

Exploring Facilitators of Transition and Adoption to Agile Methods: A Grounded Theory Study

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Abstract— Nowadays, changing development approach from traditional to Agile methods has been considered as a strategic decision for achieving Agile values by most software companies and organizations. Due to its nature, moving to Agile software development and adapting to Agile methods need a long time and enough effort. Thus, organizations are faced with a lot of challenges during the transition and adoption process. Providing facilitators can make transition process easier and faster. Conducting a Grounded Theory study on Agile transformation process, involving 33 Agile experts across 13 different countries showed that Agile transition and adoption needs to be supported by several facilitators. Thus, the main contribution of this article is providing eight major facilitators that should be used by Agile teams to support Agile transition and adoption. Some of these facilitators support team members in doing their jobs and empower them against challenges. Some others help them in dealing with challenges or prevent potential problems before occurrence in Agile transition process. Furthermore, some of these facilitators have positive effects on people and motivate them to adapt with their new behaviors. Agile transition and Adoption will be faster and easier if the more facilitators get involve.

Index Terms— Agile Software Development, Agile Transition, Agile Adoption, Agile Transformation, Agile methods, Agile Transition Facilitators, Grounded Theory

I. INTRODUCTION

Agile transformation process (ATP) as a bridge for moving software companies from traditional to Agile methodologies is an organizational mutation which takes a long time and needs huge efforts [1, 2]. Changing development approach is not easy and needs many changes in people and organizational behaviors, management style, activities and processes [3]. Such a process starts a revolution in organization [4] and companies, thus organizations would encounter with huge number of challenges and barriers [1, 5, 6]. Since Agile transformation affects all aspects of organization, many challenges would emerge in all parts of organization including management, process, people and technology [6]. In this situation, supporting strategies and facilitators

can help organizations to overcome aforementioned obstacles.

In this study, a grounded theory has been conducted on ATP with participation of 33 Agile experts from 13 different countries. The results showed that Agile teams need supportive strategies for overcoming obstacles and challenges during the transformation process. These strategies not only facilitate transformation process but also decrease cost of the organizational changes in terms of time and human effort. In this article based on the grounded data, different dimensions of facilitators and their effects on ATP have been explained.

Rest of this article includes these sections respectively: Section 2 explains a short background on ATP, Section 3 presents research methodology, Section 4 explains the findings about the facilitators of transformation process, Section 5 provides a discussion on the role of the facilitators in Agile transformation, Section 6 explains limitations of this study and finally Section 7 provides conclusion and future works.

II. BACKGROUND

About a decade ago, Agile methodologies were formally introduced by creation of Agile manifesto [7]. These methods stressed on some new values in software development industry, such as fast delivery, higher quality, embracing changes, customer satisfaction, light weight documentation and so forth [8]. Several different methods like Scrum [9, 10], Extreme Programming (XP) [11], Feature Driven Development (FDD) [3], Crystal family [3], Dynamic Systems Development Methodology (DSDM) [3] lean [3, 12], etc. gathered under Agile umbrella. They have defined new development approach by focusing on either project management or software development process. Achieving new values motivates many companies to leave traditional software development methods and move to the Agile methods via an organizational mutation, ATP. This mutation covers both organizational activities and people behaviors. It means that, nothing can remain in its previous state, so, ATP would not be an easy or ordinary change process [3].

Because of wide extent of changes in organizational roles and behaviors during the transformation process,

Agile teams are faced with lots of challenges, barriers and obstacles in moving to Agile [13]. Time consuming nature of this process can intensify problems and challenges [14]. Most of the problems are about people and their mindsets [6]. Also, human aspects make a lot of challenges and most often act as impediment factors during ATP [4]. Managers and their traditional management style are also critical barriers. Furthermore, this process suffer from weak communications in distributed teams and different cultures [15]. Although, the extent of these challenges varies in different companies, all of them impress ATP and make it difficult.

Agile teams and coaches should be ready for encountering with such barriers and having well-defined strategies to cope with barriers is extremely helpful. Also providing enough supports and using appropriate facilitators are important success factors for going Agile with less effort, in a smooth way, and in a shorter time. Appropriate training, people and management buy-in, good coaching and mentoring and several other factors act as facilitators of ATP and decrease the risk and cost of change [13, 16]. Having these facilitators during the transformation process helps organization and people to prevent most of the challenges and to deal with the problems [17].

In order to following the Grounded Theory guidelines, in this section, only a brief literature on the impacts of the facilitators was expressed and detail discussion in light of the findings of the study will be presented in final sections of the article.

III. RESEARCH METHODOLOGY

This study was carried out based on the Grounded Theory (GT), a qualitative research method which was developed by Glaser and Strauss [18]. This method defines a systematic approach for discovering the grounded theory¹ based on the substantive and grounded data [19, 20]. As Strauss explained, it uses a "systematic set of procedures to develop an inductively derived grounded theory about a phenomenon" [21]. GT is a suitable method for qualitative researchers to answer questions like, "what was going on in an area?" by generating formal or substantive theory [22]. However this method usually have been used in social studies, but it is useful for a wide range of topics in software engineering, especially those which are related to people behaviors and human aspects [23].

