Finding Efficiency in Approach Selection in Software Development and Project Management in Bangladesh IT Industry

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ABSTRACT

Here we have tried to find out suitable methods for IT companies of different ages. Some subject companies were chosen and given a survey form from which we got some data about different aged IT companies using different development methods. The models were between agile, agile process model, and other models. Through the survey, we found some data which can help different aged IT companies find the right model for their project development. The data analysis shows the suitable project method for different age companies. The subject companies also listed why they use their method and how long have been they using it. This survey result will help companies that are struggling to grow or companies which are about to start their project method. A good project method can bring success to a company.

CCS CONCEPTS

• Software and its Engineering → Software creation and management • Software and its Engineering → Software development process management • Software and its Engineering → Software development methods • Software and its Engineering → Agile software development

KEYWORDS

Industrial Survey, SDLC models, Plan by include, Data analysis

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1 Introduction

Agile SDLC model focuses on collaborative decision-making and improvement over numerous brief cycles or sprints, instead of a top-down preparation with a single arrangement of stages. The methods of agile break tasks into littler cycles or parts that don't specifically include long-term arranging. The project augmentation and necessities are put down at the beginning of the improvement cycle. In the agile model, there will be plans with respect to the number of iterations, the scope, and the extent of every cycle that are plainly characterized ahead of time. In the Agile interaction paradigm, every renewal is considered a small-time "frame," ranging from one to around a month [2]. The smaller components of a project contribute to lowering project risk and reducing total project delivery time requirements. Before a completed product is demonstrated to the client, each cycle includes a group working through the full program development life cycle, which includes arranging, requirements examination, planning, coding, and testing.

1.1 Agile Model

The agile model is a combination of an iterative and progressive process model with a focus on flexibility and client fulfillment by rapid delivery of working software items. It is an iterative, lightweight, and lean programming plan and advancement technique that was brought into the world in the last part of the 1990s to be profoundly viable with the quick improvement of the WWW (World Wide Web)

1.2 Phases of agile model

In a company, there can be 6 phases of the agile model.

1. Gathering of requirements
2. Design the requirements
3. Iteration
4. Testing
5. Deployment
6. Feedback

Gathering of requirements:

In this phase, requirements and business opportunities should be defined. And should plan the time and effort needed to build the project. Based on this information, technical and economic feasibility will be evaluated.

Design the requirements:

Work with stakeholders to define requirements after identifying the project. A user flow diagram, often known as a high-level UML diagram, can be used to demonstrate how new features function and how they will fit into your existing system.

Iteration:

Designers and developers begin working on a project after gathering all of the requirements, with the goal of deploying a working product. The product will go through several stages of development.

Testing:

In this stage, products performance will be examined and try to find out the bugs **Deployment:**

The team creates a product for the user's work environment at this stage. **Feedback:**

The final step is to provide feedback. The team receives feedback on the product throughout this stage and works through it.

1.3 Methodologies of agile

There are numerous approaches in the coordinated model. A few approaches are given beneath:

Outrageous Programming (XP): Extreme writing computer programs is one of the systems of the spry model. This approach is predominantly used to gain ground of the nature of a product and furthermore consistently dynamic with changing client prerequisites. The five upsides of outrageous writing computer programs are correspondence, effortlessness, input, boldness, and regard [3].

Scrum: Scrum system is pertinent to any project with forceful cutoff times with complex necessities and a level of uniqueness [6]. Item overabundance, run build-up and addition are the curios of the scrum. The scrum group most importantly arrange the accumulation, do arranging of the run, day by day do super-short gathering, toward the finish of run meeting of audit and run review.

Dynamic Systems Development Method (DSDM): This lithe strategy fundamentally centers around the full task life cycle, and it is an iterative and steady methodology that is generally founded on the Rapid Application Development technique.

