

Identification of Parameters Pertaining to Agile Framework for Software Development Projects

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ABSTRACT: There has been a profound change in the way software development projects are managed. Information Technology (IT) spend in 2020 is projected to increase to USD 3.9 trillion. This is as per study and forecast done by Gartner Inc. Iterative and incremental approaches are core to agile software development projects. In these projects continuous collaboration between customer and business organization takes place through a cross functional teams.

Inputs from literature pointed towards capabilities of the existing models. None of the existing models seem to have the capability of outcome prediction. The study leverages on the identified gap to carry out discussions with IT industry practitioners. In particular, this research gathered feedback from IT industry participants in order to address this gap. The attained inputs were validated for application of agile methods pertaining to projects in software development. Moreover, the study focused on responses from participants and analyzed to identify the most important parameters to be used for a larger empirical study. Larger empirical study will use the parameters identified from current approach and analyze the data in greater detail to arrive at observations and insights. The study provided insights into specific parameters that should be looked at larger empirical analysis. It also provided basis for specific areas to focus while carrying out next steps of analysis during empirical study. These areas would provide ability to identify critical success parameters for project outcome prediction. In particular, this study focuses on identification of parameters pertaining to Agile Framework for Software Development.

Keywords: Software Development, Agile Methods, Success Parameters, Project Outcome

I. INTRODUCTION

Project Management means application of knowledge, skills, technique, and tools to manage

the activities for meeting customer requirements. [1]. Project management institute states that project is a temporary endeavor undertaken to create unique product, service or a result. Software development projects have been using Rapid application development (RAD), Spiral and Waterfall methods earlier to year 2000. [2]. From point of view of managing software development projects these methods were called as "Traditional" methods. From year 2000 onwards, the focus in software development projects shifted from managing cost and schedule to achieving the business functionality. It specifically focused on benefits delivered to end users. This is very different from the approach taken in the 1990s, wherein the focus was on managing cost and schedule. This approach resulted in usage of agile methods for managing lifecycle of software development projects [3]. In year 2001, agile manifesto [4] was released by a group of seventeen independent minded software practitioners. More studies were carried out and have highlighted the impact of agile methods in the overall success of software development projects compared to traditional methods [5]

The Objective of this study is to identify parameters of agile framework for enhancing the success rate of software development projects and analyze the issues with existing models. Extensive discussions have been carried out with practitioners from Information Technology (IT) industry to identify the parameters that have most influence on the success of agile software development projects. A set of predefined criteria was used to identify right practitioners for discussions [6].

This study envisages identifying key parameters for agile framework with capability of outcome predictions to facilitate the project managers in the software industry.

II. METHODOLOGY

The following methodology was adopted for the study. The methodology centered around finding current models available in industry and looking at their characteristics. This enabled to compare these models and enabled effective analysis between the existing literature and the current industrial practice.

Critical literature review helped in identifying the primary areas to work for agile software development projects. These areas consisted of existing models and their issues, agile

framework categories to enhance success and, parameters for establishing the outcome.

The method was formulated to obtain desired outcomes which consisted of workshop with industry practitioners. Further, remediation steps or modified approach for resolution for issues with current models are critically analyzed. Expected outcomes include:

- Feedback from pilot group of practitioners for survey questions
- Draft survey questions for empirical study
- Calculating sample size

Fig. 1 shows a pictorial representation of the inputs used for analysis.

