



## What is the value of an IT e-procurement system?

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### ABSTRACT

E-procurement is gaining in popularity in business practice and its benefits encourage its adoption for a variety of areas, including IT (Information Technology) purchases. The problem with assessing the value associated with e-procurement has been addressed by researchers and practitioners, but a clear methodology to determine the benefits related to e-procurement adoption is still missing, especially for IT. This paper defines e-procurement and identifies the six most significant drivers for e-procurement adoption, which are the pillars of the proposed value assessment methodology. The authors have also applied the developed methodology to real cases in order to verify its validity and robustness. Finally, although the developed model takes into account the peculiarities of IT purchases, it also raises more research opportunities for other purchasing categories.

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### 1. Introduction

In the last few years, purchasing through electronic means has rapidly become a successful and ever-growing reality. The Gartner Group reported that the total value of business to business (B2B) activities would exceed \$ 7 trillion by 2009, of which North America represents \$ 2.8 trillion, Europe \$ 2.3 trillion and Asia \$ 900 billion (Stefan, 2008). Of these B2B transactions, 24% are expected to be conducted electronically by 2009 (Stefan, 2008).

Another less recent but highly relevant trend shows that the IT industry has in recent decades become a fundamental part of modern economies (Cooper, 1990; Jorgenson, 2001). IT investment is considered unavoidable, especially given the globalisation of markets and sourcing processes, the necessity of outsourcing to focus on core businesses and the need to exchange growing volumes of information inside and outside companies that have made IT vital for the entire global economy (Jorgenson, 2001; Chae et al., 2005). Due to the global economic crisis, worldwide IT spending in 2009 is expected to total \$ 3.2 trillion, decreasing 5.2% from expenditures of \$ 3.4 trillion in 2008. However, it is forecasted that IT spending in 2010 will increase by 3.3% from 2009, reaching \$3.3 trillion (Gartner Group, 2009).

Along with e-procurement's rising popularity among businesses, its benefits have become widely recognised and scholars encourage its adoption for a variety of areas (Kheng and Al-Hawamdeh, 2002; Henriksen and Mahnke, 2005; Tatsis

et al., 2006). However, IT categories have attracted less attention than other production-related and non-production related categories of e-procurement implementation. Is this due to the fewer benefits that IT has to gain from e-procurement implementation, or are there other barriers responsible?

Based on such premises, the authors decided to focus on the following question: as IT spending increases among companies (Lin et al., 2005), how much value can e-procurement create in the IT purchasing process? Two groups, supply managers and companies willing to sell their goods or services through e-procurement, could be particularly interested in correctly estimating the benefits of a specific investment in e-procurement.

- On the one hand, supply managers need to prove the value of the investment and convince the Chief executive officer (CEO)/ Chief financial officer (CFO) or the board to approve it: it is no longer possible, in this period of worldwide economic crisis, to base the decision of an important investment simply on gut feelings. Now even the smallest investment (e.g., an e-procurement connection with a supplier) should be based on a sound business plan (Ballantine and Stray, 1998). In the past, many IT investments had a much more permissive approval process because they were strategic ("we cannot afford not to have an ERP system"), because they were trendy ("everyone has a website now"), or because there were major technological turning points (or other turning points, such as companies updating their obsolete legacy systems in anticipation of the millennium bug) (Mahmood and Mann, 1993).
- Another example are companies willing to sell their goods or services through e-procurement; being able to show their customers the benefits associated with e-procurement is a

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good commercial weapon, and e-procurement technology can generate an advantage over competitors as well as the ability to charge higher prices or lock suppliers in a stronger relationship.

A value assessment methodology would thus be a great contribution, not just from an academic point of view, but also to practitioners trying to assess the costs and benefits of a new solution for e-procurement. While it is true that in the literature one could find a number of approaches to the value assessment of information systems, few of them are devoted to electronic procurement and none focuses on e-procurement for IT categories.

With these motivations, this paper presents the results of an international research project aiming at assessing the value and benefits associated with IT purchasing through e-procurement and systematically develops the methodology. First, relevant approaches to the value assessment of information systems are discussed in the literature review and contributions concerning e-procurement in particular are addressed. As a matter of fact, the literature lacks updated and publicly available methodologies and no available methodology is devoted to IT purchases. Then, the research objectives and research methodology are introduced to further clarify the aim of the paper. In the next section, the value assessment methodology is shown and its theoretical and practical contributions are discussed. Also, by means of a case study, the validity and practical use of the methodology are addressed. In the end, the conclusion recaps the advantages of the methodology and highlights limitations and future research opportunities.

