



IMPORTANT CONSIDERATIONS FOR AGILE SOFTWARE DEVELOPMENT METHODS GOVERNANCE

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ABSTRACT

After introducing Agile approach in 2001, several Agile methods were founded over the last decade. Agile values such as customer collaboration, embracing changes, iteration and frequent delivery, continuous integration, etc. motivate all software stakeholders to use these methods in their projects. Moving to Agile methods needs a huge change in organization and involved people. This change is a fundamental and critical mutation. The main issue is that Agile transition and governance action plan needs to consider different aspects of change related issues. Conduction a Grounded Theory study with participation of 37 Agile experts from 13 countries showed that software companies should consider three main factors before inception of transformation action plan: Adoption styles, Method selection and Awareness of challenges and constraints. These fundamental considerations encompass many critical items for Agile movement and adoption process. However these items may lead to different results in different companies, but they should be studied in deep before any transition action plan.

Keywords: *Agile Software Development, Agile Transformation, Agile Transition, Agile Methods, Agile Adoption, Agile Governance*

1. INTRODUCTION

Agile approach as a reaction [1] to traditional approaches in software development was formally introduced by creating Agile manifesto [2]. In this manifesto new values were considered in software industry and also several principles were introduced as Agile underpinning in the organization. In competitive world, industry and technology are growing too fast and therefore, clients' software requirements are changing rapidly. In this case Agile methods can support these changes effectively [3]. Agile values have attracted many companies to change their production approach from plan-based methods to Agile methods. Several well-known companies have migrated to Agile and now are using these methods even in some of their projects [4-6]. Several studies have done in how using Agile methods and also several case studies were reported in Agile migration. A critical issue for using Agile methods is that software companies and organization should change their development approach fundamentally and this is not an easy process [7]. Several studies have been conducted in transforming to Agile from different views. Most of them are based on specific

method [8], specific culture [9] or specific organization [10, 11]. Although, there are some guidelines or basic framework offered by a few studies for handling migration process [12, 13], but still it is need to study more in deep and from various perspective [13], it means that Agile migration is still a hot research area in software engineering. Since Agility affects all aspects of organization, Agile migration should be studied in a wider perspective [14]. For first step, different aspects of Agile governing for this organizational mutation should be explored from substantive data in industry. Based on our literature, there are many factors that should be considered in moving to Agile, but in a wide perspective and from change management strategy perspective, we have classified them in three main areas: how to being Agile, method selection and awareness of challenges.

The next sections of this paper are organised as follow: Section 2 explains the research methodology, Section 3 provided the findings about Agile transition styles, Section 4 discusses about the role of Agile methods in transformation process, Section 5 explains the challenges and issues in

Agile transformation, Section 6 provides a discussion on the role of different aspects and factors in governing Agile development in the organizations, and finally in Section 7 conclusion of the study is provided.

2. RESEARCH METHODOLOGY

This study was carried out based on the Grounded Theory (GT). The first step of the study was data collection based on the open questions and semi-structured interviews. The participants of the study were Agile experts who had at least one Agile transition experience and voluntarily participated in the study. Data collection was stopped when no new idea was found and data reached to saturation level [15]. The results of this study are based on the viewpoints of 37 participants from 13 countries. After each interview and transcribing it, the transcript was reviewed line by line and major key points were extracted. Each key point was assigned to an open code. Using constant comparison technique helped to compare the emerged code with the previous codes in that interview and the previous ones [16]. Iterative applying this technique led to emerging concepts which were a higher level abstraction of codes [16]. Then, by finding the relationships between the concepts, various categories were emerged and between them, the main category was emerged [17]. It means that all other categories were its related categories. Figure 1 depicts the multiple steps of data analysis.



Figure 1: Data Analysis Steps

In this study, *iterative Agile transformation process* was the core category and the Agile governance was one of its related categories which will be discussed in the next sections. Figure 2 shows the emergence of Agile governance category.

3. ADOPTION STYLES

Software companies and organizations based on their needs and limitations should decide about how being Agile. Indeed they are able to choose only some Agile practices or using Agile methods for only some steps of their software product line or become Agile completely even by using more than one Agile method. The main

options for this decision are explained in the next sections.

