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Organization's Agile Adoption: A Strategic Project Selection Approach Based on Multi-layered Selection Criteria

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Abstract:
Agile development process adoption has become one of the major challenges for any organization in today's world. An inaccurate way of adoption may lead to the ultimate failure of agile adoption for the organization. In this paper a multi-layered agile adoption approach has been proposed through project selection based on different parameters; like survey result, strategic focus, prior experience, organization's maturity level and projects requirements which can be used further to define organizations agile adoption trends. Here the implementation process of the proposed method and some practical results are also presented to prove the efficiency of the approach.

1. INTRODUCTION and MOTIVATION

Agile SW development process has already made its strong step in today's industry for its agility and effectiveness over the traditional development approaches; like waterfall, iterative, etc. 65% of the companies reporting the use of agile methods for their software development projects [1]. But, a number of organizations are struggling to find out an efficient way for adopting agile culture inside the organization. Over the past few years two common question have been asked by the organizations to the agile community *"Why should we adopt agile practices?"* [2], and then immediately after this *"How do we proceed with adoption agile practices?"* [2]. Though the numerous success stories highlighting the benefits reaped by organizations that have successfully adopted agile practices provide an answer to the first question [3][4][5][6], but for not getting the effective way to proceed for agile; many of them are failing to successfully deploy agile in their organizations. Unfortunately there is no well accepted structured approach for organizations agile adoption. The absence of a formal structured approach is the main problem addressed here for organizations agile adoption and a layer based systematic solution of this problem has become the motivation of this paper. It should not be forgotten that Agile is more of a culture, rather than a defined development process. It may even take few successive years to completely adopt agile culture by deploying agile practices in all the projects of an organization. Emphasizing on Agile Manifesto [7] which describes the importance of some criteria; like people interaction over processes and tools, working software over detail documentation, etc. a multi-layered agile adoption approach has been proposed in this paper through suitable project selection for full agile deployment or partial agile practice deployment for gradually leading towards the complete agile culture adoption by the organization.

2. PROPOSED METHOD

This work has identified several metrics and base parameters which can create major challenges to the way of agile adoption by an organization. Though some of the previous agile adoption approaches worked on motives on driving agile adoption and their effect on groupings of practices adoption [1], but in this proposed model these metrics and parameters are arranged in multiple layers where every layer depends on its previous layer. In Layer 3 of this approach (Fig: 1) all the projects have been rated and classified to identify the best suitable projects to go for agile first. Ultimately the final layer (Fig: 2) indicates the organization's trend of agile adoption. If this model is applied for few consecutive years with the aim of completely shifting towards agile, it is expected that risk of failure during agile adoption can be minimized. The proposed model can be described in two parts. Where part 1 aims to provide a rating to all projects. The rating actually helps to measure the suitability of the projects to go for agile early comparing among the projects of the organization. The activity of Part 1 starts from identifying the metrics. Though a four stage agile adoption concept had been proposed earlier where the stages are; like – identification of discontinuing factors, project level assessment, organizational readiness assessment and reconciliation, but well defined matrices can help the organization to make a right selection for going agile. In this study ten metrics were identified and those metrics values were utilized in two different parts to find out the suitable project/projects to go for agile.

2.1. Part One: Metrics based Project Rating

There are three layers in part one – identifying metrics, working with metrics values and calculating the weighted sum. This weighted sum of the rating points can be found from the scoring chart (shown in table-1) that is set by the organization. One metrics value 'Prior experience' of table-1 will be directly added in layer-2. From the below given scoring chart of Table-1 projects suitability for agile adoption is measured in following scale:

Total Rating Point		Suitability Status
0 ~ 59	----------→	Less Suitable for Agile
60 ~ 69	----------→	Moderately Suitable for Agile
70 ~ 100	----------→	Most Suitable for Agile

Table.1. Rating point measuring scoring chart

Group	Metrics	Question	Answer & Rating Point (in %)			
			0 ~29	30~59	60~79	80~100
A	A1	What is the degree of your awareness about agile methodology/ practices?	Low	Moderate	High	Very High
	A2	How willing are you to deploy agile development process in your project?	Not at-all	Not sure	Willing	Very much
	A3	Which one do you think the most important for your project's success?	Individual skill of the members	Ownership of tasks	Team coordination	Measurability, Traceability and Accountability of tasks.
B	B1	Does the product owner have any specific choice of process model or methodology? If yes; which one is that	Waterfall	Iterative or Incremental or prototype	No Such Choice	Agile
	B2	What is the level of uncertainty or risk (related to resource, requirement or any other unknown factors) in this project?	Low	Very High	Moderate	High
C	C1	How much do you know about your organization's process guideline?	Very little	Moderate	Sufficient	Know all in depth
	C2	What is the type & modularity status of the project?	Maintenance with/without sub-modules	Commercialization Support with/without sub-modules	Core development without sub-modules	Core development with sub-modules
D	D1	What is the size (number of members) of the team?	1~2	10 or above	3~4	5~9
	D2	How frequent the requirements changes in this project?	Almost Daily or Undefined	Weekly	Bi-weekly	Monthly / Quarterly
	D3	What is the release plan for the software/product?	No fixed plan, release is on-demand	Only once - at the end of the project	Only once for each module	Number of incremental releases

