A Review of Various Software Risk Management techniques

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Abstract - The development of the projects, especially in the software related field, due to its complex nature, could often encounter many unanticipated problems, resulting in projects falling behind on deadlines, exceeding budgets and result in sub-standard products. Although these all problems cannot be totally eliminated, but they can be controlled by applying Risk Management methods and techniques. This can help to deal with problems before they occur. Organizations who implement risk management procedures and techniques will have greater control over the management of the project. There are different types of techniques for find out the risks in the software or control the risk before they occurs. In this paper, we will make a review of various software risk management techniques which are used recently and are helpful in handling the various type risks which occur during the software project development.

Keywords: Risk Management, Risk Control, Planning.

1. INTRODUCTION

Software risk is a problem that could cause some loss or threaten the success of the software project but which has not happened yet. These problems might have an impact on the cost, schedule, or technical success of the software project, quality of the software products, or projects. Risk can be divided in some categories like Project risk, Technical risk, and Business risks. The Software development project are subject to many risks including: poor defined requirements, changes in client's requirements, poor techniques for the cost estimation, dependence on skills.

Software risk management is the process of indentify the software risks and planning to avoid those risks or to minimize their effects if they can't be avoided. By using risk management techniques we can decrease the harm or loss in software project. We already know that all risk can't be avoided, but by performing risk management, we can find risk at necessary time and can be handled at that time.

The main objective of the software risk management is to identify, address and eliminate the software risks before they become threats to the success. In general good project managers are also very good managers of risk. It makes good business sense for all software development projects to incorporate risk management a part of project management. The risk has two characteristics :

- Uncertainty : an event may or may not happen.
- Loss : an event has unwanted consequences or losses.

Software risk management has following stages:-

1. Risk identification: - Risk identification is a first stage of risk management and the systematic attempt to specify threats to the project planning. The purpose of risk identification is to developing a risk items called risk statements. Risk identification can be facilitated with the help of common risk areas for software

projects or the software. Within the identification phase of the risks management, several activities occur. They are following describes:-

- Identify the risks
- Define the risk attributes
- Documents
- Communication

2. Analysis: - When the risk has been identified in risk identification stage, all the items are analyzed using different criteria. The purpose of risk analysis is to estimate the loss probability and importance of each risk item. A judgment is then made about which are the most important risk must be considered immediately.

3. Plan and Track: - The risk planning and tracking process are the next stages of the software risk management cycle. In the track stage the risks are monitoring and after that action can be taken against risks to mitigate them. It considers each of the risks which have been identified and strategies are planned to manage the risk. Risk control relies on project management processes to control risk action plans, correct for variations from plans, respond to triggering events, and improve risk. These strategies fall into three broad categories:-

- Risk Avoidance
- Risk Minimization
- Risk Contingency plan.

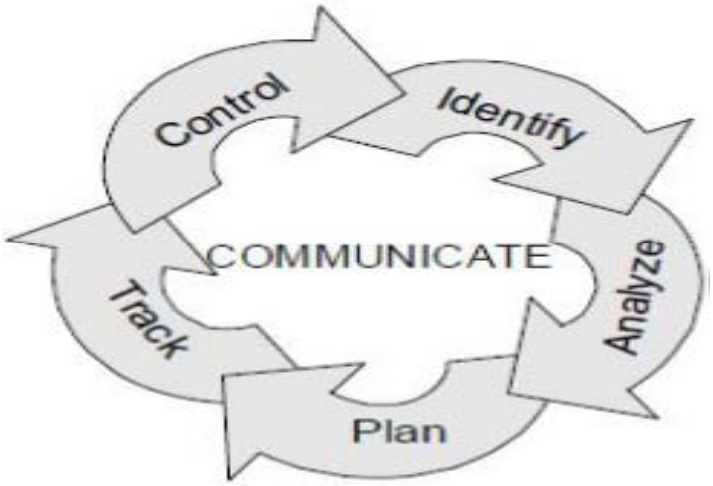

Fig. 1.1 Software Risk Management Paradigm

4. Risk Control: - The last activity or the stage is Risk Control is the process of managing risks to achieve the desired outcomes. It involve the regularly weather the risk is becoming more or less likely and whether the effect of the have changed. Risk control process involve following activities:

- Risk planning
- Risk mitigation
- Risk resolution
- Risk monitoring

II. LITERATURE REVIEW

A. "Project risk management: lessons learned from software development environment (2004)"- Y.H.Kwak, J.Stodard [1].

The challenges in applying effective software risk management process are difficult, in particular integrating the risk management process into software development organization. However the advantages of implementing effective risk management tools and techniques in software development. The current perception trends of various software development projects are identified. The implementation of effective of effective risk management process will succeed by changing the organization culture. In this paper the address lessons learned from implementing project risk management practices in software development environment.