3.1 Tailoring: Using Agile Practices Beside Plan-Driven Methods

In this approach companies are not interested in fundamental change in their process, but they want to use Agile activities and practices in only some specific stages with reasonable change only. This approach was the first choice for companies that have been relied on CMMI quality model. They needed to maintain their quality level in CMMI and then take advantages of Agility, if possible [18-20]. However, there are some reports on successful Agile adoption in CMMI companies [21, 22], but some of the CMMI practice areas are in conflict with Agile approach [23, 24]. It should be noted that both of these approach have their own benefits, but Agile Approach provides new values. Tailoring is a good choice especially for those companies which their customers ask them a rigid and disciplined development methodology. By tailoring Agile practices in their disciplined process, they can provide some Agile values simultaneously with meeting customer's requirements.

3.2 Localization: Using Agile Methods by Some Modifications

In this approach, despite of the previous approach software companies accept essential and fundamental changes in their organizational structure and development process. The main issue is that because of some limitations they are not able to adapt with all Agile practices; so, they should customize some of the Agile practices or ignore them. Sometimes this approach is the only option for fulfilling organization, project or management requirements [25]. This approach is also beneficial in early stages of Agile transformation or when stakeholders and involved developers and managers are not experienced in Agile methods. In these cases, it is better to ignore some of Agile practices like group decision making and those that needs sufficient people collaboration [26]. Furthermore, sometimes customer collaboration is not possible and so Agile customer related activities should be done in traditional way [27]. Projects limitations and incompatibility of Agile with pilot projects also forces companies to use Agile methods in customized versions [28]. It seems that companies need to choose this option only because of essential constraints in their organizations and projects.



3.3 Fully Adoption: Embracing Agile Completely

In this approach like localization, software companies accept essential changes in their development process. In this option, managers try to overcome internal and external constraints to meet maximum Agile values. Of course, there are a lot of obstacles and constraints that should be identified before migration to Agile. There are many studies on obstacles and challenges in Agile adoption [29-31]. Also a few researches have been done for proposing guidelines or frameworks to facilitate Agile movement [12]. Furthermore, several case studies have been reported about journey of Agile movement in different companies [32-35]. Agile adoption is the best way for achieving maximum Agile values and this is a fertile area for researches mainly because this process should be studied from different perspectives.

4. METHOD SELECTION

There are several Agile methods that each of them has its own specific characteristics and activities. Although all of the Agile methods are founded based on Agile values but each of them emphasizes of some values more than others. Cohen et al. have explained more popular Agile methods in their study [36]. One of the critical and important issues in Agile transformation is method selection. Indeed for finding the most suitable method and facilitate the movement process, a comprehensive study about abilities or disabilities of each method should be done. Conducting a pre-start up assessment may help software companies to choose the most appropriate Agile method.

Generally, Agile methods can be divided in two main groups on the basis of their fundamental practices: software development and software management. In other words, some of them mainly focus on the managing of software projects and the others on software development process. However a combination of both of them is more useful in almost all companies, but some companies choose only one method from one of the mentioned groups. There are some valuable studies in comparing Agile methods and discussion on capabilities of them. In some of them, differences of Agile methods are studied in a comparative analysis research from various perspectives [37, 38]. In one study also implications and applicability of different methods in industry is studied [39]. Furthermore, some other studies compare two

specific Agile methods in deep from various views [40, 41].

Managers should consider their goals, needs, organization capabilities and constraints in choosing appropriate Agile methods for their projects. Such decision can affect the future of their companies. Wrong decision in method selection strongly affects on success of Agile migration. However, some studies have focused on decision making in method selection [42, 43], but it seems that further researches should be carried out in this area. This issue should be studied as a significant part of Agile change management strategy and within Agile transition action plan.

5. AWARENESS OF CHALLENGES AND OBSTACLES

For Agile transformation, all aspects of organization should change and this fundamental change cause many problems and challenges. Agile transition action plan should be prepared only after recognition of the potential challenges, obstacles and barriers. The previous studies have shown that different challenges might be seen in this process [29, 31]. Some of them are related in management and organization. For instance, changing attitude from “command and control” to “leadership and collaboration” is a big issue [44]. Coaching and mentoring in this process is difficult, because not only technical problems should be solved but also mindset of peoples should be considered. Knowledge management is another issue in Agile methods. While in plan-driven methods heavy documentation and rigid reports are required, in Agile methods knowledge is tacit and in the head of the stakeholders and act as a barriers from perspective of traditional senior managers [45]. In process context, changing traditional life cycle to iterative and evolutionary model is a big issue. It is mainly because of effects of the process model on different parts of organization [34]. Also different measurement practices is another issue in this domain [46]. A lot of obstacles are reported in human aspects [47, 48]. Sometimes people cannot forget their previous role and resist against the change [49, 50]. For instance role of project manager is a challenge in this process [51], because they should be leadership instead of commander. In multi-sites and international organizations lack of face-to-face communication, co-located working, different cultures and time zone offset also reported as major obstacles [52, 53]. Indeed in such companies the big issue is communication which is a principle in Agile methods. Since discussion in

