



Impact of Stakeholder's Involvement In Requirement Management Process

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ABSTRACT

For any project first step in project implementation is identification of stakeholders. These stakeholders play a significant role in requirement elicitation and in other phases of project execution they either provide new/modified requirements or help the project team to decide how to manage requirements. In requirements engineering domain, a stakeholder is described as a person who has the capability to influence the requirements of the project. This paper highlights the influence of stakeholders on the requirement management process of a software based system. It brings out the methods of identifying stakeholder and ways to ensure their engagement with the project team for effective implementation of requirement management process.

INTRODUCTION

Stakeholders play an important role throughout the life cycle of any project, at the beginning stakeholders provide requirements to the development team and in later phases of software development stakeholders provide clarity to further decomposed /detailed requirements. Stakeholders also provide new or modified requirements to the team or help team to resolve conflicting requirements. They are the one who finally provide acceptance of the system developed.

Inputs provided by stakeholders are very crucial, cautious identification of correct stakeholders is hence very important to the accomplishment of the project.



CONVENTIONAL DEFINITIONS OF STAKEHOLDER:-

There are numerous definitions of stakeholder, some of them are listed below

- 1: A person who has to manage the stakes of bettors
- 2: Hold stake in organization
- 3: A person who is either involved in performing a course of action or is one amongst those who are affected by it.

Traditionally the term stakeholder was used for a person who either himself holds the money or is responsible for the money invested by one or more parties and he is responsible to pay this money, based on the terms and conditions of the investment to the winning individuals. The stakeholder is trusted by the investing parties to act impartially in accordance with the guidelines of the investment—with a level of trust that is not present within the investing parties.

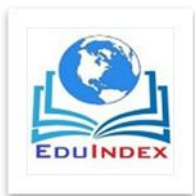
In the early 1980s, Mason and Mitroff (1981) defined stakeholders as any person or thing that can affect or is affected by a project under consideration. Their foremost intention was to discriminate a 'stakeholder' from a 'shareholder' or 'stockholder' who had a vested interest and therefore would perform in agreement with that concern.

Since that time, the term stakeholder has changed to the extent that, as opposed to being a reliable human they are believed to be not really reliable to the degree that they may even have a contrary or malevolent aim; and, at last, stakeholders may not be just human but associations, organizations and even environment also is frequently viewed as stakeholder.

MODERN DEFINITIONS OF A STAKEHOLDER

Mason and Mitroff (1981) defined stakeholders as people who possess a personal stake in an organization. Glinz and Wieringa (2007) advocates that stakeholders in the context of requirements engineering were "all those who have a stake within the change being considered, those who stand to gain from it, and those who stand to lose". Littau, Jujagiri, and Adlbrecht (2010), proposed following main types of portrayals which describes a stakeholder as:

- 1) Concerned in, or
- 2) Affected by or can affect the project; or



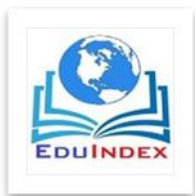
3) Some amalgamation of the first two points above

The Project Management institute in the year 2013 added knowledge area for Project Stakeholder Management in its Project Management Body of Knowledge (PBMOK) and gave definition of stakeholder as “Persons or organizations who are involved with the project, or whose benefits may be affected by the performance or completion of the project either positively or negatively”.

DEFINING STAKEHOLDER FROM REQUIREMENT MANAGEMENT PERSPECTIVE

This sort of extensive definition, the listing of stakeholders contains all those human beings and any additional living and non-dwelling structures and items that are considered by any individual to have, or understand themselves to have, some interest in the project. In most arrangements, this is truly now not a suitable definition since it's far often tough to identify a person who isn't stricken by, or fascinated in, the machine in a few ways. Even in a quite straightforward device including an ATM network for a bank, there can be millions of stakeholders by any such definition.

Since Project teams are anticipated to collect requirements from many stakeholders this definition will not be adequate. To begin with, as there are several stakeholders it is not possible to interact with absolutely everyone who will have some sort of interaction with the new system. Secondly if stakeholders are considered to be those who will be influenced by the new project or system then competitors also come in the definition of stakeholder and competitors also need to be involved for requirement elicitation. Additionally, designers cannot interact with the environment and different non-living items but must pick a human representative to talk on their behalf. Finally, the new machine may have disparate consequences on different stakeholders so they will no longer be impacted equally and they would not have identical rights in stating requirements. Hence identifying stakeholders is not just about listing all those people and things that are perceived to have an interest in the new system. From requirement management viewpoint it has to be deliberated, whether a stakeholder is a foundation of requirements or not, then they have to be engaged in the project accordingly rather than just be someone who is impacted by the system.



