Agile Transformation among Global Delivery Centres in IT Based Service Providers

Hema Subramaniam[1*], Nik Nordiana binti N Ab Rahman[2], Potriyen Selva Subbuodayar[3]

[1]Universiti Selangor (UNISEL)
hema@unisel.edu.my
[2] Universiti Selangor (UNISEL)
niknordiana@unisel.edu.my
[3] Universiti Selangor (UNISEL)
potri17@yahoo.com

Abstract: Agile methodology is a leading approach in digitalization era. It has become an appealing alternative for IT based service providers in an attempt to improve their work performance. However, the methodology which were originally designed for small and individual teams need to be tailored to cater for multinational companies. This creates a number of issues while introducing agile at a large scale, when development teams must synchronize their activities, and there might be a need to interface with other organizational units. Despite knowing the importance of identifying the potential threat while the agile transformation process takes place, there are lack of studies in identifying those challenges in the context of Information Technology (IT) servicing. This study attempts to collect and identify the major issues while implementing the agile methods in multinational companies whose aim to provide IT services. Consequently, the core success factors that contributed to the accomplishment of agile transformation at large scale companies were identified as well. The initial data regarding challenges and critical success factor was collected via literature study. On the other hand, the controlled observation technique using Kanban tools were used to elicited those elements from the real agile transformation activities. Mapping strategy is used to extract the most significant challenges and core success factors while transforming into agile working environment. As a result, all the challenges and success factors which were existed during agile software development, also were faced during the agile transformation for IT servicing. Those elements identification would be a guideline for the other multinational companies in their attempt to transform into agile environment.

Keywords: Agile Programming, Call Centre, Spiral Method, Kanban tools, Multi National Companies, SME, Critical Success Factor

1. Introduction

Agile is increasingly becoming the dominating developing method in the IT industry. A lot of companies are turning toward agility in one way or another because of the need for fast delivery while at the same time dealing with fast changing requirements Agile methodology were originally designed to use in small, single- team projects (Boehm & Turner, 2012). However, their potential benefits have made them attractive outside this context, particularly both for larger projects and multinational companies such as IBM GDC Malaysia. This despite the fact that they are more difficult to implement in large scale projects and tasks (Dyba, Dingsoyr, & Moe, 2014). Compared to small projects, which are ideal for agile development, larger ones are characterized by the need for additional coordination. A particular problem in applying agile to larger projects is how to handle inter-team coordination.

Large-scale agile transformation involves additional concerns in interfacing with other organizational units, such as human resources, marketing and sales, and product management. In addition, large scale may cause users and other stakeholders to become distant

from the development teams. Despite these known problems related to large-scale agile, there is an industry trend towards adopting agile methodologies in the large (Maria Paasivaara, 2017). They are often geographically distributed. In two recent workshops on large-scale agile development organized in XP2013 and XP2014 conferences, adoption of agile methods was one of the highlighted themes needing more research (Dingsoyr & Yngve Lindsjorn, 2013), While research on agile software development is accumulating and maturing, and has provided a basis for conducting systematic literature reviews (Dingsoyr & Yngve Lindsjorn, 2013; Jalali & Wohlin, 2014; Senapathi, Srinivasan, & T, 2013; Kaisti et al., 2013), the area of large-scale agile development has not yet been studied through secondary studies. In this paper start filling in this gap by presenting a systematic literature review of large-scale agile transformations.

While the research literature contains several experience reports and some case studies on large-scale agile adoption, a systematic overview and synthesis of this growing body of research is still missing. (Babar & Zhang, 2014) asked the industrial practitioners at the XP2013 conference to create a backlog of topics they think should be studied. The practitioners voted "Agile and large projects "as the top burning research question. Moreover, among the top ten items three focused on distributed agile development, which is relevant especially for larger organizations, process must be adjusted according to their needs (Lindvall et al., 2014;Cohn & Ford, 2013;Boehm & Turner, 2012). Agile methods also affect management and business-related functions. A key challenge is that management must move away from life-cycle models and towards iterative and feature centric models (Nerur, Mahapatra, & Mangalaraj, 2015), which requires a change of mindset. The focus must be shifted from long-term planning to shorter term project planning (Mishra & Mishra, 2013), as agile methods emphasize that planning is only meaningful for the near future (Cohn & Ford, 2013). However, the lack of planning can be a concern as business and customer relationships often build on long term road mapping. Enabling operation with shorter term planning requires educating stakeholders and reviewing contracting practices (Boehm & Turner, 2012).