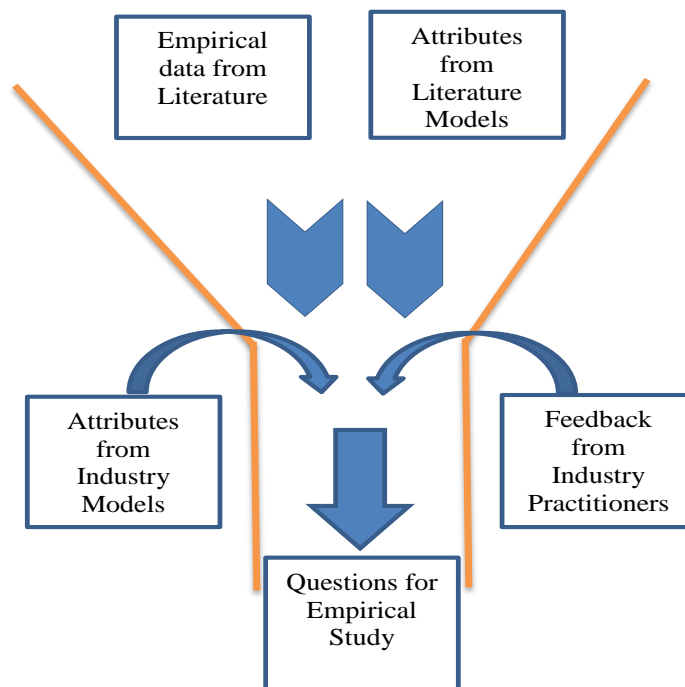


Fig. 1 - Inputs used for Analysis

2.1 Outcome-1: Comparison of Models used in IT Industry

Models in IT industry for software development projects covering various parameters were also reviewed.

A comparison of these models is shown in Table-1

Table-1 – Models from IT industry covering various parameters

Characteristics	Delloite's PPA [7]	Risk Model [8]	7 Keys Model [9]	Agile Maturity Assessment Model [10]
Model Usage	Traditional	Traditional	Traditional	Agile
Adequacy	X	X	X	X
Capability	X	X	X	X
Effectiveness	X		X	X
Challenges/Risks	X	X	X	Xh

Process Maturity			X	X
Success Factors	X	X	X	
Outcome Correlation	X	X	X	
Outcome Prediction				

As seen from Table-1, though IT industry models consider success factors for model formulation but lacks capability of outcome prediction.

Comparison from the table shows that Deloitte’s PPA [7], Risk [8] and 7 Keys models [9] offer outcome correlation capability. However, none of the models offer capability of outcome prediction.

2.2 Conducting Workshops with IT Industry Practitioners

39 questions were finalized using inputs from literature review and industry experience. These were discussed across 5 different categories: Organization, People, Technical, Process and Project. Initial discussions were in workshop mode. Results obtained represent the summary of feedback using Likert scale for the questions by category. The feedback from workshop participants was discussed with the target group by mapping from industry model perspective.

Multiple workshops were conducted with industry practitioners. These workshops were divided in two phases. First phase covered discussion with industry practitioners for their feedback from 39 questions covering various parameters. These 39 questions were obtained from the extensive literature review. Nonetheless, the idea of workshop was to get feedback from industry practitioners and use their extensive practical on job experience to optimize and shortlist right questions for the empirical study.

Participants for the workshop were carefully identified based on the following criterion:

1. Experience in managing software development projects using Agile methodology
 2. Training on usage of Agile methodology for software development
 3. Presence of Agile Methodology Certification
- Following charts represent the participant profile for the workshop.

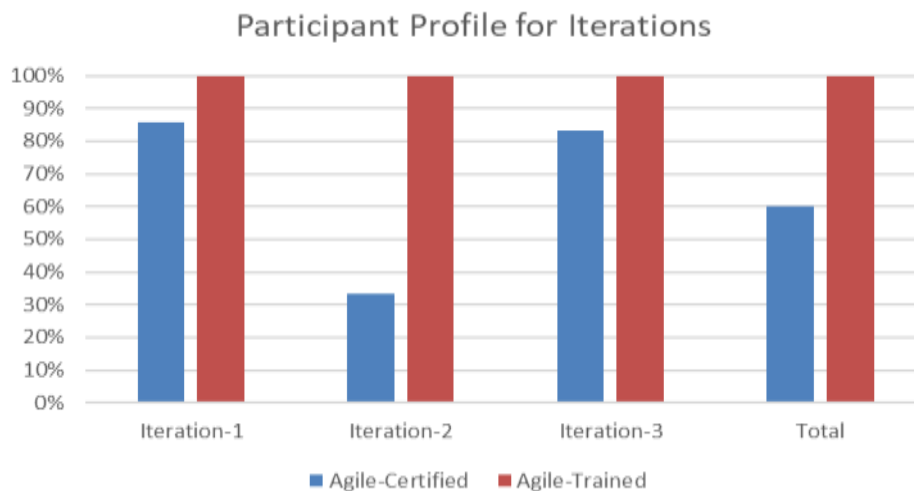


Fig. 2 Participant profile consisting of agile methodology training and certifications

