HOW PRE-START UP ASSESSMENT HELPS SOFTWARE COMPANIES IN AGILE TRANSITION

Taghi Javdani Gandomani[1,2*], Hazura Zulzalil[2], Ali Javanmardi[3], Abdul Azim Abdul Ghani[2], Abu Bakar Md Sultan[2], Mina Ziaei Nafchi[2]

1- Department of Computer, Islamic Azad University, Boroujen Branch, Boroujen, Iran
2- Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, Malaysia
3- Faculty of Computing, Universiti Teknologi Malaysia, Johor, Malaysia
Corresponding author email: tjavdani@yahoo.com, t.javdani@iauboroujen.ac.ir

ABSTRACT: *While prevalence of Agile methodologies is increasing these years, companies should be aware of challenges that may they face during changing their development approach. Agile methods focus on people and this makes transition process more difficult than people expect. Companies should be ready for Agile transition, and performing a pre-start up assessment may help them to be best prepared for the change. Conducting a Grounded Theory study involving 33 Agile experts from 13 different countries showed that pre-start up assessment can help companies in various aspects including defining business goals, addressing training needs, team set up, pilot project selection and method or practice selection. In pre-start up assessment organization and team members should be evaluated to discover their abilities, requirements and restrictions. This process helps companies to get ready for moving to Agile.*

Key words: Agile Software Development, Agile Methods, Agile Transition, Agile Transformation, Agile Adoption, Agile Assessment, Pre-start up Assessment

1. INTRODUCTION

Traditional methods are rapidly replacing by Agile methods in software companies. The Agile values including embracing changes, customer satisfaction, early and frequent delivery, higher quality tempt software companies to use Agile methods instead of disciplined methods.

So far, several Agile methods have been introduced including Scrum, XP, Lean or Kanban, TDD, FDD, etc. Although these methods have different practices, all of them follow the same values [1].

Changing software development approach from traditional or disciplined methods to Agile methods is not an overnight process and needs enough time and effort [2]. Indeed, lots of issues should be considered for altering development approach including management issues, human related issues and technical issues [3]. These factors makes Agile transition/ transformation process (ATP) a socio-technical process.

Agile methods focus on people and their behaviours, thus, ATP affects all aspects of organization. Due to the people oriented nature of ATP, organizations face with lots of challenges during transition [4]. However, awareness of challenges and having a well-defined plan to deal with them, increase the chance of success and decrease the required time and effort. Organizational assessment before starting ATP can help companies to be best prepared for altering their development approaches.

Pre-start up assessment assists companies to be aware of their abilities and constraints about ATP. Conducting a Grounded Theory (GT) study showed that pre-start up assessment process, should target several specific items in software companies. In this paper, the authors will explain how such an assessment can help organizations to provide prerequisites of ATP.

The next parts of this article are organized as the following sections: Section 2 explains a concise background about Agile Transition Process, Section 3 describes research methodology, Section 4 explains the results, Section 5 presents a discussion followed by Section 6 which concludes the discussion and addresses the future works.

2. AGILE TRANSITION PROCESS

Creating Agile manifesto causes that Agile methods gathered under Agile umbrella [5]. However, prevalence of using these methods increased over the last few years. There are several reports that have explained the journey of Agile transition in many companies. Some of the reputed software companies now are using these methods at least in some parts of their projects. At the same time, obstacles and barriers that companies are faced with are investigated in some of the research studies [4, 6-8]. These studies explained that most of the transition obstacles are related to the people and management rather than process and technology. This fact shows the significant effect of people during ATP.

What which makes ATP harder than people expect is that ATP is all about people and their mindsets[4]. In fact, adopting Agile practices requires that people change their previous mindset and behaviours. Team members, managers and even customers should change their development approach and accept their new roles and responsibility which sometime are so different with their previous roles. Companies should have a deep understanding about all aspects of ATP.

Since people are not same in different companies and also companies have different requirements, abilities and constraints, a unique action plan cannot be used to handling ATP [9, 10]. Like any project, ATP would be better to start with a preparation phase. A pre-start up assessment with purpose of addressing prerequisites of ATP is helpful.

For discovering the hidden aspects of pre-start up assessment, the authors carried out a qualitative research. The research showed that Agile practitioners is better to use early assessment process to be best prepared for ATP. In

fact, such as an assessment helps them to decrease potential challenges during the transition.

3. RESEARCH METHODOLOGY

Grounded Theory (GT) was selected for conducting this research. This methodology was developed by Glaser and Strauss and mostly is used in social studies [11]. GT by proposing a systematic process helps researches to discover a grounded theory using substantive data [12].

