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An Exploratory Study on Managing Agile Transition and Adoption

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Abstract. Software companies are replacing traditional software development methods with Agile methods due to coping with inherent problems of traditional methods. Due to the different nature of traditional and Agile methods, adaptation to Agile methods is not a simple process and needs to be managed in a sustainable way. In recent years, several studies have conducted on investigation of Agile migration journey, but less effort on identifying the serious managerial attentions in Agile transition process. Conducting a Grounded Theory in context of Agile software development, showed various aspects of the transition to be considered in order to having a successful change management process. This paper shows the important role of the emergent managerial attentions on success of Agile transition and adoption process.

Keywords: Agile software development, Agile transition, Agile adoption, Agile transformation, Managerial concerns, Grounded Theory.

1 Introduction

Agile software development was introduced to software market by creating Agile manifesto that focused on the new values [1]. The new values came from new development style which in turn focused on new activities and practices which in turn were underpinning of Agile approach [2]. The process of changing software development approach to Agile approach, called Agile Transformation/Transition/ Adoption, is a serious organizational mutation in which all levels of company and organization need to be involved. Agile approach promised values such as higher quality, customer satisfaction, early and frequently releases, light-weight documentation, embracing changes, etc. motivate software companies to employ Agile methods. At the same time, in the recent competitive economy, using Agile methods would be an advantage. Lots of reputed software companies are using Agile methods, at least in some of their projects [3, 4], and many others are tempted to move to Agile [5].

Several studies discussed about the challenges, barriers, and problems that software companies and teams are faced with during Agile transformation [6-8]. Since Agile transition and adoption process requires a huge change in the organizational culture

and people roles and responsibilities, this process most often will be faced with a large variety of challenges. In general, involved team members, senior managers, customers, tools, and technologies are the origins of the transition challenges [8, 9].

Agile transition needs to be managed in a sustainable way mainly due to the huge amount of changes, the potential challenges and barriers, and involving various people in the transition. This denotes that companies need to be familiar with various aspects of Agile transition and try to minimize the required effort and cost by focusing on specific managerial attentions to this organizational mutation.

Conducting a Grounded Theory in context of Agile software development showed various necessary managerial attentions to be considered before the transformation.

With respect to the above discuss, this paper has been organized as follows: Section 2 presents a concise literature about Agile transition issues, followed by Section 3 which presents the employed research methodology. Section 4 provides the results and continued by Section 5 which presents a discussion on the results. Section 6 explains the limitation of the research study and finally Section 7 presents a conclusion along with recommendation for future work.

2   Agile Transition and Adoption

Transitioning to Agile approach and methods are not an easy and ordinary task. Especially, for those teams that have been using the traditional methods for a long time and are fully adapted to them. Indeed, such a process requires a significant shift in the mindset of everybody involved, enough investment and many other stimuli [7, 10].

Agile transition as an infrastructural project needs a comprehensive action plan comprising all the transition related aspects and issues. So for, several research studies been done on almost all aspects of Agile transition. While most of them have focused on describing the journey of Agile transformation [4, 11, 12], some of them put more emphasis on the potential challenges and barriers [7, 8, 13]. Also, some other studies have focused on Agile principles and Agile promised values [14, 15]. At the same time a few studies have proposed some theoretical transformation frameworks or guidelines [16, 17]. However, they have not been successful enough in practice to be employed in real environments [13, 18].

Beside the above studies, in some other research studies human aspects as critical factors of the transition have been studied in detail [9, 19, 20]. In these research studies, cultural and people-related issues have been emphasized. Due to the people-intensive nature of Agile methods, paying enough attention to the people-related issues is so crucial. Moreover, in some other studies, facilitators, prerequisites, and drivers of Agile transition have been investigated [20-22]. In general, effective training, customer collaboration, people commitment to change, Agile champions, appropriate pilot project selection, suitable method or practice selection are some of the recommended drivers and facilitators. Lesson learned and weaknesses and strengths of the transition are discussed in other studies [9, 13, 23]. Clearly, the results of the previous studies give other software companies better vision to prevent colliding with the problems and challenges within migration to Agile.

With respect to the literature, it seems that Agile coaches or those who are responsible for managing or handling Agile transition should be aware of the general conditions covering the whole process. Furthermore, those who are involved in the transition need to be familiar with the change process and the factors that affect the transition. Undoubtedly, such knowledge increases the chance of success when attempting to migrate to Agile and decreases the demanded time and cost significantly.