A. Why Grounded Theory?

GT was chosen because of multiple reasons:

- Agile methodologies as people oriented methods focus on people and at the same time, GT facilitates studies on people behaviors and interactions.
- For phenomena that are not studied in deep or in global perspective, GT is completely suitable;

meanwhile, Agile transition process in real environment was not studied yet deep during ATP and in most of the times, it was studied from a specific rather than global perspective [24].

- There were enough successful evidences of using GT in Agile software development in the recent years [5, 25-29].
- The main aim of GT is generating theory on the basis of grounded data, rather than extending or verification of existence theories [30]. It means that this methodology is useful in studies that researchers cannot define upfront hypotheses and they are looking for main concerns of participants in real environments [31]. In this case, research questions should emphasize on a wide area rather than specific topic [28]. This study followed such a strategy and by coding substantive data and abstracting them in a multi-level analysis process, core concern and its related categories and properties were emerged, as Glaser explained in his instructions [32].

B. Data Collection

Since GT starts with data collection [18], this study also started with data collection. By announcing an invitation for expert Agile practitioners in several on-line communities, enough volunteers registered for participating in this study. Having at least one transformation experience was the main requirement of attending this study. Afterward, several semi-structured and on-line interviews were conducted with the selected candidates using open ended questions. Table 1 shows the participants whom their point of views were used in this study. Since all of the participants were from different countries, face-to-face interview was not possible.

Selected candidates were 33 Agile experts from 13 different countries and in this article they are referred by their numbers, P1 to P33 and their roles, if necessary. Between them almost all Agile roles could be seen, from developers to senior managers. They were using combination of Agile methods, mainly Scrum, XP and Kanban as the most popular methods these days [33].

Each interview was started with general questions about the participant's experience and his or her background in ATP. The subsequent questions were focused on challenges that they were faced with during ATP and their formal and informal solutions and strategies for handling issues. Finally, they were asked about characteristics of ideal transformation process and impacts of the effective factors on it (e.g. pilot project, method selection, people, customer, management, tools and technology, etc.). In keeping with the GT methodology, no direct questions were asked about specific topic [34]. Also, all interviews were voice recorded and transcribed with the consent of the participants.

Since data collection in GT can be stopped once the researcher reaches saturation of his/her core concepts of categories [18], the interviews were stopped when no new

¹ "Grounded Theory" refers to the research methodology and "grounded theory" refers to the outcome of the research methodology or final emerged theory.

TABLE I.
THE PARTICIPANTS BRIEF DEMOGRAPHY (AGILE POSITIONS: AGILE COACH (AC), DEVELOPER (DEV), PROJECT MANAGER (PM), SCRUM MASTER (SM), HEAD OF DEVELOPMENT DEPT. (HDD), QUALITY ASSURANCE (QA), CONSULTANT (CON), MANAGEMENT (MGT))

| No. | SD exp. (Yrs) | Agile exp. (Yrs) | Agile Position | Agile Methods | Country | Company Size | Transition period (months) |
|-----|---------------|------------------|----------------|--------------------|-----------|--------------|----------------------------|
| P1 | 14 | 8 | HDD | XP, Scrum, Kanban | Finland | 70+ | 12+, on-going |
| P2 | 25 | 15 | AC | Scrum, Kanban | USA | 65+ | 12+ |
| P3 | 7 | 7 | PM | XP, Scrum, Kanban | USA | 500+ | 6+, on-going |
| P4 | 10 | 2 | PM | XP, Scrum, Kanban | Bulgaria | 200+ | 6+, on-going |
| P5 | 10 | 2 | PM | Scrum, Kanban | Iran | 150+ | 12+, on-going |
| P6 | 11 | 8 | CON | Scrum, Kanban, FDD | Australia | 1000+ | 12-15 |
| P7 | 6 | 2 | DEV | Scrum | Greek | 20+ | 12+, on-going |
| P8 | 10 | 5 | PM | Scrum, Kanban | Germany | 50+ | 8+, on-going |
| P9 | 20 | 10 | HDD | Scrum | Spain | 200+ | 24 |
| P10 | 20 | 3 | SM | Scrum, Kanban | Spain | 200+ | 24+, on-going |
| P11 | 10 | 4 | AC, SM | XP, Scrum, Kanban | India | 50+ | +6, on-going |
| P12 | 16 | 2 | HDD | Scrum, Kanban | USA | 1600+ | 6+, on-going |
| P13 | 14 | 6 | AC, CON | Scrum, Kanban | Finland | 20+ | 3-30 |
| P14 | 15 | 3 | MGT | Scrum, Kanban | Iran | 50+ | 12 |
| P15 | 10 | 2 | CON | Scrum | Indonesia | 200+ | 3+, on-going |
| P16 | 21 | 10 | PM | Kanban | USA | 65+ | 12 |
| P17 | 19 | 5 | PM | Scrum, Kanban | Sweden | 50+ | 24+, on-going |
| P18 | 8 | 2 | DEV | Scrum | Sweden | 40+ | 24 |
| P19 | 13 | 6 | PM | Scrum | India | 200+ | USA:18; India :24 |
| P20 | 11 | 3 | HDD, PM | Scrum, Kanban | USA | 1200+ | 6+, on-going |
| P21 | 16 | 7 | SM | XP, Scrum | USA | 250 | 18 |
| P22 | 11 | 5 | AC | Scrum, Kanban | France | 2000+ | 12+, on-going |
| P23 | 16 | 8 | AC | XP, Scrum, Kanban | USA | 200+ | 6-24 |
| P24 | 15 | 7 | SM | Scrum, XP | USA | 40+ | 6+, on-going |
| P25 | 8 | 4 | DEV | Scrum, XP | USA | 300+ | 15+ |
| P26 | 13 | 6 | AC | Scrum, XP | India | 50+ | 12+ |
| P27 | 14 | 5 | SM | Scrum, Kanban | USA | 40+ | 6+, on-going |
| P28 | 15 | 6 | AC | Scrum, Kanban | Germany | 50+ | 15+ |
| P29 | 10 | 1 | PM | Scrum | Norway | 40+ | 12+ |
| P30 | 35 | 1 | DEV | Scrum | USA | 100+ | 6+, on-going |
| P31 | 17 | 4 | QA, PM | Scrum | USA | 50+ | 12 |
| P32 | 25 | 2 | AC | Scrum, Scrumban | USA | 200+ | 12, on-going |
| P33 | 41 | 3 | MGT | Scrum, Kanban | Germany | 2500+ | 15+, on-going |

