Comparative Review on the Tools and Techniques for Assessment and Selection of the Project Risk Response Actions (RRA)

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ABSTRACT

Project risk management is the process of risk identification, analysis, and response. Risk response includes assessment and selection of the efficient Risk Response Actions (RRA) in order to reduce/enhance the likelihood of the occurrence of threats/opportunities and/or the magnitude of threats/opportunities impact. There is wide agreement that development of RRA plans is an important phase of project risk management, while there are few widely accepted processes, models or tools to support the proper selection of RRAs. The present paper reviews and compares the efforts, which have been made to assess and select RRAs and address the mentioned deficiency found in the published literature. The investigations provide an insight into the need to provide the risk analysts with effective tools and techniques for assessing and selecting RRAs in the area of project risk management.

Keywords: Project Risk Management, Risk Response Actions, Risk Response Planning

INTRODUCTION

Uncertainty lies at the very heart of project management and the need for project risk management has been widely recognized. Project risk management is the art and science of identifying, analyzing, and responding to risk factors throughout the life of a project and in the best interest of project objectives (Kerzner, 2003). Risk identification requires recognizing and documenting the associated risks. Risk analysis examines each identified risk issue, refines the description of the risk, and evaluates the associated impact (Fan et al., 2008). Finally, risk response identifies, analyzes, and selects Risk Response Actions (RRA) in order to reduce/enhance the likelihood of the occurrence of threats/opportunities and/or the magnitude
of threats/opportunities impact. RRA is an activity implemented to deal with a specific risk or combination of risks. Other names for RRA include “treatment option” (Cooper, 1995), “risk controlling action” (Kontio, 1998), “risk handling strategy” (Fan et al., 2008), and “risk control strategy” (Tan et al., 2008).

According to Hillson (1999), risk assessment will be worthless unless RRAs, which really make a difference in addressing identified risks, can be developed and implemented. In the past, research concentrated more on risk identification and analysis. Despite its importance, risk responding has not received due attention in project risk research (Fan et al., 2008; Ben & Raz, 2001; Hillson, 1999). Ben and Raz (2001) state that few solutions have been proposed and there are no widely accepted processes, models or tools to support the effective selection of RRAs. The present paper is meant to review and compare the efforts, which have been made to assess and select RRAs, and address the mentioned deficiency found in the published literature.

The rest of this paper is organized as follows. The first section of the paper discusses various RRA identification and structuring techniques. Next, we present criteria and indexes for characterizing RRAs. We review two-dimensional diagrams for selecting the RRA strategy. We then discuss techniques for selection of the efficient RRAs and compare the capability of the discussed techniques. Finally, the last section concludes the paper.

**RRA Identification and Structuring**

The RRA strategies for threats can be categorized into four different groups: avoidance, transfer, mitigation, and acceptance (PMI, 2004; Tan et al., 2008). The corresponding strategies for opportunities are exploitation, sharing, enhancement, and ignoring (Hillson, 1999). Also, according to Chapman and Ward (2003), there are nine types of generic RRAs for threats including modify objectives, avoid the risk, influence risk probability, modify risk impacts, develop contingency plans, keep options open, monitor the risk, accept the risk, and remain unaware. Additionally, it is useful to consider the timing of RRAs rather than being concerned too much about the type of RRA, which is whether RRA is to be implemented before (proactive) or after (reactive) the risk occurrence.

There are some general techniques, which could be used in RRA identification such as brainstorming, interviewing, checklists, Delphi technique, Cause and effect diagram, etc (Royer, 2000). Some researchers have proposed specific methods for identification and structuring RRAs in the project context.

**Synergistic Contingency Evaluation and Review Technique (SCERT) Approach**

One of the earliest efforts was a methodology developed by Chapman (1979) named SCERT, which provides a foundation for correlating risks and activities from the project WBS (Work Breakdown Structure). A conventional SCERT approach considers each activity individually and identifies risks and RRAs associated with that activity.

**Klein et al. Method**

Klein et al. (1994) proposed a variation on SCERT, based on the analysis of a “prototype activity,” which should be reasonably representative of a substantial number of the project activities. The prototype might simply be one of the activities. Alternatively, a hypothetical activity, encompassing properties of the range of activities, might be invoked. The method proceeds by treating the prototype activity as a standard activity. The risks to which the activity is subject need to be identified and RRAs to these risks formulated. By identifying influencing circumstances and the activities in which such circumstances exist or are likely to exist, a set of rules may be developed, which show how the risk analysis for the prototype activity may be converted into analysis for the
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