In sum up, a lot of the factors should be considered together for a successful Agile transition, but it is impossible to cover all of them in a single article. Following the selected research methodology, only a minor literature review was conducted before inception of this research study [24]. However, after theory development, the findings were investigated in light of a major literature review [25]. In the next sections, this study presents its findings focusing on the managerial attentions in real Agile transition process that have been explored from the real data.

3   Research Methodology

Grounded Theory (GT) was employed as the most suitable research methodology for conducting this research study. The founders of GT, Glaser and Strauss, defined it as a systematic approach which tries to discover main concern of people involved the context under study [25]. GT, in general, is helpful to answering questions like, "what is going on in an area?" by generating formal or substantive theory [26]. Although this method usually have been employed in social research studies, it is also useful for wide range of research studies in context of software engineering in general and in Agile context in particular [27, 28].

3.1   Procedure of GT

GT defines some particular steps for conducting a qualitative research, as depicted in Figure 1.The following steps can be defined generally [25]:

- Data Collection: Contrary to the other research methodologies, GT requires minimum literature review and starts with data collection to cover general questions and concerns of people involved in area under study. There is no limitation about the type of data. However, most often data collection is carried out via conducting several interviews.
- Data Analysis - Open coding/Substantive coding: Once some data is collected, data analysis will be started. Collected data should be reviewed line by line/ sentence by sentence/ paragraph by paragraph... and *key points* should be extracted. Then, each key point will be assigned with an *open code*. Using *constant comparison* technique, the newly assigned code should be compared with the previous open codes in the same and previous interviews. This technique checks whether the newly assigned code is created previously or not. Also, it helps the researchers to

identify concepts [25]. Iterative using of constant comparison leads to emergence of *categories,* higher abstraction level, that each of them encompass several related concepts [25].
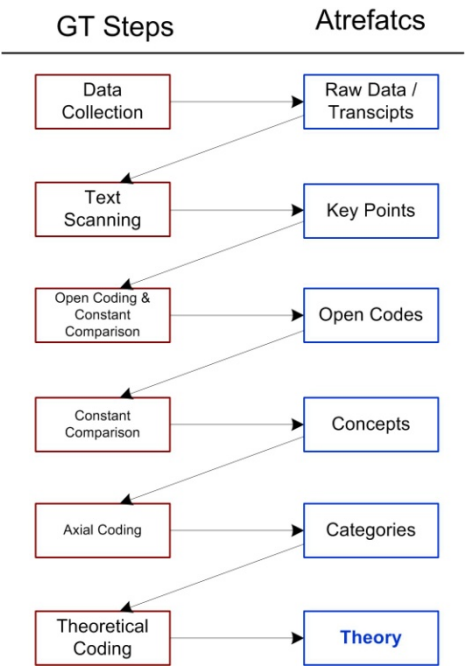

Fig. 1. General steps and artefacts of Grounded Theory

- Theoretical Memoing: After each interview, for clarifying viewpoints of respondents, supplementary data can be collected in form of memos [29]. This process helps the researchers to enrich the relationships between categories.
- Data Analysis- Theoretical coding: Theoretical coding or theory building is the last step of data analysis in which the researchers look for finding relationships between *core category* and other categories. Glaser emphasizes on induction or emerging theory without forcing [24] and suggests several theoretical coding families to assist the GT researchers to develop substantive theory.

3.2   Participants Recruitment

This study was conducted with 45 voluntary Agile experts from 13 different countries across the world. Figure 2 shows the detail information of the participants. Several interviews conducted with the participants and were voice recorded and transcribed subsequently for further use in data analysis. Due to space limitation, only a few participants' quotes are provided to clarify the researchers' interpretations.

