A methodology for ERP misfit analysis

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Abstract

Commercial off-the-shelf ERP systems have been adopted by many large companies to support their inter- and intra-business processes. Midsize market firms are now also investing their use. However, research has indicated that about three quarters of attempted ERP projects are unsuccessful: a common problem encountered in adopting ERP software has been the issue of fit or alignment.

This paper presents an ERP selection methodology, grounded in task-technology fits theory, for measuring, at a high-level, the misfit between ERP candidates and the enterprise's requirements ex-ante implementation. With this approach, organizations can more easily and systematically determine the locations of possible misfit and their degree of importance, thereby understanding the risk in their implementing an ERP. Our research thus contributes practical solutions to the problem of misfit analysis and ERP package selection.
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1. Introduction

Today, companies are seeking competitive advantages through the use of COTS systems, such as ERP, rather than building systems in-house in an attempt to reduce operating costs, increase productivity, and improve customer services [26,46]. According to Gartner research, new license revenue for ERP will reach a compound annual growth rate of 6.3% by 2009 [7].

An ERP package is a large COTS configurable system that integrates several business functions. A typical ERP package may combine inventory data with financial, sales and human resource data, allowing organizations to price products, produce financial statements, and manage human, material and financial resources [27,43]. ERP software costs millions of dollars, several times as much to implement, and often requires disruptive organizational changes to implement [39,48].

ERP system implementation is complex, involving technology innovation and change management and it has been estimated that about three quarters are unsuccessful [16,30]. A common problem results from misfits: the gaps between the functions offered by ERP and the adopting organization's requirements [15,22,31]. The misfit types can be clustered into four categories: goal, functional, data and output. Better understanding of these provides insight into ERP

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selection decisions and thus reduces the risk of project failure [17].

While few authors have investigated the nature of ERP misalignment [40,47], there are even fewer that have provided empirically grounded heuristics and insights into ERP selection. Therefore, the aim of our research was to present an ERP selection methodology that addressed goal, functional, data, and output misfits for use in an organizational environment. The validity and value of the proposed method were demonstrated using a case study.

2. COTS system development process and ERP selection

2.1. The COTS system development process

The COTS development process is different from traditional software development and presents many challenges. The main differences occur in the requirement definition, COTS selection, high-level design, integration, and testing phases. Among these differences, poor product selection results in some of the blame for failure; an example provided by Maiden and Ncube [24] illustrated this while suggesting that COTS selection was a key decision that impacted all subsequent phases and overall project success. Indeed, they proposed an iterative COTS-based software development process that included direction, requirement, system design, system integration and evaluation phases. The direction phase determined the high-level process objectives. The requirement phase acquired models and validated functional and nonfunctional requirements. The system design phase specified the functional and physical architectures and defined the hardware and software design to meet the requirements. The system integration phase involved product acquisition, prototype integration and integration testing. The integrated system was then to

be evaluated against risk and cost criteria. However, little attention was paid to user requirement analysis and systematic support in guiding the selection process.

2.2. ERP selection

Several approaches, e.g., from a financial, socio-technical or functional perspective, have been developed to help select software packages [6,9,43]. Table 1 illustrates these approaches. The financial perspective is based on cost savings and quantifiable implementation benefits. Evaluation methods include Net-Present-Value, Cost–Benefit Analysis, Payback, Return on Investment, etc. [1,13,42]. This approach expresses everything in monetary terms. If the present cash inflow value exceeds the present cash outflow value, including initial capital investment, there will be a positive net present value and, thus, acceptance of the investment. However, in ERP selection, it may not be possible to express everything in dollar figures. Further, ERP implementation is fraught with complementary investments that are intangible and difficult to measure [3].

A number of researchers have shown that normal accounting-oriented, cost–benefit analysis is unable to evaluate IT/IS effectively [8,20]. There is now a belief that the financial perspective does not provide a sufficiently good evaluation of the potential and costs of an ERP system. The critical challenge of ERP implementation is mutual adaptation between the IT and the social organization [18]. Serafeimidis and Smithson [37] argued that the evaluations would be improved by using a perspective that included content, context, and evaluation processes. They broadened the scope of conventional evaluation methods to include the context in which the evaluation took place and the process by which the evaluation was performed.

With respect to the functional perspective, the fitness of the system to the task is the major concern when

Table 1
Previous research of ERP selection approach

Perspective	Feature	Method
Financial	Evaluate the ERP based on direct cost savings and quantifiable software implementation benefits	1. Cost–Benefit Analysis [43] 2. Net-Present-Value [2] 3. Pay-back-period [33] 4. Return on Investment [1] 5. Internal Rate of Return [1] 6. Accounting Rate of Return [42]
Socio-technical	Consider ERP systems as complex social and political entities. Evaluate the system based on content, context and evaluation processes factors.	1. Hughes and Jones [19] 2. Kefi [21]
Functional	Evaluate the ERP based on the package functions and task requirements	1. Map [31] 2. Accelerated SAP (ASAP) [5]