important concept was found on this topic. It should be noted that for other categories which were not related to this article, data collection was ongoing at the time of writing this report.

C. Data Analysis

Data analysis was performed by following GT defined steps. Based on GT instructions, data analysis which called *data coding*, started once some data was collected [34]. In this study, NVIVO software was used as analytical tool for handling and analyzing collected data. This package is a powerful tool for supporting qualitative research and there are several valuable GT studies which

have been conducted recently by using this tool successfully [35-37]. Following GT steps, data analysis was started with finding *key points* within data (transcribed) through line-by-line reading them [19]. After finding key points, each of them was assigned by an open code through open coding process [18]. Discovered code through *constant comparison* technique was compared with the previous codes in the same interview and the previous ones [18, 34]. This process helped the authors to group emerged codes and find out higher abstraction which called *concepts* [18]. Iterative applying constant comparison technique helped the authors to discover *categories* [18]. NVIVO provides strong facilities for doing such analysis and helped the researchers to find categories with sufficient accuracy. Fig. 1 shows an instance of coding process.

Open coding stopped once the core category emerged.

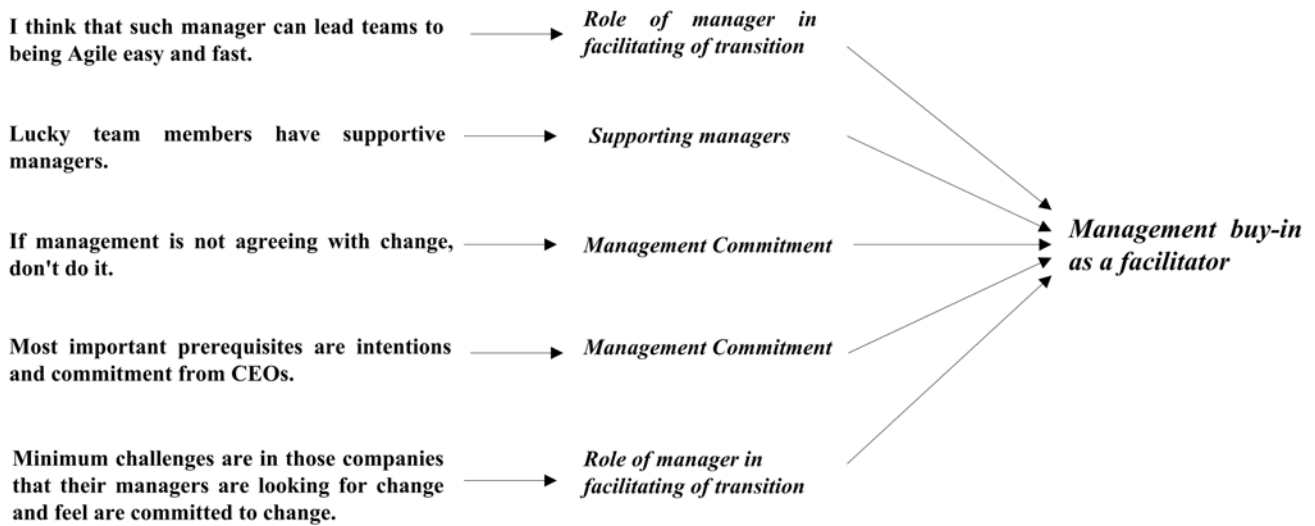


Figure 1. Emerging a category through coding process in GT

The core category reflects main concern of the participants in context under study [18]. However, emerging core category always has been a focus of concern.

The next step of data analysis was, *selective coding* that was used to integrating and refining the theory [22]. In this level of analyzing, data analysis was focused on "only those variables that relate to the core variable in sufficiently significant ways as to produce a parsimonious theory"[19]. The emerged core category, *Agile transition and adoption process*, included some related categories in which "Agile transition facilitators" was one of them.

