Challenges Faced in the Enterprise Resource Planning Material Management Section when Transitioning Towards Agile Software Development

N. Ganesh, R.C. Narayanan

Abstract: Agile Software Development Approach is the buzzword for the Organizations working with Traditional Software Development Approach. Scrum is one of the most vital frameworks used when working towards Agile Software Development projects. Material Management is one of the salient processes of the Supply Chain Management in transforming inputs into outputs. Extreme Programming is more technical in nature and Scrum is a People focused Management approach. This scrum framework is customizable according to the project teams and it is adopted widely to effectively manage software projects. Scrum framework fits into the groove for delivering quality product at a faster pace with minimal continuous feature delivery at frequent intervals. The minimal Marketable feature is delivered at the end of each Sprint. A Sprint is an iterative activity which ends up at regular intervals. But, the way of customizing the process and giving a minimal feature delivery at the end of each Sprint in the projects act as a major challenge. Other challenges resulted in the team collaboration and the involvement of the team members in the project and in integrating the minimal marketable feature. Syncing with the product owner and the other stake holders, and participation in the sprint planning were some of the issues that the team faced. The success of the entire team in implementing the Agile Software Development approach in the Enterprise Resource Planning Material Management Section is discussed.

Index Terms: Material Management, Material Processing, Supply Chain Management, Enterprise Resource Planning, Scrum, Minimum Marketable Feature, Extreme Programming, Agile Software Development

I. INTRODUCTION

Enterprise Resource Planning (ERP) is also used in the industries that deal with Supply Chain Management. The main motive of using an ERP system is that it improves efficiency.

The orders can be tracked easily and the accounts can be handled effectively. It helps in the process of decision making and improves the productivity of whole business to grow in the right direction. Nowadays, many Software changes are made in the ERP quite often. As the Production in the industry may get affected, the upgrading in the Software has to be done at a fast pace. A study was conducted in an organization that was willing to transition to agile software approach from the existing traditional approach in ERP Software implementation. Identifying and adopting specific software process methodology for a specific project to attain success rate is a critical factor. But, with the help of scrum framework, it is easy to create a collaborative and conducive environment [1][2]. Identification of like-minded and skillful resource is a challenge in scrum adoption [3]. The challenges faced by the team in transitioning towards adopting scrum framework and Extreme Programming methodology in the ERP Material Management Section is dealt with. The second part of this paper examines the scrum framework. The third part speaks about the research methodology adopted. The fourth part deals with the initial results and the respective findings. The fifth part gives conclusion and future work.

II. LITERATURE STUDIES

Material Management is a process of planning and controlling the flow of materials from initial purchase to the customer delivery. Material Management is the vital process in the
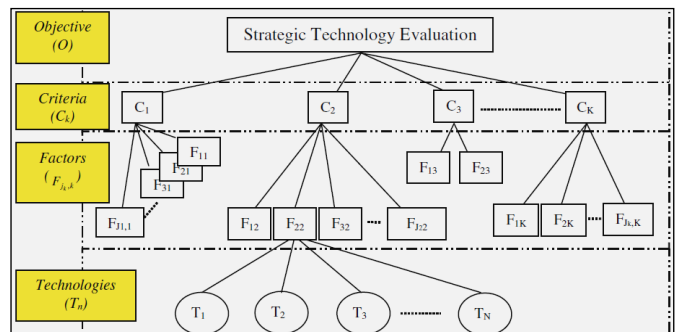
Supply Chain Management. The functionality starts from purchasing the raw materials, receiving the goods, storing of materials, inventory creation and invoicing the same,

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gearing up of the materials to the production line, Product output, quality checking of the product to comply with that of the Quality Standards, product delivery and maintenance of the product delivered at the customer end [4].

Enterprise Resource Planning is a software system that integrates all data and processes of an Organization into a unified system. Most enterprise nowadays tries to upgrade their productivity through software by integrating the entire process of supply chain management into a computer integrated system [5].

Qualified consultants with knowledge in working with enterprise business processes are required for getting success in implementing an ERP module [6].

