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Influence of Agile on Indian IT Companies

Sruthy M. K.[1], Surya M.[2] and Soumya Krishnan M[3*]

ABSTRACT

In recent years, among the professionals in software field, encourage agile methodologies than the traditional models since it supports to develop software in changing environment and requirements with high quality and low cost .In this paper, we tried to investigate the effect of agile within the Indian software industries. The data collected via questionnaires from various Indian IT companies were analyzed. The results shows that most of the Indian IT companies now wish to use and practicing agile methodologies in their industries since it provided them with better results in their software development process compared to other development methodologies.

Keywords: Agile principles; Agile Methodologies; Success factor; Process models

INTRODUCTION

Traditional development models are not suitable for today's businesses due to the changing requirements within projects. In 2001, developers introduced a lightweight development methods called agile manifesto which is different from traditional approaches. This helps taking up changes anytime during the software development. Nowadays, agile approaches have incredible importance due to its fast delivery and help developers and stakeholders to better understand the problem there by bringing a successful output.

Agile methods are now widely accepted in the world. Researchers already made variety of studies in the agile software development about its applications, pros, cons and adoption. The success of agile is achieved by choosing the best determinants [6]. There are many factors of agile methodologies that will increase the quality and productivity of software development [5].

OBJECTIVE

In this paper, our main focus was to find the impact of agile methodologies and models in Indian software industries. For this we tried to identify the success and failure rate in the implementation and use of agile in Indian software industry.

METHODOLOGY

In order to identify the impact of agile in India, we conducted a survey with questionnaires, which are the building blocks of this study. The questionnaire covers 13 questions of objective type and the survey was done through email and direct communication. We had send more than 250 mails and communicated with 75 companies and received 130 responses, out of which only 100 were suitable for our analysis.

LITERATURE REVIEW

The survey study is done in various Indian IT organizations to understand the effect of the agile methodologies. To understand more, we had reviewed a few research papers related to agile methodologies. In [1], it shows

[1,2] Department of Computer Science & IT, Amrita School of Arts and Sciences, Kochi, Amrita Vishwa Vidyapeetham, Amrita University, India, *E-mails: sruthymanchery564@gmail.com, nakshathra.surya@gmail.com*

[3] Assistant Professor, Department of Computer Science & IT, Amrita School of Arts and Sciences, Kochi, Amrita Vishwa Vidyapeetham, Amrita University, India, *E-mail: mail2sou@yahoo.com*

the attempt to trace out the challenges and benefits of adoption of agile methodologies in Pakistan through the survey. The author found that lack of experience and complexity of the projects are the obstacles of using agile. Use of agile gives better results in Pakistan environment. In [9], author reviewed the existing agile methodologies such as Extreme Programming, Feature Driven development and Scrum. They performed a detailed comparison with conventional models and analyzed difficulties in agile implementation. In [3], authors reviewed Scrum, Extreme Programming and agile modeling, and investigated that improper communication among developers and customers and addition of new members in the team created a negative impact in the agile model. The article [8] proposed a new model for handling changes during any stage of the software development. The proposed model had three phases. At the initial stage, the changes were categorized based on its function then selected the appropriate technique in the second stage. At last sending request for change for execution based on the priority. Paper [4] made comparative study of agile methodologies such as XP, DSDM, Crystal family, ASD, Scrum. They discussed about project failure aspects and traceability involved with in agile. They recommended suitable solutions for the risks. The authors proposed a new framework which tells about what principles are to be applied based on different aspects of an organization. In [10], the paper makes a study on Brazilian software industries to know the success factors of agile implementation. They trace out five factors that makes agile successful. And factors are investigated through various analysis methods such as factor analysis and cluster analysis. This paper helped us to baseline our area of research. In [7], authors make a survey on methodologies and testing aspects of agile. Author found that in agile, automation is a feasible solution which includes SCRUM. In article [2], author reviewed experimental studies of agile development. They have tried to trace out the benefits, strengths and limitations of agile methodologies based on four themes.