Among the data analysis, by using *theoretical memoing*, several memos were added in collected data

after each interview or during other steps. "Memos are the theorizing write-up of ideas about substantive codes and their theoretically coded relationships as they emerge during coding, collecting and analyzing data, and during memoing" [32]. When almost all codes were saturated and data collection was nearly finished, conceptual sorting helped the authors to demonstrate the emerged theory and depict its outline [22].

D. Theory Building

Theory building or as called in GT, *theoretical coding*, was the last step of this study [18]. There are some different approaches on GT about theory generation. Glaser emphasizes on emerging the theory or induction [34], while Strauss stresses on systematic approach and validation criteria[22]. On the other hand, Charmaz, emphasizes on the role and effect of researchers on theory

building; Constructivist Grounded Theory [30]. In this study, Glaser's view was used and theory was generated at the end of data analysis process [34].

In the current study, the main emerging theory is *Agile transition and adoption process* where covers all related categories and properties of this process. It includes Agile transformation prerequisites, Agile transformation facilitators, Transformation and adoption framework, etc. These categories encompass their own sub-categories and properties which will be explained in separate articles.

The core category is still emerging. Therefore, selective coding is ongoing while this paper is being prepared. Fig. 2 shows all level of data analysis carried out in this study.

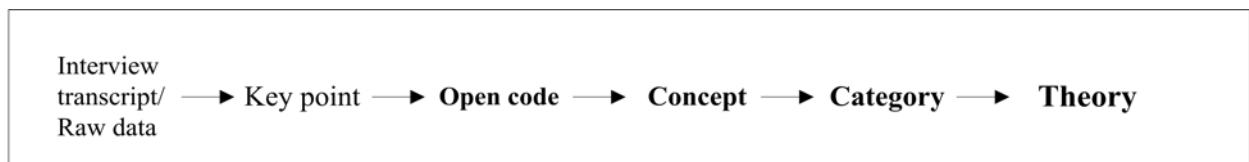


Figure 2. Multi level data analysis

IV. FACILITATORS OF AGILE TRANSITION PROCESS

For successful migration to Agile software development, all people in software organization should be involved in ATP. There are various barriers and obstacles during this process and without handling them, ATP needs more time and can fail easily. At the same time, organizations can use several facilitators to reduce challenges and barriers. Providing these facilitators has significant effects on facilitating transformation process. Nonetheless, for various reasons, all of them may not be available in all organizations. In next sub sections, these facilitators that have emerged from substantive data are presented. Fig. 3 depicts all of the discovered facilitators in transformation process.



Figure 3. Emergence of Agile transition facilitators theory

A. Training

Almost all of the participants stated that since Agile approach offers different values from traditional approaches, people should learn new activities and focus on new achievements. They declared that training is so important for being familiar with and adapting to new roles and activities. In other words, lack of appropriate training can lead to problems and hindrances during the transformation process.

“Training should cover business benefits ... this is the most important one in training. Furthermore, 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.

“All should be trained for it [Agile transformation process]. Each member based on his/her abilities and weaknesses should take this medicine. Agile training is critical; it is totally different from academic training like colleges program. You know, most of my friends complain about tedious training courses.” P18, Agile Developer.

The important point is that, since some of Agile practices return to people’s behaviors and mindsets, training in this situation should be practical and functional.

“Without a precise training plan, transformation would be so difficult. Training in

Agile teams should be done inside the teams. I have seen many persons that read a lot of books and went to many seminars, but I believe that without practical training, people cannot achieve the real purpose of training. Coaches should start transforming with many practical training activities. This is an effective way.” P2, Agile Coach.

At the same time, some of the participants mentioned that training acts as a helpful tool for handling their challenges 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.

“Fortunately, focusing on training helped us to overcome most of the problems. Paying enough attention to education has significant role on this project [transformation].” P4, Project Manager.

Lack of adequate and dysfunctional training causes many problems in transformation process including Unrealistic expiation of Agile, Difficulty of change, Lack of deep understanding of Agile values, Lack of effective collaboration and Low confidence. These categories were discovered in this grounded theory study and will be discussed in another article. Thus, having well-defined and flexible training plan facilitates change of development approach in organizations, as recommended by some of the participants. They believed that training should not be limited to specific stage(s) of ATP and should be provided at all times, if necessary.

“I believe that it is necessary to have a separate well-defined plan for education to achieve its goals, also effectiveness of training should be assessed continuously.” P1, Head of Development Department.

“There are lots of challenges with lack of deep understanding of Agile; my solution is planning, one by one mentoring and continuous training. Based on my experiences, continuous training is one of the tricks that help organization to overcome transformation challenges.” P11, Agile Coach.

B. Good Coaching and Mentoring

ATP needs to be managed and involved people should be coached during the transition. Mentoring and coaching help Agile teams to learn more and deeper information about their roles in-time and in practical manners. Especially those teams that are moving from traditional methods rather than fresh teams need more coaching services to leave and forget their previous roles and mindsets and learn their new responsibilities that are very different from previous ones. Some of participants addressed this issue and emphasized on importance role of coaches and mentors in ATP.