FINDING STAKEHOLDERS

While finding stakeholder it is desired to find out whether an individual who portrays himself as a stakeholder has the authority to provide requirements for the project and if he has been nominated by his group or organization to do so. In case of numerous stakeholders, it is difficult to decide the priority.

Following additional points need to be followed for discovering stakeholders for a project

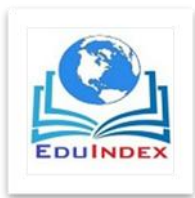
- To ensure no stakeholder is overlooked out it is advisable to list all possible candidate stakeholders (anyone affected by the system or able to affect it).
- Once all stakeholders are identified then the list is shortened by evaluating candidates and grouping stakeholders in groups by types
- Each stakeholder in the list is examined for the role he plays, responsibilities he possesses and relationships he holds with other stakeholders
- For all identified stakeholders in a group it is needed to identify a stakeholder representative

Following List of Steps can be considered for Identifying Suitable Stakeholders so that Requirement management process can be achieved successfully-

- | | |
|---|---|
| 1. Identify all candidate stakeholders | 4. Prioritize stakeholders |
| 2. Evaluate candidates and select stakeholders | 5. Form the Stakeholder Management Board |
| 3. Identify stakeholder representatives | 6. Develop Stakeholder Management Strategies |

IDENTIFY ALL CANDIDATE STAKEHOLDERS

To start with identifying stakeholders all the candidate stakeholders are listed, i.e. a list is prepared where all the candidate stakeholders are listed. Based on the generic definition of the term Stakeholder we should attempt to identify all those who meet the criteria of having some



sort of interest in the project or all those whom think they are affected by the project or all those who think they are in a position to affect or influence the project.

Where ever possible we should attempt to classify the stakeholders in different groups based on their either interest from the project or based on their expectations from the project. We have to understand that we may not be able to identify all stakeholders at the beginning itself. Clarity about identification of stakeholders will gradually improve as we proceed further in project implementations.

EVALUATE CANDIDATES AND SELECT STAKEHOLDERS

Once a detailed list of candidate stakeholder is identified we evaluate each one to find who among this list is really a stakeholder and who are the ones which are not really a stakeholder but only perceive themselves to be a stakeholder. It must be said though all stakeholders are important but since we know that managing all stakeholders is not possible so it is important to identify each stakeholder's interest and ability to influence the project for proper managing of stakeholders.

To identify really which stakeholder's needs to be closely engaged we need to understand the roles and responsibilities they hold in the system being developed. For Example, an operator is a stakeholder for a project being developed but his role is limited with respect to the project being developed he is not someone who can influence major requirements of the project. On the other end an investor of a project is a stakeholder that can influence the requirements of the project in a big way. Hence it is important to understand the role of each stakeholder so that we can plan later how to manage each one of them effectively later.

After identifying the stakeholders and grouping them based on the interest in the project it is important to understand the dynamics that exist with these groups with respect to their interest in the project. This is important from the view-point of receiving contradicting requirements from these groups and if we are well prepared in advance then it will be easier to sort out conflicting requirements from different stakeholder groups. On the other hand, if two groups of stakeholders have some common interest from the project then we can accept complementary requirements from both groups.

IDENTIFY STAKEHOLDER REPRESENTATIVES



Since it is not possible to engage with all stakeholders of a certain group because of limitation of time and in few cases where the identified stakeholder is a non-living thing like environment, we cannot engage directly with them at all. Hence it is vital to identify representatives who can convey the thoughts on behalf of that stakeholder communal. These representatives are the once from which we can elicit requirements and from whom we can get the inputs necessary during requirements analysis. The inputs from these representatives representing different stakeholder groups are important to the system hence, careful selection of appropriate representatives from each stakeholder group is very important.

We have to carefully select a suitable representative of the group within each group of stakeholders so that not only that representative is able to contribute by providing detailed and correct set of requirements but also is powerful enough to convince others in his group of these requirements. The identified representative should have acceptance within his group so that whatever he commits as requirements for the project others in the group should abide by that and shouldn't try to change it.