THEORETICAL OVERVIEW OF AGILE METHODOLOGIES

Agile Principles

The agile basically contains 12 principles which are common for all the methodologies. Working product of each iteration in agile is delivered fast and feedback is collected from customer within a very short span of time. Therefore, developers get opportunity to develop product with customer satisfaction. In agile, it can access changes at any point of time or stages in the development without waiting for the whole system to get completed. Distance between planning and delivery is short, customer may have changes and improvements that can be effectively done throughout the development stages. Through the daily interaction between the developers together, they will get more details about the developing product. And the business people can see what progress developer make in the product.

Build project around motivated individuals, concentrate on building a team with professionals having skill to work in decision oriented way are the key principles followed in agile. And so, such team generates best results for sure. Face to face interaction is the heart of the agile project by which analysis of issues and resolution becomes much easier and manageable. Team evaluates the work product to check whether it meets customer needs with quality and other measures which are not so important.

By maintaining a constant pace, we can ensure proper communication is done between all the stakeholders indefinitely. Do not stress team members and allow them to do their work freely and their own creativity is the major manifesto followed. Agile process helps to improve and development process becomes more flexible when giving more attention to technical excellence. While developing product, the staff must highly indulge in their work and selection of skilled staff is essential. The removal of the unwanted features of a project can be done at any time. By doing so, it will minimize the distance to the useful work. Teams will do as per it needs and it won't wait for any supervision or direction. So it will reduce the risk and clear the obstacles too. The team focuses on their own work and is not bothered of others. Teams will check

whether the simplicity, quality, technical excellence and result predictions are improved or not after each iteration. If any problem arises, they analyze its root cause.

Some of the main models under Agile, followed by different IT companies are as follows:

SCRUM

Scrum is simplest and most widely accepted model under agile. Here a complex project is divided into sprints. Sprints are created based on the priority of the user requirements. The product owner is responsible for prioritizing these requirements .These requirements are included in product backlog. After developing each sprint, it will be delivered to the customer. Each sprint will be reviewed and it won't allow any sought of changes until it is delivered to the customer. The scrum master acts as a mediator between project team and the product owner but he is not allowed to manage the team. Every day 15 minutes Scrum meeting is compulsorily done and coordinated by the scrum master.

eXtreme Programming

XP supports simple design, refactoring, team collaboration and pair programming. Here each contribution is very important and unavoidable. If any changes have to be made, it can be done with the absence of a team member because XP supports multiple owners. Since it follows a consistent style in coding, everyone can follow and make changes in it. Here the products are delivered in small releases and also ensure that whether it meets all the customer requirements in each release. Based on the priority given by the customer, the software is being developed, unlike scrum model. In XP, a meeting is to be conducted in every couple of weeks. In that meeting, they release their product, collect its feedbacks and also plan for their next release. Here customer involvement is highly appreciated. Since they are involved in this meeting, the progress of the product is visible to them.

KANBAN

When compared to other methodologies Kanban works differently since it provides continues delivery of a product based on the convenience of project team. For the releasing of a product there is no fixed length and the developers focuses more on the business value. The developers will take their work from the product backlog only after completing their current work. The product owner can do modifications based on the priority of the features in the backlog.

In software development, developers can do their next work only after testing the current work. Otherwise testers will face bottlenecks. In Kanban, it will remove bottlenecks by overlapping skills and reduce cycle time by the heterogeneous work of team members. Kanban reduce the amount of work in progress, the team members have to do multiple works. So there is no hinders in work completion. Since work in progress is visually represented, it is easy to find and remove bottlenecks and also find the progress.

LEAN SOFTWARE DEVELOPMENT

Lean is a translation of lean manufacturing and lean IT principles and practices. Lean philosophy eliminates waste. To eliminate waste, we need to recognize the waste and then eliminate those identified waste. In lean, amplify learning improves the software development environment. It prevents defect by testing the code as soon as written. It can be simplified by requirements gathering and by presenting screens to the user. Learning process become fast with the use of short iteration. Short feedback helps better understanding the problem domain for both development team and customer representatives and generates the solution with proper customer communication.