“We contracted an experienced Agile coach and applied the methodology to one team. They were very disciplined in their approach. Having

experienced in-site coach helped team members to adapt easier and faster to their new roles and practices." P3, Project Manager.

"I've run Agile transformations for a number of companies since then [first transformation]. I would say that companies that are willing to embrace change and who have undergone good training and coaching to understand the true impact of Agile, are best prepared for transformation." P6, Agile Consultant.

"Having experienced coach is very important. We have had some coaches come in and that has made a great difference in our success." P29, Project Manager.

The participants believed that coaching and mentoring should not be limited to specific times and stages. In-site coaching was also suggested by several participants.

"[I] strongly advise you to hire a full-time coach. We were faced with many problems and no one was ready to help us. Many questions we should ask our coach, one who was able to feel our situation and work with us. An experienced coach or trainer should be involved in transition process." P7, Agile Developer.

"I think that the best supporter is an experienced mentor; one who is hired only for Agile transformation and not for other jobs. This process is not an ordinary process, it should be managed well and companies need to hire an experienced coach for it. Good managing and coaching increases the chance of winning and decreases cost of change." P5, Project Manager.

Furthermore, as the participants claimed, coaching in this process is different from only technical coaching, thus, coaches should have some special personal characteristics to do their jobs well and in an effective manner.

"I should be patient ... Changing mindset of people takes a long time. Some of them [team member] get better over time. My solution is always training and coaching. I cannot do anything else. Can I? The worst issue is lack of participating in training process. In this [case] your effort is useless." P15, Agile Consultant.

"In many organizations, sometimes coaches are also responsible for training; in this case, they should be patient and feel people's challenges." P8, Project Manager.

Besides these items, some of the participants addressed coaches and mentors as the best supporters of team members during the transformation process. This hidden role also affects quality of transformation process strongly. (P3, P4, P7, P8, P10, P16, P21)

C. Management Buy-in

Role of managers in Agile transformation process was addressed as a critical role; they should not only participate in this process, but also support other people. Without management commitment, any change in organization could be more difficult.

"... If management is not agreeing with change,

don't do it. We were faced with this challenge and our project failed because of them. We expected that management should facilitate this process and support others..." P18, Agile Developer.

As some of the participants emphasized, management buy-in is not only a facilitator but also a necessary prerequisite. This situation makes it more critical in transformation process.

"Most important prerequisites are intentions and commitment from CEOs. Managers help people in change process by supporting them and reducing hindrances and handling challenges." P10, Scrum Master.

Furthermore, lack of the management commitment could cause many challenges for ATP, either about their roles and responsibilities or about the others.

"We had also some problems with managers. They used to play their roles in previous style, stressing in commands for doing works. It was hard for them to change." P17, Project Manager.

"The main challenge was to get the founder, owner and inventor of the company to relinquish control and learn how to delegate." P1, Head of Development Department.

At the same time, interested supportive managers could manage the transformation process and encourage others to adapt to their new roles.

"Managers can be the best supporters, especially middle managers. If managers have enough commitment to change, and support other members, this is the best motivation. Lucky team members have supportive managers." P15, Agile Consultant.

"Our top management helped our team in all steps. He was very knowledgeable and open minded. I think that such manager can lead teams to being Agile easy and fast." P9, Head of Development Department.

Supportive role of managers also was addressed by other respondents too. (P2, P3, P11, P12, P14, P20, P22)

D. Team Members Buy-in

People commitment was one of the important factors that were emphasized by the participants. It supports the people oriented structure of Agile methods which was addressed previously by researchers and Agile practitioners strongly.

"People commitment increases the chance of transformation success and decreases the cost of change. In my opinion, change process is only about people and by changing people's mindset, process will change easier." P14, Senior Manager.

The participants believed that people commitment helps and facilitates change in organization. Furthermore, interested and enthusiastic people not only participate in transformation, but also can persuade the others.

"Get people buy-in, before going Agile. It can help you to overcome most of the people-related challenges. In this process people can be both facilitators and hindrances..." P26, Agile Coach.

"Fortunately, we had minimum problems with

developers. Do you know why? [Because] They were really enthusiastic for changing their ways. They were more interested in Agile compare with managers. This situation made our transition easier.” P17, Project Manager.

At the same time, lack of people involvement and buy-in caused some problems during ATP. This issue was also seen regarding external team members like customers and coaches.

“... Some customers have been full supporters. Some have had concerns about confusion that production releases have to be every 2 weeks...” P20, Head of Development Department.

“...Lack of buy-in from customers and stakeholders... These items suffered transformation process and team members.” P6, Agile Consultant.

People buy-in and their interests and enthusiasms as facilitator of ATP also were mentioned by some other participants. (P8, P13, P19, P22, P31)

E. Right People Selection and Empowering Team

Some of the companies and organizations had started transformation with only some of their members rather than all of them. In this case, the participants explained that choosing appropriate members had significant effects on quality and success of transformation process.

“Choosing appropriate members, motivated, knowledgeable, sharp and social and those who can feel spirit of teamwork is necessary.” P5, Project Manager.

“I think that our company has still many challenges ... Choosing talented and enthusiastic people and good managing the process and enough coaching decrease the amount of challenges and risks. Honestly, we had problem in this regard and some of our problems are because of this factor. Such qualified people can help other members also during the process.” P14, Senior Manager.

Furthermore, assigning qualified people to the critical roles was so important from some of the participants' points of view. They mentioned that some of the roles like Project Manager, Scrum Master, Coach and mentor facilitate transformation process by helping team members and supporting them in doing their responsibilities during ATP.

“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.

“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.

“Finding the SMs and POs is critical (don't also require they do another role). PM roles are still critical (don't steal from Peter to pay Paul).” P30, Agile Developer.

Besides of choosing appropriate people, trusting and empowering them in their jobs also was emphasized by the respondents. In this case, their innovations can make transformation easier.

“Get people freedom and flexibility in doing their tasks and trust them. In this way, change happens sooner than you think.” P18, Agile Developer.

“Allowing the team to become self-directing, helped us to deal with human challenges during the project.” P12, Head of Development Department.

Careless about this factor had led to a lot of problems for organizations during ATP. Some of the other respondents explained their experiences about challenges that they were faced because of lack of appropriate people selection before starting ATP. (P1, P4, P6, P8, P14, P19, P21, P25)

F. Continuous Meetings and Negotiations

Meetings and communications were addressed by many of the respondents as helpful strategies for overcoming problems during ATP. Since this process focuses on the people, these strategies are more helpful in Agile methods comparing to traditional methods.

“We had a lot of discussions with our team, four times in a week and also we had two weekly meetings with customer's representative. Such meetings helped us to manage our problems. People resistance by these meetings reduced significantly.” P14, Senior Manager.

Face-to-face communication, especially when people are faced with problems was addressed as an effective strategy to overcome the problems. It was also a good strategy for handling differences of opinions during the process.

“We had a lot of discussions, first with top and with middle management. They played negative roles in transition process and we should inform them about their significant roles in this process, I mean negative and positive effects on the process. Face to face communication is the best way for motivating opponent members...” P2, Agile Coach.

“We [He and two other developers], in a meeting asked him [their direct manager] to forget his previous role and let us be free in our jobs.... We had different ideas about team structure and project management with our customer; fortunately by holding several meeting most of disagreements were solved.” P18, Agile Developer.

Indeed, this strategy made people positive about change and helped them to accept changes with less resistance and so, in this way, transformation would be easier.

“Make people understand why the transformation is occurring and listen to their suggestions and opinions. Be Agile about becoming Agile.” P6, Agile Consultant.

“I make several sessions about the problems

with them [team members]... and reason is that by doing that I get the commitment of those people. If I do it myself, then they think that it's my model not theirs". P13, Agile Coach.

Focusing on training was addressed as *"common problem solving strategy in all challenges"* (P24) as well as direct and face-to-face communication. (P1, P3, P10, P12, P22, P27, P33)

G. Agile Champions

A champion in Agile transformation was referred to as a person who can adjust Agile practices to suit environment and also supports other members in change process.

"I always try to identify the "champion" who will drive the internal change. Champions expand or even break the borders that Agile practices face in their environment. They also try to find the better ways of working with the others around them. They really help organizations in transformation process." P6, Agile Consultant.

The participants claimed that existence of champions in Agile teams can facilitate transformation and motivate the others to follow required changes which are defined in framework.

"In transition process, champions play a critical role. I totally agree with the idea that having at least to champions on the teams during Agile transformation gets people to herald its adoption. In my opinion, changes with more champions come to fruition easier. I believe that any successful Agile transformation has a champion, even he would not be known with that name." P23, Agile Coach.

"Companies should hire an expert; they should have their own champion. Champions can reduce side effects of change, lead and inspire the change and lead people to next level." P16, Project Manager.

Wonderfully, the more experienced respondents emphasized more than the others about the role of champions in transformation process. (P2, P6, P16, P23)

H. Incentive Factors

Since all members should be involved in transformation, and sometimes their knowledge about Agile values is not deep or don't understand real reasons for going Agile, so they need to be encouraged about ATP. Lack of deep understanding of Agile and new values can act as a serious barrier within transformation process, as the participants explained. Providing sufficient motivations was addressed as a strategy to deal with this issue.

"They [team members] should be involved in Agile movement; managers should persuade employees in moving to Agile. Changing behaviors and mindsets is not easy and people need to be encouraged, supported and managed." P5, Project Manager.

"All members can understand values, achieving Agile is achieving value. The important issue is

that organizations should motivate them for being Agile. Encouraging people helps managers to handle migration process faster and easier." P25, Agile Developer..

This strategy should be also used for customers. By using this strategy they accept changes faster.

"Customer involvement in our transformation process was insufficient. Fortunately, by motivating them and offering some incentives, their collaboration got better..." P3, Project Manager.

Early successes, showing progress and celebrating successes make people positive about the changing approach and methodology and help them to accept changes and adapt to them.

"Make sure to have some early wins. It acts as an incentive for rest of organization..." P12, Head of development Department.

"Maybe at first stages nothing could be done for encouraging opponents. Managers should have some ceremonies for showing progress [in Agile transformation process], even for small progress." P4, Project Manager.