Ideally, a suitable stakeholder representative must exhibit following characteristics:

- Sound knowledge of the business domain;
- Understand the application area where this project will be operating
- Understand the basic problem for which this project is initiated;
- Should understand concepts of systems engineering;
- Should have sound understanding of the requirements-engineering process;
- Appreciate the silent features of the associated technology;
- Should be able to put forward the requirements of their stakeholder community;
- Be supportive of the system;
- Should have approval inside their stakeholder group; and
- Should have adequate time to be able to donate for the project

We can safely say that the success of the requirements-engineering process will hinge severely on the appropriate selection of stakeholder representatives. Since all the identified representative of the stakeholder group may not have all the above covered attributes hence it is important to provide training at the very beginning of the project so that all representative



of the stakeholder groups is aware of the way in which they can contribute to the success of requirements-management processes being implemented in the project.

PRIORITIZE STAKEHOLDERS

It is significant to understand the requirement of identifying stakeholder, i.e why are doing the task of identifying the stakeholder should be very clear in the mind of all concerned.

It is very difficult to achieve our objective in case we are having many stakeholders having equal rights or priority, since in that scenario it is not possible to resolve conflicting requirements as both the parties have equal priority. Hence it is imperative that we arranged different stakeholders into groups based on different categories and should define the priority and right of each of these groups clearly,

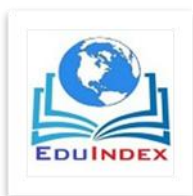
The job of requirements analysis turn very organized if stakeholders' inputs are ranked. If there are any contradicting requirements then it becomes very clear if one group of stakeholders have more priority over other. Additional advantage we achieve by separating stakeholders in different groups is that it gives a clear direction to the development team to plan how much time and effort they need to spend for a particular group of stakeholders in eliciting and elaborating requirements.

FORM THE STAKEHOLDER MANAGEMENT BOARD

Stakeholder Board formalizes the way by which stakeholder needs and requirements are identified, analysed, prioritised and managed throughout the life of the system. This board is constituted from within the identified stakeholder groups with one representative from each group is included in the board and the power of each representative is equivalent to the priority of the group from which these representatives have been selected. This board is headed by the identified business owner who is leading the requirement management process. It is advisable to have even number of members in this board so that in case of situation where voting needs to be used to decide on an issue clear result can be achieved.

DEVELOP STAKEHOLDER MANAGEMENT STRATEGIES

After all stakeholders are identified, grouped, and representatives from each group have been identified and priority for each group is decided, next step is to formulate strategies with the goal to capitalize on stakeholder involvement in the requirements engineering process. The identified strategies should answer to questions like what is the strategy if an important stakeholder does not agree to other requirements from another stakeholder. There should be a



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strategy in place to gather requirements from stakeholders that do not have a voice (such as animals and inanimate objects).

Communication plan and Decision/ responsibility Matrix are two important concepts that need to be used extensively for developing stakeholder management strategies. Here it is important to understand that requirement management process is essentially driven by humans hence it is important to give focus on people management techniques so that all identified stakeholder's representatives are actively involved in requirement management process throughout the life cycle of the project development.

The objective of the current study is to examine the relationship between stakeholder involvement and performance of requirement management process. Based on the output of the case study it can be decided how important stakeholder involvement is for the performance of Requirement Management process.

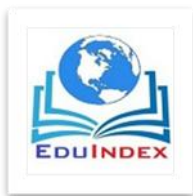
METHODOLOGY OF THE STUDY:-

To investigate the relationship between Stakeholder Engagement and Performance of Requirement Management Process, a questionnaire is prepared with two dimensions. First Dimension examines the involvement of stakeholders during different stages of project life cycle while second Dimension examines the performance of Requirement Management process in projects. Total of seven questions were framed in each dimension and a sample size of 100 were identified for data collection and study.

Table 1.0 and Fig 1.0 shown below represent the response received from 100 respondents for examining the involvement of stakeholders during different stages of project life cycle.

