

IT Value in Public Administrations: A model proposal for e-procurement

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Abstract Recent studies have affirmed the necessity of a discontinuity in the method of investigating the value produced in organisations by IT. Existing studies have in common a prevailing (when not exclusive) attention paid to the private sector, as testified by the frequent use of income or financial indicators to measure organisational improvements. These approaches however cannot be directly applied to public utility organisations like Public Administrations. Taking into account this scenario, the present exploratory work looks at the analysis of IT investments in the public sector by identifying a viable approach to research in this domain. To move towards this objective, procurement management has been taken as the field to be observed, and an Italian public Local Healthcare Agency which has managed several e-procurement projects was analysed. This case represents a valuable context for examination and discussion because the outcomes of each project were evaluated in detail. A rich IT Value Model devoted to the private sector was adopted and discussed, and later some resulting adaptations were suggested, together with some hints and limitations.

Introduction

The existence of a positive correlation between investments in Information Technology (IT) and performance improvements in organisations (in terms of productivity, savings, or income) has often been taken for granted. However, the observa-

tion of the so-called productivity paradox by Brynjolfsson [1] made this statement uncertain and stimulated new interest in research into the strategic value of IT investments. Recent studies affirm the necessity of a discontinuity in this domain of research, by rethinking the method of investigating the value produced by IT [2].

The diversity in research methods leads to results that are hard to replicate in different contexts. Moreover, existing studies have in common a prevailing (when not exclusive) attention paid to the private sector. Such a tendency is testified by the frequent use of income or financial indicators to measure organisational improvements. These approaches cannot be directly applied in organisations operating for public utility purposes [3] such as Public Administrations (PAs). Actually, there are few studies investigating the relationship between investments in IT and value delivered to the stakeholders in this context.

Having in mind this scenario, the present exploratory work deals with IT value analysis in the public sector, and also identifies a viable approach to research in this domain. To move towards this objective, procurement management was taken as the field to be observed. The rationale for such a choice is the PAs' frequent recourse to e-procurement, which is seen as the most probable innovation to produce tangible value in this sector. Experiences and findings coming from an interesting context were used as a basis to discuss the IT Value Model by [4] and to draw a new one more suitable to investigate the public e-procurement domain.

The analysed context is that of the public Local Healthcare Agency (LHA) of Viterbo (Italy), which seemed pertinent to the research since this LHA managed several projects of IT-supported innovation to introduce e-procurement with the aim of gaining efficiency and cost reductions. Moreover, the outcomes of most of these projects were analysed in detail, and many studies were published over several years by different scholars, advisors, and consultants (while the public e-procurement topic is still neglected). Additionally, the Local Agency level is comparable with that of a firm, and is usually adopted in IT value assessment and also in the adopted model as the unit of analysis. Finally, the e-procurement is actually applied and produces real outcomes (if any) at the level of a single administration.

The paper is structured as follows: in the theoretical framework a brief litera-

ture review on IT value analysis, one of the most complete models for the private sector, and some definitions on e-procurement are introduced. Next, the adopted research methodology, a brief context description, and the research findings are reported. Then, the findings are discussed and the resulting adapted model suggested. Finally, some hints and limitations are proposed in the conclusions.

Theoretical Framework

IT value research [4] focuses its efforts on the paradox consisting in the lack of productivity improvements resulting from massive investments in IT [1]. Available research papers in this area analysed the topic with several approaches and methodologies [5], in the end highlighting that IT affects organisational performance [6, 7, 8]. Even if the paradox cannot be considered to be solved, at least there is consensus on factors and loci affected by IT investments [5, 9, 10].

Research efforts have often been concentrated on the identification of metrics and measures (see [9] and [5] for a detailed list of proposed ones) to assess performances, but their suggestions can hardly ever be applied to PAs since such indicators are drawn from profit oriented organisations [3].

The need to identify common traits among available studies is considered a necessary foundation for further progress on this topic [5]. With the aim of analysing value delivered by IT investments in PAs, we decided to start from the IT value framework defined in [4]. This framework was drawn by overlapping a series of 202 different IT studies available in the literature which had as their core matter the IT value generation process inside organisations. The model derived from this research, relying on a Resource Base View (RBV) theoretical perspective, places three layers behind such process. It identifies the locus of IT value creation as the *focal firm*, but it also stresses the relevance of the *competitive environment* and the *macro environment*.