Highlight Driven Development (FDD): FDD is another system of the lithe model which arranges programming improvement around gaining ground on highlights. This model essentially allows the gatherings to refresh their tasks on a standard premise and furthermore distinguish the mistakes rapidly. Additionally, customers can be given data and significant outcomes whenever [1]. Five essential exercises exit during FDD: Develop generally model, form include list, plan by highlight, plan by include, work by include

Gem Method: Crystal strategy is a lightweight and versatile way to deal with creative programming. These techniques are appropriate for singular ventures. Enormous or basic activities require more philosophy components than little non-basic ventures. These techniques are principally zeroing in on individuals, cooperation, local area, abilities, gifts, and correspondence as first request consequences for execution. Interaction stays significant, however optional [1]. Lean Software Development: This dexterous strategy is for the most part utilized for diminishing the season of advancement and assets, disposing of waste, and at last conveying just what the item needs. In this strategy, the group initially recognizes the worth at that point map the worth stream. Next, make a stream and distribute pull. What's more, ultimately, look for flawlessness.

Kanban: Kanban's lithe strategy isn't really iterative. This technique allows the product to be created in just one phase. It is a light cycle that resembles a scrum that has a short emphasis that duplicates a task lifecycle on a limited scale, having a particular start and end for every emphasis. This model is basically used to imagine, as far as possible work in progress and rapidly complete the work from first to last. It is an incredible strategy for those who have loads of approaching requesting that contrast in need and size.

1.4 Importance of Agile model

There are some after explanations behind picking a coordinated model. They are:

This model can pay off the specialized obligation. In this model, there will be an up-close and personal discussion which can be the best type of correspondence. It is a simple model and rapidly Adapts to Change More excellent Products can be accomplished by a nimble model. It can give client-centered Testing. This model can give better consumer loyalty. By utilizing this model undertaking can be controlled in a superior manner. The spry model puts a solid spotlight on individuals and cooperation which gives the group numerous chances to work with the customer and comprehend their vision. This model remembers the ordinary base foundation for a deliberate and trained way which redesign the initial quality to help the cooperation. By separating the undertaking into reasonable units, the group can without much of a stretch discover the issues. Any task utilizing a coordinated system won't ever come up short because of dexterous works in the small run centered around consistent correspondence and conveyance. In this SDLC model consideration is paid to the great plan of the item.

1.5 Usages of Agile model in IT companies

The objective of any IT company's goal is to be efficient and achieve maximum team productivity by cutting costs and shortening development time. For each project, a new SDLC model is used. There are numerous SDLC models to choose from. Waterfall model, iterative model, spiral model, big-bang model, and agile model are some examples. Agile is one of the most widely used SDLC models. Companies in today's world must deal with a continually changing business environment. The agile paradigm is well suited to this type of difficult and complex task. Agile techniques are organized around the needs of the client. Teams using the Agile methodology gradually add features and functionalities, but they don't wait until each one is finished before releasing. As a result, the model's idea makes it a relatively simple methodology to adjust when requirements change unexpectedly. Agile approaches differ in certain ways, but they all recommend breaking down requirements into discrete stories so that a change does not affect the entire system. And it marks the beginnings of software development based on modules. This methodology can be used on any urgent project that is both difficult and new. Many IT businesses in Bangladesh are already using the agile model for various projects because agile is swiftly establishing a solid reputation for assisting organizations, teams, and products with crucial features such as productivity, efficiency, and quality.

1.6 Aims and objectives

1.6.1 Core objectives:

We have done a survey on some different aged it company. Here we have asked them experiences about different methods of an agile model. And which agile method they mostly use on their projects. Through the survey, we found some data. On that analysis, we have made some graphs. Our main objective is through the survey results and graphs help different aged companies to find the right model for their project development.

1.6.2 Future Objectives:

In the future, by getting the survey data and information, companies will be more efficient finding appropriate agile methodologies for their work. By this research paper, companies will be benefited from knowing different aged its company's project work system with different methodologies of agile model