The picture below shows the workshop in progress



All participants in the workshop had training in agile methodology. More than 50% of the participants were certified in agile methodology.

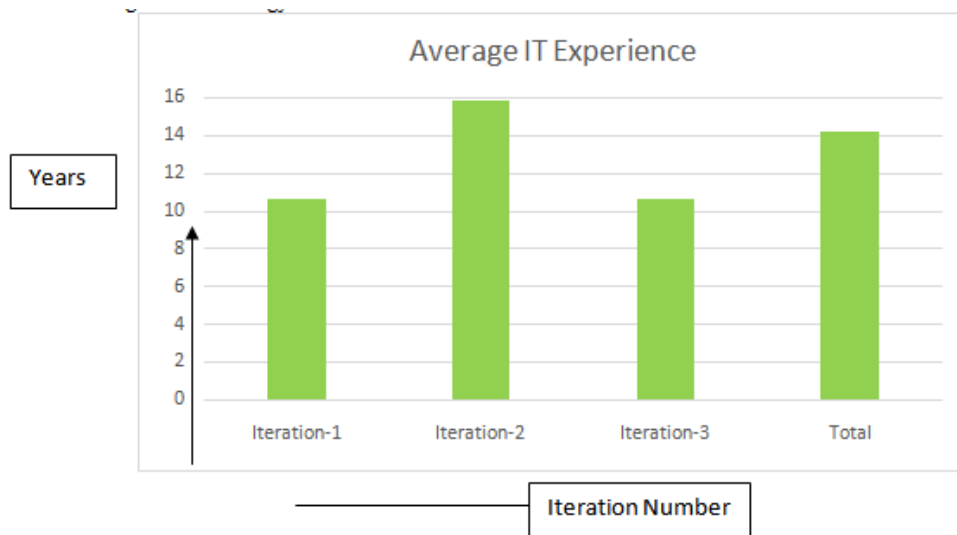


Fig. 3 Average information technology industry experience of the participants (mention X and Y Axis)

It is found that the average IT experience of the participants was 14 years. The approach to workshop consisted of review of questions and collecting feedback about the most critical parameters for empirical study. The questions looked at agile methodology practices contributing to the success of software development projects. A

list of 39 questions were split across five categories viz.

- Organization
- People
- Technical
- Process
- Project

2.3 Outcome-2: Analysis of feedback from workshops and results

After detailed discussion on every question and clarifying the understanding, Individual participants provided feedback about the survey questions. Nature of feedback was as follows:

- Combine some related questions together to make it more effective and relevant, for example:
 - Executive support and business sponsor related questions could be combined
 - Culture and communication style related questions could be combined
- Reword the question so that the intent of asking the question is clear, for example:
 - Can we add a specific mention of business value for feature priority?
 - Can we look at specific mention of scrum master and leadership team for a question about leadership style?
- New question to be looked for specific area if it is relevant and not represented in any other question. Some areas suggested were as follows:
 - Did the project involve Multiple Vendors?

- Did the team use any Metrics to track agile project progress?
- What is meant by “onsite customer”, can we make it more specific?

Further discussions were held with industry practitioners for success prediction parameters. Source of these parameters was literature review covering various parameters for success prediction. These models were used for discussion in the workshop with IT industry participants to check for familiarity and usage in industry.

- Success parameters for scrum agile method
- Test defects
- Iteration velocity
- Effectiveness of agile scrum process
- Effort estimation

The summary of discussion based on feedback from participants of workshop are reported in Fig. 4.

