SindhUniv. Res. Jour. (Sci. Ser.) Vol. 52 (02) 187-190 (2020)
http://doi.org/10.26692/sujo/2020.06.28
SINDH UNIVERSITY RESEARCH JOURNAL (SCIENCE SERIES)

Software Requirements Prioritization using Agile Technique

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Received 27th October 2019 and Revised 06th March 2020

Abstract: Pesent Investigation based upon systematic literature review of agile development model for requirement prioritization with the help of requirement engineering process. Strategies and several methods which maintains easy and feasible requirements and software development model. This article helps future software engineers to prioritize their requirements covering Agile Software Development (ASD). Agile software development model has become the trending approach to deliver product on time according to customer demands and needs, it becomes harder to maintain all demands on top. Where increases which losses order of importance of all requirements. Initially it was difficult to keep on eye every customer requirements also complete task on their desire date. It will cover all aspects of keeping on their prioritization list on order also covering requirement engineering phases with Agile Software Development (ASD).

Keywords: Agile Development Model, Requirement Prioritization, Requirement Engineering.

1. INTRODUCTION

In this era, software engineering processes considered to be more than software development activities like programming, coding, testing. Requirement engineering is fully associated with their philosophies which is required to program functioned as it was expected, Agile software model becoming popular and among the software engineers. It has high due to its powerful nature of keeping customer demands on their prioritization list. There have been discovered several methods to entertain customer needs and their requirements also keeping in mind to deliver their software on required time. Ensuring every time their need and demands on priority(Laplante 2013). All previous approaches shared similar properties which includes:focus on customer satisfaction, changing requirements adaptation, able to deliver working software regularly, and creating close collaboration between business people and developers. Agile believes to be efficient because it provides face to face collaboration between stakeholders to achieve similar goals(Naseem *et al.* 2019).

Customer expectations increases which increases pressure to deliver valuable product on prescribed time. Customer makes schedule tough and tight which makes developer uneasy to deliver valuable product on prescribed time and date. As customer demands increases developer must have to set priorities of requirements and those requirement has less priority could be skip. It has to be understand that every customer demands cannot be entertain. With contribution of both developer and customer have to provide inputs to set priorities of necessary requirements. The customer mentions greatest benefits factors with highest priority. All risk, cost, difficulties and technical issues defined by developer for any future miss happening conditions for software. Some features can be altered or change on the basis of information provided by developer regarding software market trend. Higher impact feature on the system's architect but with low priority can be proposed by developer to save.

During Agile development, prioritization is performed on the basis of their grade or rank requirement including their order of performance and the implementation applies afterwards (Tarhan and Yilmaz 2014). These significant decisions occurs to increase the value of system economically. Software requirement prioritization (SRP) determined to be highly designed principles which is expected to work according to the process of software development. Decision making process of requirement prioritization is considered complex multi- criteria(Hujainah *et al.* 2018). Whatever software system is established must be acceptable by stakeholders including users, requirement should be well analyzed, captured and prioritized. All important requirements which has been already perceived by stakeholders has to do with SRP (Palomares, *et al.,* 2014). With respect to price or cost, quality, and provided available resources and desired product delivery time all core requirements of stakeholders should be implemented(Devadiga 2017). For ensuring efficient requirement engineering process the critical success factor of distinct ranking of software requirements.

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Requirement prioritization possess many advantages of being implemented before architecture coding and design. All preferential requirements described or marked by stakeholder was aid to be implemented first (Barlow *et al.* 2011), where the software development becomes most important challenges such as insufficient budget, limited resources, inadequate skilled programmers among others which makes requirement prioritization really important. Due to some challenges which is mentioned before not all the elicited requirement could be implemented in single release (Berander and Andrews 2005). Requirement prioritization becomes most integral part of software development process, due to this process it increases the planning, budget control and scheduling and software release program. In a crowd of requirements it is important to determine which requirement should be implemented at first also maintaining the order of implementation is known as requirement prioritization. Moreover those software product was designed on the basis of requirement prioritization has less chance of being rejected from market. By maintaining prioritize requirement, stakeholders have to compare requirements in order to govern its respective importance along scoring system or weighting. A large number of requirements have becomes more complex due to these comparisons (Perini, *et al.,*2009).