Software development always contains uncertainty, so delay in making decisions will lead us to many uncertainties. Sometimes customers cause delay due to the unawareness of sharing the requirements. So, decisions are made only after customer are made aware about their requirements. This helps in focusing on delivering the product as fast as possible. Fast delivery of product results in faster collection of feedback. This helps the team to the next level of iteration. Lean allows developers to do their work freely and with their own creative power. This environment doesn't stress them and always keeps them encouraged to do their work efficiently. If any issues are faced, members discuss with the team leader. In lean all team members should be aware of all principles and practices in their walkthroughs.

CRYSTAL CLEAR

Crystal Clear method is normally applied on a team having less than ten members. Here more importance is given to the varied skills and talents of team members rather than process. That means, they can use good techniques in other methodologies. In CC, there is much iteration before each product release. Most of the iterations are not capable of delivering the product, only the feasible iterations are capable of delivering it. The delivery time of a product is based on its size.

Here communication overhead is reduced due to the osmotic communication. Through this, information is immediately distributed within the team. Developers get new ideas through their experience. Due to the personal safety features in communication, people can talk freely. It gives more focus to the flow of progress and resolving the issues in the path of its goals. Here expert communication is done every week. So development gets much improved.

TEAM SOFTWARE PROCESS

TSP is used to build a project team which is self directed. It helps in producing high quality software. In TSP, it defines the roles and responsibility of each team member. It consists of the following activities such as: Project Launch, High Level Design, Implementation, Integration & Test, and Postmortem. These activities enable the project team to plan, design and construct the software in a well disciplined manner. We can make better teams by using TSP principles. There is a common principle for each team member to do their respective work. Team members do their work based on planning. If we train a team effectively, then we can launch a TSP team. In this launch process, teams prepare a detailed plan. Each team member must participate in this process and all of them must accept it. The launch coach will give guideline for the launch process.

AGILE MODELLING

Agile modeling (AM) is a new methodology for making effective modeling of software system. It is a collection of practices that is used to apply by the professionals in a daily basis. The values of AM include the same as of XP like communication, simplicity, feedback and courage. To model software in an agile manner, we have to apply practices of AM appropriately. The fundamental practices of AM includes: create several models in parallel, apply right artifacts in the appropriate situation and iterating to another artifact to move forward at a steady pace.

IMPLEMENTATIONS OF AGILE METHODOLOGIES AND ITS IMPACT ON INDIAN IT COMPANIES – A SURVEY REPORT

Research Design

Using questionnaire, a survey was conducted over 250 Indian IT companies through email and communication with various IT professionals. Out of which, more than 100 companies gave their

responses. As a part of collecting responses we used Google survey forms. From the received responses only around 100 replies were chosen eligible for data analysis. Through this survey, it was found very effective to collect the feedback about the usage of agile methodologies in Indian organization.

The investigation was done using 13 questions. From the survey responses, we could arrive at a conclusion which show cased about how much important agile methodologies have in IT companies across India. It also showed the success rate or the elevation in success of software development in every Indian IT company.