Figure 4 shows the familiarity and usage of methodology by participants. The heuristic is higher percentage indicates higher familiarity or usage.

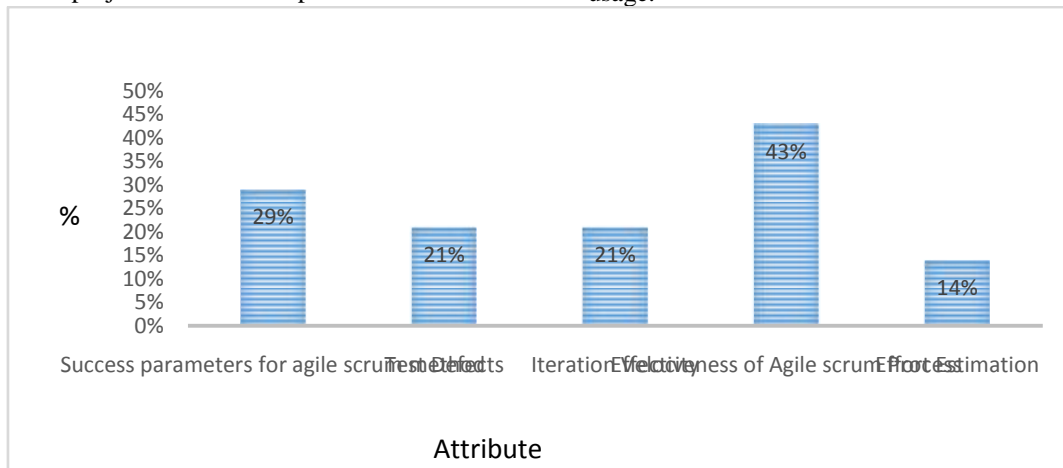


Fig. 4 - Familiarity feedback from workshop participants

Participants specifically commented on usage of models referred in literature. Most familiarity was found for success parameters of agile scrum method.

Total of 39 questions were discussed across five categories as covered in initial

discussion about workshop. Figure 5 represent the summary of feedback in the form of Likert scale for the question categories. Mapping from industry model is also included.

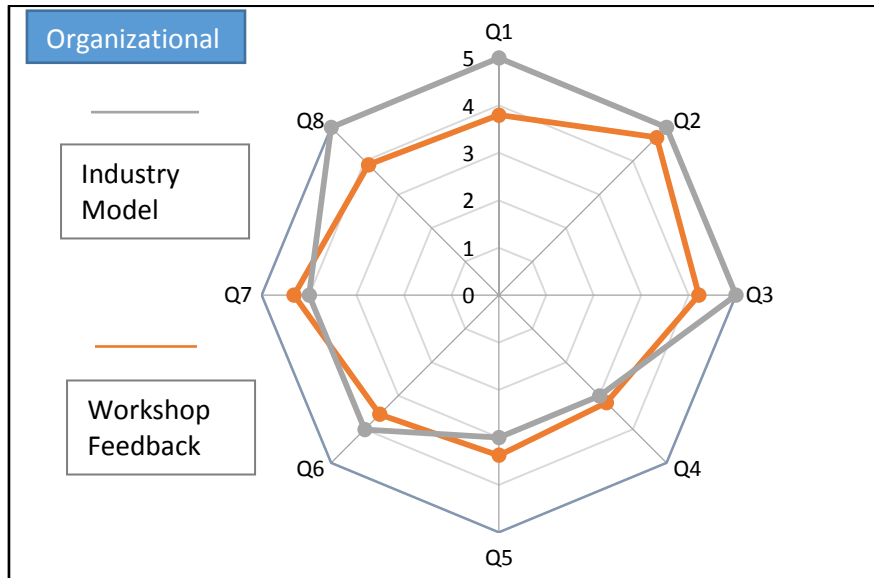


Fig.5 Summary of Likert scale scores for category Organizational

For organizational category, questions 4 and 5 received low scores from workshop feedback and also from mapping to industry model. Similar analysis has been done for questions for other categories, process, people, technical and project. This analysis resulted in identifying questions for empirical study based on feedback from workshop participants. The analysis resulted in elimination of

14 questions from the larger question set of 39 and keep 25 questions for the next stage of empirical study.