Since we are in the era of Industry Revolution 4.0, the transformation into agile methods is very important. Generally, agile methods were implemented at the concern of software development. Knowing its agility in solving problem at faster manner, many multinational companies have ventured the agility concept in their core business especially in providing IT services. Therefore, the working process in IT service-based companies has begun to transform into agile methods. Many IT service providers have failed in the transformation process due to a factor that agile method basically meant for software construction instead of software servicing task (Hanssen et al., 2014) So, the identification of challenges that occur during those transformation processes would contribute to the success of agile methods in IT servicing phase. But, there is a little agreement on the existing agile methods implementation challenges in the context of IT service providers. Most of the studies tends to focus on challenges of agile methods implementation in software development which relatively not applicable into IT servicing. It is not yet known that challenges happened during agile transformation process would become the threat for IT service providers. Therefore this research would be addressing the issues related to lack of identification in addressing the potential threats while the agile transformation process takes place in the context of IT servicing. Apart from that, there are unstructured core success factors with regards to the IT service providers.

2. Literature Review

We are living in a time of digital change. The terms of competition are increasingly dictated by companies that were born digital, and traditional companies are transforming how they do things to stay in current era. A few years ago, the concept of bimodal IT was all the rage. Chief information officers (CIOs) could develop new digital capabilities quickly using an agile approach while running core IT operations and services in a traditional way. While this may have been a good way to get started on the digital path, today IT leaders realize that digital transformation requires applying agile principles and practices much more broadly throughout the organization. Many IT leaders are familiar with using "agile" practices for software development. Those with experience have seen significant improvements in the speed at which they can deliver new capabilities often with remarkable results. To extend the positive benefits of agile, forward-thinking CIOs are now combining agile principles with practices that originated in lean manufacturing and applying them to the improvement of IT operations and services. This means taking a holistic view of a service such as the delivery of a new service. When that process involves over a dozen different touch points, such as networking, security, and storage, breaking down the walls between them can provide the service in a faster, more efficient, more coordinated way based on the business's needs. Increasing pressure to reduce cycle time, improve quality, and swiftly react to changes in customer needs are driving companies, large and small, to adopt agile software development ("VersionOne, Inc," 2016). Agile development can improve efficiency and quality (Livermore, 2016), and enable shorter lead times and a stronger focus on customer needs.

2.1 Large Scale Agile Transformation Challenges

Many of the world's biggest companies struggle to be nimble, efficient, and data-driven, which then makes them less productive than they should be. It's not just their size that holds them back; much of the problem is created by a traditional business model that's been created for scale and standardization, rather than for agility and innovation (Procter et al., 2016). While many organizations have teams working in an agile way, very few businesses have been able to implement this model across their entire enterprise. As companies move from implementing agile on individual projects to portfolios and, ultimately, to an entire business, more and more core processes need to be adapted a significant operational challenge in itself. This study has covered as much as possible of the primary studies talking about challenges facing agile transformation.

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2.1.1 Organizational Change

Coordinating large, multi-team projects is not a new topic, but doing it in agile projects is a new issue. Agile projects follow a set of principles defined in the Agile Manifesto (Hyldmo, 2015), and these are to be followed when coordinating teams in agile projects. Due to the fact

that agile methods amongst other rely on "individuals and interactions over processes and tools" (Hyldmo, 2015), it is not considered appropriate to enforce any specific working method onto the project teams. The teams are supposed to be self-organizing and autonomous (Nerur et al., 2015) . The biggest challenge facing is how to coordinate agile teams across multiple projects in multi-disciplined environments while keeping them running fast such as difficulties managing at a distance across the cross cultural team around the global and ongoing struggle for a balance workload among cross functional team seemingly contradicting and conflicting agendas of flexibility and improvisation of projects.