Stakeholder participation during multiple stages of project life cycle

S.No	Question	SDA	DA	N	A	SA
1.	Stakeholders are involved throughout the life cycle of the project	0	10	26	48	16
2.	We identify key stakeholders early in the project	0	0	38	28	34
3.	We ensure that stakeholders are engaged	0	0	32	42	26
4.	We have stakeholder management plan for our project	0	0	28	36	36
5.	We categorize stakeholders based on their interest and degree of influence on the project	0	0	39	43	18
6.	Stakeholders for our project have sufficient domain knowledge	0	8	34	32	26



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7.	We give emphases on communication between our stakeholders	0	0	36	30	34
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Table 1.0

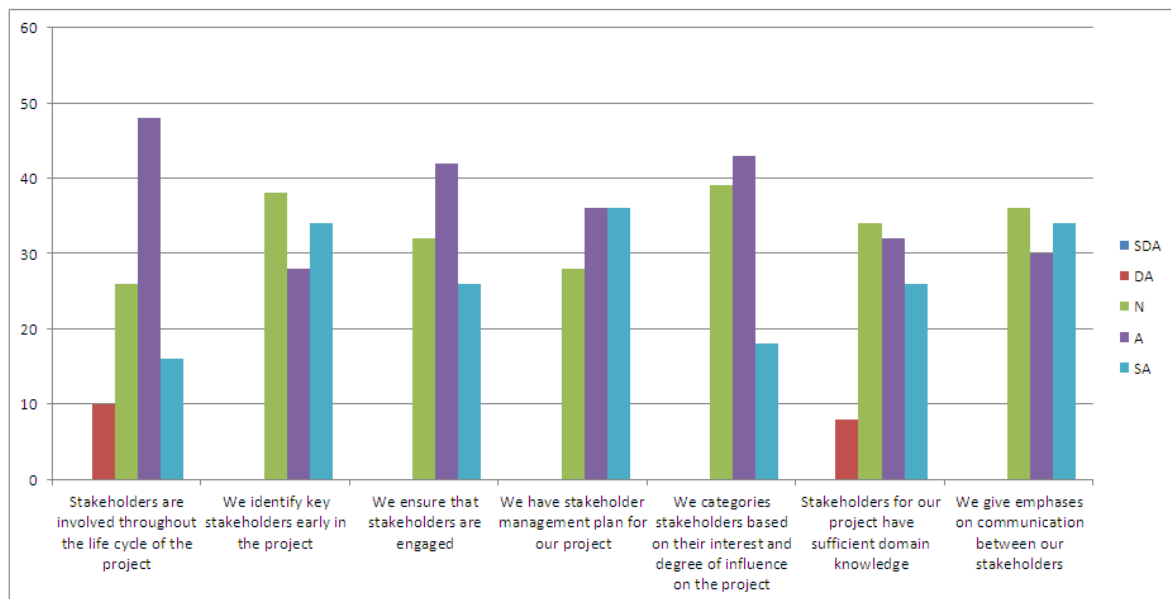
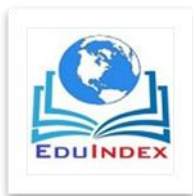


Fig 1.0

Table 1.1 and Fig 1.1 shown below represent the response received from 100 respondents for examining the Performance of Requirement Management Process during different stages of project life cycle

Performance of Requirement Management Process during different stages of project life cycle

S.No	Question	SDA	DA	N	A	SA
1.	Most of the requirement identified early in the project does not change	0	6	30	34	30
2.	All stakeholder have common understanding of the project requirements	0	0	16	50	34
3.	Ration of ambiguous requirements to unambiguous requirements is very low for our projects	0	0	24	50	26
4.	Requirements changes were minimum during the life cycle of the project	0	0	30	34	36
5.	We find values for volatility metrics always under control	0	0	26	46	28



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	for our project					
6.	We are able to perform traceability of requirements through different phases of project	0	4	22	44	30
7.	We are able to resolve contradicting requirements from different stakeholders	0	8	40	32	20

