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RESEARCH ARTICLE

RMMM: A SURVEY

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ARTICLE INFO	ABSTRACT
	In today's Life everyone has to face challenges. Every software has risk which should be managed very carefully. Risk identification, risk estimation and risk evaluation is done in order to avoid, monitor and manage risks and its Impact. To achieve a quality product risk mitigation, monitoring, and management is performed.

INTRODUCTION

Risk is an assumption of loss or uncertainty, a problem that might occur in the future. Because of inappropriate or lack of information, control or time. Every software projects has a risk. Software risk are caused because the future is uncertain. There are many things that can cause risk some are known and some are unknown.

Risks are arising from three possible cases

Facts known to the team. For example if there is less number of developers, project delivery can be late. Risks like this are described and mention in the Project Management Plan. Second is when team is aware of risk but it may or may not exist in the project. If the communication with the client is not good enough then it is not possible to identify the requirement properly. This is a known to the team and whether the client has communicated all the required information properly or not is not known to the project. Last one is risks about which the organization has no idea. For example risk related to technology such as technologies or tools that are used because your client wants you to work that way. These are few ways how risk occurs in project. The goal of risk management is to improve project quality by performing identification and assessing risks, developing strategies to reduce risk if possible or to avoid risks whenever possible, and maximizing opportunities (Chapman and Ward, 2003). Risk mitigation,

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monitoring and management plan (RMMM) is to identify as many risks as possible. First step is to identify what can cause a risk, risk identification. Next, each risk is examined to determine the chances that it will occur. Once this is done, risks are ranked, by its probability and impact of occurrence. Finally, a plan is developed to manage those risks which have high probability and high impact (www.srmuniv.aqc.in). The Risk Mitigation, Monitoring and Management, RMMM, plan (create) documents which include all work done and performed by team. Rather to develop a formal RMMM document one can also develop Risk information sheet (RIS). RIS contains:-

- Risk identity,
- Date,
- Probability of risk,
- Risk impact,
- description,
- Refinement,
- Mitigation/ monitoring,
- Management/ contingency plan/ trigger,
- Current status,
- Originator and assigned information.

I. Risk in project

a). Schedule risk

Project tasks and schedule release risks must address properly or Project schedule can be at risk. Schedule risks mainly leaves footprint on project and thus lead to project failure.

b). Budget risk

Budget risk arises when there is inaccurate budge estimation. It is also possible when the project cost overruns. Budget risk has high impact on the project.

c). *Decision making risk*

When developer makes any small mistake or a little carelessness in decision making there may occur a risk with high impact

d). Technical risks

A technical risk generally has impact on failure of project. Because of any fault in techniques in project, projects turn to fail.

e). Design risk

If there is any uncertainty in designing the project it can be a noticeable risk to the project. Because of not designing project properly it can cause a high future risk, which can also lead to project failure.

f). Project planning risk

The plan of project must be in accordance of user requirement. This risk includes changes in *scope*. Inappropriate plan of the project may mislead project towards other risk.

g). Programmatic risks

These are the external risks beyond the operational limits.

- Project Running out of fund.
- Market development of the project requirement.
- Changing customer product priority and strategy.
- Government rule changes.

II. Risk Mitigation

One of the essential parts of risk management is risk mitigation, because it process to eliminate or reduce risks. Risk mitigation is the primary strategy and is achieved through a plan. A scheduling strategy for risk mitigation is essential to known the risks to be mitigated (Pengzhou and Hareton K.N. Leung, 2013). A risk mitigation strategy provides the best use of resources and reduces the risk, it performs better than a Random strategy. Classification of risk is perform i.e. resource related, technology related, department related etc. After classification is done mitigation plans are detailed out to mitigate risk. During RMMM planning roles and responsibilities of all staff are carried out so that risk mitigation performs on time (Sanjay Mohapatra, 2011).

There is a risk mitigation framework which is divided in following:

- Risk Identification
- Risk Assessment and
- Risk Mitigation

In the Risk Mitigation Framework for the 3D-Mintegration project, the Key Characteristics method for the identification

of risks is being used (Rolls-Royce, 2002). In risk mitigation plan the HR ensures that resources are available for key projects area and documentation is maintained (Software Project Management, **2011**). In testing stage it coordinates with CCD at early stages of project and gets commitment. Technology and future prospects are discussed with all members included in project. Risk mitigation measures is indented for reducing the acuteness of risk consequences, reducing the probability of the risk materializing, etc. The purpose of such strategies is to reduce, the adverse impacts of the known or perceived risks in a particular undertaking, even before any damage. In some situation risk mitigation cost is greater than risk cost than risk is accepted by the organization otherwise risk mitigation is performed. By this some risk are accepted and some are mitigated.