Extreme Programming (XP) is one of the Agile Software Development Methodology. In XP, the Programmers write code. The Customer writes the user stories and sets implementation priority. Tester helps the customer to write functional tests. Tracker tracks the progress of iterations [7]. The Agile Coach guides team to follow the XP process.
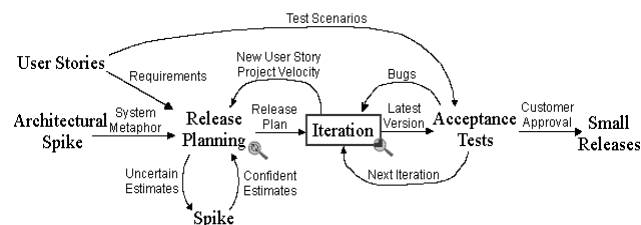

Fig. 1 Working of an Extreme Programming in project

Scrum framework is considered to be one of the early agile methods that came into existence when group of individuals coined the Agile Manifesto in 2001. Scrum Framework facilitates the Project Management process. Scrum framework adapts the agile principles and values as stated in Agile Manifesto [8]. The Scrum framework is suitable for handling agile software projects. The scrum framework is briefed as shown in Fig.2.

Fig. 2: Scrum Framework

Scrum is basically a people oriented approach. Scrum promotes collaboration, team syncing, frequency matching and the other related artifacts leading to the project involvement of the respective stake holders. Scrum projects the role of a Product Owner, who may be the Customer or the Customer representative [9]. Further, Scrum promotes Self organization among the team members which results in the software process improvement and thereby gaining increased productivity [10][12].

III. RESEARCH METHODOLOGY

Initially, the study was started in identifying the skill of a team member, his involvement in the team and the like mindedness and frequency syncing among the members of the team. The team was given awareness of various agile methodologies that

could be used in the projects. They were initially given training on one such agile methodology, which is Extreme Programming. The scrum team consists of a scrum master, who is also called as an agile coach, a product owner, who is part of the customer, a team manager, who is responsible for identifying the interested team members. The Organization taken up for study was from Chennai, India that had more than 19 years in manufacturing products and for more than 7 years the Supply Chain Management is handled through ERP. The entire industry has 92 Software professionals working in various roles and responsibilities. Out of them, the professionals willing to work with the Scrum framework were identified. Fig. 3 depicts the scrum team. The aim of identification process is to select the creamy 12 members and to make them the pilot team to start scrum adoption for ERP upgrading in the Supply Chain Management that handle Material Management. Few of the team members had experience in working in Software Projects that involved traditional approach. But, they were only new in implementing the Agile Software Development approach.
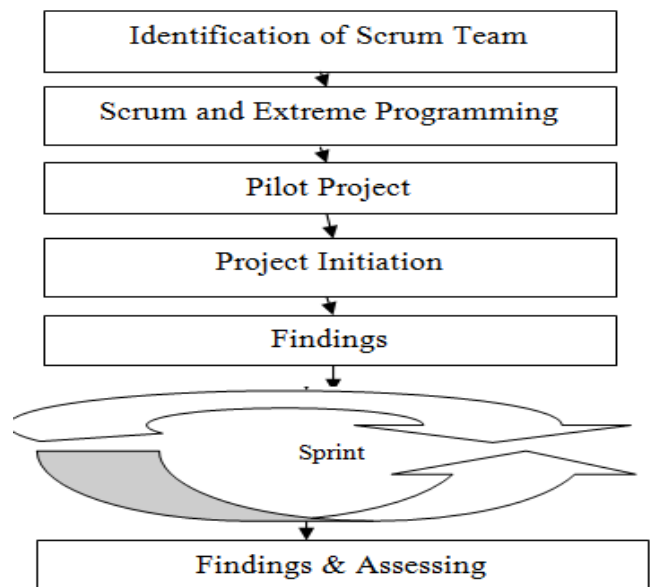

Fig. 3 Identification of scrum team

As it was a pilot project, the Organization made sure that it is a less critical project and one and only after seeing the initial success, they wanted it to roll out. The pilot team members were also asked to play the role of an agile tester. In an agile team, multiple roles were performed by a single team member [13]. Fig. 4 depicts the identified scrum team and their project progress.
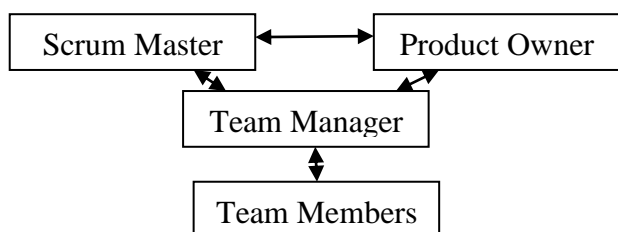

Fig. 4 Identified scrum team and their project progress

The selection committee selected 12 members from the registered 49 members which is nearly one-fourth of the candidates from the registered candidates. These 12 members were identified as the pilot team. Table 1 shows the selected team.