Proposing the framework (depicted in Fig. 1), the authors affirm that IT impacts organisational performance via intermediate business processes, with the

support of other organisational resources that may act as mediator or moderator, and under the influence of the external environment. At the same time they highlight the importance of disaggregating the IT construct into its meaningful sub-components.

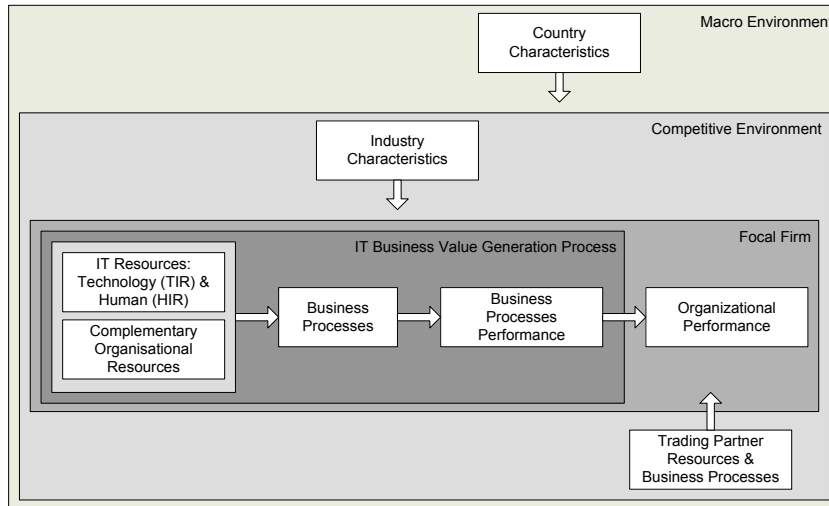


Fig. 1. IT Business Value Model [4]

The focal firm is the domain affected by the IT investment as it represents the organisation acquiring and deploying the IT resource, and for this reason it has to be identified in every analysis. This layer includes the *IT resources*, *complementary organisational resources*, *business processes*, and *business process performance*, which all together are components of the *IT business value generation process* and the *organisational performance*. The *competitive environment* is the specific context where the focal firm operates. This environment is divided into two elements: the *industry characteristics* and the *trading partners resources & business processes*. Finally, the *macro environment*, mainly focused on *country characteristics*, includes country and meta-country specific factors that shape IT application for the organisational performance improvement.

With the intent to apply this framework to a Public Administration, adaptations may be required. The IT business value generation process is, among all, the part

probably requiring fewest modifications, even if metrics and measures may need to be adapted. The last component of the focal firm layer (organisational performance) is more problematic, as all the income or profit indicators are unsuitable for PAs. The competitive environment may also require some attention, as it is disputable whether a PA may work in a competitive environment or not. Moreover, the environment where a PA operates is probably animated by a different set of agents that may have an influence on the focal organisation differing from that possibly exercised on a private company by other actors in the same position. Finally, the Macro Environment layer might be relevant only when PAs from different countries are taken into consideration.

As regards procurement, following other studies [11, 12], in this paper it is intended as a broad process that starts with a need for a good or service and ends with its use and the payment for its supply. According to this statement, the term *e-procurement* indicates the organisational solutions supported by Information & Communication Technology (ICT)-based tools that allow electronic forms of procurement, which are potentially more effective and efficient than traditional ones, where a more or less broad and profound process redesign is required [13]. E-procurement solutions include tools in two areas, which must be jointly used to streamline the whole procurement process:

- *e-purchasing*, which includes very different tools supporting the purchasing phase, from finding a product to invoicing and payment, to be entirely managed through on-line tenders (*e-tendering*) or *marketplaces* and *electronic catalogues* (*e-requisitioning*), electronic invoice exchange and processing (*e-invoicing*), and liquidation activity (*e-payment*);
- *e-logistics*, which aim at optimising the management of inventories and internal goods flows on the basis of Intranet/Extranet technologies, integrating Supply Chain Management (SCM) solutions linking both internal and external players.