P#	SD exp. (years)	Agile exp. (years)	Agile position	Agile methods	Country	Projects domain	Branches	Transformation period (months)
P1	14	8	HDD	XP, Scrum, Kanban	Finland	Mobile software	1	12+, ongoing
P2	25	15	AC	Scrum, Kanban	USA	All domains	4	12+
P3	7	7	PM	XP, Scrum, Kanban	USA	Web applications	3	6+, ongoing
P4	10	2	PM	XP, Scrum, Kanban	Bulgaria	Banking	1	6+, ongoing
P5	10	2	PM	Scrum, Kanban	Iran	Financing	7	12+, ongoing
P6	11	8	CON	Scrum, Kanban, FDD	Australia	All domains	7	12-15
P7	6	2	DEV	Scrum	Greek	Office Auto.	1	12+, ongoing
P8	10	5	PM	Scrum, Kanban	Germany	Web applications	5	8+, ongoing
P9	20	10	HDD	Scrum	Spain	Custom Development	3	24
P10	20	3	SM	Scrum, Kanban	Spain	Transportation	4	24+, ongoing
P11	10	4	AC, SM	XP, Scrum, Kanban	India	Publication	1	+6, ongoing
P12	16	2	HDD	Scrum, Kanban	USA	Life and insurance	16	6+, ongoing
P13	14	6	AC, CON	Scrum, Kanban	Finland	Consultancy services	1	3-30
P14	15	3	MGR	Scrum, Kanban	Iran	HRMS, CMMS	1	12
P15	10	2	CON	Scrum	Indonesia	MIS	1	3+, ongoing
P16	21	10	PM	Kanban	USA	SCM	1	12
P17	19	5	PM	Scrum, Kanban	Sweden	Financing	2	24+, ongoing
P18	8	2	DEV	Scrum	Sweden	HRMS, MIS	1	24
P19	13	6	PM	Scrum	India	Banking	3	18 in USA, 24 in India
P20	11	3	HDD, PM	Scrum, Kanban	USA	Insurance, Banking	16	6+, ongoing
P21	16	7	SM	XP, Scrum	USA	Financing, HR	3	18
P22	11	5	AC	Scrum, Kanban	France	Banking	100+	12+, ongoing
P23	16	8	AC	XP, Scrum, Kanban	USA	All domains	7	6-24
P24	15	7	SM	Scrum, XP	USA	All domain	3	12
P25	8	4	DEV	Scrum, XP	USA	HRMS	1	6+, ongoing
P26	13	6	AC	Scrum, XP	India	Medical systems	3	15+
P27	14	5	SM	Scrum, Kanban	USA	Mobile applications	2	12+
P28	15	6	AC	Scrum, Kanban	Germany	Advisory/consulting	2	15+
P29	10	1	PM	Scrum	Norway	Web Agency	2	12+
P30	35	1	DEV	Scrum	USA	Finance, Banking	3	6+, ongoing
P31	17	4	QA, PM	Scrum	USA	All domains	3	12
P32	25	2	AC	Scrum, Scrumban	USA	All domains	2	12, ongoing
P33	41	3	MGR	Scrum, Kanban	USA	All domains	17	15+, ongoing
P34	7	2	QA	Scrum, Kanban	USA	Retail systems	3	9+, ongoing
P35	20	8	HDD	Scrum, XP	USA	Life and Annuity	50+	15
P36	17	7	MGR	Scrum, Scrumban	USA	Investment Services	21	18
P37	13	1	HDD	Scrum	USA	Finance, Banking	3	6, ongoing
P38	7	2	PM	Scrum	USA	Web Applications	1	12+, ongoing
P39	35	10	AC	Scrum, XP, Kanban	USA	Consultancy services	1	15
P40	30	15	AC	Scrum, Kanban	USA	Consultancy services	1	12
P41	11	3	PM	Scrum, Kanban	India	Mobile applications	2	12+, ongoing
P42	14	4	DEV	Scrum	Spain	Banking, HR	14	15+, ongoing
P43	18	6	AC	Scrum, XP	USA	Banking	2	6+, ongoing
P44	17	5	SM	Scrum, Kanban	Norway	HRMS	2	9+
P45	11	6	PM	Scrum	USA	Mobile applications	4	12+

Fig. 2. Demography of the participants (HDD: Head of development dept., AC: Agile coach, PM: Project manager, CON: Consultant, SM: Scrum master, MGR: Manager, DEV: Agile Developer, QA: Quality assurance)

4 Results: Managerial Concerns in Agile Transition

Data analysis discovered the main concern of the participants, '*Agile transition and adoption process*', and showed that '*Managerial concerns in Agile transition*' is one of the its related categories. This section describes this category in form of the Glaser Strategy Family, suggested by Glaser [25]. Figure 3 shows the emergent theory following the Weber's recommendations for illustration of relationships [30].

4.1 Focusing on People

The participants explained the importance role of people involved in the transition. The reality of transition is changing people behaviours and mindsets. Hence, focusing on them is so crucial within the transition.

"At Toyota this is also known as 'Building people before building cars', this is the fact behind any successful Agile transition... " P1, HDD.
"Focusing on people is success key of transition to Agile, it is all about people and their behaviours." P21, SM.

