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# Risk assessment in ERP projects

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ABSTRACT

Conducting Risk Management of Enterprise Resource Planning (ERP) projects is an ambitious task. ERP projects are complex undertakings for business enterprises, as the associated risk factors include myriad technological, managerial, psychological and sociological aspects. Moreover, such factors are often tightly interconnected and can have indirect effects on projects. Such features make Risk Management more difficult, uncertain and important than in traditional projects, especially in the Assessment stage.

The aim of this paper is to propose an innovative technique to support Risk Analysis in order to provide a better, more structured and systematic understanding of the major relations amongst various risk factors, on the one hand, and between risk factors and the specific effects associated with ERP projects, on the other. A real case study regarding a multinational company and involving a panel of experts and practitioners is presented to illustrate application of the method.

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## 1. Introduction

An Enterprise Resource Planning system is a suite of integrated software applications used to manage transactions through company-wide business processes, by using a common database, standard procedures and data sharing between and within functional areas. However, installing an enterprise system is not merely a computer project, but an expensive and risky investment, which impacts on a firm's primary and support processes, its organizational structure and procedures, the existing legacy systems, and the personnel's roles and tasks [41]. Many of the associated costs are hidden, its benefits intangible, and its effects wide-ranging, cross-functional (difficult to isolate) and "long-term" on resources and competences.

According to the estimation of the Standish Group International (SGI), 90% of SAP R/3 ERP projects run late [32], while another SGI study of 7400 Information Technology (IT) projects revealed that 34% were late or over budget, 31% were abandoned, scaled back or modified, and only 24% were completed on time and on budget [12]. One explanation advanced for the high ERP project failure rate is that managers do not take prudent measures to assess and manage the risks involved in these projects [20,39].

Therefore, the organizational consequences and risks involved with ERP projects make it all the more important that firms focus on ways to maximize the chances for successful adoption of ERP. Several studies of ERP implementations, combined with findings from earlier work on reengineering and change management, point to some of the areas where critical impediments to success are likely to occur [43]: human resources and capabilities management, cross-functional coordination, ERP software configuration and features, change management, organizational leadership [10], systems development and project management. With reference to the last factor, brand-spanking new combinations of hardware and software, as well as the wide range of organizational, human and political issues, make ERP projects inherently complex and the lack of skills and proven approaches to project management and Risk Management (RM) represents a critical risk factor [29].

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Recently a large number of models, methods and techniques have been proposed by both academics and practitioners to address the need for a structured Risk Management approach as a core activity of ERP projects [6,19,28,31]. Herein, we deal with the Risk Assessment (RA) stage of Risk Management in an attempt to contribute to the development of an effective methodology for its application and to provide a support tool for the formulation of risk treatment strategies and actions during the introduction of ERP systems. Specifically, a systems engineering theory (Interpretive Structural Modeling—ISM) is suggested to meet the needs for the analysis and modeling of causal relations amongst risk factors themselves, and between risk factors and their effects. Indeed, the ultimate aim of the research is to provide valuable input to both the risk evaluation and treatment stages.

In this regard, the aims of the paper are to:

- Adapt ISM features to meet the needs of the risk management (analysis) process in ERP projects by presenting and discussing the benefits of its application through a real case study focusing on risk factor modeling.
- Set the stage for future research aiming to integrate the proposed technique within a broader risk assessment methodology, which is to include risk effects modeling and extend the validation process to a larger number of case studies.

In the next sections, we first present the background research context on IT and ERP Risk Management, the problem of establishing a general reference framework and the existing approaches in the literature. The research objectives and methodology are then introduced and the case study presented and discussed. Finally, conclusions and indications for further developments are advanced.

## 2. Research background

### 2.1. A project Risk Management framework

In dealing with Risk Management with regard to any project, it seems worthwhile to define 'risk' as *an uncertain effect on project performance*. Thus, efficient, effective project management requires appropriate management of all sources of uncertainty within the project. Quantitative (or qualitative) Risk Assessment is a process for systematically guiding Risk Management activities by collecting and evaluating (quantitative or qualitative) data on the severity of the potential effects consequent to a risk factor (event) and its probability of occurrence.

According to the literature [11,13,16], in complex projects, Risk Management can lead to a range of project and organizational benefits, including: enhancing corporate control in terms of more effective resource allocation; increasing confidence in achieving project objectives; more precise estimates (through reduced uncertainty); improving the ability to look out for and take advantage of opportunities; minimizing surprises and unexpected events; improving chances of success; helping to avert disasters; avoiding reworking; focusing and balancing efforts; and promoting win–win situations.

Several generally accepted approaches to Risk Management have been proposed in the literature. Some of the best-established frameworks have been outlined in the PRAM Guide [33], PMBOK Guide [28], RAMP Guide [23,34], the Australian Standard [6] and SHAMPU process [13], PRINCE2 manual [9] and SAFE approach [27]. Comparing these approaches, however, discrepancies in terminology and overlapping activities often emerge, since they stem from different views and aim to fulfill different needs. In this section we present our proposal for a Risk Management framework which tries to uniformize such discrepancies.

The framework has been drawn mainly from the PRINCE2 guide [33], the Australian Standard [6] and the PMBOK guide [28]. While inheriting the general structure of the first and second models, it also supports the operational perspective suggested by the second and third, especially regarding the identification and quantification stages.

Concerning the assessment stage, in particular, the newly devised framework is more analytical than formulations such as PRAM [33], RAMP [34] and SHAMPU [13]. The main reason for this is to resolve the taxonomical ambiguities that generally plague earlier contributions. Moreover, it incorporates and standardizes the treatment strategies presented in the RAMP [23] and PMBOK guides [28]. Lastly, the framework follows SAFE guidelines [27] well, in that it is places great emphasis on the control and reporting stages.

In accordance with the foregoing, a general Risk Management framework can be drawn up for IT/ERP projects. It consists of 7 basic activities and 4 main stages, as shown in Fig. 1.

(i) *Context Analysis*—aims to define the boundaries of the Risk Management processes (the processes to be analyzed, desired outputs and performance, etc.) in order to define a suitable risk model approach.
(ii) *Risk Assessment*—is a core step in the Risk Management process and includes:
  (a) *Risk Identification*—aims at timely identification of potential threats (internal and external risk factors) and their impact (effects) on project success.
  (b) *Risk Quantification*—involves prioritizing the identified threats according to their risk levels; this consists of two main steps:
    - *Risk Analysis*—provides input to the risk evaluation and treatment stages for final risk quantification and formulation of the best response strategy. Typical inputs include the probability of a risk factor occurring, factor interdependencies, their links with potential effects, the severity of these effects and, when necessary, the difficulty of detecting them.
    - *Risk Evaluation*—defines classes of risk. By selecting an appropriate, effective risk aggregation algorithm, the risk level for each risk factor identified can be expressed synthetically.

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