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**EFFECTIVE PROJECT RISK MANAGEMENT  
THROUGH STATISTICS AND QUALITY TOOLS**

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# Effective Project Risk Management through Statistics and Quality Tools

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**Abstract – Project risk management primarily comprises cost and schedule uncertainties and risks associated with each activity of the project network. We have identified the major risk sources and quantified the risks in terms of likelihood. Management of risk in project is one of the vital project management processes. There are numerous tools and techniques available to support project risk management (PRM) at different phases of a project. Whereas tools commonly utilized by large firms are much publicized, little is known about tools and techniques used by small-to medium-scale enterprise (SMEs) in managing project risk.**

**The response data were analyzed to identify the techniques and tools which are most utilized. Proper project decision-making requires that risk management and risk analysis techniques be applied in order to guide management in making better decisions. Cost estimates attempt to define projects as single point values whereas virtually all project variables are variable and may deviate from the values assumed in preparing the original estimate. Some pieces of risk analysis software will be described and range estimating will be demonstrated as an effective tool for reducing risk and for determining how much contingency to add to reduce residual risk to an acceptable level.**

**Keywords: Effective, Project, Risk, Management, Statistics, Quality, Tools, Network, Management, Processes, Techniques, etc.**

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## INTRODUCTION

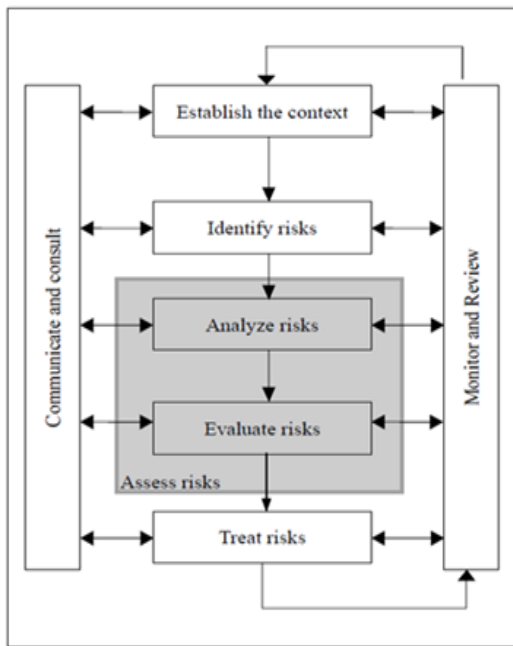
Today many organizations are working in projects and in order for a project to be successful, project risk management is an essential part of project management. As with life, projects are risky and every organization should strive to have an effective project risk management process in order to identify and manage risks. The traditional approach to project risk management is emphasizing on identifying and managing threats, mainly focusing on the negative effects of risks (ACT Insurance Authority, 2004. Ariful, *et. al.*, 2006). As to this date, some leading standards, such as guidelines from the Project Management Institute, nowadays have broaden the definition of the term risk which also includes opportunities. Opportunity management is focusing on the positive potential effects of risks that could be beneficial for the projects (Aven, 2012).

## REVIEW OF LITERATURE

A process of risk management in projects is a rational chain of practices by which decision-agents plan and execute actions and control the results in order to keep the implementation of the project under certain

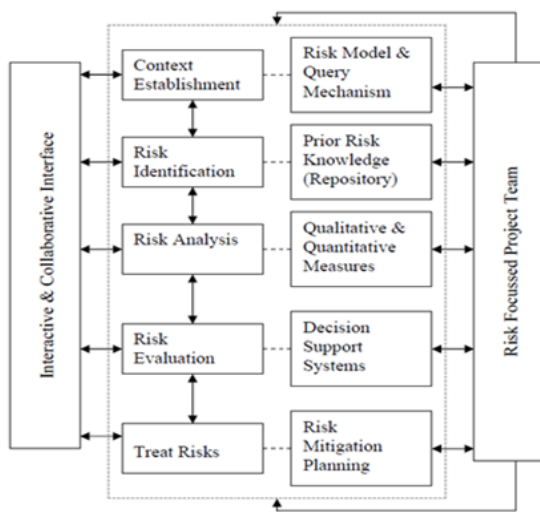
conditions (time, cost and quality parameters' set). With the purpose of providing guidelines for the selection of the best practices taking into account the organizational maturity and project complexity, a theoretical framework to classify and associate those practices to each phase of the project life cycle and to each project risk management process is proposed. Project modeling tools and techniques are in general, are also the techniques for context establishment for risk management (Bakr, *et. al.*, 2012. Creswell, 2014. Curran, 2008). These are project network diagram, precedence diagramming method (PDM), generalized activity networks (GANs), design structure matrices (DSM), IDEF3 process modeling and IDEF0 functional modeling.

The risk management process refers to uncovering weaknesses in methods used in product development through a structured approach so that timely mitigation actions are initiated to avoid risk, transfer risk, reduce risk likelihood or reduce risk impact (Kwak and Stoddard, 2003). The risk management process proposed by the Australian Standard for Risk Management is shown in Figure 1.



**Figure 1 Representation of the risk management process**

A framework for risk management tools can be developed in relation to the risk management process in Figure 1 and is shown in Figure 2.



**Figure 2 Framework for risk management tools**

A risk query mechanism may then be formulated through techniques presented study and imposed on the process model through interactive or collaborative interfaces to collect quantitative and qualitative data as described in this study. The risk evaluation consists of decision support systems using techniques presented in this study (Gustavsson, 2006. Hashi, 2013. Host, 2011). Risks worth investigating further due to their high chance of occurring or high potential impacts or leading to new opportunities are then pursued leading to being treated. This whole process of risk management is collaborative and requires incremental contributions from all participants within the organization and supplementing project management approach, which is more proactive.

**CONCLUSION**

Project risk management endeavors to supplement project management practices by investigating project structure organizational environment, external environment, products processes and procedures in detail. It further, supplements the existing knowledge with lessons learnt, best business practices industry benchmarks and case studies such that risk mitigation plans are in place when risk events do eventuate. This prevents crisis situations and also provides future avenues for opportunities. Current state of development in hardware and software technology enables integration of applications for the techniques presented in this study. There are many risk management tools commercially available to support project management but tend to address either a limited scope of application or limited processes in risk management.

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