Software Engineering: Factors Affect on Requirement Prioritization

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Abstract

Software engineering research is yet in its early stages hence it needs evaluation. So, software engineers think about experimental research and try to adopt analytical approaches to validate results like in other sciences. It should be asserting that requirement engineering process is to use requirements prioritization. The use of requirements prioritization helps the anatomy of requirements and isolates the most important requirements. A lot of prioritization techniques, practices and methodologies are used in software requirements. But lack of empirical search program and proficient methodology, was not decide which should be implemented. In this research, the requirement prioritization for systematical reviews was carried out. Based on systematic review, a framework is introduced for further research within requirement prioritization. This paper described a framework for scrutinize the discussion that take place during requirements elicitation and requirements prioritization. The survey presented in the paper gives a practical view how to prioritize the requirements. It also reflects the requirements prioritization in the industries needs. Which factors of the requirements engineering affect the requirements prioritization.

Index terms— framework, requirements prioritization, software engineering, requirement engineering, systematic review.

1 Introduction

The term requirement may be defined as demand or need. In the world of the software engineering, a requirement is an explanation of what the purposed system should do or perform. A system may have a lot of requirements. Software requirements demand what must be accomplished, shaped or provided. Requirement elicitation is all about knowing the desires of stakeholders. \cite{1} The term requirement has been used in the software engineering society since 1960. The requirements provide a firm basis for the success of the project and delivery of the product. The requirements often shrink the gap between software team and end users. Requirement phase begin at the analysis phase.

Requirements managed throughout the project life cycle. So requirements are the report of the services that a system must perform and operate under some constraints.

Author ? : University of Agriculture (Computer Science Department), Faisalabad, 38000, Pakistan. E-mails : shams219gb@hotmail.com, ? salmanafsar@hotmail.com Requirement Engineering (RE) is worried about the naming of the goals, achieved by the imagine system. Most difficult and critical to be achieve the better quality of the requirement. Incomplete, inconsistent and ambiguous requirements have the most serious impact on the required software. If requirement errors correction perform late the cost raise up to 200 times as compared the requirement errors correction perform in time. Requirement Engineering deals with a wide range of business domains and tasks like decision, administrative support. \cite{2} Even though the considerable Requirement Engineering (RE) explore and research attempts over the many past years but the gap between the industry and
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research still hang about constantly. Now Requirement Engineering research society tries to address these issues.

[3] Requirement Engineering (RE) comparatively new field. Requirement Engineering is a system and processes
that covers the activities based on computer system. [4] Requirement elicitation and requirement management
have healthy documented using UML (Unified Modeling Language). Many tools are available that support the
UML standards in any way. These tools have their own advantages and disadvantages. Many available tools
need customization to meet the special requirements. The prototypes also used to create system requirements
automatically. [5] Requirement elicitation is a technique to collect the requirements. Professionals like system
engineers, software analysts work with the stakeholders; this is useful for finding and solving the problems. There
are many requirement elicitation techniques like interviews; questionnaire etc. [6] Requirement elicitation is the
main movement in the requirement engineering process. It occupied to find out the needs and collecting the
required software requirements from the stakeholders. There are some problems occurred by software engineers
when they perform requirement elicitation processes. Requirement elicitation faced many problems like users’
involved and perfect documentation. To get the correct requirements and complete requirements required
the right stakeholders. So there must be need to adopt the technique that could help in recognize and decide
the stakeholders. [7] It is the major problem with software developers that developed software does not meet
stakeholders’ requirements. It stresses the user to focus importance of (D D D D)

2 II.

3 Requirement prioritization and stakeholders

The role of prioritization of requirements is imperative to an efficient and result oriented product development.
Requirement prioritization marks high risk and most important requirements to be given priority in imple-
mentation. [8] Usually stakeholder expectations are high but shortage of time, limited resources and budget
constraints make it difficult to implement all requirements that have been elicited for the system. With the help
of prioritization, it can be decide which one should be implement first.

In several known customers prioritization adopt difficult shapes because of different users involve as well as
have different thinking and separate preferences. A most important issue arises when stakeholders are scattered
different geographical areas. There priorities are not same, all the time. Every requirement analyst performs
the process of prioritization. Software engineers are not well trained to elicit, gather, analyze and security
requirements.

[10] Requirement prioritization is extremely dangerous are of requirement engineering.

Without appropriate requirement prioritization, offer by different stakeholders, the necessary objectives of the
end product cannot be achieved properly. The product may fails to meet its heart objectives on the basis of
several requirements prioritization techniques presented by different researchers. [11] III.