Moreover, middle managers' new role in agile are unclear. The need for additional management positions in a larger organization such as Global Deliver Centres may cause problems to agile processes that emphasize self-organization. Especially the role of middle management was unclear in agile methods. This is problematic, as an agile transformation requires a cultural change particularly on the middle management level. (Procter et al, 2011) Managers were reported to need to resist the tendency to command and control and allow room for self-organization, but the change in mind-set was difficult to achieve for the people involved. One case describes how the project management group had previously worked through big up front plans and competed for resources, but those ways would need to dramatically change. Several other problems related to management roles were also presented. For instance, (Procter et al, 2011), describes how managers were left outside the roles offered by the new agile way of working. In another case, when managers were appointed as Scrum masters, developers felt being micromanaged. This was partially because of a poor understanding of the agile method. Furthermore, management still in waterfall mode even after adopting agile transformation, there were cases where management continued to work according to the old waterfall model (Gothelf, 2014). One case described management as "focused on meetings and big up-front project plans", despite having adopted agile. In another case, management was losing confidence in agile because reports on costs and progress were not produced in the same format as before. As Scrum teams did not commit to fixed schedules, they were considered unreliable.

2.1.2 Agile is Impossible

Agile customized poorly, the difficulty of and misunderstandings related to agile were evident in cases where the methods were customized poorly. The implementation often was not feasible, organizations attempted to tailor the agile method to suit their specific needs. However, in some cases this simply meant skipping practices, which led to problems. In one case, certain individuals were allowed to ignore core elements of Scrum, which turned the teams' decision making into a variant of command and control. In this case, there was a temptation to strip some agile practices and enhance others. Previous attempts had proven that one of the reasons for agile implementations to fail was deviations from the process, because of which the agile mindset did not take root. A poor customization may lead teams to adopt only practices that reflect their current needs, thus failing to achieve any real change in process and mindset (Gandomani, Zulzalil, Ghani, & Sultan, 2013). Moreover, reverting to old way of working. In several cases, challenges in the transformation resulted in people reverting to the old way of working. In some cases it was only a temporary struggle while learning agile practices, but in other cases the old way of working displaced agile. Development work has to go on during the transformation but

there will be new things to learn for the team. Stress caused by the combination of schedule pressure and much change at once can pull people back to the old way of working Even subtle trouble may put the transformation at risk, as people will always look for reasons to revert to familiar behaviour. Teams without adequate training were struggling with applying agile practices correctly, and the challenge the new practices posed made people abandon them and return to the ways they know.

2.1.3 Different Approaches Emerge in Multiple Discipline Management.

Interpretation of agile different between the teams when many teams implement agile without consistent guidance, friction and fragmentation may emerge. The organization may require moving people between teams from time to time, and therefore it is desirable that the agile cultures of different teams are not too different. Divergence in process creates increased costs when relocating people. Further, forecasting and benchmarking teams become difficult to overcome problems with divergence in agile approaches some organizations defined standards (Lindvall et al., 2014).

Globally, what research have found that organizations either have too much discipline or not enough. Saying ‘be agile ‘and expecting teams to sort it out is as ineffective as over-governing the development process. Finding the sweet spot between the two is the challenge. According to, (Lindvall et al., 2014) It recommends a flexible approach to enterprise discipline. What we try to do is help organizations adopt framework rather than a method. We believe disciplines like enterprise architecture need to be taken into account, but that a process framework which gives organizations the ability to adapt methods on a project basis, delivers the best results.

2.2 Large Scale Agile Transformation Success Factors

Research on agile success factors is not conclusive and there is still need for guidelines to help in the transformation process considering the organizational context. This research proposes a survey among practitioners to identify the difficulty to implement success factors in organizations to create a fertile environment for agile transformation.

2.2.1 Communication and Team Support

Create and communicate positive experiences in the beginning. Several cases highlighted that the agile transformation spread effectively through positive word-of-mouth. The move towards agile is assisted by making any benefits publicly visible and celebrating even the small victories. Make the change transparent, when good results were shown by a team it created interest in others, and enthusiasm to try the new way of working would spread. Some companies used agile and waterfall methods side by side. This setting made comparison possible, bringing up the benefits of agile. It is important to reach as many people throughout the organization as possible, as without communication the new way of working will not take root (Procter et al.,

2016) . It was recommended that working in the new agile way is made highly visible on many communication channels and even over-communicated.

