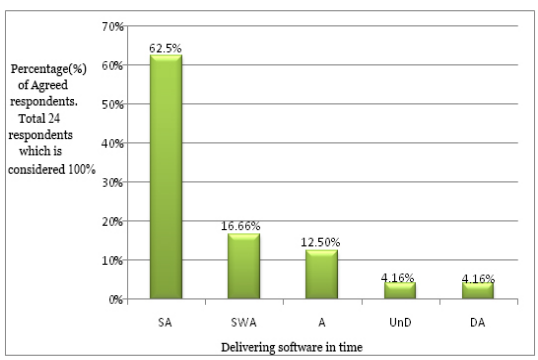

Figure 8. Delivering software in time (N=40).

3.6 ABILITY TO MANAGE CHANGES

In our survey, practitioners were asked to indicate their ability to manage changes based on the following options as shown in Figure 9 (SA = Strongly Agree, Agree = A, SWA = Somewhat Agree, UnD = Undecided, DA = Disagree). Based on their responses, those that strongly agree to this were 66.66%. However, those that agree said that agile approaches have increased ability to entertain or manage frequent changes of software within shortest time period were 28.57% while those that somewhat agree whereas undecided and disagree has less than 10%.

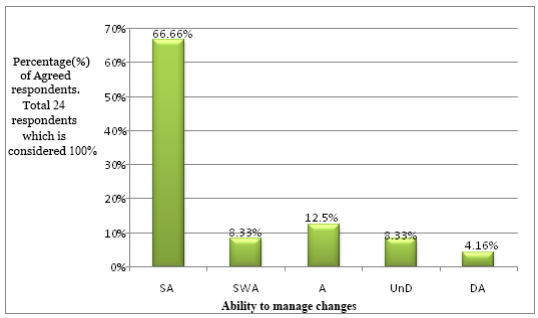

Figure 9. Ability to manage changes (N=40).

From this analysis, one can figure out that agile adoption has positively impacted the IT organizations with greater achievements in terms of return on investment, reduce cost, increase efficiency and improve customers' satisfaction in general.

4. CONCLUSION

Based on the survey analysis, we found that the Scrum is the most popular agile methodology adopted by majority of IT organizations. We noted that generally the highest percentage of respondents (50% to 90%) say that agile approaches increased managers, developers and customers' satisfaction significantly, that indicates IT organizations should embrace agile methods more.

However, it is important to note that the largest team size with agile approaches is 6 to 10 members for better performance. Moreover, agile based projects that practice co-located agile team were more successful and has improved

organizational performance.

By and large, some of the barriers were identified as to further adoption of agile in organizations such as the decision-making is greatly influenced by organizational culture, mainly by executives within the organization. Moreover, lack of knowledge of agile methods and their benefits were major constraints in the adoption. However, it was also noted that most of the respondents, who have not yet started agile in their organizations, showed interest and willingness to adopt agile software development within the next three months.

This study was conducted to know the impact of agile adoption on the performance of IT organizations across the world. In order to conduct this research, we designed a survey. The data was collected from Agile Practitioners Conference Malaysia 2014 and Agile conference UTM-KL campus 2014.

The findings show that budget constraint was the lowest barrier with 10% while the highest barrier was the ability to change organizational culture with 45%. The findings of barriers to further agile adoption in organizations in 2013, perceived time to scale was 14% as the lowest, and the highest was ability to change organization culture 52%. Also in barriers to further agile adoption in organizations 2014, confidence in the ability of project to scale was the least with 12% while the highest was experience with agile methods with 46%. On the side of popular adopted agile methodology, majority mentioned Scrum with 54.16% while the least was Kanban, DSDM and mixed with 4.16% respectively. However, those within the range of 30% to 50% and 90% to 100% have recognized agile approaches have increased developers satisfaction positively. However, 50% to 90% of respondents said that agile approaches have increased managers' satisfaction significantly. Respondents who strongly agree said that they delivered software within shortest time period were 62.50% while only 4.16% disagree with the statement.

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