

# DOCTOR OF PHILOSOPHY

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## ENHANCEMENTS AND EXTENSIONS OF FORMAL MODELS FOR RISK ASSESSMENT IN SOFTWARE PROJECTS

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The Modified Risk Model is a macro model developed to aid program managers in effectively planning the required effort to deliver software products. The model projects the probability of completing a software project, subject to the available resources supplied by management. This approach to software project risk management is unique because the model's input parameters are derived. Subjective variables are not part of the model. Different program managers would derive the same projections on the same software project. Risk management is most effective in impacting the project's success if project risks are identified and mitigated early in the software lifecycle. The Modified Risk Model was developed specifically for this purpose. Additionally, the Modified Risk Model is versatile enough to be adapted to any software development activity. Validation of the model occurs in approximately 2,000 software projects. During these preliminary experiments, the Modified Risk Model out-performed the macro models of Basic COCOMO and the Simplified Software Equation.

**KEYWORDS:** Risk Assessment, Formal Models, Software Estimation Models, Software Metrics, Project Management, Monte Carlo Simulation