In addition, teamwork support seven cases reported that close connections and constant communication between teams and team members are necessary for successful agile development. The organization should establish a transparent environment for openness in the team without fear of discussing problems to improve teamwork. Also, it is better to keep teams small. Communication between teams and team members can be enhanced by scrum meetings and retrospective meeting. Make team support visible according to (Moczar, 2013), visible involvement of management was reported to motivate and encourage employees to adopt the new way of working. For instance, the CTO organized training sessions personally and frequently visited sprint demos. When the corporate level supports for the agile initiative was showing teams adopted agile methods even spontaneously.

2.2.2 Organizational and Leadership Support

Numerous cases made it clear that management support is an absolute necessity This was reflected in statements such as "Adopting agile, or implementing any significant change, requires an executive's sincere support. "Executive commitment was crucial to implementing massive change." and "Having upper management engaged, supportive and visible is critical for wholesale organization involvement with Scrum." (Dingsoyr and Moe, 2014). Managers were seen to be in a key role in making the change stick, as they had the authority and power to remove impediments.

(Seffernick, 2013) describes how a number of people tempted to explain away the applicability of agile methods, but the objections were overruled by the director's commitment to make agile work. Management support was similarly needed when tight release schedules had to be flexed in order to give room for the adoption process (Misra et al., 2010). Favourable management decisions were also critical when additional resources were allocated to training and coaching. Recognize the importance of change leaders. Transforming the way of working of a large group requires coordination and leadership. In addition to the leadership provided by coaches, specific change leaders were mentioned. Cases indicated the importance of having spokespersons for the change Cowan describes how one person was strongly driving the transformation, and made an indisputable contribution for transforming the organization.

3. Research Methodology

The research process consisted of four main stages as depicted in Figure 1. The selection of primary studies where to identify and extract the existing challenges was done in two stages, first using keyword based database searches to identify potentially relevant sources and then manually filtering the search result where the list of challenges explained in literature were taken into account.

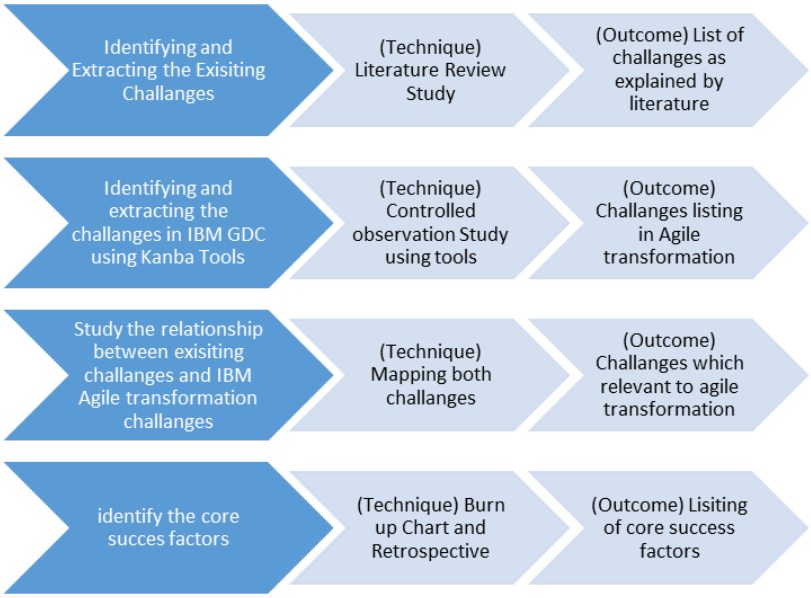

Figure 1: Research Process

Followed by stage two, identifying and extracting challenges in IBM GDC using Kanban Tools. Three teams from workspace modenization services in IBM GDC Malaysia was involved in this controlled observation study. Team A (consists of imaging speciallist and team lead), Team B (consists of packager), team C (consists of software distributer and manager) and each team consists of 15 members. All three teams consist of IT Specialist from different work profiles in IBM GDC Malaysia. Controlled observation study using tools were conducted in order to list the challenges in Agile transformation.