2 Literature Review

2.1 Introduction:

Agility is the capacity to make and react to change to benefit in a violent business climate. Organizations need to develop better, and quicker tasks react rapidly to serious activities, new innovation, and client necessities. Every emphasis is an independent, small venture with exercises that length necessities examination, plan, execution, and test. The deft strategies of Scrum and Extreme Programming are turning out to be mainstream and a few organizations have executed acts of these approaches. A considerable lot of them have not been effective in their utilization, on account of the absence of information on the systems and conditions that impact effectively the execution of these practices [20]. To work together to this situation, we present in this paper a rundown of techniques and conditions, caught from the writing, which impacts emphatically into the sending of nimble practices. To get the positioning of these systems, we led a study with project chiefs, modelers, item directors, and engineers with experience in utilizing agile techniques. In this paper, we will introduce the accompanying outcomes: techniques and conditions that most decidedly and adversely impact the execution of practices and methods and conditions that don't impact them. This prompts an emphasis discharge (which might be just an inner delivery) that coordinates all products across the group and is a developing and advancing subset of the last framework. Little items and groups; adaptability restricted. Unseemly for security basic items as a result of successive changes. Useful for

dynamic, however costly for stable conditions, the necessary experience of coordinated staff all through and the workforce prevail on opportunity and mayhem

In the spry programming advancement, there are various elements behind the achievement and disappointment of tasks. The paper addresses the achievement, disappointment, and alleviation factors in the spry turn of events. A contextual analysis is introduced relying upon these variables after the finishing of little tasks. Each group assembled into 10 colleagues and built up the venture with various methodologies. Each gathering kept up the documentation from beginning client stories and elements utilized on the undertakings. Ultimate results are noticed dependent on the examination of proficiency, exactness, time of the executives, hazard investigation, and item nature of the undertaking. Ultimate results are distinguished utilizing the various methodologies.

2.2 Core Background Study:

Achieving the main degree of significant worth for the item thing being passed on is the target of any IT affiliation. Every affiliation needs to execute cycles and practices that would help to achieve this target of extending the idea of an item thing. There are such endless models open today that affiliation can use for developing an item yet considering the components of the present existence where development is changing at a high velocity and innovative things are hitting the market at uncommon speed, these affiliations needn't bother with an item improvement model that eats up a piece of time and attempts, and from this time forward most of the business houses are moving towards Agile technique for programming headway. With this change of approach for programming headway, the unavoidable issue is how to ensure the Quality of things made using the coordinated model. The ordinary system has an alternate stage for testing an item thing which ensures that a free gathering has endorsed the thing per decided essentials. Regardless, with a spry strategy for programming improvement, this impact of consideration of self-sufficient experimental groups and test levels has taken aback. This paper will highlight thoroughly the piece of QA inside the Agile progression model, with revolve around new examinations and approaches to manage to improve the overall idea of things made using Agile methodology. The use and meaning of Metrics for getting to the Quality inside the Agile model will in like manner be inspected.

Reformist market circumstances and switchable customer necessities raise more prerequisites for the thing improvement. Don Wells highlighted the overall aspects that XP fits into fixed time programs that use technological advancements face Yielding conveyances should be made and administered in short accentuations as a result of the quick external changes and keeping up a first-class level. Agile practices (like the acknowledged systems in Extreme Programming and Scrum) offer an unbelievable strategy for managing and controlling speedy thing improvement cycles and conveyance progression. A labyrinth in thing improvement projects, regardless, is the best approach to apply deft procedures and norms as a piece of the baffling thing headway. The justification for this paper is to depict, how the nimble assessment was guided for a circumstance association to help thing headway and customer care improvement. During the investigation, it was found that lithe assessment is a capable methodology to clarify what agile practices are fitting for the affiliation's thing improvement and customer co-action. Another finding was that the usage of the best suitable deft practices would make consistent headway checking and abomination of requirements.

Matters of the components that sway the execution of a nimble advancement technique are totally heavily influenced by the board. The establishment that is conceived carrying out a deft philosophy can deal with a portion of these elements to expand the chances for the accomplishment of their approach.

Popular coordinated SDMs are Scrum, Crystal Methods, and Feature Driven Development (FDD). These approaches are essentially unique in relation to customary SDMs and help associations address the difficulties of the present advanced economy [8]. The activity of utilizing lithe systems empowers programming engineers to deliver more excellent programming in a more limited timeframe. These approaches were created to improve the advancement cycle by eliminating boundaries to tolerating business prerequisite changes during the advancement interaction. This isn't so essential to freeze or secure business necessities and configuration subtleties while creating programming with a dexterous system [9]. Spry SDMs all offer a few characteristics including prototyping, iterative turn of events, and insignificant documentation.