Data Analysis

The data analysis is done with 100 verified responses collected from different software firms and each question were analyzed separately. Question 1- Figure 1 describes that 79 companies out of 100 prefers agile methods. From figure1, we can understand that now-a-days, most of the Indian companies are using the agile methodologies in software development. While analyzing the second Question - Figure2, we found that most of the companies are using agile methods from the last three years. But some companies are using the agile methodology for more than three years. However, even though there exists many agile methods, it is clear that SCRUM is the most preferred agile method in India from Question 3— Figure 3. About 52% of companies prefer the SCRUM model over other models under agile. The other agile methods such as Kanban, XP, and Lean, CC, TSP and AM are also used in some companies. Question 4- Figure 4 illustrates the overall success rate of the product developed using the agile method. 29 companies reveal that their improvement in success rate is 80%-90% on using agile methodology. 24 companies' states that they got a success rate of 60% to 80%. Question 5- Figure 5 indicates that the agile methods have made a greater impact on the overall performance of the organization. 12 companies have much higher and 56 companies have higher influence in the organizational performance. The study evidently points out the value and the necessity of agile methods in organization. We have traced out various aspects with respect to agile methods in different software development organizations. Thirteen varieties of questions were framed and were distributed across 250 industries. The selected responses were represented using graphical mode such as pie and bar diagrams and made a clear vision of usage and impact of agile methodologies.

When analyzing Question 6- Figure 6, 34% of the professionals somewhat agrees with the introduction of agile in organization and 18% of them strongly agrees with this concept. Similarly with Question 7- Figure7 and Question 8- Figure 8, most companies somewhat agrees in late requirement changes in the software development and frequent delivery of product respectively. In question 7, 24% of developers somewhat agrees to the changes occurring late in development process and 13% strongly agree and 14% showed their disagreement. In question 8, 33% of professionals somewhat agrees frequent delivery of the product and 18% of them strongly agrees to it. Question 9- Figure 9 and 10- Figure 10 indicates that most of the companies strongly maintains the daily collaboration and face to face communication throughout the project development respectively. That means, in question 9 and 10, 32% and 35% of developers agrees strongly to the situation. With the Question 11- Figure 11, it is clear that 40% of the companies strongly agrees the process of tracing the progress based on the working product. While analyzing the Question 12- Figure 12, to a large extent 42% of the organizations and teams presently follows the core agile practices and 10% - 11% of them adopt core agile practices to a great and very large extent. Finally, with figure13 shows the error rate of the software product that built with the agile methods. The Figure 13 shows 38% of the companies under survey agree that, the use of agile methods, reduced the overall error rate and 16% of organizations responded neutrally. While 10% of organization strongly agree with the decrease in the number of errors.

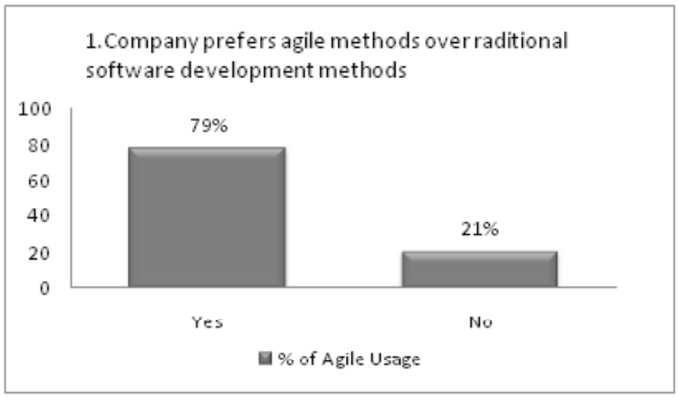
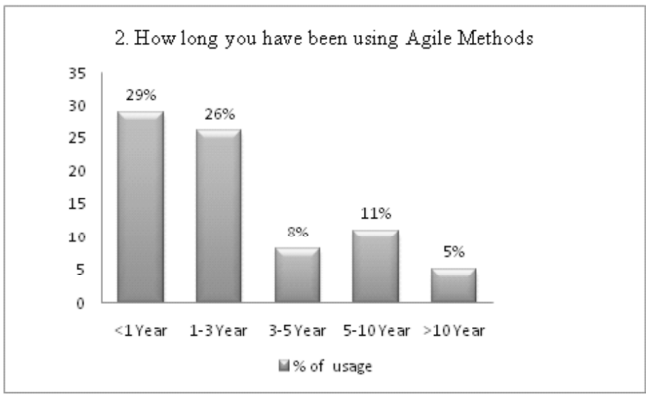