Layer-1: Identifying Matrices: The first part of this agile project selection process starts from choosing metrics. In this proposed approach ten (10) metrics have been identified and those are of four different areas. Eagerness of the project team, expectations of the team and experience of the members in agile domain are the first three metrics of layer 1, Product owners' requirements (directly related to project) and other external factors are the next two, on the other hand process guidelines which may come from the Agile Manifesto [7] and overall situation of the organization depends on defined process based feedback; whereas team size, projects change frequency and business logics are directly related to projects domain.

Layer-2: Working with Metrics Values: In layer-2 the defined parameters are survey results, management preference, scrum masters feedback, project study and prior experiences. In this layer specific metrics values of different areas are gathered in different ways. Each of the parameters is given a weight based on organizations focus areas and also on Agile Manifesto [7]. For example if the organization aims to completely shifting to agile, prior experience of any team can be given a higher rating,

so that projects/teams applying agile last year is automatically get selected to practice agile in the successive years. Similarly other factors can also be given weight based on a standard scoring chart set by the organization. The score of the projects are calculated as the average of all criteria's scores. When all the projects ratings are calculated projects suitability or priority to go agile becomes instantly visible. These achieved data is used further in part 2 (Fig: 2). When survey takes place to collect the first three metrics values team experience is simply the previous agile experience of the team; whereas eagerness of the team and expectation of the team both these values are directly related to the level of collaboration among the development team members, organization's management and the agile coach. It is said that the dimension of collaboration is the foundation of agile software development [8][9][10]. So, before going for any survey it is made sure that the development team members and the management have clear idea about the agile development process. Product owner's requirement and other X-factors/unpredictability factors are directly responsible for management preference. For example if any product owner or client directly asks the development team or the organization's management to maintain the agile development process for their product then it gets very high priority and high rating in the selection chart, at the same time some unpredictable factors; like undefined project length becomes important indicators for management preference. Prior experience of a team also gets higher value in the rating chart. For example project teams who deployed agile practices previous year if they continue similar type of projects this year; also gets high rating in the scoring chart. Scrum master or agile coach's feedback has come from the rating two metrics - overall situation of the organization; like the communication culture of the organization or team members satisfaction level, etc. and process guideline which is set by the organization based on the Agile Manifesto [7]. The final three metrics - team size, requirement change frequency and business logic these three ratings have directly been produced from the projects data and are found through studying project documents; like –request for proposal (RFP), raw requirements, prior works, etc.

Layer-3: Calculating the Weighted Sum

In layer-3 the weighted sum of layer-2 values which have come from layer-1 metrics point rating; are been calculated for each of the project. Hence the projects total rating points are measured in numeric values which help the organization to identify its projects suitability for agile process deployment.