## 2. Literature review

### 2.1. Information systems (IS) value assessment

Value assessment results from the need of value-based management, which is a managerial approach oriented to maximise shareholder value (Arnold and Davies, 2000). The study on value assessment methodologies began as early as the 1950s (Ackoff, 1958). The basic typology of information systems evaluation can be ex ante, or pre-implementation, or ex post, or post-implementation. Ahituv (1980) generalises three

approaches to the evaluation of information systems: pragmatic assessment such as cost-benefit analysis (King and Schrems, 1978), theoretical evaluation on the basis of decision theory, proposed by several authors such as Ackoff (1958), Marschak (1971) and McGuire (1972), and a combination of the two, which creates utility functions for certain information problems and finds the system giving an optimal solution according to these functions (Ahituv, 1980).

Farbey et al. (1993) and Farbey and Finkelstein (2000) propose a classification of evaluation methodologies: quantitative/comparative and qualitative/exploratory methods. The former are called “objective” methods and provide a quantification of costs and benefits in economic terms and also allow the comparison of the costs and benefits of different information systems. These methods are usually based on conventional accounting methodologies to measure monetary benefits. Then there are qualitative/exploratory methods, which can be called “subjective” methods, which emphasise the importance of understanding the opportunities as well as the threats that the change may bring to some stakeholders, with the aim of obtaining an agreement over objectives through a process of exploration and mutual learning. Tables 1 and 2 show the classification framework advocated by Farbey et al. (1993) and Farbey and Finkelstein (2000).

Focusing on methodologies, Anandarajan and Wen (1999) build an ex ante methodology to evaluate information and communication technology (ICT) investments in the manufacturing industry. They take into account monetary benefits for different functions (production, marketing, etc.) and compare them with the costs of the solution to calculate a net present value, an internal rate of return and a risk evaluation of the investment. Their approach is based on a solely quantitative investment evaluation. Murphy and Simon (2001) build an ex ante model with the aim of evaluating the impacts of adopting enterprise resource planning (ERP) on company performance. The model uses a multi-criteria method and evaluates both quantitative and qualitative benefits, where output is shown according to the potential benefits that are achievable. By means of an analytic hierarchy process (AHP), Narasimahn et al. (2003) create a hierarchy model of benefits to evaluate different e-procurement systems. Dehlin and Olofsson (2008) fashion a model to measure the payback (ex ante and ex post) associated with the implementation of IT innovations in the construction industry. They adopt a multi-criteria method as well, considering

**Table 1**  
Quantitative/comparative methods (Source: adapted from Farbey et al. (1993) and Farbey and Finkelstein (2000)).

| Method                              | Detail                | Process management  | Data   | Features  |
|-------------------------------------|-----------------------|---|--|---|
| Cost/ revenue analysis              | Very detailed         | Accounting and costing staff  | Cost accounting and work-study method  | Focus on cost savings and cost displacement   |
| Return on investment (ROI)          | High                  | Calculation by professionals; tangible costs and benefits aggregated as cash flows                          | Tangible; direct; objective  | Ex ante and ex post ; future uncertainty is considered; middle to high cost   |
| Cost-benefit analysis               | High                  | Bottom up; carried out by experts; money values for decision makers by incorporating surrogate measures     | Cost and benefit elements expressed in a standard money value form; pseudo-objective | Ex ante or ex post ; cost-effective solutions; “external” and “soft” costs and benefits; numbers more important than process; high cost |
| Return on management (ROM)          | Low                   | Calculation by professionals; manipulates accounting figures to produce a residue—value added by management | Accounting totals (e.g. total revenue, total labour cost)                            | Ex post; no cause and effect relations can be postulated; utilisation of a formula; cheap   |
| Boundary values and spending ratios | Low; aggregate        | Top-down; senior stakeholders involved; calculation by professionals  | Ratios of aggregated numbers (e.g. IT expense per employee)                          | Ex ante or ex post ; supporting benchmarking analysis; cheap  |
| IE, information economics           | Usually very detailed | Many stakeholders involved; detailed analysis required  | Ranking and rating of objectives, both tangible and intangible                       | All options are comprehensively dealt with; rather complex  |

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