The next section shows the related work and section 3 discusses the methodology and research discussion about the proposed conceptual framework of requirement prioritization with Agile methodology. Section 4 shows the conclusion and future direction.

2. METHODOLOGY

There are several methods has been presented yet for prioritization with effective requirements. In this section it will represent the critical analysis and finding new techniques of top ten prioritization which is based on the number of citation (Yoo and Harman 2012).

(Rahim, *et al.,* 2017) was a new requirement prioritization technique which is easy to adapt and simple to understand, it is less time consuming to determine priority of requirement, customization is flexible and easily deal with starvation issue. Below are the main contributions of this paper are:

- A new technique was proposed for requirement prioritization in agile development model.
- Stimulation has effective use

For any developed project RP (Requirement Prioritization) is an essential process. It uses all well-known factors and it has been used widely. If agile has intensive changes in their requirements it involves stakeholders heavily to deal with where RP needs more focus on changing their requirements. To increase business values in software development process this goal must be achieved. Contribution of this literature was to find a more general model which enhances RP process more effectively. This study was based in RP models which are already exists. By designing this model all defects fact and figures and all mistakes where take in to the account. RP technique of type absolute scale is introduces based on two most important existing technique which includes all factors. The future works is validation which has options to explore and to apply this model efficiently (Alkandari and Al-Shammeri 2017).

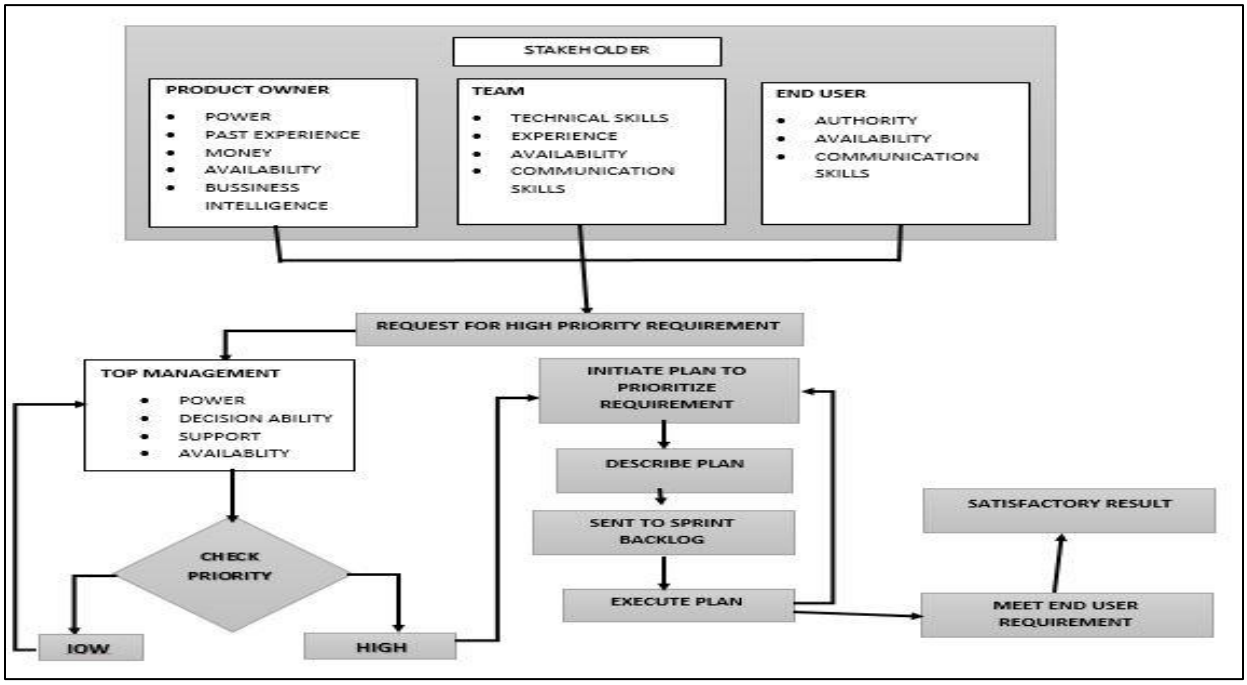
To purchase a software system it depends on the customer wish to which features meet their requirements. To make customer satisfy establish priorities offer opportunities to get good results(Yousuf and Asger 2015). Requirement prioritization can be defined as significant action during system requirements were being identified and got their order on their base of importance (Bebensee, *et al.,*2010).