E-procurement in public healthcare can be considered as a highly representative domain which comprehends the same domain in other PAs since in healthcare [13]:

- structures deliver more critical and specialised services in comparison to the rest of PA, and safeguarding high quality standards for many purchased goods is paramount;
- spending has a more composite structure, which includes standard supplies for the whole PA, together with highly specific purchases (e.g. operating room specific devices);
- the market involves about 500 thousand highly differentiated suppliers (multinationals, mid-size national companies, and local SMEs).

Methodology

The present research paper is based on the analysis of a set of individual studies focused on the organisational and performance consequences related to the implementation of e-procurement in the LHA in question. This analysis took into consideration about 35 research documents (only partially cited here due to lack of space; a complete list is available upon request from the authors). Each study has undergone a text analysis covering its content and results, in order to establish whether it had to be included. We mainly focused on measures, indicators, and agents involved in the IT investment/innovation processes, both inside and in the environment around the organisation representing our present Focal Firm.

Case Description

The considered LHA is a public structure and provides healthcare services to the province of Viterbo. With the aim of gaining efficiency and reducing spending on goods and services procurement, since 2000 the LHA has managed several experimental projects on e-procurement, whose results were evaluated in detail in order to assess savings (both on final and on administrative costs) and to make the best decision on their definitive adoption. The results were remarkable, even though different in nature and dimension, taking into account the obstacles met (techno-

logical, organisational, and also normative) as for any innovation [14]. After the pilot experiences, since 2004 the LHA has launched an extensive programme to innovate the end-to-end procurement process through the implementation of the best tested solutions. The outcomes of the first steps of this phase (which is still ongoing) were also assessed in detail [14]. The analysis of reports following each project test is summed up in Table 1.

Table 1. Characteristics and used metrics of the projects carried out by the LHA of Viterbo.

Project	Year	IT contents	Resources & processes	Role of the environment	Metrics used in the assessment
Marketplace	2000	Healthcare specialised marketplace test.	Purchases unit (part of).	Marketplace owner (also sponsor). Other healthcare structures participating in the test.	Savings on final costs.
Public Electronic Catalogue	From 2002	E-catalogue accessible via Internet.	Purchases unit (part of). Change of internal rules and above-threshold tendering process.	CONSIP (Italian Central Procurement Agency) which created and manages system on the basis of new laws. Suppliers admitted by CONSIP.	Comparison of past/actual: – Effort in purchasing (standard and range) – Elapsed time in purchasing (standard and range) – Number of roles and offices involved – Number of tasks performed.
MEPA	From 2002	Wide-scope marketplace with special functions for requesting	Purchases unit (part of). Change of internal rules and below-threshold tendering and direct purchases	CONSIP: created and manages system on the basis of new laws. Suppliers of goods/services included in MEPA by CONSIP.	Comparison of past/actual: – Effort in purchasing (standard and range) – Elapsed time in purchasing (standard and range) – Number of roles and offices involved – Number of tasks per-

		and submitting tenders.	processes.		formed
E-tenders (test)	2003	Platform for e-tender.	Purchases unit (part of).	Provider of the platform IT consultants.	Elapsed time reduction.
E-logistics	2003	Intranet/ Extranet platform for SCM.	Purchases unit (part of). Warehouses and internal departments in receipt of SCM process.	Logistics outsourcer. CONSIP (as advisor). IT consultants. Suppliers of goods.	Comparison of past/actual: – Savings on fixed and financial inventory costs – Elapsed time in supplying – Number of positions removed in the warehouses
Operating room e-procurement	2003	Intranet/ Extranet platform for SCM.	Purchases unit (part of). Warehouses. Wards. Specific procurement process.	Supplier/logistics outsourcer. IT consultants.	Comparison of past/actual: – Savings on fixed and financial inventory costs – Effort in inventory management – Savings in administrative costs.
E-tenders (actual)	2004	Platform for e-tender.	Purchases unit (part of). Change of internal rules and tendering processes.	Provider of the platform. IT consultants. Suppliers ready for e-tenders.	Comparison of past/actual: – Effort in purchasing (standard and range) – Elapsed time in purchasing (standard and range) – Number of tasks performed.

