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Role of Agile Methods in Global Software Development

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PROPOSAL FOR MASTER THESIS OR APPLIED PROJECT

**TITLE: ROLE OF AGILE METHODS IN GLOBAL SOFTWARE
DEVELOPMENT**

BY

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ABSTRACT

Currently software companies are developing the software applications that are developed by global software development teams. In order to develop the quality and cost effective software applications, companies are trying to adopt new methodologies for the global software development. Using of agile in global software development industry yielded benefits and challenges too. The researchers show that agile has many benefits in the software development and fewer complications. But suggesting the agile software development to the global projects is more challenging. This paper focuses on presenting the benefits and challenges in adopting the agile in global software development projects.

KEYWORDS:

Agile Software Development, Global Software Development (GSD).

1. INTRODUCTION

In global software developing projects, the stakeholders and development teams are located in different parts of the globe and in different time zones. It is difficult to gather user stories/requirements for the global software development projects because of the culture variance and communication barrier between the teams.

Agile software development methodology is one the adaptive and flexible methods that can be leveraged for the software development project. In agile, a gathering of the user stories requires the involvement of clients, developer teams who are located geographically at different locations. Bringing the agile methodology for the global software development projects is difficult and complicated.

Since the agile benefits are well-known, implementing it in the global software development projects can have fewer investment costs and time.

Project managers and business analysts that are working in the IT sector can benefit from this paper.

In global software development projects, the main issues are communication barrier between the onshore and offshore teams and failure of requirement gathering which results in the low-quality output. Different agile methodologies that can be adopted are Scrum, Lean Software Development, and Agile Unified Process and scaled agile.

The project manager needs to know the challenges that occur during the global software development. Adopting the correct methodology for the implementation of the project will be done by the project manager.

During the global projects that I worked in past, I had come through many problems during the sprint releases. We have to break down the project deliverable according to location and implemented in phases. In the end, this method of implementation didn't yield good results for the team and management. This motivated me to learn and find out the solution for the problem.

2. PROBLEM STATEMENT AND JUSTIFICATION

The research question that chosen for this project are "What is the role of Agile methods in Global Software development" [3].

Samireh and Wohlin (2012) have suggested various areas in their review, one of the suggestions that requires more research is "what is the best agile method that can be adopted in Global Software development"

The agile software development has shown the more benefits during the adoption of the individual software projects. The implementation of the agile in global software development has more challenges and the solution for the challenges is the reason for this research question. The literature reviews have been utilized to research on this question and provide the solution.

The second research question that chosen, "Best agile methodology that can be adopted in Global software development projects". Most of the practitioners and researchers used the scrum and distributed agile development methodology for the projects. The challenges that are identified are quite different for each project.

The problem impacts the quality of the end product and cost that is involved in this project.

3. LITERATURE REVIEW -- ANALYSIS OF RELATED WORK

The foundation for this project is described by Samireh and Wohlin (2012) who describe the field of global software development as one consisting of the low development cost and market time. This review explained the studies that are successful in implementing the agile method in the globally distributed projects.

The review studies on agile methods and global software development are explained with the supporting researchers and case studies. The review studies not only explained the agile methods in the GSD they also included the combination of the agile methods in GSD.

Agile approach mainly focuses on the close collaboration between the customers and developers and budget driven [Samireh, and Wohlin (2012)].

The research questions of this review are:

- a. What is reported in the peer-review research literature about agile practices in GSE?
- b. Which agile practices in which GSE settings, under which circumstances have been successfully applied?

The systemic review was performed to identify the answers to these questions.

The search strategy used for this review was to use the keywords in the databases such as the IEEE, Inspec, Compendex, AIS and ACM portal. Obtained results were analyzed to find out the key papers for the future work.

The results were validated and were checked to analyze which agile practices were used in the distributed agile projects. Later the projects were filtered into offshore and onshore locations and mapped to the countries.

The results of the system review stated that answer one of the research question is contributed by the most of the authors. The author of the review suggests that most of the studies author should collaborate to know exactly the agile framework that can be implemented for the globally distributed projects.

Bose [5] conducted a research on the distributed agile software projects and review study was explained with case studies. Here are the few notes that are from this research.

The pair programming used in the agile software development helps in increasing the quality of the output. Assigning two different expertise for the same work will increase the quality of the work. By following this pair of programming not only increases the quality of the work and also the communication to follow the decisions of the personnel. This is reason agile is the personnel driven not the process driven. The key features and benefits of implementing the agile in global software development are listed in below table.