Extreme Programming (XP) is an agile software development approach that attempts to deliver better software while also improving the development team's quality of life. In terms of proper engineering methods for software development, XP is the most detailed of the agile frameworks.

2.3 When Applicable:

dangers from dynamically changing programming needs. Little by little, you can assist in the formation of a larger progression

group. Automated unit and functional tests are part of the advancement you're employing.

Values: The five upsides of XP are correspondence, effortlessness, input, boldness, and regard Correspondence Programming improvement is typically a gathering action that relies upon correspondence to move data from one associate to each and every individual in the gathering. XP stresses the meaning of the fitting kind of correspondence – very close discussion with the guide of a whiteboard or another drawing framework.

Simplicity: Ease implies "what is the most direct thing that will work?" The inspiration driving this is to avoid waste and do just absolutely significant things, for instance, keep the arrangement of the structure anyway essential as possible so it very well may be less difficult to care for, support, and rethink. Straightforwardness also suggests addressing simply the requirements that you consider; don't endeavor to anticipate what's to come.

Feedback: Through consistent contribution about their past attempts, gatherings can perceive regions for advancement and rethink their practices. Analysis similarly maintains a clear arrangement. Your gathering amasses something, aggregates contribution on your arrangement and execution, and subsequently changes your thing going on.

Courage: Strength, according to Kent Beck, is "fruitful movement even in the face of dread" (Extreme Programming Explained P. 20). This term depicts a proclivity for taking action while adhering to a set of rules, with the goal of ensuring that the outcomes are not harmful to the group. You'll need strength to bring up specific difficulties that are limiting your gathering's capacity. You'll need mental toughness to stop trying to achieve something that doesn't work and try something different. Even when it's difficult to recognize, you need intensity to recognize and circle back to analysis.

2.4 Review Based on Methods:

We planned this review by preparing some survey questions relevant to our research objectives. We defined the way how software companies make their projects in different criteria. We present these in more detail below.
Our survey was limited and the result was based on our limited subjects. Software companies can get help from the output but for more success, we are preparing a more effective survey form including effective questions regarding IT company's methods and their projects. We are also preparing to reach more companies by which we can get more data and give more effective results for companies and companies change their project method during the project.
This survey will help us to determine the best methodology used in our country to develop software projects. This research will mainly help the new companies to make wise decisions in the time of preparing any project.

2.5 Review Based on results:

Our work was mainly finding out the suitable project model for different age IT companies of Bangladesh. Startup IT companies or different age IT companies of our country can have different problems developing a project and the main reason is their unsuitable project method. For that we prepared a survey question including company age, the person filling up the survey forms position, developers experience with their project model, which model they use, and other related questions which helped us to find suitable methods for startup companies and companies which are not doing well in our country. In the analysis, we found that most of our start-up or beginner Companies use agile as their main method, and they are doing well with their method and they are very satisfied with their method. In the end, we also saw that many old companies use agile, and it is suitable for their projects. Some companies do some adjustments with their method to get better results or to some personal reasons but most of our subject company's use agile as their main method and some companies who use other methods, we have done a survey on then if they want to change to agile and most of the output came out positive. However, companies over 7 years used method output came out different. We found that companies over 7 years can use any method as they choose.

3 Research Methodology

3.1 Introduction:

According to our survey, we can say that agile is the most popular methodology to develop a project among the software companies in Bangladesh. There are many other methods like a waterfall, DevOps deployment methodology, Rapid application method, and many others. But most of the companies use different types of agile models like Scrum, Extreme Programming (XP), Crystal Method, etc. These are the most usable methodologies in Bangladesh according to our survey.
The Survey has contained 12 questions. All the questions are related to Agile. These questions help us to determine the best

methodology. In our survey, all the questions were open-ended. Three questions allowed multiple answers and the rest of the questions allowed single answers.