Some of the participant believed that companies and managers only need to help people to change themselves while empowering them.

"The technical implementation of Agile is usually the easiest; it's the people transformation which is difficult. Managers need to help them to change themselves and give them enough authority in their work." P6, CON.

Encouraging people, motivating and supporting them during the transition help them to adapt to their new responsibilities easier.

"Supporting and helping them, managers can do this, and persuade them [involved people] in transition. People need good supporters while they are changing their behaviours." P16, PM.

Almost all of the participants emphasized on the critical role of the people and believed that most of the transition efforts are related to people.
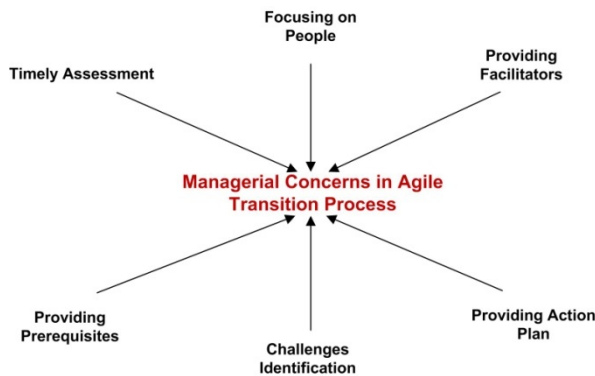
Fig. 3. Emergent of theory of Managing Agile Transition from underlying concepts

4.2   Providing an Action Plan

Agile transition should be considered as an organizational project. Hence, it needs to be planned carefully. Such a plan needs to cover all the transition issues and steps.

"Companies need to take it [transformation] seriously, not just like a momentary fashion. It should be done based on an action plan". P10, SM.

Companies can prepare a framework that considers all the required activities and highlights their business goals.

"We did a primary analysis on our needs and goals, and then prepared a plan or framework for it. Although it took a considerable time, but it helped us in all steps." P33, MGR.

Clearly, all the involved people need to be familiar with prepared action plan, its goals, and its milestones carefully.

> *"Companies need to make sure that the framework is in place and has been communicated before beginning an Agile transition."* P26, AC.

Finally, almost all of the involved Agile coaches emphasized on having an action plan before inception of the transition and addressed lack of it as a potential risk.

4.3   Transition Challenges Identification

During the interviews, almost all of the participants warned the researchers about the potential challenges during transition. They stressed that all members need to be aware about potential challenges.

> *"They [managers] should ensure that all members are aware about the transformation process and its challenges."* P19, PM.

Having enough knowledge assists all members to know the challenges and be ready to cope with them or reduce the likelihood of their occurrence.

> *"Make people strong enough before going Agile. If they know the challenges they'll be facing, it is much easier to provide a solution..."* P28, AC.

Furthermore, some of the participants explained the potential challenges that among them, 'lack of training', 'people resistance', 'people wrong mindset', 'customer issues', 'cultural issues', etc. were the most important ones. Some of them addressed 'lack or weak transition management' as a serious challenge as well (P1, P39).

4.4   Providing Prerequisites

Most of participants emphasized on providing transition prerequisites before starting the transition in order to facilitate the transition process.

> *"There are several prerequisites that I always ask my clients to provide them. I strongly believe that without them there will be no effective transition. For instance, if management is not committed to the change, transition would be meaningless."* P2, AC.

Some of the participants strongly believed on defining a preparation phase in order to provide the transition prerequisites prior to the transition.

> *"A distinct phase is needed to be defined before going Agile. I see most of companies who are not serious about it, while it is so critical and helps them in next phases",* P43, AC.

The participants addressed several prerequisites too including 'people buy-in', 'training', 'pilot project selection', 'having convincing reasons for Agile', and 'defining business goals'.

> *"After many years experience, I strongly advise managers to provide the required prerequisites to have a smooth transition."* P39, AC.

4.5   Providing Facilitators

Due to wide range of challenges that software companies and teams may be faced with during the transition, the participants emphasized on providing transition facilitators that help teams to deal with the challenges.

> *"During the early meetings with my clients, I always ask senior managers to provide change facilitators; to me, this responsibility is the most important responsibility of managers during Agile transformation."* P13, AC.

Some of the participants believed that good facilitators can guarantee the success of the transition and lack of them causes trouble for involved people.

> *"… There are many factors and facilitators that existence or lack of them has a great impact on the success of project [Agile transition]… motivation and incentives, experienced coaches … are some of them."* P35, HDD.