In order to study the relationship between existing challenges and IBM transformation challenges mapping were done where data extraction of challenges which relevant to agile transformation were outlisted. The results were elicited by aggregating and analysing the challenges in agile transformation at multinational companies such as global delivery centers.

Furthermore, core factors were identified by using burn up chart and retrospective study. Burn up chart aids in analysing the percentage of the challenges and success factors while retrospective study aids it analysing on the flow as such what went well, actions to be taken ,what did not go well and also concerning challenges.This reserch process can highlight characteristic in the agile transformation.

The first phase consists of research activities such as systematic literature review and controlled observation. The operational activities of this phase is described in Table 1.

Table 1: Research Methods Deliverables

Activities	Method/Tools	Deliverables/Finding
Sub-phase 1a: Literature Review	Journal Literature Review from other	Feedback on reference agile transformations on challenges

	sources.	and core factors.
Sub-phase 1b: Controlled Observation	Scrum Retrospective Monthly Meeting Town hall	Identify and extract the challenges and success factors from agile based tools.

Table 1 shows the operational framework of the research and how the research was conducted. Based on the given table, it is known that the literature review phase includes controlled observation and their deliverables.

4. Result and Analysis

Any organizational transformation that involves numerous individuals will face challenges. In this section this study challenges related to large scale agile transformations among Global Delivery Centers in IT based service providers using IBM GDC Malaysia has been reported for as a case study.

Table 2: Identified Challenges from Literature Review Study

Challenges	Challenges Type	Sources
Middle managers' role in agile unclear	Organizational Change	(Hyldmo, 2015) (Nerur et al., 2015 (Procter et al, 2011) (Gothelf, 2014). (Dybå et al., 2014), (Maria Paasivaara, 2017) (Iivari & Iivari, 2011) (Moczar, 2013)
Keeping the old bureaucracy		
Management in waterfall mode		
Team coordination		
Organization working culture		
No proper agile based training.	Lack of sponsorship from executive leadership	(Moczar, 2013) (Thomas, Nelson, & Silverman, 2011)
Lack of scrum master and experience coaches.		
Agile customized poorly	Agile is impossible	(Gandomani, Zulzalil, Ghani, & Sultan, 2013) (Moczar, 2013)
Reverting to the old way of working		
Excessive enthusiasm		
Interpretation of agile differs between teams	Different approaches emerge in multiple discipline management	(Lindvall et al., 2014) (Hanssen, Smite, & Moe, 2014)
Using old and new approaches side by side		
Inefficiency in Delivery development over planning Improper prioritization	Process Related Challenges	(Thomas, Nelson, & Silverman, 2011) . (Moczar, 2013)

Distribution Problematic	Managing and Priorities and Dependencies	(Procter et al., 2016) (Gandomani, Zulzalil, Ghani, & Sultan, 2013)

Table 2 list the identified challenges when transforming to agile along with the categories of challenges. Sources of the listed challenges are shown in table as a reference.

Following are the critical success factors for agile transformation.

Table 3: Identified Success Factors

Success factors	Success Type	Sources
Communicate the change intensively	Communication and Team Support	(Procter et al., 2016) (Moczar, 2013)
Make the team support visible		
Ensure team support		
Educate team on agile practices		
Create and communicate positive experiences in the beginning		
Recognize the importance of change leaders	Organizational and Leadership Support	(Dingsoyr and Moe, 2014) (Seffernick, 2013)
Engage change leaders without baggage of the past		
Communicate that change is non-negotiable	Commitment to Change	(Hamed & Abushama, 2013)
Show strong commitment		

Table 3 shows the identified success factors according to sources. The source factors, categories can be seen from the table along with the sources from literature review.

Figure 2 Literature Review Study Outcome

Mapping strategy is used to compare and map from the findings in systematic literature review between the identified challenges from controlled observation method in agile based tools.