Discussion

Some considerations can be pointed out by reading the LHA e-procurement history. In all the innovations, even when based on a really fresh IT tool (often this LHA was a first-mover), the process re-design had a relevant part, which was of-

ten highly constrained by laws and rules. The effort required to internal *human IT resources*, if it existed at all, was always very poor, since most tools were based on Internet/Intranet technologies and were provided and managed by an external provider. External agents were many and their role was always relevant. The performed assessments denote a high interest in evaluating savings (on staff and administrative costs overall), speeding up processes, and workflow simplification. We can also formulate further remarks by applying all the aforementioned framework components.

The IT business value generation process does not need changes. The evaluation of the business process performance required the adoption of specific indicators that rely on the passive side of the financial cycle: the focus is mainly on cost reduction and time and effort savings. Remaining at the focal firm level, the impact of business process performance on organisational performance cannot be taken for granted in the context of PAs, as efficiency improvements at the organisational level (i.e. reduction in the number of employees involved in a process) do not easily turn into value, as real value is capitalised only when these resources are allocated to new activities or moved to other positions (improving the services offered) or even removed (yielding actual savings in the balance sheet).

Given the perplexities mentioned in the theoretical framework on the role of the competitive environment for a PA, it is indubitable that the focal PA is immersed in a totally different environment to that of a private company. We therefore suggest calling it the *sector environment*, as it groups all the agents and organisations that a PA may be in contact with. Organisations animating this sector environment may be in the position to facilitate or impede the IT innovation process of the focal PA. We propose to group the subjects animating the Sector Environment of a PA according to the hierarchical position they may have in relation to the focal PA. In this case we can identify two groups which become two components of the layer: *partners* (in trading partners resources & business processes) and Institutions (in the *institutional sphere*, instead of the former industry characteristics). Partners are normally in a peer hierarchical position in relation to the focal PA. Nevertheless, they can have a real impact on the IT value. They may pro-

mote IT innovation in a PA by introducing software and methodologies and then playing the enabler role. On the other hand, they may not be able to support innovation, because of a lack of skills, structures, or technology, or may even block it, showing opportunistic behaviours or resistance to changing the established market state. Among institutions, first of all Agencies may be strong drivers in IT value creation. As CONSIP did in our case, they can further innovation through the arrangement and even the management of shared IT/organisational resources that will be employed by focal PAs afterwards. This is the case of the Public Electronic Catalogue or the MEPA, whose resources are shared among several PAs at the Focal Firm level. In the same area we can also find other institutions that may have an even stronger impact on the focal PA, being in the position of lawmakers. These bodies (such as the Ministry of Economics) can both foster the innovation (e.g. by giving more funds to PAs or Agencies to enable them to use IT in their processes) or prevent it (e.g. by freezing expenditures).

Finally, the macro environment is probably the least evident level in our empirical setting. Anyhow, we argue that the macro environment could affect the process of differentiating among PAs of diverse countries. For example, PAs from different European Union member states possibly rely on different stocks of funds and different IT infrastructures that may impact the IT value generation.

Conclusions

This research paper discusses the application of an IT value generation framework available in the literature [4] on the public e-procurement context. The analysis of the innovation history of the LHA of Viterbo contributed to identifying the need to adapt this framework for application in this sector. We highlighted the need to identify proper indicators and measures to assess process and organisational performances inside the focal PA. We identified the role and the position of institutional agents and partners that animate the Sector Environment external to the focal PA. We argued that the Macro Environment is not relevant in our case, but

should however be considered when making a cross-country analysis of PAs.

We also suggest that, although related to the e-procurement process, the presented propositions could constitute a first basis for the development of a general framework to analyse also other IT innovations in the entire PA domain.

The LHA of Viterbo is an interesting case that has been analysed by many studies from several perspectives, but for its novelty it is still not comparable with others. This causes a limitation of this study, since it is based on an only organisational setting. Results may then vary when considering other PAs.

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