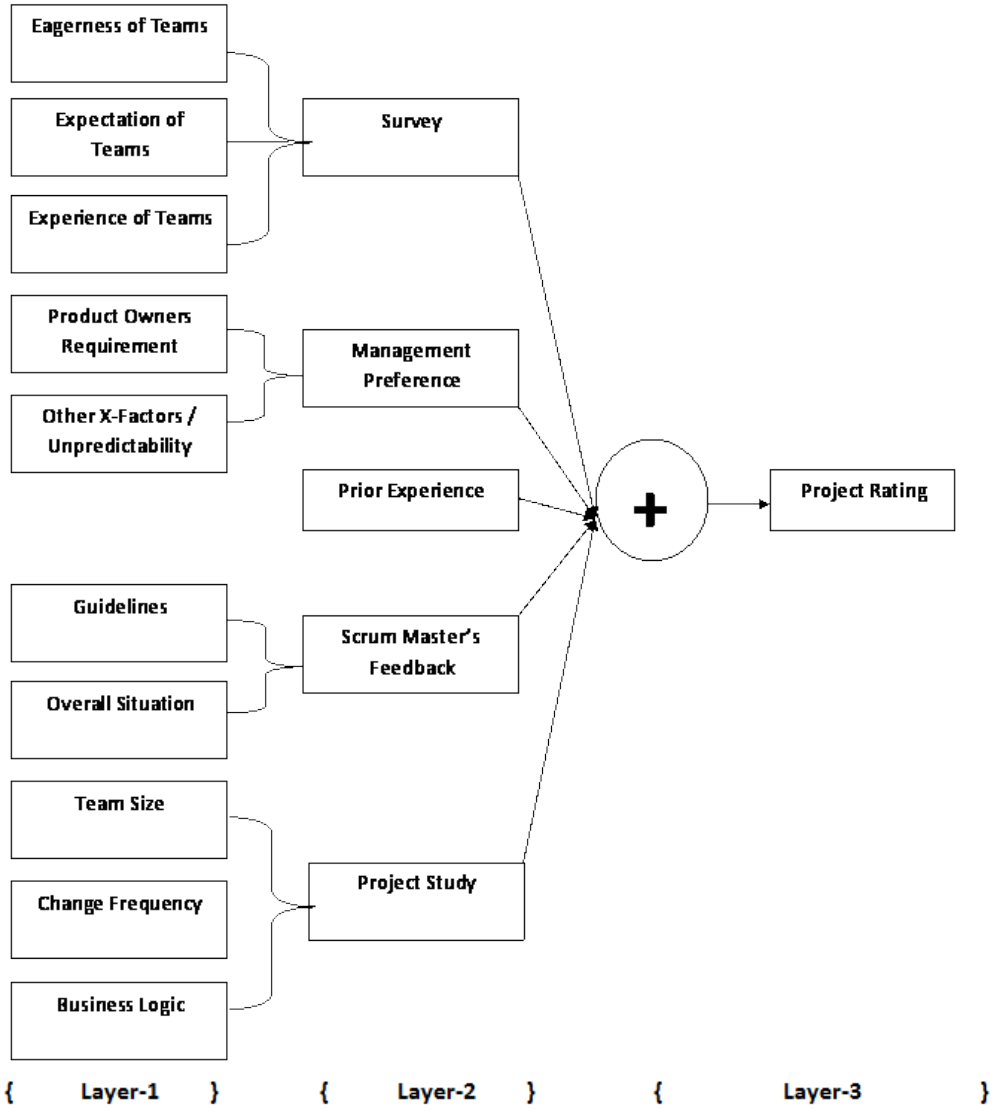

Figure.1. Project rating and selection model (Part-1).

2.2. Part Two: Rating Point based Project Selection

Part 2 has two more layers (layer 4 and layer 5) to define organizations trend of agile adoption. Based on the project ratings achieved in part 1(Fig: 1), projects are categorized in three categories; like - Mostly suitable for agile deployment, moderately suitable for agile deployment and less suitable for immediate agile deployment. Layer 4 defines the categorized projects based on the projects ratings. These project ratings have been done through different levels of scores which have already been set in the scoring chart. For example projects that have scored high level of rating will be known as mostly suitable for agile, the immediate next level of rating will be treated as moderately suitable for agile and the last level will be considered as less suitable for agile. At layer 5 the degree of agility is defined for all the projects where mostly suitable projects goes for complete agile adoption, moderately suitable projects adopts only some of the preferred agile practices for partial agile adoption and rest of the projects are selected to train, monitor and observe for this year and then wait for the next years rating. To avoid any unnecessary process overhead during this whole project selection process one question has taken under special consideration and that is – *'Does this project really need to adopt agile process?*' Because after all plan and deliver software frequently is one of the major agile principles [11][12][13]. So, any major agile principle shouldn't be impeded for any process overhead. Then the immediate next year moderately suitable and less suitable projects are evaluated again. Ultimately continuing this process for few consecutive years lead the organization towards the complete agile for all its required projects successfully and then organizations agile adoption trend has also been revealed.