3.1 Why GT?

Grounded Theory was chosen because of several reasons. The first reason was the nature of ATP which is people oriented and GT is the best research method for studying people related issues. The second reason was that, GT is useful for those studies that have not any up-front hypothesis [13]. This study had not a pre-defined hypothesis because it was looking for discovering theory of ATP on the basis of substantive data. The third reason was that GT has been used increasingly in software engineering and Agile software development studies in recent years and has developed many successful results [14-17].

This study was looking for a wider area, the whole Agile transformation process, rather than topic of this article and so, consistent with GT instructions, the questions solely covered general aspects of ATP [18].

3.2 Data Collection

This study started with data collection as recommended by GT instructions. By publishing an invitation in online Agile communities, Agile experienced practitioners who had experience in at least one ATP transition were invited to the study. About 50 experts participated in the study. However, the results of this study are based on the viewpoints of 33 participants that in this article they are referred by their number and roles, if necessary. They were from 13 different countries, in which most of them were from USA. Scrum, XP and Kanban were the most popular Agile methods that they were using in their companies. Although the participants had different roles, most of them were Agile coaches. Furthermore, in 50% of their companies, ATP was ongoing and this made a good opportunity to this study to use live data.

Since all the participants were out of the country, all interviews were carried out using online communication media such as Skype, Oovoo, Gtalk, etc. Semi-structured and open ended questions started with general questions about the participants' background. The next questions were about the challenges they faced with during ATP, their suggested strategies that they used to dealing with those challenges, steps of change process, characteristics of ATP, framework of transition and so forth. Following GT instructions, all questions cover only general concepts and data collection was continued up to reaching data saturation [19], which meant no new concepts in the participants' viewpoints [11]. It's why we have used viewpoints of 33 participants for this subject. However, at the time of writing this article, data collection in other concepts rather than topic of this article was on-going. Due to space limitation, list of the participants has not been provided.

3.3 Data Analysis

A multi-level analysis was carried out. For improving the quality of data analysis and decreasing human errors risk, NVIVO software package was used. This software is a powerful tool for handling and analyzing data in qualitative researches which have been used frequently in software engineering in recent years.

By line-by-line reviewing transcripts, all the key points were extracted. Then, each key point was assigned with an open code. Immediately, each newly emerged open code was compared to the previous open codes in the same and previous transcripts using constant comparison technique [11]. This mechanism helped to grouping codes and finding out the concepts. Iterative using this technique also helped to find the categories which were a higher abstraction of analyzed data. Afterwards, axial coding technique assisted the authors to find the relationships of the emerged categories and putting back the fractured data together. Eventually data analysis leads to emerging the core category of grounded theory. In this study, iterative Agile transition process was the core category and pre-start up assessment was one its related sub-categories.

Besides of the above process, using memoing helped the researchers to add more related data to the emerged concepts. Memos are the complimentary data which are collected to clarify the viewpoints of the participants [20]. Figure 1 depicts multi-level data analysis of this study.
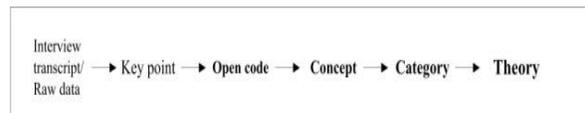

Fig 1: Various Steps of Data Analysis

3.4 Theory Generation

Theory generation or theoretical coding was the last step of this study. Although, there are different approaches about theory generation in GS studies, the author used Glaser approach. He suggested a family of codes which helped the researchers to generate their theories [19, 21]. Using Temporal family, the authors discovered that pre-start up assessment can be considered as one step of ATP. The theory showed the goals of the pre-start up assessment. Figure 2 depicts this theory well.

Due to space limitation, providing all the emerged codes, concepts, categories and also participants' quotes is impossible. In the next section, the results along with the only some of the quotes will be provided.

4. PRE-START UP ASSESSMENT IN ATP

The results of this study indicated several critical prerequisites of Agile transition and adoption process, which pre-start up assessment is one them. The participants emphasized on the importance role of such an assessment in increasing chance of success in Agile transition. Although they addressed several points that this assessment can be helpful, the most important ones are business goals setup, addressing training needs, team set up, pilot project selection, and method selection. In this section, these items will be explained in detail.
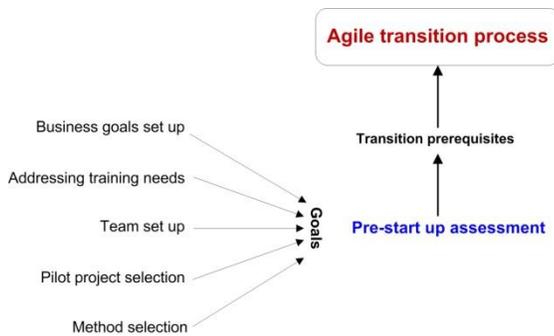
Fig 2: Emergence of Pre-start up Assessment Theory

4.1   Business Goals Set up
As the participants declared, for Agile transition, the organization should have a convincing reason. In fact, management should decide whether Agile is good for them or not. If so, they should set some business goals.