Table 4 Challenges for Large-Scale Agile Transformations

Literature Review Study Outcome (Challenge) / **Retrospective, Town Hall and Meeting Outcome**	**1**	***2***	**3**	**4**
1. Night shift member unable to join the meetings.	X			
2. It is been discussed in Kanban that skeptical team members wasted time and effort Skepticism was often created by misconceptions.	X			
3. Been discussed that, management unwilling to change such executive support would have been required to extend the agile process to involve product management office and separate quality assurance groups. In this case, when managers were not involved in the transformation.	X			
4. Arranging proper coaching was a problem in IBM. It is critical to coach teams in their real work environment as a proper change in mindset is difficult to achieve. only by attending training sessions		X		
5. Don't have enough funding for trainings create a difficulties in the transformation.		X		
6. It been discussed in Kanban that High amount of workload and old commitments cause difficulty.		X		
7. It been discussed that some of the agile principle are wrongly understand by team member			X	
8. It been highlight in Kanban that there is no proper guidance from scrum and agile based coaches when there is an issue.			X	
9. It been discussed that, reverting old way of working development work has to go on during the transformation but there will be new things to learn for the team. Stress caused by the combination of schedule pressure and much change at once can pull people back to the old way of working			X	
10. Interfacing between teams difficult due to certain limitation in terms of communication and the roll-out of agile had not removed dependencies, and the dependencies made managing development difficult				X
11. It been highlighted that, Global distribution challenges. Distribution had negative effects, such as missing kick-off meetings, reduced feelings of proximity when communication is necessary, and difficulty in arranging frequent meetingsdue to time zone differences				X
12. Interpretation of agile differs between teams Using old and new approaches side by side				X

In this section second research question were answered

RQ2: What success factors have been reported for large-scale agile transformations

Table 5: Success Factors for Large-Scale Agile Transformations

LiteratureReview / **What went Well**	**Success Factor 1**	**Success Factor 2**	**Success Factor 3**
Managers were seen to be in a key role in making the change stick, as they had the authority and power to remove impediments	**X**		
Visible involvement of management was reported to motivate and encourage employees to adopt the new way of working	**X**		
Managers not understanding the principles of agile felt left out with the introduction of self-organizing teams, which sometimes resulted in backlashes providing proper training corrected the situation, and even created strong agile sup- porters in management. Training cleared misconceptions and helped create a consistent implementation of the agile approach across the organization	**X**		
Senior management pushed hard on a mandate to have deliveries every 90 days. The mandate made change necessary, and while the strong pressure did not promote agile practices in every case, the drive for change was perceived good in general		**X**	
The agile approach is introduced because of problems in the old way of working, and therefore there will be organizational issues uncovered during the transformation. People must not be demoralized when facing challenges, and the determination to change must be maintained		**X**	
Recognize the importance of change leaders			**X**
Engage change leaders without baggage of the past			**X**

It is important to reach as many people throughout the organization as possible, as without communication the new way of working will not take root	**X**		
Enabling transparency during the transformation was reported as important, and even highlighted as a critical factor for success			**X**
Create and communicate positive experiences in the beginning.	**X**		

5. Conclusion

As a conclusion, controlled observation session has been conducted successfully to monitor the full transformation on agile implementation. Tool been used for the daily task tracking has been captured in this research such as Mural, Kanban Board, Retrospective and Mural. The detailed notes during the observation sessions on what happened, what was presented and discussed, who were present, and how the employee behaved. For confidentiality reasons, the observation sessions were not recorded, as during those sessions' details of current challenges and success factor based on agile practices been discussed in detail. The details were highly been used for analysis part in this research and mapped with the existing findings from Literature Review. The information gathered during the observations was used to support and complement this research.

The controlled observation of this research study has been limited in IBM GDC Malaysia. The responders include; managers, packager, team leader, software distributer and imaging specialist like who work in technique and support department. Each person in agile base company can have impact in success of projects and their feedback is important. There were around more than three thousand people working across the department. Consequently, the sample is restrained and covers employees of the company in workspace modernization services IBM GDC Malaysia. In contrast, example of challenges that not been faced by IBM GDC Malaysia but been identified in literature review is about the quality assurance of work such as requirement ambiguity. Apart from that, cultural challenges is about difficulty of integrating cross cultural knowledge which not been faced by IBM GDC Malaysia since IBM have an operation more than 170 country around the global with multi religious employee.

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