The respondents addressed several facilitators including, 'on-site coaching', 'management buy-in', 'team members buy-in', 'Agile champions', 'incentive factors', etc.

In general, the main focus of the facilitators should be on involved people and creating a positive atmosphere for the change.

4.6   Timely Assessment

The participants emphasized on conducting assessments within transformation in several points.

> *"We had a mistake in transformation; I recommend others to define measurement criteria for assessing the transformation process over time and identify their progress, challenges, weaknesses, and strengths."* P8, PM.

Although the participants addressed different points for conducting assessment, they emphasized on the role of assessment in increasing chance of transition success.

> *"The assessment of current situation, and existing assets, before starting the change will lead companies to prerequisites"* P2, AC.

Due to the importance impact of assessment on transition, many of the participants addressed pre-start up assessment as one of the critical prerequisites.

> *"Only by conducting a self-assessment before starting the project companies can decide about their required action plan and its step."* P40, AC.

Such an assessment was emphasized for various parts of the transition such as, 'pilot project selection', 'team selection', 'practice adaptation', 'defining goal', etc.

5   Discussion

Several research studies have been conducted to study Agile transition process, but yet there is no standard or popular roadmap to deploy Agile methods in software companies. Most of the studies in this context have focused on the journey of transition, lesson learned, and specific aspects of transition. Conducting a GT study showed that Agile transition and adoption process needs to be managed carefully to result in a successful transition. This study discovered the six most important managerial attentions to be considered during the transition, as explained in the above section. Conducting a major literature review supported the findings of this study strongly.

Conboy et al. by investigating on the challenges that are faced by software companies during the transition emphasized on the role of people and their skills in the transition process [7]. Lalsing et al. addressed people factors in Agile transition and put emphasis on focusing on people in this process [31]. Cockburn and Highsmith believed that since "Agile processes are designed to capitalize on each individual and each team's unique strengths", Agile transition must consider human factors carefully [32]. Focusing on people also has been emphasized by other researchers [33, 34].

Providing an action plan or framework was also stressed in the literature. Boehm and Turner suggested a risk based plan for using Agile approach in software projects [35]. Furthermore, some frameworks were suggested for Agile adoption [17, 36], however, they were not enough successful in the industry [18]. Also, a few experience-based roadmaps to going Agile [37].

Identification of the potential transition challenges was also emphasized by the literature. Conboy et al. believed that finding the challenges should be the first step of transition [7]. There are several research studies which by explaining the challenges, put emphasis on finding and handling the transition challenges before their occurrence [13, 23]. Furthermore, several studies described the challenges and problems they faced with during Agile migration and warned others about them.

Providing Agile transition prerequisites was another finding of this study. Esfahani focused on Agile pre-adoption and explained the necessity of providing prerequisites of the transition [38]. Other studies also focused on impacts of providing various prerequisites of the transition including 'defining business goals of transition' [39], 'initial training' [40], 'selecting an appropriate pilot project' [21, 41], 'appropriate team set up' [42] and so on. Almost all of them believed that these prerequisites directly impact the success of the transition.

Besides the prerequisites, software companies need to consider several change facilitators during the transition. Previous studies addressed various change facilitators including 'on-site training' [7], 'management and team members buy-in' [41, 43], 'right people selection and empowering team' [7], 'champions' [42], 'frequent communications'[44] , and 'incentive factors' [45].

Finally, the literature supported conducting timely assessment as one of the critical managerial concerns within Agile transition. Conducting assessment prior to starting the transition, method selection, during adaptation, and after adoption were emphasized by previous research studies [17, 46].

It should be noted that, beside the above brief discussion, some parts of findings of this study have explained previously in several distinct article or are under publishing process [6, 9, 21, 22, 27, 47].

6   Limitation

All the emergent codes, concepts, and categories in this study came from data directly, therefore the findings are grounded enough in substantive contexts [29]. Nonetheless, this article cannot claim that its findings are universal, since access to resources was limited to the participants of this study, but, it claims that its findings have characterized and described the context studied [48].

7   Conclusion and Future Work

The study showed various managerial concerns to be considered for managing Agile transition process. Most of them are related to the people and supporting them during this process. This reflects the critical role of the involved people throughout the transition. Preparing a perfect action plan, identifying potential challenge areas, providing prerequisites and facilitators to support the change, and conducting required assessment helps companies to manage the transition process well.

Conducting a quantitative research study and indentifying impact of the findings of this study on success of transformation is suggested for future work.

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