Agile features	Benefits
Pair programming	Increases the quality of the product and developed software code.
Small releases	Resolving the defects and will help to reduce the roadblocks for the future developing software code.
Requirement gathering	Continuous requirement gathering based on the customer decisions.

Customer feedback	Customer feedback at every release will reduce the fixes at the end.
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The studies that are reviewed in this literature review explain the strategies that are used by the companies to overcome the challenges in their projects.

The [Fowler 2004; Sepulveda 2003] study proves that developers at the different locations use the asynchronous way to communicate about the project which yields less productivity. The review suggests that the developer has to communicate frequently that are located at different geographical locations. Need to have communication with the customer to get feedback and collecting the requirements.

The [Fowler 2004; Sepulveda 2003] explains that trust and different time zone also main challenges that are faced in the distributed agile projects. An agile method encourages having the face to face meetings frequently which is not possible in teams that are located in different time zones. To overcome the developers need to have the proper communication to develop the proper software build at the end of the day and place the files at the shared location. This will allow the users to test and provide the feedback.

Trust is also the major conflict between the developers. Frequent meetings between the customer and onshore team would develop the friendly relations between the teams.

Other challenges in the distributed agile projects are work culture, knowledge management, and personnel selection.

The author did a case study analysis to understand the challenges that are experienced by the project managers in the distributed agile software development. The search resulted in 12 case studies which are successful in implementing the agile method in the distributed software development projects.

- Hossain et al. [6] research study has adopted studies that involve the role of the scrum in the global software development. It explained the successful strategies that are implemented at the off shore and on shore teams. The review classified the specific strategy applied in the project.

Strategy	Team
Extreme Programming	Offshore,
Extreme Programming	Globally Distributed team
Scrum	Offshore – Globally located
Pair Programming	Distributed team
Agile	Offshore, Distributed team, Virtual team

- Ali Saeed Khan et. al [7] in his research study is to develop the framework for the medium sized industries located at different locations and capable of providing the offshore services.
- E. Hasnain et. al [9] systematic literature review includes the one the challenge is the trust in the distributed agile projects. The conclusion of the review includes that various project managers proposed and implemented a different solution to overcome the trust issues between the teams.

I agree with the topic breakdown done by the authors because it details about the researchers and practitioners use of agile methods and its benefits in the distributed software development.

Search strategies:

The search strategies included for this project are manual searches and databases.

The main electronic databases that are used for this research study are:

- Google Scholar
- Elsevier Science Direct

The below-mentioned framework is utilized to analyze the research question and find the solutions for the questions. The literature review for the research questions was to present the results in the two subsections agile methods, benefits, and challenges.

Benefits - Agile	Challenges - GSD
Effective communication	Communication barrier
Project visibility	Language barrier
Productive	Lack of team work
Lessons learned are shared easily	Lack of communication
	Cultural diversity

Benefits and challenges are varied between the projects and methodology used by the researchers. The reason for the question is not answered because the

challenges are unique to the project. The lesson learned are not beneficial at every time, the new approaches are required to be developed to over the challenges.

4. PROPOSED SOLUTION APPROACH

The supporting literature reviews revealed that there is no proper agile framework developed for the distributed agile projects. The suggestion made by the researchers was that all agile method managers should collaborate together to develop the solution.

The challenges that are explained by the project managers are the methods that are adopted for the projects are incorrect. The methods for the different projects will yield different solutions. Experiment the projects with different methods will help to understand the results.

Study:

The study will be mainly aimed to find the methods that can be implemented to the global software projects. Based on the experience from the project manager of the already implemented GSD projects input will be considered. The design for the study is will be documented in the protocols and it will be provided to the teams. The teams will be trained on the protocols and about the solutions. The teams from the different geographical location will be assigned to the projects. The projects will be having the offshore teams, onsite team. The onsite team will include the customer for the requirements. All the team personnel will be involved in the expertise of their projects and implement the proposed solutions. The solutions will be obtained from the questionnaire form provided to the project managers and also from the case study results that are listed in the literature review.

The input for the projects will be taken by sending out the questionnaire forms. The answers from the questions will be analyzed. The final results can be studied and develop the framework. The framework will reduce the development cost for the future projects. The form will be initially approved by the institutional review board.

The form includes the questionnaire about the challenges they faced during the implementation projects. The forms include listing the major challenges that are raised during the project and type of the projects.

The interview questions will include the roles of the personnel and projects that they have worked. Only the qualified personnel will be involved in this study because they should be aware of the challenges that come with the projects.