Figure 1



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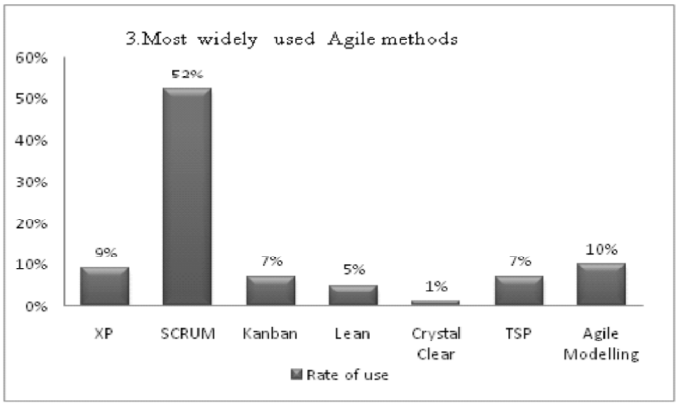

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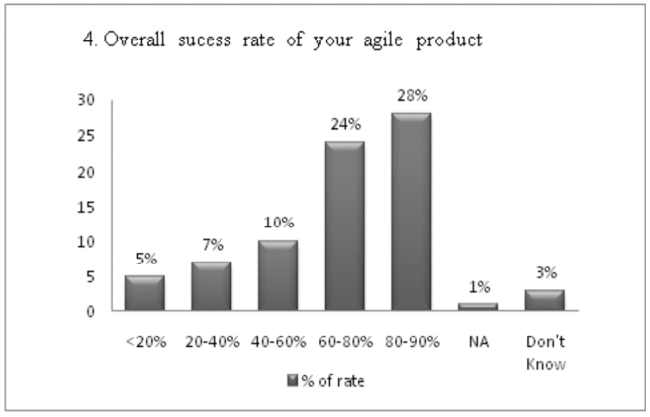

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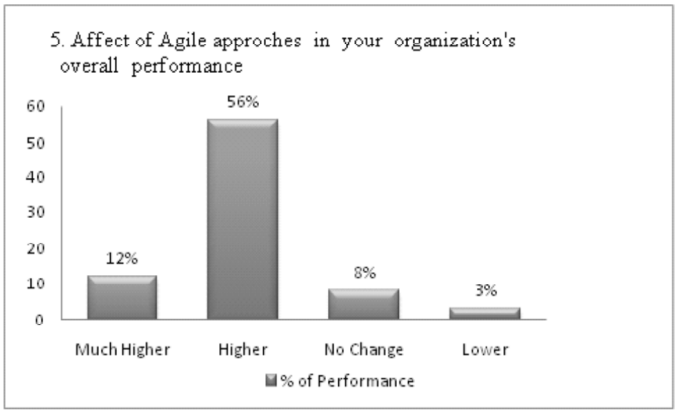

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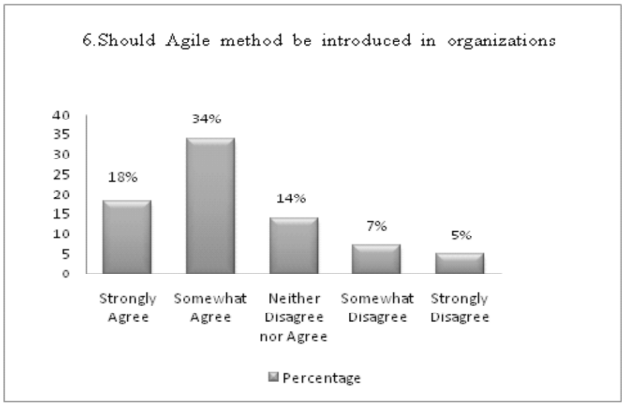
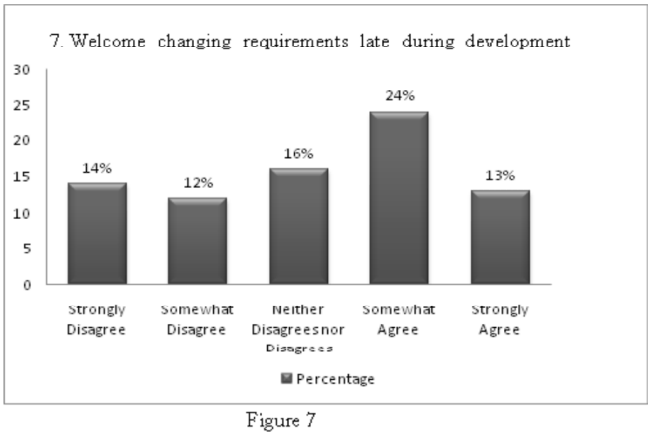