4 Requirement prioritization and agile software development

Agile development techniques become more accepted during last decade. Many methods built for the faster
delivery of the software and those techniques ensure the developed software meets the user requirements.
Requirement engineering depends on the documentation for the customer needs and agile technique depends on
face to face association between the stakeholders to get the same requirements. [12] Agile software development
scenarios and stories are used. Use case modeling also popular method for requirements gathering and analysis.
To collect the requirements through these methods always are complete, clear and validate. [13] In habitual
software development techniques customers or stakeholders predefined their software requirements and software
engineers, software analysts’ analysis these requirements for specification. It is very difficult and not cost effective for complete
requirements. This difficulty solves by the XP methods. [14] Agile methods give the importance of continuous
requirements prioritization from customer point of view. A agile approach give the client’s critical role in making
decision. [15] IV.
5 Research method and data collection

The experience was drawn from this study conducted on seventeen different industries. The purpose of the survey based research was to find out how the software engineers could produce the product that might give good satisfaction of the stakeholder needs by the requirement prioritization. The organizations have different type of application domain. Through the questionnaire survey, studied the actual requirements prioritization work in special stage of software development. To get the clarification of the current requirement prioritization methods in-depth interviews were conducted. There are three groups according to their application domain. The purpose of the focus group was to determine how organizations prioritize the requirements and which development phases involved in practice. Through the survey, it was concluded that which issues effect the prioritization and from which basis the stakeholders elicit the information on which they decide the requirement prioritization. In addition, picture was drawn to minimize the cost and enhance the effectiveness of the software though the requirement prioritization. The stakeholders and their associations to the requirement prioritization have shown the following table.

6 Table 2: Company and its stakeholder’s designation

<table>
<thead>
<tr>
<th>Company</th>
<th>Stakeholder’s Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry A</td>
<td>CEO, Project Manager</td>
</tr>
<tr>
<td>Industry B</td>
<td>Business Analyst, Team Lead</td>
</tr>
<tr>
<td>Industry C</td>
<td>Manager, Analyst</td>
</tr>
</tbody>
</table>

The age of the analysts affect the result of requirement prioritization as show below. The team leader or business analyst required at least bachelor’s degree. A survey showed that the inhouse development industry try to hire at least bachelor employees for analysis, requirements analysis and prioritization but industries desired for business analysts having brilliant computer education like M.Sc. (CS) etc. Because their professional work involves solutions to meet the customer business needs and customer challenges. As industries have over all well educated and experienced persons in different working areas and industries businesses enhance day to day. In the result of this requirements of industries generate dynamically. To control and prioritized all those requirements, the team leader should be high qualified and have ability to translate industries requirements into system requirements with prioritization for software developers. They should have expertise in open range of business effect and software programs. Education generates the ability in analyst to understand the business requirements, identify those requirements, document those requirements and prioritized them for business application for software developers. They get the ability to cope the relationship between different departments, effective communication, strategy of development those prioritized requirements.

The importance of the requirements is never neglected. The requirements prioritization is based on the following factors. Study indicated that there are three factors which affect the priorities. It is the base line for the profit of any organization. These factors minimize the gap between the stakeholders. Any issue like relationships, communication problem and project involvement between the customers and analysts can be shrinking using these factors. There is no defined method for inhouse development to prioritize the requirements. The organization must know these attributes in any software engineers. Any software developer who contains these attributes can make easily requirements prioritization and logical implementation of these requirements. The skill and education attributes cover the geographical region made their requirements priorities. It is not easy to say which individual factors affect the prioritization of the requirements.

V.

7 CONCLUSION

The study has been conducted at three types of industries, to find out the results about requirements prioritization that gives the high level satisfaction of the customer. To achieve the explanation of the actual requirements prioritization, conduct the survey indepth. The purpose of the survey was to determine how organizations prioritize the requirements. The term priority is the property or attribute of the requirement. In the survey organization, the requirements elicitation and requirements prioritization interacts the domain expert users.

The survey study indicated that there are three factors like analyst’s qualification, experience and age which affect the prioritization. These factors help to minimize the distance between the stakeholders. The defined three factors resolved the issues like relationships, communication problems between users and software engineers. Any software developer pursuing these attributes can make easily requirements prioritization and implementation of the requirements. Accurate requirements prioritization produced the cost effective solution for the organization.
Figure 1: Table 1:

Figure 2: Figure 1:
CONCLUSION

Figure 5: Figure 4:

Figure 6: Figure 5: