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A PATH FOR HORIZING YOUR INNOVATIVE WORK

RISK MANAGEMENT IN DEVELOPING PROJECT

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Abstract: Risks are possible events that have a negative effect. Only those events that have a negative effect on a project are called project risks. Risk management is used to control and understand the risks that can occur during a project. The challenges and realities in applying effective software risk management processes are difficult, in particular integrating the risk management processes into software development organizations. However, the benefits of implementing effective risk management tools and techniques in software development project are equally vital. Current perceptions and emerging trends of various software risk management practices are reviewed and risks specific to software development projects are identified. Implementing effective risk management process will succeed by changing the organizational culture.

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INTRODUCTION

At first software, software is not only a computer program. Software is also packed with the related documents and the configuration data that is used to operate the program. It can be developed for a particular customer/domain or for general use e.g. Microsoft Windows, Word, Excel, etc. Software is developed by software engineers, though this engineering discipline differences with other engineering disciplines. Software engineering is concerned with all aspects of software and not only with applying methods and tools but also with management, tool development, methods and theory development.

A project is a set of activities that have a predefined goal. As mentioned, projects have a certain objective and are subject to uncertainty, complexity and are bounded by constraints. These constraints can be split up e.g. requirements, future scope, time and budget constraints.

The process of risk management consists of the following stages: risk identification, analysis, planning and monitoring. The identification stage is concerned with the discovery of the project risks. The next stage, the analysis stage, is concerned with the judgment of the probability and impact of each discovered risk. Whenever probability or impact is zero the risk can be ignored. In the planning stage countermeasures are set up to face the risks that are discovered and analyzed. Summerville (2001) calls the countermeasures strategies, he categorizes those into tree classes: Avoidance strategies; reduce the probability, minimization strategies; reduce the impact and contingency plans; deal with worst case scenarios.

Theory of Risk Management

A formal, well-documented Risk Management Plan should be part of the overall Project Management Plan. The Risk Plan should include:

• Clear definition of project objectives so that all participants become totally aligned to the objectives and critical success factors for the project.

• An analysis of the work scope of each party as it relates to Risk.

• Development of a Risk Management Plan stating clearly defined project objectives, and strategies and how it is to be applied to the specific project in question.

• Project team awareness and training to effectively communicate risk-planning information across the total project organization.

• Deployment of effective risk management techniques in order to facilitate a proactive approach.

• Ongoing monitoring and review to ensure risk issues are included within project processes for monitoring, updating and review throughout the life of the project.

• Deployment of specific 'risk' activities such as quantitative risk analysis, risk decision support tools and other techniques as required.

Due to the cyclical nature of the process, project objectives, work scope responsibilities, the project risk register and the risk management plan are revisited and updated as necessary to ensure that the management of risk remains proactive, focused and appropriate throughout the project lifecycle.

Most Common Risks Factors

Five major risk factors have been brought are as following: Dependencies, Requirements Issues, Management Issues, Lack of Knowledge and Other Risk Categories.

1. Dependencies

Usually a big project is not completed only by one company; it will involve many other agencies, consultants and other factors. It's difficult for us to control the external dependencies. For example, several companies cooperate to complete one project and each company take responsibility to one part of it; we can see that the accomplishment of the whole project depends on the one – another module(s). Which leads out some typical dependency-related risk factors: customer-furnished items or information, internal and external subcontractor relationships, inter-component or inter-group dependencies, availability of trained, experienced people, reuse from one project to the next.

2. Requirements Issues

Misunderstandings or unclear requirements problem are one of the biggest challenge for project managers by which project may lead to wrong direction. If they make a plan according to an incomplete requirement, their following job will probably make no sense. But to get a complete requirement is not easy, even the users themselves can't describe it clearly sometimes, because something like skill is difficult to be described in words. Another problem is that the requirements are changed frequently. Here are some risk factors: lack of clear product vision/goal, lack of agreement on product requirements, not prioritized requirements, rapidly changing requirements, ineffective requirements change management process, inadequate impact analysis of requirements changes.

3. Management Issues

Management is a very important element in a project, because it's the manager who makes the project plan and writes the risk management. If he makes a little mistake it will probably raise a big loss. In addition, to know the states of the project clearly, make realistic commitment and to make the employees keeping high spirits all depend on the capacity of the managers. Other factors about management are: unclear project ownership and decision making, managers or customers with unrealistic expectations, staff personality conflicts, and poor communication.

4. Lack of Knowledge

New methods and new tools are put forward ceaselessly and the capacity of the staff is ragged, so the quality of the software is without any guarantee. And there may be a project where the staff doesn't have enough skill or training to complete successfully. Here are some factors about the team: inadequate training; poor understanding of methods, tools, and techniques; new technologies or development methods; ineffective, poorly documented, or neglected processes.

5. Other Risk Categories

There are also some other potential risks need to consider. For example: unachievable requirements, unrealistic time commitment and inability to acquire resources with critical skills.