Table 1.1

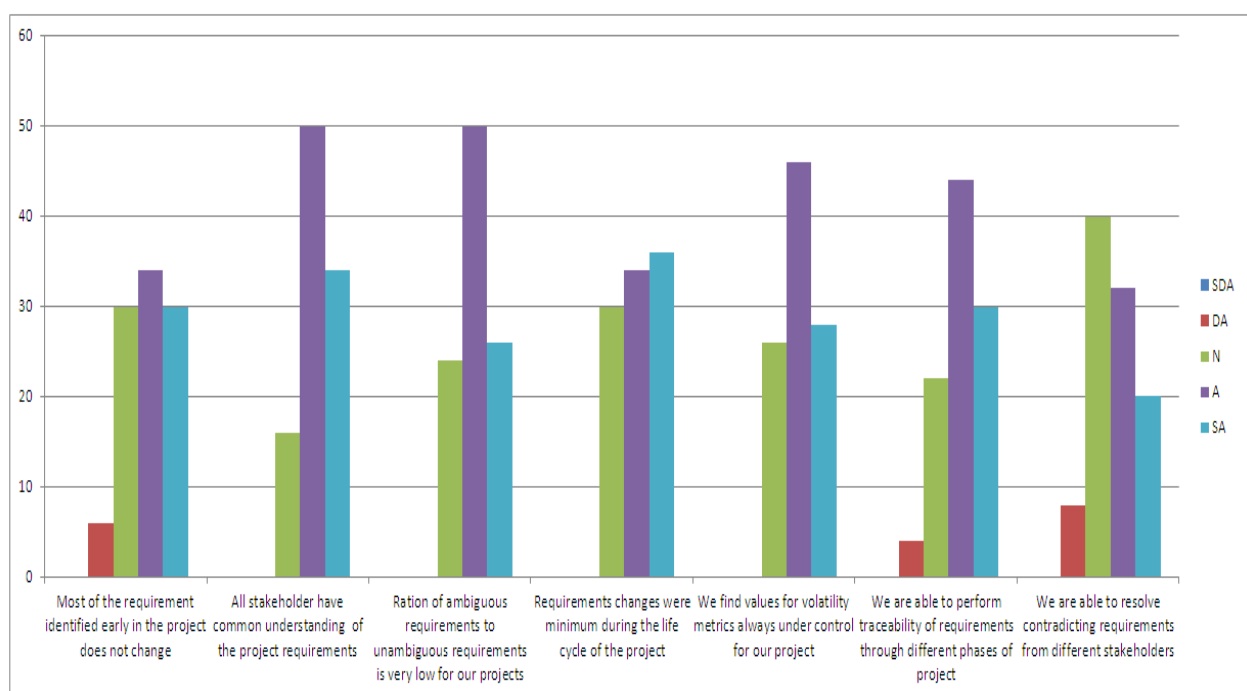


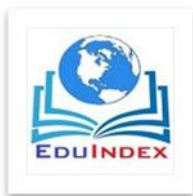
Fig 1.1

Hypothesis:-

Following Hypothesis is framed to examine the relationship between stakeholder involvement and Requirement management process performance

H₀:- There is no significant relationship between stakeholder involvement and Requirement management process performance for a project.

H₁:- There is significant relationship between stakeholder involvement and Requirement management process performance for a project.



DATA ANALYSIS AND INTERPRETATION:-

Data collected from 100 respondents is tabulated as shown in Table 1.0 and Table 1.1 above. The data collected is then analysed using Excel as a tool and the Table shown below summarizes the result achieved after applying, t-Test and computing Pearson Correlation coefficient.

Pearson Correlation = 0.594884

PValue = 0.003922

Positive value of Pearson Correlation coefficient indicates that there is positive Correlation between stakeholder involvement and performance of requirement management process. Hence more the stakeholder is involved in a project better will be the performance of Requirement management process for that project.

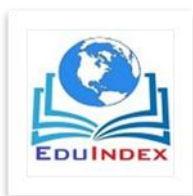
The p-Value computed indicates that there is strong evidence to reject the Null Hypothesis and accept Alternate Hypothesis.

Hence from both Pearson Correlation coefficient and p-value, it can be concluded that there is strong positive correlation between stakeholder involvement and performance of Requirement management process.

SUMMARY

Early identification of stakeholders is key for the project success and in particular to the performance of the requirements management process. From the viewpoint of requirements management process the traditional definition of stakeholder which says that stakeholder is defined as someone who can affect the system or is someone who is affected by the system is not useful. Since this definition identifies too many people as stakeholders it is not possible to engage all of them in requirement management process. Hence it is advisable to define a stakeholder as someone who is capable to influence the outcome of the system, instead of someone who is merely affected by the system. Also, all stakeholders cannot be considered having equal capability to influence the output hence stakeholder's needs to be prioritized and based on priority of each stakeholder each one of them needs to be managed. This paper also attempts to study the degree of influence of stakeholder management over performance of requirement management process.

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