Research Article
Towards Comprehensive and Disciplined Change Management Strategy in Agile Transformation Process

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Abstract: Moving to agile through a well-defined strategy and framework is essential and this socio-technical process should be studied in deep. Advantages and earned values of agile approach in software industry motivate a lot of companies to try to use agile methods in their software product lines. Transformation process to agile methods is not easy and because of its nature, takes a long time. Since agile transformation needs organizational mutation, companies are faced with many challenges during this process. While several studies have been conducted for how to use agile methods, some other studies have focused on finding obstacles in agile adoption process. However, previous studies are valuable, but each of them has focused the change process from a particular perspective. In this study we discuss the dimensions of agile transformation process from a wider perspective. We will show that focusing on agile adoption is not the only master key for success in agile transformation process and we need to define an agile change management strategy for this organizational metamorphosis. This strategy should consider all aspects of changing approach and is underpinning of achievement in agile transformation process through substantive transformation experiences.

Keywords: Agile adoption, agile software development, agile transformation, change management strategy

INTRODUCTION

Over one decade after agile manifesto (Beck *et al.*, 2001), several agile methods were founded and introduced to the software industry. Although some of them have been founded before agile manifesto, but it was the first time that all of them were collected under agile umbrella. Scrum (Schwaber and Beedle, 2001), XP (Beck and Andres, 2004), Crystal methods (Highsmith, 2002), Feature driven development (FDD) (Highsmith, 2002), Dynamic Systems Development Method (DSDM) (Highsmith, 2002), Test Driven Development (TDD) (Beck, 2002), lean software development (Highsmith, 2002) are some the famous agile methods. However these methods are different in some activities and goals, but all of them rely on same agile values.

Agile methods are defined as a reaction to traditional methods (Boehm, 2002) and emphasize on new values which are not stressed by traditional methods. Focusing on the individual and interaction, working software, customer collaboration and embracing changes are these values (Beck *et al.*, 2001). Along with these values, agile methods claim to provide fast delivery, higher quality (Huo *et al.*, 2004), customer satisfaction and a dozen of other advantages.

A glance at the mentioned benefits motivates managers and all software stakeholders to using these methods.

Several well-branded companies and organizations like Microsoft, Google, Nokia, IBM, FBI, Primavera, etc. are using agile methods in at least some of their projects (Cohan and Glazer, 2009; Fulgham *et al.*, 2011; Jakobsen and Johnson, 2008; Laanti, 2010; Schatz and Abdelshafi, 2005), but there are many companies which are using traditional software development methods yet. Many of these companies have good experience in traditional methods and many others worry about changing their development process.

Previous researches in this matter typically have focused on case studies in transforming to agile and have explained the dimensions of change in organizations during the agile movement process (Babuscio, 2009; Fraser *et al.*, 2006; McCarthy and Tsinopoulos, 2003). Some other studies have done on agile adoption. Of course because of the nature of agile methods and their different effects in organizations, there is no unified strategy for agile adoption. In one study, a framework was suggested to adapting to agile in a multi stages process (Sidky, 2007). This approach is an engineering approach, but there are a lot of other issues in agile movement process that should be considered and managed such as cultural issues, non-technical issues, etc. Also in recent years, many

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researches are conducted in moving to agile based on a specific method (Cho, 2010), specific culture (Asnawi *et al.*, 2012) and specific organizations (Barlow *et al.*, 2011; Sureshchandra and Shrinivasavadhani, 2008a). We believe that those studies that have conducted from the perspective of teams are more valuable than others. Agility affects all aspects of organizations, so, effective researches should be done via exploratory methods.

Clearly, achieving agile values and also twelve agile principles (Beck *et al.*, 2001) behind the agile manifesto needs an extensive mutation in software development approach in each company. Without a comprehensive strategy for overcoming the obstacles and issues, a huge amount of effort and cost should be paid and in most of time less value could be achieved.

In this study, the next sections are subsequently: tailoring, localization or adoption of agile methods, investigating on challenges and issues of agile migration, role of agile methods in adoption, necessity of definition of change management strategy and finally conclusion and future work.

BEING AGILE; TAILORING, LOCALIZATION OR ADOPTION

Tailoring, localization and adoption are solutions that companies may choose for using agile methods in their projects. Of course these concepts are close to each other, but each of them is based on a particular approach.

