

Approaching the ERP Project Cost Estimation Problem: an Experiment

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Abstract

This poster reports on a solution to ERP project cost estimation and on results from its first experimental application.

1. Background

Enterprise Resource Planning (ERP) projects have specific context factors, such as reuse levels, interdependent functionality, and use of a vendor-specific implementation methodology, which impose risks known to cause various degrees of project failure. We tackle this issue from a portfolio management perspective. Our solution rests on other authors' work [3] and our experience in ERP requirements engineering [2]. It combines: (i) the COCOMO II reference model [1] which lets ERP adopters account for specific cost drivers, (ii) a Monte Carlo simulation [4] which aids to handling the cost drivers' degrees of uncertainty, and (iii) a probability-based portfolio management concept [5] which lets quantify the chance for success with proposed interdependent deadlines for a set of related ERP projects.

2. The Experimental Study

We set out to apply our solution approach to real-life ERP project data, in order to learn if bundling ERP projects in a portfolio is advantageous over managing them separately. We call 'advantage' the ability to explicitly and systematically approach ERP context's uncertainty. We assumed that projects, with two different ratings for the same context factor, will differ in probability of success. We proceeded by three steps: First, we modeled the uncertainty of the COCOMO II five scale factors and the 17 cost drivers by means of a probability distribution based on literature sources [3,4] and uncertainty assessments provided by our ERP project stakeholders. Second, we run a Monte Carlo simulation process [4] with the COCOMO II factors and uncertainty values as input. It generated a population mean, standard deviation and confidence intervals. From each uncertain factor, we obtained possible effort and duration estimation values. Third, we applied the effort-and-deadline probability model in

[8] to obtain (i) the probability of ERP portfolio's success with the proposed deadlines for each project in our portfolio, and (ii) a set of new deadlines which delivered a fixed probability of success. Our experiment's data came from 13 SAP projects implemented in a telecom service company.

3. Results and Future Research

Our calculations yielded that, when managing ERP projects as portfolio, the probability of success was 99.11% under effort constraints and 87.76% under time constraints. Next, for each cost driver/scale factor, we constructed two portfolios: the first had this driver/factor rated 'very high' for all projects and the second had it rated 'very low' for all projects. We observed: (i) 13 out of the 17 drivers could be adjusted in a way that maximized the probability of success; and (ii) the probabilities of success for highly uncertain projects are greater when managed as a portfolio (Table 1).

Uncertainty level	Probability of success		Ratio of increase (1)/(2)
	Individual projects (1)	Managed as Portfolio (2)	
Low uncertainty	15.76%	87.52%	5.55
High uncertainty	8.31%	75.91%	9.13

Table 1. Low/high uncertain projects under time constraints.

Although, this approach sounds an interesting solution alternative to ERP-adopters, our results are preliminary only and we acknowledge that related validity concerns are our most important issue. We plan a series of experiments, action research, and three case studies to test our approach.

7. References

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