Other identified risk factors

• Unrealistic commitment from top management to the project

• Failure to gain user commitment

• Misunderstanding the requirements

• Lack of adequate user involvement

• Failure to meet end user expectations

• Changing scope/objections

• Lack of required knowledge/skills in the project personnel

• Lack of frozen requirements

• Introduction of new technology

• Insufficient/inappropriate staffing

• Conflict between user departments

The table below summarizes some of questions you can ask in considering potential risks associated with your project and the action you can take to minimise them:

Risk Type	Questions to ask	Actions you can take
Financial risk	Will the project deliver the savings predicted during scoping? Will the funds requested for the project be sufficient to deliver the project?	Ensure any quotes come from reputable sources. Review a similar project if available and use any monitoring and verification of their projects to inform your own calculations. Conduct sensitivity analysis to account for variability in the assumptions you make about the costs and benefits of your project.
Strategic risk	Will the funds be used inappropriately, and hinder the organization's ability to deliver other corporate goals?	Demonstrate how your project links to existing policies and strategies and make sure you follow any processes that are outlined in your organization.
Operational-technical risk	Does the project involve potential interruptions to normal plant operations?	Consult with the relevant managers and specialist expertise as required.
Operational-safety risk	Will the project involve safety issues?	Most organizations will have an established safety risk assessment protocol that will need to be followed.

Risk Management Features

Project Risk Management allows for the promotion of original thinking while at the same time ensuring that risks and actions generated are evaluated objectively and the best options to mitigate risk are selected to increase the likelihood of success. Effective risk management should:

• Consider both downside (threat) risk and upside (opportunity) risk

• Challenge project participants and draw from their expertise

• Promote innovative thinking

• Focus management attention on key areas of risk

• Incorporate a standard risk management framework that is meaningful to decision makers while remaining flexible in order to adapt to project specific issues and best applicable methods.

• Allow for the ongoing management of risk with continuity through all phases of project development leading to and including the ongoing operations of the facility

Techniques for Managing Project Risk

Fig. Steps in Risk Management

Step 1 - Defining Objectives

This is a key step as it forms the basis for all risk management activities on the project. It is important that the project objectives are recorded and understood by all participants. This involves identifying project requirements, stakeholders, and developing an understanding of the success criteria for the project. Requirements must be assessed and challenged at this point to ensure they are realistic and understood by all team members. At this point, base assumptions relating to the project and key constraints must also be reviewed.

Step 2 – Risk Management Plan

The purpose of the Risk Management Plan (RMP) is to formalize the risk management process for the project. It is a single document that contains the definition of the chosen risk management process to be undertaken. It includes; the scope and objectives of the risk process; the organization, roles and responsibilities of participants; the tools and techniques to

be implemented; deliverables; review and reporting cycle. The RMP provides a document for all to relate to.

Step 3 – Identification

The Identification of project risks can use a variety of identification techniques such as brainstorming, interviewing, fish bone diagrams, mind mapping etc. It should be comprehensive and consistent and identified risks should be given names that are meaningful to anyone whether they have intimate knowledge or not. It will be impossible to avoid all risk on any given project. However the key objective of comprehensive risk identification is that risks are undertaken knowingly rather than unwittingly.

Step 4 – Assessment

Risks must be assessed objectively so that key risks can be prioritized and effective strategies to deal with them developed. This focuses management attention on the key issues. Two assessment methods can be employed.

a. Qualitative assessment provides a descriptive result and allows the relative ranking of risk issues. This is applicable to any project of any size and is always undertaken first.

b. Quantitative assessment provides a mathematical description of risk and produces a numerical result (risk estimate).Quantitative assessment is undertaken to address specific issues that warrant a detailed analysis.

Step 5 – Planning

Once the risks have been identified, it is important that the responses to be implemented to deal with them be thought out in some detail to achieve appropriate, achievable & affordable action plans. Risks are assigned to risk owners who are individuals best placed to deal with given issues. Each action owner must then develop a management plan with review dates. This establishes who is going to do what and by when to mitigate the risks.

Step 6 – Management

Effective management of risk requires ongoing review of the action plans and adjustment of strategies to respond to risk in response to the fluid situation as the project progresses. It requires ongoing diagnosis of the current position with respect to risk, identifying the best alternatives and generally sustaining the process.

Step 7 – Feedback

Effective feedback is a key vehicle for others to learn from successes and mistakes. During the project, it allows for continuous re-evaluation of the situation with respect to risk and adjustment of the responses to ensure a successful outcome. Over the course of many projects, it allows businesses to continuously improve their performance, their planning and estimating, and the risk management process itself.

Recommendations

Unexpected events that surprise management are not tolerated in business or projects today. Risk management can be developed as a good practice technique that becomes embedded as part of a company's culture. We suggest that a company reinforce this by applying the technique throughout the organization, from the corporate office to the engineering teams and mill maintenance shop. Using web-based systems and proprietary software allows interconnectivity of systems and users, within and outside the company to minimize the ramp-up time and to formalize the plans. As with any technique, the usefulness is a direct result of the commitment, attention and actions that result. With successful mitigating actions, confidence will build. With management attention and support, the actions have a high probability of success.

Without a risk management plan, the risks are there but perhaps hidden, or not well considered. You are taking the risk, so why not try to mitigate them. The return on the time, effort and costs of risk management can be substantial.

CONCLUSION

Although software risk management is a daunting task, organizations that implement effective processes proved to be successful, while those that fail in this effort will be unsuccessful. The nature of software projects creates many risks that must be managed diligently to avoid the common drawback of many projects. The perceptions and attitudes towards risk management activities compound difficult challenges for implementing a risk management strategy. Formal risk management process is recommended to manage complex issues associated with software development projects. Many risk management processes have been created to aid organizations, but integrating the processes into organizations was not successful. The theoretical aspects of the process must be reconciled with the practical challenges of the organization to implement risk management successfully. Effective risk management process will succeed by changing the organizational culture to motivate the individual. Cultural changes require time and repetition before they are firmly embedded into the organization. Reduce risks at the start, but continue to reduce them throughout the project.

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