



Decision Support

Managing critical success strategies for an enterprise resource planning project



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ABSTRACT

This paper develops an innovative objectives-oriented approach with one evaluation model and three optimization models for managing the implementation of a set of critical success strategies (CSSs) for an enterprise resource planning (ERP) project in an organization. To evaluate the CSSs based on their contribution to the organizational objectives, the evaluation model addresses an important issue of measuring the relationship between objectives in a three-level hierarchy involving the organization, its functional departments, and the ERP project. To determine the optimal management priority for implementing the CSSs from the organization's perspective, the three optimization models maximize their total implementation value by integrating individual departments' management preferences. An empirical study is conducted to demonstrate how these models work and how their outcomes can provide practical insights and implications in planning and managing the implementation of the CSSs for an ERP project.

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1. Introduction

An enterprise resource planning (ERP) system is implemented in an organization to support its cross-functional business process integration and standardization (Davenport, 1998). As an enterprise-wide information system, the ERP system provides various functional modules for all departments of the organization to help achieve their stated departmental objectives, which are established in line with the organizational objectives (Rajagopal, 2002). The ERP implementation is a complicated and costly project with a high failure risk (Su and Yang, 2010; Aloini et al., 2012). The project is deemed a success if it helps the organization achieve a substantial proportion of its organizational objectives (Umble et al., 2003). To ensure that the organizational objectives will be achieved, the organization should ideally develop and implement a set of critical success strategies (CSSs) that are critical to the success of the project.

The CSSs for an ERP project can be developed based on the critical success factors (CSFs) that have been identified in practical settings of ERP implementation (e.g. Hong and Kim, 2002; Al-Mashari et al., 2003; Umble et al., 2003; Somers and Nelson, 2004; Motwani et al., 2005; Sun et al., 2005; Zhang et al., 2005; Law and Ngai, 2007). When planning to implement an ERP system, the organization should first identify context-related CSFs relevant to the operational settings of its departments and then develop the CSSs that

are essential for successfully achieving its stated objectives. With limited management resources available, it is of managerial importance for the organization to set management priority for implementing the CSSs for the ERP project. To help achieve the organizational objectives effectively, the implementation should be managed from the organization's perspective, although these CSSs are to be implemented at all the departments involved.

No existing methods are available to address this important issue in implementing an ERP project. It is thus the primary purpose of this paper to develop an innovative methodology for setting management priority for the CSSs based on their potential contribution to the organizational objectives. This methodological development and its managerial implications in ERP project implementation are indeed the innovative contributions of the paper. It provides a structured approach for planning and managing the CSSs effectively. To realize this methodological contribution, we address two important research issues concerning the contribution evaluation and the implementation management of the CSSs from the organization's perspective while considering the management preferences of individual departments.

The issue of evaluating the contribution of the CSSs is complicated by the fact that these CSSs are to be implemented at individual departments for primarily achieving the ERP objectives, but they are to be evaluated in terms of their contribution to the organizational objectives. Addressing this issue thus requires measuring the relationship between the objectives in a three-level hierarchy involving the organization, the departments, and the ERP project. In this paper, we develop an objectives-oriented evaluation model

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to measure the relationship among the organizational objectives, the departmental objectives, and the ERP objectives.

The issue of managing the implementation of the CSSs at the organizational level is complicated by the fact that individual departments often have different management preferences on the CSSs as these CSSs have varying degrees of contribution to their own departmental objectives. The contribution degree of each CSS to a department is determined by its importance to the departmental objectives and its achievability level. First, each CSS will have different importance values to individual departmental objectives, indicated by the degree to which it helps achieve the departmental objectives if effectively implemented at the department. Second, each CSS may have varying levels of achievability at different departments, indicated by the degree to which it can be effectively implemented under the current operational settings and resource availability of individual departments. To address this issue, we develop three optimization models for obtaining an overall management priority for these CSSs at the organizational level, while considering their varying degrees of contribution to individual departments.

In subsequent sections, we first present a three-level hierarchy of objectives in the context of an ERP project in order to describe how the CSSs contribute to the organizational objectives while being performed at lower-level departments. Next, we develop an objectives-oriented evaluation model for addressing the issue of evaluating the CSSs. With the evaluation results, we then develop three optimization models for addressing the issue of managing the CSSs at the organizational level. Finally, we conduct an empirical study to demonstrate the effectiveness of the models developed and discuss the managerial implications of the study outcomes.

2. A three-level hierarchy of objectives in an ERP project

Fig. 1 shows a three-level hierarchy of objectives in an organization when an ERP project is being undertaken. Working with the functional departments of the organization, a project team is formed to administer the ERP project (Sarker and Lee, 2003). The project team usually consists of senior managers of the organization, department managers, key users, consultants, and technical staff. The project team aligns the functional modules of the ERP system with the current business requirements of the functional departments (Laughlin, 1999; Mandal and Gunasekaran, 2003). To address the resource requirements of the functional departments, the project team works cooperatively to reach mutual agreements on shared resources among the departments for implementing the ERP system. In particular, the project team must ensure that all departments have an explicit understanding on the availability of resources required for them to implement the ERP system.

Based on the functionality of the ERP system designed for the whole organization, the project team works out a set of ERP

objectives (as shown at Level 3 in Fig. 1) in order to essentially meet specific requirements of the core business processes of the departments involved. As such, the ERP objectives are defined in line with the departmental objectives to ensure that the ERP system will help enhance core business processes of each department. The achievement of the ERP objectives will thus help achieve the departmental objectives, as shown at Levels 2 and 3 in Fig. 1. In a strategy focused organization with management by objectives, the departmental objectives are established in alignment with the organizational objectives (Drucker, 1954; Kaplan and Norton, 2001). The achievement of the departmental objectives will thus help achieve the organizational objectives, as shown at Levels 1 and 2 in Fig. 1.

To successfully achieve the ERP objectives, the project team identifies a set of CSSs for implementation at each department through discussions among themselves and with the organization's top management on the basis of the current operational settings and the resources available for the implementation. Effective implementation of these CSSs will contribute to the achievement of the ERP objectives, as shown at Level 3 in Fig. 1.

A successful ERP project will help achieve the organizational objectives. This is the ultimate goal for the organization to undertake the ERP project. Therefore, from the organization's perspective, the CSSs identified for ensuring the success of the ERP project should be evaluated and managed based on their contribution to the organizational objectives. The ultimate contribution of the CSSs to the organizational objectives is made through their implementation at each department for achieving the ERP objectives and the departmental objectives, as indicated in Fig. 1. As such, to measure each CSS's contribution to the organizational objectives, we need to measure the relationship between the objectives at Levels 2 and 3, and between the objectives at Levels 1 and 2 in the three-level objective hierarchy.

The alignment of lower-level objectives with higher-level objectives in a multi-level organizational structure has been facilitated by widely used management concepts such as the balanced scorecard (Kaplan and Norton, 1992) and management by objectives (Drucker, 1954). To measure the relationship between two-level objectives under a balanced scorecard framework, Xu and Yeh (2012) develop a multiattribute decision making (MADM) based evaluation model. In this paper, we extend this evaluation model to measure the relationship between the objectives at a three-level hierarchy.

MADM has been widely used to evaluate a finite set of decision alternatives with respect to a set of evaluation criteria (Hwang and Yoon, 1981). Multiattribute value theory (MAVT) developed by Keeney and Raiffa (1976) has been widely used in solving MADM problems (Schuwirth et al., 2012). MAVT-based MADM methods will generate a cardinal preference or ranking of the decision alternatives, for each of which a relative value is obtained.



Fig. 1. The three-level hierarchy of objectives for an ERP project.

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