Figure 6



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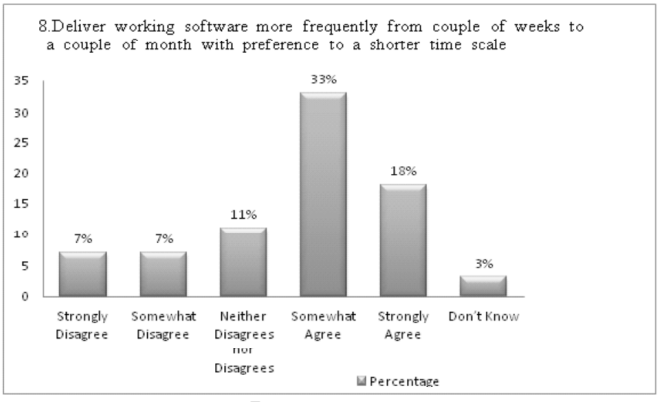

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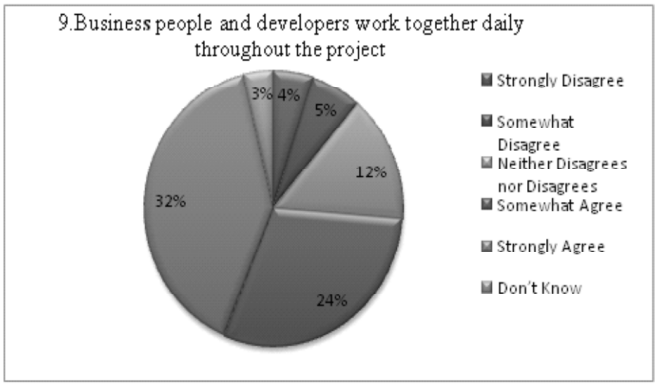

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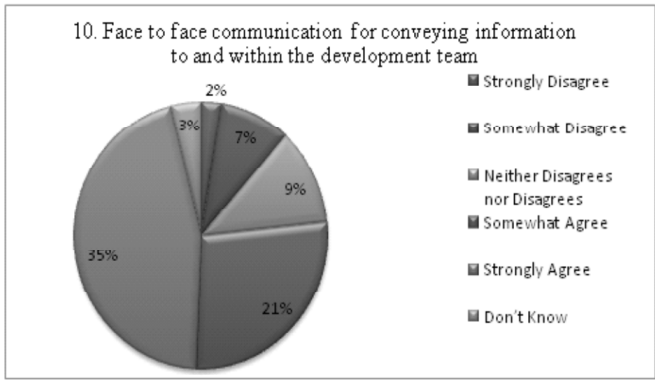