Tailoring approach mainly focuses on using agile methods in organization with the minimum changes in the structure of organization. This approach was followed mostly in the early years after introducing agile methods. At that time CMMI model was the best assessment model for achieving high quality product, so, many managers were not interested in essential change in their product line. In other words they preferred to have agile values beside their main development line. For instance, they wanted to keep and maintain CMMI practices and if possible, use agile methods (Alleman, 2004; Anderson, 2005; Diaz *et al.*, 2009). It is clear that with this perspective, sometimes agile methods could not be implemented in the best way, or sometimes some of the major agile values should be ignored (Mahanti, 2006). Since agile methods have some conflicts with some CMMI practice areas, using agile methods and having CMMI at the same time, in some cases is not possible (Fritzsche and Keil, 2007; Turner and Jain, 2002). Nonetheless, there are some reports that claim for mixing agile and CMMI completely without any problem (Jakobsen and Johnson, 2008). In sum up, benefits of each of these approaches (Agile and CMMI) cause interesting in both of them and tailoring is reasonable process yet (Glazer, 2010). It seems that it is first choice of managers in disciplined companies to using agile in at least some of their projects or using some of the agile practices in

their product line. Furthermore in many cases customers ask for a rigid and high disciplined process for their projects and tailoring approach is a good choice for managers to meet customers' requirements and simultaneously gain the agile values.

In the second form, localization, it seems that managers accept essential change in production line, but some of agile activities customized and some others may be ignored. Clearly such these activities are different in each method (Fitzgerald *et al.*, 2006; Mirakhorli *et al.*, 2008). This is one way to customizing agile methods to fulfill management, organizational plan or project requirement (Mirakhorli *et al.*, 2008). Especially at early stages of moving to agile, because of lack of experience in team members, some practices are ignored and typically done in traditional way. For example, group decision making which is one of the team-oriented activities in many case studies was ignored. Also in some other reports, customer collaboration is not possible, so, some of customer related activities automatically are done in traditional way (Srinivasan and Lundqvist, 2010). Furthermore, sometime incompatibilities between agile pilot projects and environments compel companies to localize agile methods in their organizations (Mahanti, 2006). It seems that localization of agile methods is only because of organizational requirements.

In the agile adoption process, managers accept essential organizational changes and try to adapt their organizations with agile methods. In this case, almost there are no internal and external limitations for implementing agile methods and managers try to use one or more agile methods completely in their projects. There are many publications in this regard; while some of them have focused on finding obstacles and challenges (Babar, 2009; Nerur *et al.*, 2005), others claimed to provide a guideline of framework for transformation to agile (Sidky, 2007). Also, there are some case studies explaining story of movement and lesson learned among the movement process (Ganesh and Thangasamy, 2012; Hajjdiab and Taleb, 2011; Srinivasan and Lundqvist, 2010). Agile adoption is the best way for achieving agile values and could be studied deeper in different perspectives.

Anyway, moving to agile is a hot research area and there are a lot of research centers that try to facilitate this fundamental change in organizations (Dingsøyr *et al.*, 2012).

MIGRATION AND ADOPTION CHALLENGES AND ISSUES

As mentioned in previous section, several studies have been done in this area. These researches mainly have started after 2005, since at that time, efforts for using agile started in some companies. Nerur *et al.* (2005) in a classic research defines four challenge

categories; management and organizational, people, process and technology. Changing mindset of people especially senior traditional software developers is not easy (Cohn and Ford, 2003) and need to enough mentoring and time (Sureshchandra and Shrinivasavadhani, 2008b). In other hand, human aspects in agile methods which are called ecosystems by Highsmith (2002), most of the times act as serious obstacles in organization (Tolfo *et al.*, 2011). For instance, sometimes this factor causes problem in conducting pair programming in XP by senior developers (Hunt, 2005; Sureshchandra and Shrinivasavadhani, 2008b). Also, code ownership is a challenge area in perspective of developers against other teams (Hunt, 2005). Ambitious people in teams sometime change customer's priorities and make the transition process and adoption harder (Krasteva and Ilieva, 2008). Furthermore, cultural differences and consequently different mindset and mentality also were reported as barriers in deploying agile methods (Tolfo *et al.*, 2011). Coaching in agile is different from other methodologies, since both technical and social aspects should be considered together. lack of experienced and patient coach is an important issue in movement process (Srinivasan and Lundqvist, 2010) and is referred as a biggest challenge in a case study (Sureshchandra and Shrinivasavadhani, 2008b).