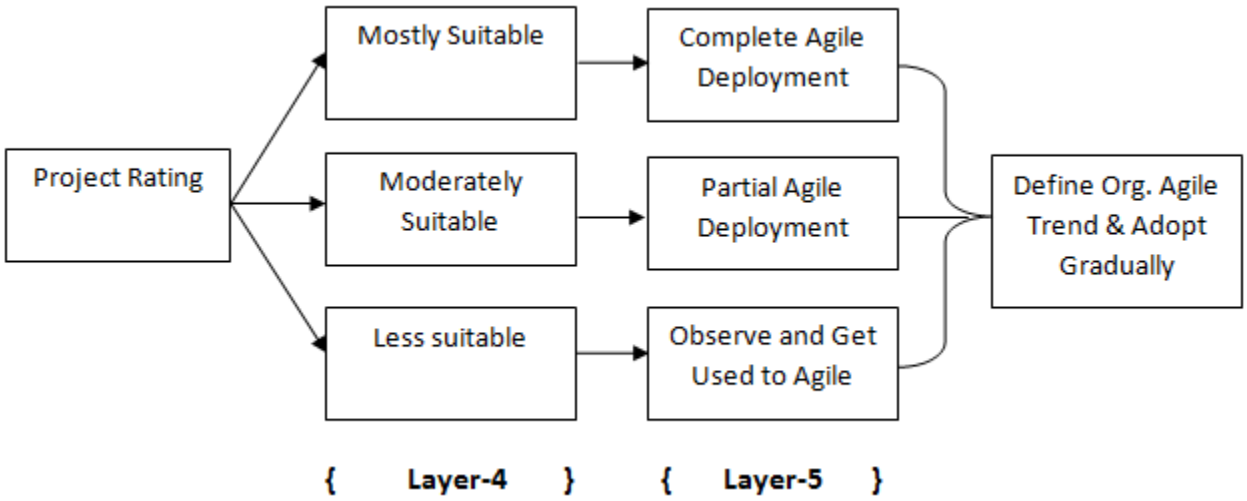

Figure.2. Project rating and selection model (Part-2).

3. EXPERIMENT RESULTS

The proposed model was applied on total of eight projects of the organization where a number of project members, agile coaches and management people were participated in this project selection process. In this experiment it is shown that how the ratting points have been scored against each of the projects based on different layer's output, and then how every single project's feasibility for agile adoption has been measured depending on the achieved rating point level. The following table (Table-2) is showing how the rating point based project selection technique worked as a very effective agile process adoption approach for the organization.

Table.2. (part-1): Experiment result

PROJECTS	PART-1 (All values are in %)														
	Layer-1										Layer-2				Layer-3
	A1	A2	A3	B1	B2	C1	C2	D1	D2	D3	A	B	C	D	Rating Point (Total)
Project-1	59	59	59	79	29	59	29	59	59	29	**59**	**54**	**44**	**49**	**53**
Project-2	79	59	79	79	29	59	29	79	79	29	**72.33**	**54**	**44**	**62.33**	**52.33**
Project-3	59	29	79	79	59	59	59	29	79	59	**55.67**	**69**	**59**	**55.67**	**53.67**
Project-4	59	59	79	79	79	59	79	100	79	59	**65.67**	**79**	**69**	**79.33**	**64.4**
Project-5	100	79	59	79	79	79	100	100	79	100	**79.33**	**79**	**89.5**	**93**	**73.9**
Project-6	79	79	100	79	59	79	100	100	59	79	**86**	**69**	**89.5**	**79.33**	**80.57**
Project-7	79	59	100	79	59	79	59	79	29	59	**79.33**	**69**	**69**	**55.67**	**60.4**
Project-8	100	100	79	79	79	100	59	100	100	79	**93**	**79**	**79.5**	**93**	**74.5**

Table .2. (part-2): Experiment result

PROJECTS	PART-2			Organization's Current Agile Adoption Feasibility & Trend
	Layer-3	Layer-4	Layer-5	
	Rating Points (Total)	Agile Feasibility	Agile Adoption Decision	
Project-1	**53**	Less Suitable	Observe & Get used to with Agile	Currently the Organization itself is **64.03%** Ready to Adopt Agile Development Process
Project-2	**52.33**	Less Suitable	Observe & Get used to with Agile	
Project-3	**53.67**	Less Suitable	Observe & Get used to with Agile	
Project-4	**64.4**	Moderately Suitable	Partial Agile	
Project-5	**73.9**	Most Suitable	Complete/Full Agile	
Project-6	**80.57**	Most Suitable	Complete/Full Agile	
Project-7	**60.4**	Moderately Suitable	Partial Agile	
Project-8	**74.5**	Most Suitable	Complete/Full Agile	

In the above tables (Table 2: part-1 & part-2) projects rating points have been calculated based on the feedback collected from the project members and other stakeholders. Then depending on the achieved rating points three (3) projects have been selected for complete agile adoption, two (2) have been selected for partial agile adoption (only few agile practices) and the rest of the three (3) projects have been decided to observe other agile projects agile practices, get trained and get ready for agile next year. Finally averaging all the projects total rating points the current trend and readiness of the organization to adopt agile has been revealed (which is 64.03%).

4. CONCLUSION

There is no strict rule or universally excepted framework for organizations agile adoption. Different organizations are trying different ways to start and continue their agile process journey. So, there is always a necessity and opportunity as well to work in this area for finding out a structured approach of organization's agile culture adoption through agile practices. In this paper, a well-structured multi-layered project selection model has been demonstrated as the way of organization's agile adoption. Also some evidential real facts and figures have been presented here to make it very clear that this can surely be one of the most effective, efficient and sustainable way of Agile adoption for any organization.

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