

PERT 3.0: Ambiguity-free Project Risk Simulation Using Expert Insights

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Abstract

This research paper unveils PERT 3.0, an innovative analytical framework designed to address the prevailing ambiguities associated with the Program Evaluation and Review Technique (PERT) in project risk simulation leveraging expert judgments. By conducting a comprehensive historical analysis, we trace the evolution of PERT from its inception as a second-moment analytical tool (PERT 1.0) to its development into a hybrid probability distribution within the beta distribution family (PERT 2.0), emphasizing three-point subjective uncertainty assessments. PERT 3.0 emerges as a refined, ambiguity-free solution, clarifying misunderstandings surrounding PERT 2.0's perceived uniformity. This advancement not only sheds light on the misinterpretations but also significantly enhances the theoretical and practical applications of PERT in project risk management, offering a more precise and reliable tool for expert-driven risk assessment.

Author Biography:

Dr. Kim is an Associate Professor of Project and Supply Chain Management at the Black School of Business at Penn State Behrend. He earned his Ph.D. degree at Texas A&M University, TX. He served as an Assistant Professor at Ohio University and has seven years of industry experience in heavy highway construction. Dr. Kim has published one book on project management and more than a dozen research articles in top-quality management journals such as the European Journal of Operational Research, IEEE Transactions on Engineering Management, Production Planning and Control, the Journal of Construction Engineering and Management, the Journal of Management in Engineering, and the Engineering Economist. His current research interests include project analytics, stochastic project control, risk visualization, forecasting, simulation modeling, Kalman filter forecasting, Bayesian decision-making, and risk-based EVM systems. Dr. Kim is a registered Professional Engineer in Ohio, a registered Structural Engineer in South Korea, and a Project Management Professional.