Self-organizing team is one the essential of agility, Hoda *et al.* (2011) has explained all required roles in an agile team but, assembling such a perfect team is not easy. Furthermore, several obstacles and issues were reported about some specific roles in agile teams. For instance, project managers especially those who are experienced in traditional software development, cannot forget easily their previous role as a commander in traditional methods and alter it to a leadership (Sureshchandra and Shrinivasavadhani, 2008b). Customer, who supposed to be one the active team members, may play a negative role in movement process. Sometimes they resist against new situation (Hunt, 2005). Characteristics of customers in agile project, were explained in many studies (Cohen *et al.*, 2004; Turner and Boehm, 2003), but having such perfect customers in early stages of moving to agile is a great chance.

Light weight documentation and tacit knowledge in head of development team members is also a barrier from management perspective (Levy and Hazzan, 2009). Another issue is decision making in agile teams. Drury *et al.* (2012) have demonstrated six major obstacles in this issue. These obstacles are unwillingness to commit to decisions and rely on project manager, conflicting priorities for decision, unstable resource availability and also lack of implementation decision by team members, lack of taking ownership or decision and lack of empowerment by preventing expert from making decision. Furthermore, group decision making especially in allocation of development resources, alignments of strategic product line and performing development and maintenance tasks in teams is a barrier of agile adoption (Moe *et al.*, 2012).

In process domain, changing process model from traditional life cycle model to agile (evolutionary and iterative) is an obstacle in altering approaches; because this change has significant influence on strategies, tools, role of the people and techniques (Ganesh and Thangasamy, 2012). This change especially in companies with a higher level of CMMI, sometimes is more difficult because of their rigid and solid behavior (Babuscio, 2009). Finally, different measurement practices in agile versus traditional methods is an issue and should be considered especially for those who have a bias toward traditional measurement (Javdani *et al.*, 2012). Agile adoption process in distributed organizations has more issues to be managed compare to the previous discusses challenges. The most important issues are communication and cultural differences. In such companies due to the distance, face to face meeting is difficult; also time zone offset makes communication harder (Fowler, 2006). Although Impossibility of the teams to work collocated at one place all the time is a serious barrier in adoption early phases in none distributed organizations also (Krasteva and Ilieva, 2008). Cultural issues mainly are seen in multi-international sites (Summers, 2008).

It seems that all parts of organization face to several barriers, challenges and issues. Exactly because of this fact, many studies have been done in this area and will be done later also. Awareness about these challenges is necessary and all team members should be trained. Overcoming to these challenges even with awareness about them needs a lot of efforts and time. It should be noted that there are many reports on problems and challenges in post-adaption phase that are not included in our study and should be discussed in a separate study.

ROLE OF AGILE METHODS IN TRANSFORMING TO AGILE

As was mentioned before, several agile methods were founded and over past years almost all of them were used by different companies. Their underpinnings values are the same but their practices are different from each other. Cohen *et al.* (2004) have explained more popular agile methods. However, some other methods like adaptive software development (ASD) (Highsmith, 2000) and Internet-speed development (ISD) (Baskerville and Pries-Heje, 2001) which were introduced at the early years of the emergence of agile, didn't get popular as segregated and well-defined methods over the years. The main reason for this issue is because the mentioned methods does not emphasize on any particular practices. For instance, ASD focuses on result instead of the task needed to achieve the result (Chowdhury and Huda, 2011; Highsmith, 2000). Of course the concepts defined in them are provided in other popular agile methods.
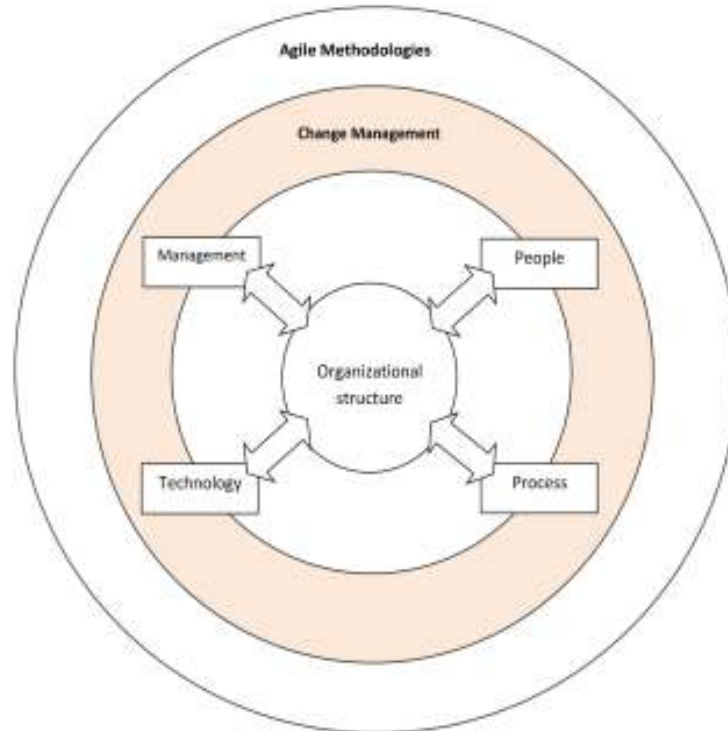
Fig. 1: General plan of change management strategy