Figure 10

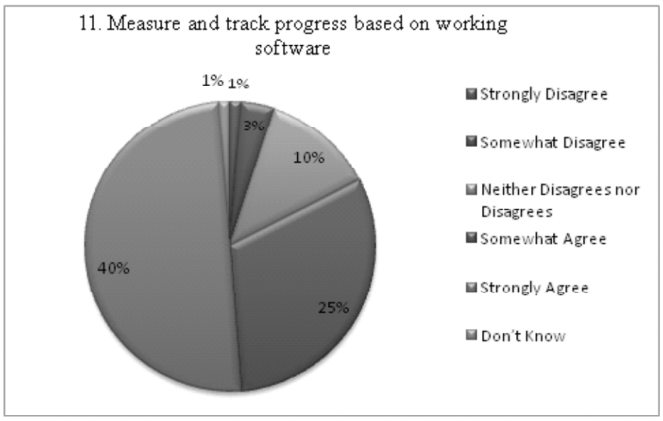

Figure 11

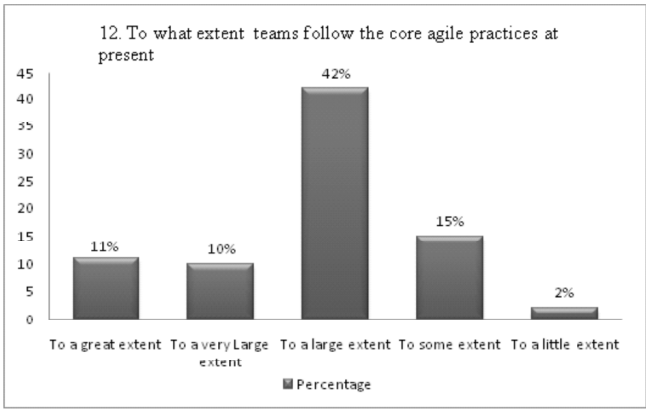

Figure 12

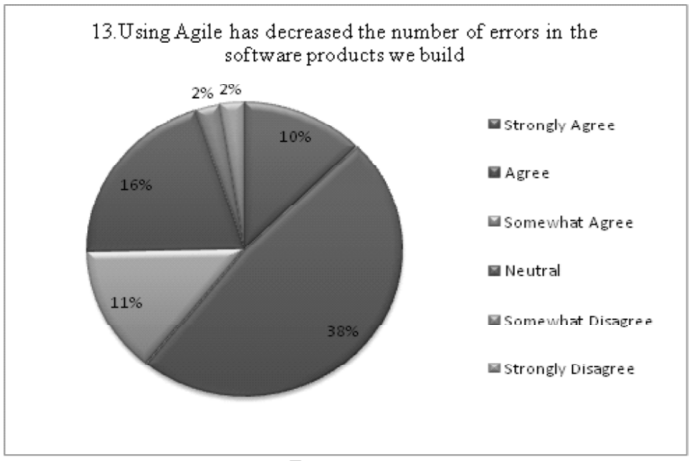

Figure 13

CONCLUSION

From the empirical study done as part of the survey, it can be concluded that a large number of Indian IT industries uses agile principles and methodologies. The aim of these paper is to identify the use of the agile methodologies and their impacts in these companies. The survey shows that most of the companies used Scrum rather than other development methodologies. 56% of the companies say that agile approaches have higher effect in their organizations and have definitely brought an increase in the overall performance of the software. Whereas, 12% of the companies experienced a much higher effect than before. 18% of companies strongly agree and are extremely happy with the introduction of agile in their organization. Also the survey showed that 13% strongly agree and 14% strongly disagree with the changing requirements

during the late stages of development. 32% companies strongly support the developers to work together daily and 4% strongly disagree on having the daily meetings. Most of the companies supports face to face communication for conveying information and 2% of companies strongly disagree on the concept of face to face communication. 40% of companies measure their progress based on the working software and 25% somewhat agree with this. It is clear from the survey data that, at present 42% of IT companies follow core agile practices to a large extent ,10 % to a very large extent and 11% to a great extent. 38% companies agrees that the usage of agile methods decreased the number of errors in the products and 10% strongly agrees with this concept. Finally, we could conclude that Indian IT companies showed a drastic improvement in their software development and exhibited a greater success rate on implementing and following the agile methodologies, principle and practices as part of their day to day development activity.

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