B. "State of Software Risk Management Practice (2008)''- Mira Kajko-Mattsson and Jaana Nyfjord [2].

In this paper, the researcher explores the idea of risk management practice within 37 software organization and then finds out that how companies studied have integrated their risk management with software development .There are some discrepancies between industrial practice and standard model. The industrial organization has not implemented important activities that are prescribed by the standard model. So in this paper the both the standard and industrial issues are suggested. In this paper, synthesized Risk management process model is also described.

C. "The Importance of 'Risk Radar' in Software Risk Management: A Case of a Malaysian Company (2010)"- Khairul Azizan Suda and Nazatul Shima Abdul Rani [3].

In this paper, 'Risk radar' is applied to a company in Malaysia. The main aim of study has been an analysis of risk management and risk exposure of software projects practices in the company. This study also shows the successes of the several software that goes into the Malaysian market, depending on how risk management and its plan in software development as in the case of the company. In this paper risks are identify with Pareto rules or techniques. It find the risks using 80/20 rules or Pareto Principle, 80% of the risks item listed by Boehm in Ten (10) Top Risks are due to 20% of sources . By using these rules most prominent risks find out in the Malaysian company such as rework, budget overruns cost overrun, content deficiencies and etc.; and ability to own the technology rather than uses the technology with reasonable cost in development and always meet or exceed customer requirements in the market or in a company.

D**.** "A Review of Risk Management in Different Software Development Methodologies (2012)"- Haneen Hijazi, Thair Khdour, Abdulsalam Alarabeyyat [8].

There exists different software development methodology. It depends on the developer that which methodology he choose for developing the software and depends on several factors. One factor is that how risky the software is and the factor is that which methodology is used to support the risk management. The aim of the study is to comparing software development process models which support the risk management. In this paper, the researcher finds out the state of risks and risk management in software development process models.

This study helps the project manager o developer to choose the methodology that is best for the project. The benefit is that it will make a way for further that aim at improving the software development process.

E. "Trivial model for mitigation of risks in software development life cycle (2011)"- Basit Shahzad, Yousef Al-Ohali and Azween Abdullah [5].

Software development is an art of developing the software in the appropriate manner by using the software development model, but it depends on the developer that which model he use to develop the software. The development of software of software is a dynamic activity and it requires lot of rational thinking during the analysis, design, coding, testing and maintenance phases of software development. We know that when the development of the software is start there are the possibilities of occurring of risks but the attention o risk management has been observed to be helpless to improve with the same pace to tackle the dynamically increasing software. In this way the need of software risk management felt by the academic and industrial community to minimize the losses and increase the profits and handle the software risks. In this paper firstly 18 prominent risk factors are indentify and using RIMAN model or technique of the software risk management that provide the step wise execution of risk handling methodology .The model presents the easy to understanding , flowchart to express the working of each mitigation against any risk factors.

F. "Review of risk management methods (2011)"- Robert Stern, José Carlos Arias [9].

The development of the project, especially in the software related field, due to its complex nature, could often encounter many unanticipated errors, resulting in projects falling behind on deadlines, exceeding budgets and result in sub-standard products. Although these problems cannot be totally eliminated, but they can be controlled by applying Risk Management methods. This can help to deal with problems before they occur. Organizations who implement risk management procedures and techniques will have greater control over the management of the project. So in this paper the different type of techniques is summarized with their advantages and disadvantages and comparison is also describe. The purpose of this paper is summarized the five methods BOHUM, RISHIT, SEI-SRE, SERUM, SERIM. These methods can be used as a very effective business tool to minimize the risk.

TABLE 1

Sr. No	Paper Name	Technique Used	Result/Conclusion
1.	A State of risk management practice	SYNTHESIZED risk management process	Standard models not sufficiently reflected the practice, need of organization studied.
2.	The importance of 'Risk Radar' in software development life cycle	80/20 Pareto Principles	Importance aspects of human management ensuring success of s/w development.
3.	Trivial for mitigation of risks in software development life cycle	RIMAN model	Indentified strategies to avoid risk mitigation strategies.
4.	Review of risk management methods.	BOHAM, RISKIT, SEI-SRE, SERUM, SERIM	Methods for select and implement and eliminate the risk in project substantially reduced.

III. CONCLUSION

With ever-increasing the complexity and increasing demand for bigger, better and faster the software industry is a high- risk business. When team does not manage risk they leave the projects vulnerable to factors that cause major rework or project failure. But adopting the software risk management program is the step every software manger can take to more effectively manage software development initiatives. Based on a positive, proactive approach risk management can greatly reduce or eliminates the risks with in software projects. For eliminates the risks lot of work has been done in every field. To eliminate the software risks and make the software more reliable still the work is continue. In this paper, we make a review of some of these different techniques used in recently research papers that will be helpful to minimize the risk in project or software development.

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