this area is long and beyond the scope of this paper,

6. CONSIDERING THE ABOVE ASPECTS IN AGILE GOVERNANCE

Managers of software companies for Agile transformation and adoption require to consider all of the above aspects. Since Agile transition process is pervasive, all effective factors should be studied in it. The aforementioned approaches are the most important factors in Agile transformation and any shortcoming about each of them causes many problems for migration process. As Figure 3 depicts, Agile governance in a higher level should consider three main factors: The potential challenges and constraints, Adoption style and Method selection. In one hand, managers should be aware of challenges and obstacles and in the other hand they should choose the most suitable Agile method(s) for their projects based on their requirements and constraints. Also they should decide that how they want to be Agile. They should find the best choice for going Agile considering which methods are the best for them. Answer of these questions are underpinning of change management strategy.

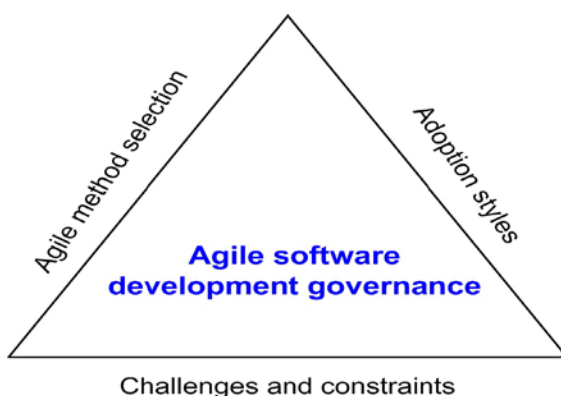


Figure 3: Agile Governance Important Considerations

7. CONCLUSION

Changing software development approach from traditional to Agile is a fundamental change in organization and should be managed via comprehensive organizational change. Agile transformation should be considered as a disciplined process and before inception should be known completely.

This study showed that for a successful Agile transformation process, different aspects of Agile migration should be considered. Agile

only a concise discussion is provided.

transformation process needs to consider these main factors: The organizational constraints and the potential challenges that companies may face with them, Adoption style and Method selection. The results showed that Agile adoption can be accomplished in three ways: Tailoring, Localization and Fully adoption. Software companies choose their adoption style based on their abilities, needs and constraints. Also they should decide that which Agile methods is the most appropriate methods that meet their business goals.

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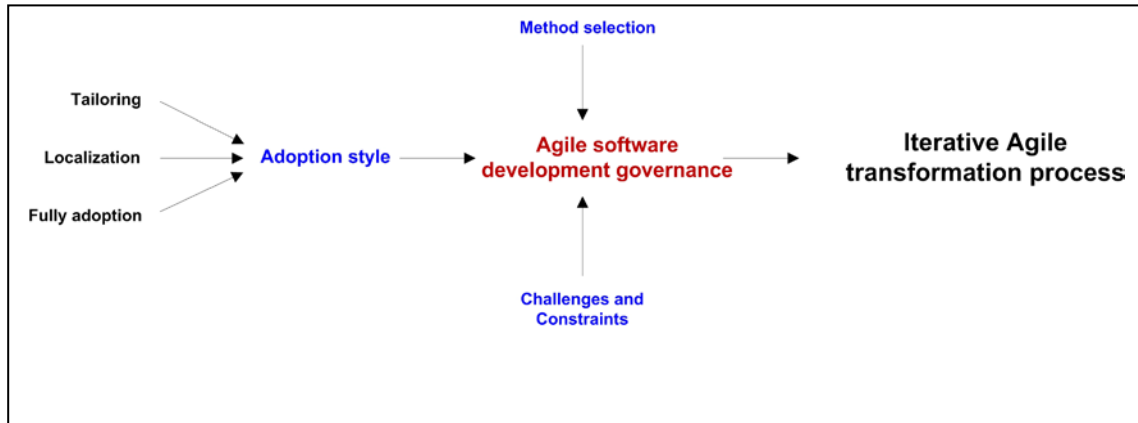


Figure 2: Emergence Of Agile Software Development Governance Category Important Considerations