Identified Practitioner	Traditional Software Development Experience	Experience in the present Organization
P1	6	3
P2	5	4
P3	7	5
P4	5	3
P5	6	2
P6	6	2
P7	7	3
P8	6	4
P9	5	3
P10	6	4
P11	5	3
P12	6	4

Table 1: Identified Participants and their Experience Levels

The selected pilot team was given 10 days of intensive training, which included two effective workshops on Agile Software Development with an exclusive focus on Scrum framework and Extreme Programming (XP) methodology. The principles and values of agile methods were dealt in detail. Apart from the team members, the Product Owner identified by the customer had 4 years of experience working with agile projects. Well experienced agile coach acted as the Scrum Master for the pilot team. Both the Scrum Master and the Product Owner were the source of treasure for the entire pilot team. The Product Owner gave away the requirements to the Scrum team. The pilot project had 8 sprints with each sprint having 15 days of length and 2 days of sprint gap. In these two days, they had introspective and retrospective meeting [11]. At the end of each Sprint, it was made a mandatory practice to deliver a Minimum Marketable Feature [MMF] to the customer. The data collected were analyzed and initially there was an issue in gathering the requirements and the related issues were sorted out by using a mix of methods [12].

IV. FINDINGS AND OUTCOMES

By delivering the Minimum Marketable Feature (MMF) at the end of each Sprint improved the Quality of Development process to a greater extent. Data analysis showed the performance of the pilot team and it was broadly segregated into constructive adoption process and negative aspects. Any new ideology taken, there would be negative aspects. So, the negative aspects were also mentioned.The team was asked to inspect among themselves and do an introspective of themselves in order to find them whether they got adapted to the transition towards agile software development. As the MMF was delivered at the end of each Sprint, the team members became energetic after receiving positive feedback from the customer and they started to work in a vibrant manner. But, in order to make the minimal Feature ready at the end of the Sprint, frequent continuous testing was carried out. This MMF concept made a positive impact with the Organization, with the Stakeholders involved it and had a

positive impact in the Software process. Review meetings and retrospective meetings were conducted. Such meeting are conducted to improve one own self and not to find faults with other co-practitioners. As the team was small and was identified within the same Organization, there were no barriers in communication. Barriers in communication may occur mainly in geographically distributed teams only. As the environment was so conducive, only positive feedback was obtained. Further, the pilot team was handpicked from a group of persons who wanted to enroll themselves towards the agile software development. Few selected team members were so lethargic in executing certain task. But, by and large lethargy was minimized as the team size was small was placed in a single location. Few team members found difficulty in collaborating with their fellow team members. In the initial days, they also found pretty difficult in communicating with the Product Owner, as he is experienced in handling projects on agile software development. But, as days went on, the team members were comfortable enough in coordinating with the Product Owner. As Minimal Feature was delivered at the end of each Sprint, continuous testing was done. But, integrating the features with that of the previous Sprint was an issue.

V. RESULT & DISCUSSION

The conducted research showed that all the team members employed in the agile software development project were conducive in nature and were willing to accept change. This is in contrary to the reports stated by the other researchers [15][16]. The retrospective meetings were held in an encouraging manner and as the team is new to agile software development all were having the positive energy. This is in contrary to the negative aspects stated in other research works [11]. As all the team members are known to each other and there was only one scrum master and a Product Owner was present in the same location, there were not much of difficulties in gathering requirements as stated in the other articles [14].

VI. CONCLUSION

Team Collaboration and the motivation of individual team members were found to be the positive aspects of the study made. Similar to any new team working in a new environment, even this team found few issues not in delivering the minimal marketable feature, but in integrating the minimal feature which was also sorted out in due course of time. No major issues reported in handling the agile techniques. No major issues in gathering requirements or in working environment is identified as the team considered was smaller in size and all the team members were present in a single location. As a future extent of this work, the Scrum framework can be adopted to bigger ERP projects that are more critical in nature. As well, this can be implemented for a geographically distributed teams working with varied cultures.

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