Other respondents also mentioned about necessity of providing incentives during the transformation process for persuading people to change their approach and for supporting them to overcome their problems. (P7, P8, P10, P11, P19, P26, P32)

V. DISCUSSION

Conducting a comprehensive literature review after theory emergence is a critical step in GT study. The literature review in this step provides a backdrop against which the new findings can be evaluated.

Moving to Agile and its challenges and barriers were studied previously from several different perspectives. Fortunately, most of the strategies that were discovered in this study as facilitators of transformation process are supported by other studies.

These facilitators can be provided before and during Agile transition. However, this classification may not follow precisely in real environment.

A. Critical Facilitators as Transition Prerequisites

Some of the ATP drivers and facilitators should be considered before starting the transition. These facilitators are more important than the others. It means that lack of them impresses all next activities and even leads to transformation fail.

1) Effective Training

Training was addressed in this study as a critical facilitator that all of the software practitioners need to attend it. Vijayasathy et al. recently showed that training is one of the two critical drivers of promoting, adapting and using Agile methods in organizations [17]. Also, Lynch et al. showed how practical training can act as facilitator for Agile adoption, especially for Agile dedicated practices that team members never did them before [38]. Wang et al. explained that in their study for assimilation of Agile practices in use, providing enough

training for each case study received training. In those teams with extensive training, adoption and assimilation of practices have better results [39]. Srinivasan et al. emphasized that rigorous training should be considered as a necessary activity before migrating to Agile [40]. Conboy et al. explained how training can be considered as a strategy for dealing with challenges during Agile transition and adoption [41]. They mentioned however training was difficult, but it is necessary and helpful in dealing with the transition challenges including lack of business knowledge, weak social interaction, and problems with devolved decision making. They explained that how training was used as a strategy for problem solving during the transition. Many other studies also addressed training as a facilitator of transformation process [42-44]. This study also discovered that Agile teams have relied on training to dealing some of their barriers. However, training is not a time-boxed activity and should be continued in all steps of transition.

2) *Management buy-in*

Management support and commitment has a critical role in Agile transformation and adoption. Many studies were conducted about this concept [1, 17, 40, 45]. Hoda et al. explained the role of the senior management in Agile teams and its effects on self-organizing teams in Agile projects and organizations [25]. Chow et al. in their survey discovered that management commitment is one of the most critical factors in Agile projects [46]. Nerur et al. also addressed it as one of the challenge areas in moving to Agile [6]. Pham strongly suggested that without top and middle management buy-in, transformation will be so hard [47]. Pikkariainen et al. emphasized that management commitment and continuous support are necessary for moving to Agile [48]. This study also showed that management buy-in can act as a facilitator in transformation process and is a necessary prerequisite for it.

3) *Team members buy-in*

Agile methods are people oriented methodologies and comparing to disciplined methods, people involvement and collaboration is more critical. Indeed, Agile transition is nothing more than changing people's mindset and behavior [3, 49]. At the same time, people resistance against change is a critical issue in moving to Agile [6]. Conboy et al. stated that most of the challenges are related to people and not process during the Agile transition and without solving them the transition will not go well [41]. Tolfo et al. by describing cultural issues and human aspects of Agile migration, emphasized that commitment of people to changing process is necessary for moving to Agile [4]. Sureshchandra et al. explained that unhappy people make transformation so hard [50]. They recommended that it is best not to have inflexible people in Agile projects. Furthermore, encouraging people to change was emphasized in many resources [47, 51-53]. Misra et al. addressed customer commitment as one of the most important successful factors in Agile migration [54]. Hoda et al. studied the impact of inadequate customer collaboration on self-managing

Agile teams and concluded that inadequate customer involvement causes several adverse consequences for Agile teams [25]. This study also found out that people commitment makes transformation easier and faster and is necessary for going to Agile.

4) *Right people selection and empowering Agile teams*

Choosing appropriate and qualified members for moving to Agile, reduces the transformation barriers and challenges. Furthermore, trusting people as one of the Agile principles and empowering the team, is necessary [7]. Srinivasan et al. emphasized that in personnel selection process before migrating to Agile, it is necessary to pay enough attention to selecting the right people [40]. Moe et al. discovered that allocation of development resources is one of the critical challenges of shared-decision making in Agile methodologies [55]. Giving team members most of the decision making authority increases collaboration and creativity in Agile teams. Misra et al. discovered that competent and smart people facilitate Agile adoption comparing to indifference people [54]. Dorairaj et al. in their grounded theory study, showed that trusting people is very important, generally in Agile teams and particularly in Agile distributed teams [56]. Pham et al. suggested that choosing qualified members for Agile transformation, should be considered as one of the pre-migration tasks [47]. Conboy et al. emphasized that lack of Agile-specific recruitment policy causes difficulty in finding right people for Agile development in most of the companies [41]. In some case studies, selecting wrong people and incorrect role assignment addressed as the reasons of occurring several challenges like group decision-making problem, people resistance and, cultural problems [51, 55, 57, 58].

B. *Supportive Facilitators during the Transition*

Some of the facilitators are so helpful during the transition. These facilitators help team members to change themselves and support them to adapting their new roles.