"I think that organizations should at first, know their real needs and goals. It is not a fashion [laugh]. Check if Agile is suitable for them then start transformation." P10, Scrum Master.

They mentioned that *"Because everyone else is doing it is not a reason."* (P1). Focusing on finding real reason for change and also setting up some business goals are so critical, because *"any changes without real feeling, [may] fail."* (P18).

Before starting ATP, business benefits and goals should be clarified for the organization. In fact, achieving these goals is the ultimate goal of ATP.

"The ultimate goal of Agile adoption is achieving new business values. Companies that intend to be Agile without clear business goals cannot feel the reality of Agile values and principles." P33, Top Manager.

Some of the participants believed that the outcome of assessment before starting ATP impresses the whole Agile transition. Furthermore, low attention to it, was addressed as a risk point for ATP.

"Preparing organization for change relatively depends on its business goals, if its goal is one team be Agile or is the whole company become Agile, it's completely different. Prerequisites should be defined based on business goals." P13, Agile Coach.

The more experienced participants and the Agile coaches emphasized more than the others on clarifying business goals during the pre-start up assessment. It shows the importance of the items comparing the others.

4.2   Addressing Training Needs
Training was addressed as the most important and critical drivers of Agile transition by almost all of the participants. Since all people, team members, top and middle managers and even customers should be involved in ATP, training should be comprehensive and covers their needs.

"All should be trained for it [Agile transformation process]. Each member based on his/her abilities

and weaknesses need to be trained." P18, Agile Developer.

As the participants explained, training materials strongly depend on the knowledge and experience of each team. However, Agile values and principles should be considered for all involved people.

The participants stated that training package can be best designed, based on the outcomes of the pre-start up assessment. Perfect training plan assists people to being familiar with their roles and responsibilities as well as Agile desired values.

"Training should cover all other aspects, from technical to social factors. I mean that it can be used as lever of pressure on moving process." P2, Agile Coach.

A comprehensive and effective training plan helps team members to deal with their challenges easily during ATP.

"It [Training package] depends on stakeholders and their knowledge. We did an assessment for training. Training is our primary tool for [supporting] process of change. It needs a comprehensive and flexible plan." P20, Head of Development Department.

The study also showed that inadequate training causes several problems such as unrealistic expectation of Agile, Low confidence and collaboration, difficulty of change and so forth which are beyond of scope of this article.

4.3   Team Set up
The participants declared that most often ATP starts with only one team or a few teams. In this case, choosing the most appropriate members are so important.

"Choosing appropriate team members, motivated, knowledgeable, sharp and social and those who can feel spirit of teamwork is quite important." P5, Project Manager.

"You can mitigate transformation challenges by ensuring that the right people are hired is challenging. This often means that the HR team also needs to understand about Agile so they can hire the correct type of people." P6, Agile Consultant.

One part of the pre-start up assessment is assessing team members to choosing the right people for starting transition. Furthermore, some of the participants emphasized on the some important roles and assigning right people to those roles.

"One important factor is to make sure the right resources are placed into the roles of Product Owner and Scrum Master. It's very critical." P12, Head of Development Department.

In assessment process both technical and personal abilities of people should be considered. Since Agile teams should be self-organized, it is important that members have enough ability and confidence to collaborate with other team members.

Some of the participants addressed their previous experiences and explained how wrong people selection had led to critical challenges during ATP.

4.4   Pilot Project Selection

Selecting initial Agile project, called pilot project, is a critical decision that impresses Agile transition strongly. The participants emphasized on doing assessment to choose a best pilot project for Agile transformation.

"Applying Agile to a pilot project is so critical. Organizations should consider their constraints and abilities and select an appropriate pilot project to doing transformation to agile..." P28, Agile Coach.

Most often, pilot project *"act as fair"* (P13) or *"is very useful in that it helps work out any kinks"* (P12). Therefore, project selection is critical and even may affect the future of Agile in the organization.

"...Some seniors were waiting for our fail! The first project is important, you can prove yourself. I think it is important that Agile teams think enough about pilot before transformation process." P15, Agile Consultant.

In assessment process capabilities and limitations of organization, project and team members should be considered.

"Choosing a pilot project which its owner does not like to involve in the development, adopting many practices of Scrum is so hard." P27, Scrum Master.

4.5 Method Selection

The last important goal of pre-start up assessment which addressed by the participants, was indentifying appropriate Agile method(s).

"Choosing an appropriate method or methods depends on many factors such as business goals, organizational abilities and constraints and so on. Managers should assess such factors before starting transformation." P26, Agile Coach.

Since different Agile methods have different practices and are suitable for different purposes, pre-start up assessment helps managers to decide which methods or practices are the most suitable for them.