3.2 Problem Finding:

In our country, most of the companies are one to [1]three years experienced (According to our survey). There are also some new companies. The following graph is showing the percentage of experience of software companies in Bangladesh. (According to our survey)

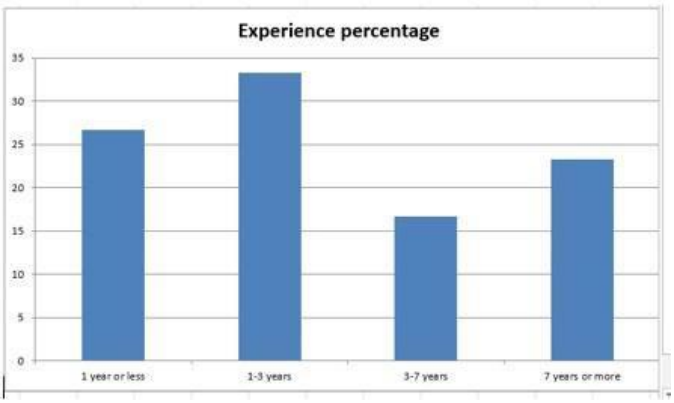

Figure 1: Company Experience Percentage

All the new companies (2 or fewer years experience) are using agile. And they are satisfied with their method to develop a project. In agile there are some models like Scrum, Crystal, etc. In all the Scrum is the most popular model among the developers and the companies. Especially the new companies (2 years or less) and the experienced companies (8 years or more) are using scrum rapidly nowadays.

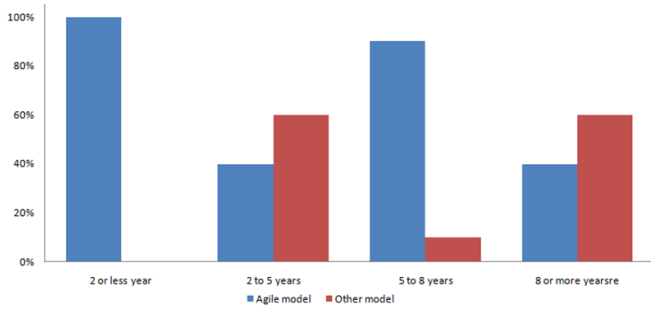

Figure 2: Use of Agile vs. other models according to company age.

But companies aged between two to five years are not that much satisfied with agile methodology and are not so comfortable using agile models.

3.3 Proposed Solution: Proposed solution describes how software companies can start using Agile to reduce the project completion time and how to plan a project with agile.

[1]Dataset:https://www.kaggle.com/mostafizmim/software-development- methods?fbclid=IwAR1CqkcOaugA_667BhxH8flxsgtFl92bzWfkSXyiEkvf5ff62-8Cdi1e0Go

4 Results and Analysis

4.1 How well it works:

By following the result and analysis a company can find a suitable project model for the company.

In the survey, we asked the subject companies about their company age, and which model they use to develop their project. By analyzing the results, we found a chart in which we showed companies using models according to age. In Fig 1 above we can see the chart in which company age was divided into four sections and the results came out as,

The first company age was 2 or fewer years and the most used model of that time period was Agile. Every company from that age uses agile as their project development model. Companies from 2 to 5 years of age use another mode more than agile. The analysis shows 40% use of agile and 60% use of other models. Analysis shows companies from 5 to 8 years use more agile than other models. Almost 90% of our subject companies use agile from that age. The last company age 8 or more years chart was similar to the 2 to 5 years chart. The ratio of agile was 40% and other models 60%. For this chart, two questions from our survey question were analyzed, the company age and the model they use for project development. The fig 2 chart shows the reason why subject companies use the selected models. We prepared five reasons and on a scale of 0 to 20 the feedbacks were rated. The most common reason for using a selected model was Flexible to respond to market changes. This reason got the most response from all of the other reasons. The next was cost control reason and it is an important reason for using a model because a low-cost model can be easily inherited and small companies or companies which are about to begin looking for models with this capability. To spread easily in the market, placing a high-quality product is very much mandatory for a company and not for small but also big and established companies need to build the high-quality product to maintain their standard. In one of our questions, we asked the companies if they get enough time to develop a project and 76.7% of the answer came out yes so in the chart time consuming was not that much rated as the developers get enough time from the clients. By studying the above chart, it can be told that companies will use models that have Flexible to respond to market changes, are able to control cost, and can be used to build the high-quality product. This reason got the most response from all of the other reasons. The next was cost control reason and it is an important reason for using a model because a low-cost model can be easily inherited and small companies or companies which are about to begin look for models with this capability.