Abrahamsson *et al.* (2003) have done a comparative analysis on agile methods to show differences of them from different perspectives. Of course they mentioned that at that time there were not enough empirical supports for their research Recently, Rao *et al.* (2011) have done a study on applicability and implications of different agile methods in industry. Also, there are some studies which compare two specific agile methods, like Scrum vs. XP (Fernandes and Almeida, 2010) and Adaptive Software Development vs. Feature Driven Development (Chowdhury and Huda, 2011). In general, the main aim of these studies is not to find pros and cons of agile methods; they have tried to increase the knowledge of applicability of the methods.

Generally agile methods in software development either focused on software development or project management. This difference in perspective leads them to different applications. However, the main differences are seen from project management viewpoint, there are many disparities in software development life-cycle (Abrahamsson *et al.*, 2003). We should be aware that degree of agility in different agile methods is not equal to each other. However this factor is not enough accurate and fair for comparing them, but it can be useful for all stakeholders to fix their perceptions and expectation of agility.

Based on the above discussion, it seems that another important item for increasing successfulness of agile migration is having enough knowledge about origin and capabilities of each agile method. Each company should select one or more agile methods that are more suitable for them. Since each method emphasizes on particular goals and practices and the ability to use or not to use of these practices has significant effect on success of agile movement process, method selection is a critical decision and should be done by enough study and time. There are some studies to help managers in this important decision (McAvoy *et al.*, 2007; Mnkandla and Dwolatzky, 2007).

CHANGE MANAGEMENT STRATEGY IN THE AGILE TRANSFORMATION

Agile methods offer a lot of values and achieving these values motivate all companies. They have only one solution for gaining the values, they should change.

Scope of change: Based on our literature, there are a lot of obstacles in agile transformation process. It is mainly because the range of change is so vast that all parts of organization are involved and need to adjust themselves with new situation. Agile adoption requires alteration in attitude and approach and change in this level may affect organization's goal also.

Necessity of change management strategy: In an idiotic view, moving to agile is changing the process of software development. This is an engineering approach and we believe that in socio technical problems, engineering approach is not sufficient.

Sidky (2007) proposed a framework to guide companies for adopting to agile in a four stages process. His work is valuable but he focused only through the engineering perspective and without pay attention to

real situation of stakeholders. It should be noted that at that time there were no enough migration experiences to being studied.

For success in this process, all of the required functions and practices should be gathered under a single umbrella called change management strategy. Agile transformation should be seen from different perspective such as management, process, people, organization and technology Fig. 1 shows general plan of this strategy). Indeed any guidance to transition to agile should be a change-oriented process and not methodology-oriented. For realization of this idea, previous experiences should be studied and outline of the strategy should be exploited form the inside of organizations. We believe that the best strategy for change management could be codified by conducting a Grounded Theory (GT) (Glaser and Strauss, 1967). Fortunately previous successful GT based researches in agile software development area (Babar, 2009; Cho, 2010; Hoda *et al.*, 2011), have had great contributions and it seems that because of nature of these methods, GT is the best way for investigating on them.

CONCLUSION AND RECOMMENDATIONS

Agile methods in last decade have been hot methodologies in software development. These methods by offering significant values motivate software stakeholders to use them. For achieving the agile values, development approach should be changed from traditional to agile. This change should be done in all parts of company and covers all aspect of organization.

Researches in this area mainly focus to find barriers, challenges and lessons learned from agile transformation and adoption case studies. Also few frameworks were supported for agile adoption based on the specific perspectives. Based on our literature, agile transformation should be done only via a comprehensive framework which is explored from inside of organizations. Different challenges and obstacles and also different perspectives on this mutation process support our idea. We believe for success in agile transformation it should be done only via a change management strategy that will considers all significant factors like people, organization, management, process and technology. Indeed without following a disciplined strategy companies will spend a huge amount of effort and cost without achieving a reasonable agile achievement. We are conducting a Grounded Theory research for exploring change management strategy.

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