Figure 6 shows the summary of scores obtained from workshops. The box plot is useful to understand the positioning of each category in comparison with each other.

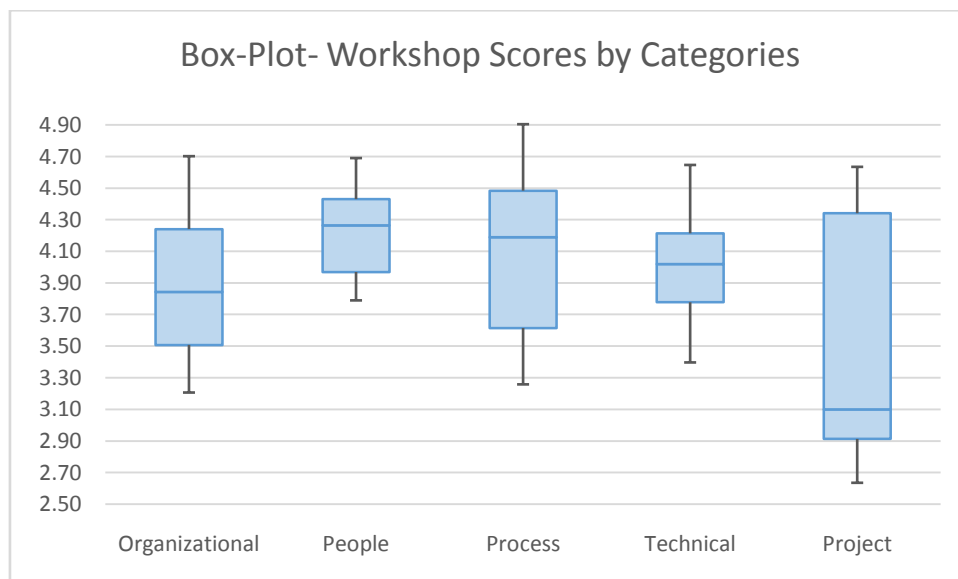


Fig. 6 - Summarized question feedback from workshop (Mention X and Y – Axis)

III. SUMMARY OF RESEARCH FINDINGS

The focus of this research has been to look at an approach to understand the methods used to improve success rates of agile software

development projects. As per Gartner [10] global IT spending will reach USD 3.9 trillion by 2020. Any improvement in success rate of IT projects will help in making the outcome favorable for businesses outcomes. This study takes one step in

identifying the parameters of agile software development projects that help in improving the probability of success of the project. The study resulted in finalizing of 25 questions to be used in larger study with more participants from IT industry.

IV. LIMITATIONS AND NEXT STEPS

Personal mode of interaction with industry participants limited the number of participants. This limitation can be overcome through an empirical study with addition of more participants to obtain feedback and responses for the identified questions.

Next step is to carry out empirical study for aiding the implementation of agile framework in software development projects considering adequacy, organization capability and effectiveness along with statistical data analysis with validation.

V. CONCLUSION:

Critical review of models from literature and industry highlighted key issues with existing models on agile software development projects. Models in industry use considers success factors for model formulation but lacks capability of outcome prediction. In the survey, more than 50% of the participants were certified in agile methodology. The results indicate that project managers in software industry are familiar with Success parameters of agile scrum method. Total of 39 questions were discussed across five categories as covered in initial discussion about workshop. This study helped in improving the probability of success of the Project.

Moreover, industry participants were also familiar with related execution methods for scrum.

Based on feedback from IT industry participants, key questions were identified for conducting empirical study with wider audience feedback as the future research direction. This study will contribute to the existing literature by warranting for agile framework with capability of outcome predictions to facilitate the project managers in the software industry.

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