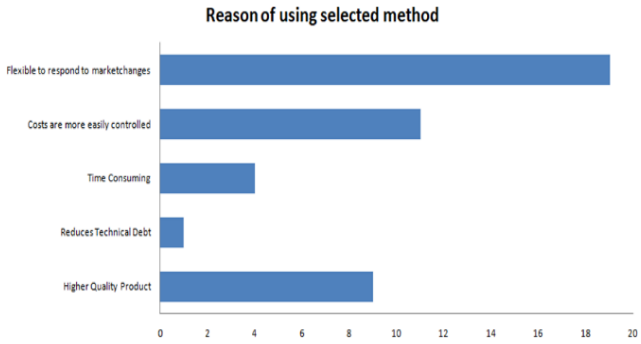

Fig 3. Reasons of using the selected model

4.2 Output and Analysis:

In our survey output we can say that a startup IT Company must use Agile as their main project development method as our entire subject companies of that age done well using that model and 2 to 7 years age companies can also use agile because most of our subject companies of that age use this model and companies those use other models also wants to shift to agile. Companies 8 or more years of age can use any model as they wish and they can change the model during project development if they need. At last, we can say that according to our survey and output if a company follows our chart and inherits the chosen method for them they will get success.

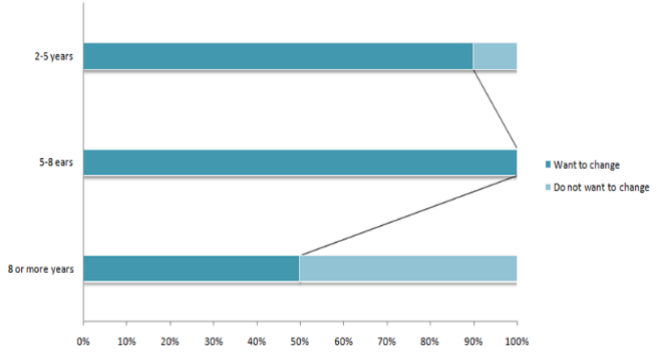

Fig 4. Other model users want to change to agile

In figure 4 we saw what company's uses as their project model, the company's age, their satisfaction using their project model. Different age companies use a different model. But in this fig 4, we can see companies wanting to shift to agile from their current model. According to fig 1, almost every company (age 2 or fewer years) use agile as their main project development method. Companies from 2 to 5 years of age voted 60% for other methods and 40% for agile but in this fig 4, we can see almost 90% of that companies want to change to agile from their current method. Almost 90% of our subject companies (age 5 to 8 years) use agile in fig 4 we can see all of the other method users wants to shift to agile as their main method. From the big companies (age 8 years or more) 60% of them use other method and 40% use agile and in this fig 4, we can see 50% of other method users wants to shift to agile and the rest of them don't. From this, we can see that if a company's age gets 8 or more years, they can use any model they wish.

5 Conclusion & Future Work

In this paper, we have surveyed some subject companies and got a result according to them and proposed methods for the unsuccessful companies. Our survey was limited and the result was based on our limited subjects. Companies can get help from the output but for more success, we are preparing a more effective survey form including effective questions regarding IT company's methods and their projects. We are also preparing to reach more companies by which we can get more data and give more effective results for companies and companies change their project method during the project. So, our future work will also help us to develop an effective method for many companies.

For our thesis, we studied different models including agile, agile process models, and some other models. Before starting we studied different research papers and books including our topic and understood the necessity of proper project methods in a company. Our research was mainly for those companies which needed a proper project method and were not doing well with their company. We studied that a proper project method can pull up a company from a hole and for that our research was done. There were many papers and research books about agile, different project models but there was not good research on proper project models for our country companies. However, our survey and result were limited for we worked with limited subject companies and the output from them did not give a result that every company can use. The result can be used for beginning companies and a few struggling companies but the better result we are working in our future work.

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