1) *Good Coaching and mentoring*

Coaching and mentoring in Agile methods are different from traditional methods. Good coaching and mentoring can bring leadership concept to these methods [59]. Augustine explained that such coaching is meant to demonstrate "light touch" leadership [59]. Ganesh and Thangasamy by explaining importance role of Agile coaches and their effects on transition, described personal characteristics of Agile coaches [1]. Earlier, Beck et al. suggested hiring experienced Scrum master and coach to help team members for adapting to Scrum practices, especially human-centered ones [11]. Poppendieck in a panel emphasized on the role of leaders and coaches in agile migration and believed that for helping people, coaches and leaders are required while managers are optional [60]. Hoda in her thesis, by describing the role of Agile coach and mentor, focused on role of coach on self-organizing team as one of the important Agile concepts [61]. On the other hand, there are some reports on lack of

effective and good coaching and its effects on Agile transformation [40, 50, 62]. These articles also discovered that good coaching and mentoring is an important facilitator in ATP.

2) *Continuous meetings and negotiations*

Continuous and planned meetings in Agile software development addressed as a strategy for increasing people collaboration. Face-to-face communication and people collaboration were addressed as Agile principles in Agile manifesto [7]. For instance, structure of Scrum is on the basis of the continuous and planned meetings [10]. Williams showed that even after a decade of Agile manifesto, Agile practitioners emphasize on the importance of communications and collaboration in Agile software development [63]. Recently, Mishra et al. reported that communication and collaboration are important enablers in software development generally, and in Agile development particularly [64]. Korkala et al. addressed lack of communication as one of the critical issues in Agile teams, especially in distributed teams [65]. This issue was addressed by others too [6, 40, 66-68]. At the same time, in most of the studies, face-to-face communications and meetings were addressed as the strategy which is used by Agile teams to dealing with problems both during transformation and after adoption [48, 69, 70]. Results of this study also showed that communications and meetings are used by Agile teams for handling their challenges during ATP and for facilitating the change.

3) *Agile champions as change facilitators*

Some roles in Agile teams may impress other members significantly during ATP. Agile champions are those who play a hidden role to facilitate changes and persuade others to change themselves. Hoda et al. explained the role of champions in self-organizing teams. They stressed on the role of champions in understanding business drivers and also their effects on other members [71]. Senapathi et al. discovered that champions and top managements are the roles that have significant influence on usage and adoption of Agile practices [72]. Earlier, Kum et al. discovered that champion (member or team), is one of the success factors in Test Driven methodology [73]. This study also discovered that Agile champions make Agile transition easier and help other team members to adapt their new roles. Yet, it seems that it can be studied further.

4) *Providing sufficient incentive factors*

People play critical role in Agile software methods. Due to their critical roles in transformation, they need to be supported and motivated. This research discovered that providing motivations and incentives acts as a facilitator of Agile transition process. People need to be positive about change by in-time encouragement and supporting [74]. Monteiro et al. explained that how supporting people, makes them positive and persuades them to participate in Agile practices [75]. Conboy et al. explained that lack of motivation makes problems in using and adapting to Agile software methods [41]. They addressed that this problem is more dominant in those companies that adopted Agile methodologies top-down.

Petersen et al. addressed lack of developer motivation to use Agile methods [76]. Chan et al. also explained how motivation-related factors should be considered for using software development and Agile methods [77]. O'Connor explained that creating the right incentives for increasing productivity during ATP was one of the responsibilities of project managers in his Case Study research [2]. Although, it seems that providing incentives are effective in all development approaches, Melo et al. showed that motivators in Agile teams are slightly different from other teams [78]. Ganesh et al. also mentioned that during ATP, slow motivation is critical and supportive for team members [1].

VI. LIMITATIONS

The emerged key points, codes, concepts and categories of this study came from data directly and data also collected from real environments, so, its findings are grounded in substantive environments [32]. 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 [79].

VII. CONCLUSION AND FUTURE WORKS

By performing a GT study, involving 33 practitioners of Agile, from 13 different countries, this study discovered that Agile teams benefited several facilitators during the Agile transformation process. This article has explained the role of these facilitators in moving to Agile methods. While some of them can be considered as prerequisites of Agile transition, some other can be provided during the transition.

The most important emerged facilitators are Training, Good coaching and mentoring, Management buy-in, People buy-in, Right people selection and Empowering team, Continuous meetings and negotiations and Incentive factors. Training as a facilitator, reinforces all members including team members, managers, and customers for dealing with transformation challenges. Good coaching and mentoring supports team members during the process and helps them in the right time to learn how to deal with challenges. Although management and people buy-in have different impacts on transformation, without both of them, Agile transition will be hard and removing barriers will need more time and effort. At the same time, selecting right people and empowering them in doing their jobs, will affect transformation process positively. While Agile teams use communication and negotiations in all steps of transformation for problem solving and removing bottlenecks, providing motivation incentives brings positive atmosphere to members involved in ATP.

Detail features of these facilitators can be studied by focusing on them in another study. Also, the impact of each factor on facilitating of transformation process can be measured in a quantitative research in several case studies. Finally, it was mentioned that role of Agile champions is not clearly defined in Agile transition yet,

so, focusing on this role and its effect on transformation process can be studied in a specific research too.

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