III. Risk Monitoring

Risk monitoring deals with monitoring of risk to completion. The purpose of monitoring phase is to ensure that risk is monitored to manage the project quality. Risk monitoring is a daily, on-going process from project start to project finish. As part of monitoring project manager has to assess if the risk exposure is negligible or not. It is also possible that the risk which is mitigated may arise later, so project manager needs to monitor project and for that he has to review the status for risk till project completion. Risk monitoring helps us for Preparation of status reports for project management.

Risk monitoring is to keep an eye on the effectiveness of measures which are used to reduce the risk and controlling the project (Xiaohua Sun, 2016).

The objective of risk monitoring is:

- To assess the predicted risk occur or not.
- To ensure that risk reduction steps are being applied properly.
- Information are collected which may be used for future purpose.

By monitoring project person can know what risk caused which problem throughout the project.

IV. Risk Management

If any risk occurs in the project which is unavoidable, because it cause a big loss in future. We have to manage risk to produce good quality of product. Risk comes from various sources which are project failure, natural disaster, unforeseen events etc (ISO Guide, 2009). Risk management is a continuous process which is accomplish throughout the life cycle of the project. Risk management depends on Risk identification, Risk categorization, Risk prioritization, Risk management planning, Risk monitoring (Sergey M. Avdoshin and Elena Y. Pesotkaya, 2011).

A.Risk identification

Risk identification is the comply of identifying negative and positive risks and their impact. Identifying the risk in every project is helpful to produce a quality product (http://www. brighthubpm.com/risk-management/89885-what-is-the-difference-between-risk-identification-and-risk-assessment).
Not identifying risks can have drastic, costly, and even deadly consequences.

Table 1. Example of risk management

Risk	Description	Probability	Impact	Residual
Lack of programming experience	If there is new staff or team member to handle project	Medium	High	Low
Project scope	Change in project scope due to clients demand.	Medium	Medium	Low
Lack of developing resource	Not enough resources provided by organization.	Medium	Low	Low

B. Risk estimation

Risk Estimation is a procedure of assigning values to the probability and consequences of a risk.

C. Risk evaluation

Risk evaluation act to define how the estimated risk will be concerned with people or how people will be affected by the risk. A large part of this evaluation will be the consideration of how people perceive risks.

D. Risk response

The risk response planning involves some ways to reduce or remove any danger to the project, and also the chances to increase their impact. Project managers should work to eliminate the risk before they occur. Also, the project managers should work to make sure that negative impact gets removed and positive opportunities occur.

V. Risk Management Organization and Roles in team

Effective risk management needs entire program team involvement. Also, the risk management process deal with program hardware, and other integration issues. Project manager has responsibility of risk management. However, all project members should participate in the risk identification and estimation process. It is useful to understand from starting the scope of the project to avoid complex problems and better positioning of the projects. Many project managers are familiar with the situation where some functions may have low priority in the beginning of project and becomes high priority up to finishing project. This brings to the complicated change requests process and might be risky for the project. Even if the documents are well documented and transparent, there can be a risk of requirements change and project delays. Other than this external expert's maybe representatives from the user, contract manager, testing team, logistics and industry. All software/hardware risks are of considered and must be handled by the project team or office (Sergey M. Avdoshin and Elena Y. Pesotkaya, 2011). The organization and the developer must work from a same software risk management process and database. Risk mitigation does best provides the balance between performance and cost. The organization shares the risk with all department involve in project, the development production, or supported team, and does not transfer all risks to anyone. Organization has a responsibility to provide supportive and profitable project to its customer. Monitoring these activities will be the responsibility of the Project Manager, also other member of project team help to achieve its target.

VI. Conclusion

Risk is a situation that appears during project execution. Risk is uncertainty which leads to the project failure. RMMM plan help to reduce the chances of occurring risk. Risk has to be identified, evaluate and estimate in the project. If possible risks are mitigated. By monitoring and managing risk can be reduce or recover. If risk are managed well then it helps us to produce a better product. Risks are not always to be taken negatively because by managing risk we can produces good quality of project.

VII. Acknowledgment

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