



# IT governance for enterprise resource planning supported by the DeLone–McLean model of information systems success

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## ABSTRACT

I investigated the role of IT governance in driving the success of ERP projects. The tool for assessing ERP value was a comprehensive, multivariate and validated model adapted from the widely used Delone and McLean model of IS success. This showed that ERP investments were more effective in organizations having an IT governance domain consisting of proactive strategic guidance and participatory team building. Large enterprises, however, under-performed compared to SMEs and needed specific performance drivers, such as top management commitment to become effective.

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## 1. Introduction

Today's business requirements have moved IT governance into the focus of attention. The core processes underlying effective and comprehensive IT governance are the same as those for an enterprise. IT activities are critically important to all aspects of the enterprise. This applies to ERP system applications which are seen as key in supporting business processes in many organizations. ERP involves the seamless integration of processes across functional areas such as finance, human resources, manufacturing and logistics. They support improved workflow, standardization of business practices, and improved capabilities. ERP systems include several configurable modules that integrate core business activities into a single environment based on an integrated, shared database. The far-reaching structural changes following an ERP implementation can be disastrous, as shown by examples [3,5,21]. Indeed, it has been reported that 70% of ERP implementations fail to achieve their corporate goals. However, most research conducted on ERP systems has concentrated on issues related to the implementation phase in large enterprises. There seems to be limited work reported that assesses the value of ERP in a multivariate context focusing on post-implementation stages.

My goal was to analyse empirically the success rates achieved with ERP investments according to expectations for a multiple

attributive assessment seeking to embrace all major dimensions of ERP consequences for the organisation. In order to tackle this task, the popular Delone and McLean (D&M) IS success model [8,9] was adopted with multiple attributes that accounted for ERP as a specific IS investment. The work went beyond implementing a D&M model specification by applying it as a concrete measurement model. A number of questions were developed as hypotheses to analyse the effect of observed IT governance practices on ERP value delivery. To support the analysis, I drew on data gathered from an independent, empirical survey undertaken in Austria for small to medium and large enterprises in order to include size-specific considerations. The Austrian case can be seen as a good example for a well-developed region within the European Union. In this sense, results should be applicable to most of the 25 member states.

## 2. Research background and research hypotheses

### 2.1. IT governance

The critical role of IT in enterprises has led to the view that IT governance must be managed to support or enable business objectives and mitigate risks associated with IT implementation [4,23,26]. IT strategic planning has received growing emphasis and is a major component of IT governance [11], which can be seen as a holistic strategic controlling framework for effective and efficient use of IT. Legacy software and infrastructures must be transformed into well-defined services to facilitate future business models and

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legal needs. Business management needs to trigger organizational change, establishing a new organizational structure. Consequently, any ERP initiative can be viewed as a strategic IT decision adding value to the firms' IT/IS infrastructure and that it should be safeguarded by effective IT governance methods. In addition, the legal and regulatory responsibilities of top management are evolving and becoming more complicated.

## 2.2. A characterisation of ERP

ERP can be viewed from a variety of perspectives: as a software product, an infrastructure, from a vendor or user viewpoint, etc. Here, ERP is considered to be both a commodity and a management concept that seeks to map all major processes and data into a comprehensive integrative structure. It is a software package that is customizable without much programming effort having pre-configured templates that allow it to target an anonymous market. Typical business processes are generally supported across business units and functions in a seamless way. Thus, ERP packages are complex software applications having some difficulties in their implementation. The operational challenges associated with ERP implementation and on-going usage can easily dominate the user's perception of ERP. I focused on a conception-centric view of ERP, rather than a technical or IS oriented one. The ERP implementation must be based on an understanding of the processes used by the firm and should provide the basis for future processes.

To assess ERP value or success, a model was developed. An ERP system has many stakeholders. Thus, different actors define its success differently [13]:

- From an implementer's perspective, it entails adherence to projected resource commitments and developing specifications for particular functional objectives.
- From a vendor's perspective, the implementer must carefully consider follow-up investments.
- From an end user's perspective, the ERP system should improve job performance while being usable and satisfying.
- From a manager's perspective, it should be effective and efficient in supporting business objectives.

Measurement of ERP success also depends on time spent for implementation [17]. However, ERP success criteria defined in the early stages will not capture the entire scope of ERP related success during use and later periods. Case-based studies have shown that an ERP implementation claimed to be successful can become a failure [14]. I believed that ERP success was multi-dimensional covering aspects related to strategy and business. This business perception of ERP differed from that of IS in general and proved difficult to measure.

## 2.3. DeLone and McLean's IS success model

The assessment of economic and organizational benefits is a difficult task. Several models have been developed to examine how firms utilize IT capabilities, e.g. [15,16,29]. These concentrate on the rationale behind IT adoption, but cannot provide a holistic picture of adoption success. A widely adopted model of IS success concentrated on its multi-dimensional and interdependent nature: the DeLone and McLean's (D&M) IS success model. The purpose of the original model was to synthesize work involving individual measures into a single coherent model. This was based primarily on work reported in [18,22] and empirical IS related studies. The model contained six IS success factors: (1) "system quality", (2) "information quality", (3) "use", (4) "user satisfaction", (5) "individual impact", and (6) "organizational impact". Based on a

large volume of contributions since the original model was published (referenced in nearly 300 articles), the authors revised their model. Quality was considered to be a three-dimensional construct (information, system, and service quality), each measured and controlled separately. Those quality dimensions singularly or jointly affect intention to use, use, and user satisfaction. As a result certain net benefits occur.

The purpose of my study was to view ERP success in the usage stage after its implementation. Important social actors of this stage are end users, technical administration, and business and IT management personnel. All of these are involved in the D&M (updated) IS success model. The multi-dimensional approach with suitable perspectives justified its use.

## 2.4. Research hypotheses

Whereas the direct influence of management practices on the configuration of IT is known, their direct effects on IT utility and firm performance remain unproven. I focused on the direct link between managerial practices and ERP value. In general, business management acquires resources directly or indirectly by finding appropriate partners, investors, and advisors. Firms with developed and diverse management skills can undertake more promising competitive roles. SMEs often show a relatively unclear distribution of responsibilities in management, a lack of formal structure, strategic limitations due to short-term time frames, and a lack of managerial experience. Consequently, it is necessary to emphasise the importance of building management competence in SMEs [12].

I hypothesized that ERP success increased with implementation of key IT governance practices. More specifically, the considered practices comprised of the employment of an IT/IS strategy; the achievement of strategic alignment; the development of a selection goal hierarchy based on fundamental strategic objectives; management commitment to the whole project; and the installation of a participative form of decision making and implementation that included all major stakeholders. All facets were considered as managerial key practices in strategic IS decisions [24,28,30]. Accordingly, I enunciated the following hypotheses:

**Hypothesis A.** ERP success increases if firms have an explicitly defined IT/IS strategy.

**Hypothesis B.** ERP success increases if companies pursue strategic alignment.

**Hypothesis C.** ERP success increases if a strategic concept drives ERP evaluation.

**Hypothesis D.** ERP success increases with top management commitment to the whole project.

**Hypothesis E.** ERP success increases if a participative form of decision-making is employed.

**Hypothesis F.** ERP success decreases if the project team is dominated by business management.

**Hypothesis A** assumes a clear understanding of the strategic goals of the company. In terms of any major business investment, there must be a clear definition of goals, expectations and deliverables [1]. The decision maker, controller, and auditors need to know why an ERP system is being implemented and what critical business needs it should address. However, the strategic focus of the firm is often vague or undefined. Consequently, my study began by analyzing whether companies with a defined IT/IS strategy achieved greater ERP success.

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