"In a company (one of my clients) the most problematic issue was project management and late delivery. By doing an easy assessment I suggest them adopting of Scrum." P22, Agile Coach.

As the participants explained, companies can start with a specific and suitable method, then later use other methods based on their needs. However, choosing a method should be based on pre-start up assessment.

5. DISCUSSION

Following the research methodology, after emerging the theory, the findings should be verified by conducting an extensive literature review[11]. In this section, a brief discussion on the findings in light of literature is provided.

Cockburn and Highsmith stated that "Agile development is not for everyone" [22]. They believed that companies should assess their needs and decide whether Agile is useful for them or not. Pikkarainen et al. emphasized on defining and having a clear vision, understanding and awareness of Agile methods for Agile transition. They suggested doing an assessment before starting change process [23]. Holtsnider et

al. stressed that Agile organizations should consider their long-term business goals before and after Agile adoption [24]. Wang et al. showed how business values and goals may impress organizations in performing their projects and applying Agile approach [25]. In this study also the results showed that business goals should be the main purpose of ATP and these goals should be indicated before starting Agile transition.

Vijayasarathy et al. addressed Agile trainings as one of the most critical drivers of using, adopting and promoting of Agile methodologies [26]. Misra et al. also discovered that training is one the critical success factors of Agile practice adoption [3]. Several other studies emphasized on the importance role of training in Agile acceptance and adoption. They explained that having enough deep understanding of Agile values and practices facilitate ATP [27, 28]. Finding the real training needs is necessary, especially when training would be considered as a powerful tool for dealing with human related challenges during the Agile transition [4, 25]. Current study showed that training needs of the involved people should be addressed using a per-start up assessment.

Choosing right people, trusting and empowering them are critical issues in Agile transformation. Indentifying the most qualified people requires enough assessment and qualification. Moe et al. showed that how allocation of development resources affect shared-decision making in Agile methodologies [29]. Misra et al. stated that people qualification before starting transition and selecting smart and motivated team individuals can strongly facilitate moving to Agile comparing to indifferent people [3]. Furthermore, there are many evidences that wrong people selection and careless about choosing the most appropriate people have caused many challenges and problems during ATP [30, 31]. This factor becomes more critical in appointing critical roles such as Agile coach, Scrum master, Project manager, Agile champions and so on [8, 32, 33]. Team set up was identified as another goal of pre-start up assessment during the current study.

Pilot project selection is also considered as a critical factor in successful transformation to Agile and it was addressed as one the pre-start up assessment in our study. Cohn addressed pilot project as one the transition challenges. He described some features of a suitable Agile pilot project and recommended that companies should do adequate assessment for choosing pilot projects [34]. Mahanti also addressed pilot project as a critical success factor in Agile transition [6]. However, Mikulenas and Kapocius believed that at the time of pilot project selection, desired Agile methodology should be considered [35]. The assessment for picking a pilot project in large companies should be carried out with careful consideration of organizational abilities and restrictions [36, 37].

Besides pilot project selection, method selection is also so important. Indeed, organizations need to adopt with those Agile methods or practices which are most suitable for their projects and fit their requirements. Cao et al. emphasized on considering organizational and development context in selecting Agile practices [38]. Sidky et al. proposed a model

for selecting appropriate Agile practice based on organizational assessment before starting Agile transition [39]. Esfahani et al. also suggested a methodological framework for choosing Agile practices based on the organization and project features [40]. Based on the results of the current study, method selection should be considered as one of the pre-start up assessment [41].

To sum up, there are enough reports that have emphasized on doing assessment before starting ATP. They have addressed several reasons for assessment in which findings of this paper are the most important ones. In fact, the previous literature strongly supports contributions of this paper.

6. CONCLUSION AND FUTURE WORKS

Moving to Agile methods as an organizational mutation needs enough time and effort. Since this process affect all aspects of organizational behaviours of people, it would not be easy and therefore, organizations need to be prepared for it. Conducting a Grounded Theory involving 33 Agile experts showed that an organizational assessment before starting the transition is so helpful. The study showed that pre-start up assessment should focus on some critical prerequisites of Agile transition. The most important factors that such an assessment should target are business goals set up, addressing training needs, team set up, pilot project selection, and method selection. Focusing on these items, pre-start up assessment can impress the whole Agile transition process by decreasing potential risks. The assessment should mainly focus on organization and team members' capabilities and restrictions. Based the results of the pre-start up assessment, organizations can define an action plan for conducting the change process.

This study did not focus on detail criteria and metrics of each goal. The authors suggest further investigation on the required criteria for each goal. For instance, what criteria should be considered during assessment process for finding the best pilot project? Which metrics should be measured for assessing training needs?

Furthermore, this study cannot judge to what extent pre-start up assessment may impress the transition process. Finally, the authors recommend proposing an assessment model for evaluation of companies before starting Agile transition.

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