In Agile development model, choosing the right stakeholders to get involved in requirement prioritization process is necessary. Stakeholder should take care of customer need and interest and have significant knowledge about agile development model. In order to establish direct communication between stakeholders must trust each other and have joined learning experience together (Heeager 2012). Project constraints is base of requirement prioritization. Those requirements have least cost are likely to be given on high priority. Keeping view on cost benefit analysis the resources spent on implement of those requirement which is comparatively a benefit received iteration (Svahnberg *et al.* 2010).

All above literature reviews indicates that past studies which was attempted to be identify the possible factors included in requirement prioritization using in agile development. However, these above factors are isolated and none of the reviews completely determine the interrelation among these factors. In this paper it is to integrate the factors in form of conceptual framework. In future this framework might use to guide work as subject guideline.

3. RESULT AND DISCUSSION

The exploration led in this investigation study depends on three purposes behind playing out a Service level requirement (SLR). First is to total and bring together information from past looks into concerning the related point. Second is to distinguish shortcomings from past inquiries about. Furthermore, third is to help for finding new research theme by giving base data required. These reasons are the reason SLR competent to satisfy requirements to arrive at different purposes while keep up a solid demonstrating ground.



- **Fig 1. Conceptual Framework of Requirement Prioritization with Agile methodology**

- **Initial environment for Prioritization startup:** In this phase the process startup with the following project factors like, Stakeholders Characteristics, Product Owner, Team and End Users. Product Owner more sub categorized into five main factors: Power, Past Experience, Money, Availability and Business Intelligence. To select appropriate stakeholders are to be involved in process of requirement prioritization where identification and consideration are the important aspects and essential features of this process. Cost, Human Resources, Risk and Schedule behaves the main constraints to prioritized the requirement in agile. Here also the Complexity, Dependencies, Importance, Business Value and Volatility was influenced by the selection.

- **Check Priority:** Whenever the requirement arise it will go through the process of checking the status of requirement either priority would be high or low. If the requirement has high priority it will proceed further while the low priority requirement will remain in queue. Requirement prioritization is also maintain the balance between high and low priority requirement. All aspects must be fulfil to keep requirement at top of its notch. It is mentioned above that dependencies, complexity, business intelligence and availability of all sources are important factor to keep requirements on top.

- **Top Management:** Top management decides the appropriate stake holders by reviewing their

- Knowledge, Authority experience and collaboration between stakeholders and their learning. Project sponsor and the top management decide it is whether to provide more funding to the project or to move it to the next level.

- **Process:** High quality could be generated if all requirement prioritization would be executed effectively. To perform effective prioritization it is required to plan activities effectively so the effective plans could be achieved. By delivering high quality requirements it contributes the customer satisfaction to high level. Customer satisfaction is main agenda in Agile development. In above figure where conceptual framework of requirement prioritization in Agile describes the theoretical understanding of relation between each factors.

  - In process block all project goals and objectives have been decided. In beginning of process block all product scope, product budget and product schedule have been scheduled before. Initiating the releasing plan all product requirement have been described, product requirement has been prioritized and their criteria to prioritize the requirement (product backlog) has been discussed.

  - Divide product requirements (backlog) into task (sprint backlog). Hereafter it prioritize the sprint backlog. Furthermore the task distributes among the development team to implement the sprint.

- Finally iteration performs and on the basis of customer feedback reprioritization performs. Highly qualified requirements will meet the customer satisfaction level.

4. CONCLUSION

We tried to discuss the possible factors that could be taken into the consideration while performing requirements prioritization with agile development model. It is crucial if requirement prioritization increases the cost of developing the project may lead to the project into risk or failure. where it is indicated the three aspects are involved in requirement prioritization in agile development: Environment, Process, Product and selecting stakeholder by the Top Management where the project cost are decided. The Product shows the ultimate results and outcomes of the above process, which execution is based on the identified factors. Through the conceptual framework significantly emphasize the further future exploration. With the running time every new techniques have been introducing to explore the requirement prioritization with different methods. In future, new methods and techniques could be introduced to investigate and helping to select stakeholders and prioritization methods which conducts systematic requirement prioritization and reprioritization process in agile development model.

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