The challenges like the communication, trust, and personnel hired for the roles can be identified. The onshore and offshore teams locations can also be identified. By the literature review, it is identified that the offshore team relation with the US and India had highest success rate compare to other countries.

The obtained results will be analyzed by type of project, method used, offshore site and a number of personnel involved.

The process involves identifying the project managers that are involved in the implementation of the GSD. This will help to know the challenges they did overcome.

The protocols will be developed which involves the implementing of the solutions suggested by the project managers through the question forms. The protocol will be developed based on the suggestion of the solutions and project scenarios. The scope of the projects will be different and the solution will be implemented to analyze the results of the solution with each project.

The obtained results will be represented by the team to obtain the survey. The survey will help to get the efficient results and acceptance. As the agile method is mainly to focus on the time frame for the projects and to reduce development costs. Verifying the efficiency of the solutions will be helpful.

The resources involved in the process are project managers, onshore and offshore team, customers. The analysis of the results of the project will provide the results of the identified solution. This will eventually help to develop the framework that can be used for the GSD.

The standard ANSI sampling procedures will be adopted for evaluating the procedures. All the projects that will be used for the study will be reviewed by the board.

The results from the each project will be evaluated with the challenges that faced and the solution implemented to resolve the solution. The success rate of the solution will be calculated based on the time frame it took to resolve. The percentage of the failed solution for the challenges will be graphed for the evaluation.

Different projects will be assigned with the different methods like scrum, extreme programming.

5. METHODOLOGY:

In current projects, project managers are adopting different agile methodologies to achieve success. Few global project teams used scrum, XP, Lean software development and Agile unified process. The literature review was performed by different reviewers to investigate the road blocks during the project development.

Few findings in the literature review are “What are the techniques to build the trust in distributed agile teams?”, “Formal vs informal collaboration for the global software agile

teams” and “Which Decision points are considered in practice when making offshore insourcing decisions?”. The problem that I have chosen to investigate through this literature review is “Which agile method is good to adopt for the global software agile development projects?”.

Using the scaled agile method can mitigate the problems for the global software development projects. Adopting the scrum and Kanban methodology can reduce the few issues like communication gap in the projects.

The type of project that I have chosen is data migration project between the Enterprise Resource Planning systems (ERP). We separated the project teams in to three scrum teams and each team will support the migration activities. PMO set up for the project will manage the activities between the project team. Communication plan was developed by the PMO with the guidelines to be followed by the teams.

Stakeholder identification:

The project kick off meeting have to be set up to identify the business expectations and stakeholders of the project. Questionnaire through any of the tools like a2 intake and PMx will be submitted to the stakeholders to understand the needs and budget assigned for the project. The methodology to be implemented during the project will be the out of the questionnaire. The questionnaire suggests which methodology to follow the either waterfall or agile framework. The Project manager will outline the framework for the project based on the outcome of the questionnaire.

After identifying the framework, User stories (requirements) for the project will be gathered during the initial stage of the project. 80% of the user stories (requirements)

are collected at the initial stage and they were augmented during the sprints. The user stories can be updated based on the feedback of the stakeholders.

The prototype will be presented in the sprint demo to the stakeholders for the feedback. If the developed user stories are not accepted by the stakeholders they will be moved back to “To-Do” list of user stories and will be re-developed.

The sprint burndown chart helps us to understand the growth of the project and later to know the metrics of the project.

The scaled agile framework with the Kanban and scrum is planned to implement for this project. After the release of two sprints, the results can be evaluated to understand the impediments that are observed. Scrum master will be performing stage gate assessment during the sprints to evaluate the health of project team.

6. PROPOSED WORK PLAN

I am planning to start the execution of the proposed solution starting from late spring 2017.

Initially, the team will be identified for the implementation of the projects. The projects that are already initiated will also be considered. The short term project will be used for this study. The timeline for the projects will be range between the 2 to 3 months. They will be sent the protocol of the proposed solution. The acceptance for the study will be obtained from the teams. The methods that need to be implemented for their project will be explained.

In the first week of the February, the evaluation of the solutions will be performed. The success rate of the solutions will be calculated based on the timeline planned for the

activities. Any new challenges that are raised during the time will be listed and appropriate solution is provided.

During the march, the timelines of the project that are extended and out of targeted deadlines will be evaluated. The drawbacks for the project will be identified for the further projects. At the end of the project, closure survey will be conducted. The survey forms will be provided to the teams to analyze the results and satisfactory of the new approach. This will help to know the effectiveness of the proposed solutions for the projects.

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