# TrivPlat - A monitoring, management and evaluation tool for electronic public procurement

### Isabel Ferreira
IPCA, Portugal
iferreira@ipca.pt
Centro ALGORITMI, University of Minho

### Sandra Cunha
IPCA, Portugal
scunha@ipca.pt
Research Centre in Political Science, University of Minho

### Luís A. Amaral
University of Minho, Portugal
amaral@dsi.uminho.pt
Centro ALGORITMI, University of Minho

### Pedro J. Camões
University of Minho, Portugal
pedroc@eeg.uminho.pt
Research Centre in Political Science, University of Minho

## ABSTRACT[1]

Bad decisions in public procurement processes have two negative effects: price increase of public goods and services with an impact on public expenditure, and adversely effects on competition, with the negative result of loss of efficiency and social welfare.

Electronic public procurement (EPP) has been considered an important tool for promoting competition, simplifying and ensuring transparency in decision-making processes, thus ensuring significant time and money gains. In Portugal, EPP replaced paper-based pre-contractual procedures for communication and processing based on information technologies and systems.

Interested in this phenomenon, the authors of this paper structured the TrivPlat project, a tool of free access for monitoring, managing and evaluating electronic public procurement.

This paper aims to present the TrivPlat project and its contributions to the discussion about additional efforts needed to be implemented in order to efficiently promote a more transparent and accountable governance, in the defense of public interest.

## CCS CONCEPTS

[Social and professional topic]; [Professional topic]; [Management of computing and information systems]

## KEYWORDS

e-government, electronic public procurement, transparency.

## 1 INTRODUCTION

Literature has pointed the potential of the TIC in the development of new public governance models that promote transparency and accountability [1][2]. In this context, public procurement has an important role because it represents a large amount of public expenditure [3].

With a focus on transparency, governments have made efforts to implement electronic public procurement (EPP). Considered as important tools of digital governance. Among other advantages, public procurement has the potential to promote competition, more open decision processes, reduce corruption and reduce administrative burden.

In Portugal, EPP replaced paper-based pre-contractual procedures for communication and processing based on information technologies and systems. The organizational gains are recognized, particularly in the European context [4]. However, e-procurement platforms have limitations, which result in a set of constraints to evaluate the impact of public procurement in the creation of public value. Additional efforts are required to efficiently promote a more transparent and accountable governance, enhancing thus the creation of public value through ICT.

Interested in this phenomenon, the authors of this paper defined and structured the TrivPlat project, a tool of free access for monitoring, managing and evaluating electronic public procurement.

Briefly, this paper aims to present the TrivPlat project and its contributions to the discussion about additional efforts that are needed to be implemented to efficiently promote a more transparent and accountable governance, in the defense of public interest. It is intended, therefore, to contribute to the provision of information related to electronic public procurement and its perception, increasing transparency, promoting rational management of public resources and fighting corruption.

Following the article framework in the current Section, Section 2 focuses on EPP and, among other matters, its impact on governance. The TrivPlat project is presented in Section 3. Finally, in Section 4, the main results of TrivPlat are identified in the discussion.

## 2  ELECTRONIC PUBLIC PROCUREMENT

Public procurement in Europe accounts for around 1/5 of EU's GDP (EU, 2014) annually. In the OECD it represents 12% of the GDP and is estimated to be around €4.2 billion in 2013 [3][17]. Poor management of public procurement harms competition and increases prices of goods and services, affecting public expenditure and taxpayer revenues [5][6][7][8].

EPP is a crucial initiative of Governments' strategies given its impact on economic development [9][10][11][6][12][13][14]. Relevant investments are made by Governments to implement EPP, a tool to promote competition, foster more transparent decision-making processes, reduce corruption, diminish bureaucracy and allow time and money gains [4].

Benefits related to the use of information technologies in public procurement are: (i) simple and efficient method of purchase, allowing reduction of costs; (ii) more efficient identification and negotiation with suppliers; (iii) automation of workflows that can be extended to allow sharing of information and integration; (iv) processing of orders, monitoring and control of acquisition activities; (v) transformation of the method to conduct pre-contractual processes; (vi) enhancement of transparency between public bodies and the market; (vii) support in decision-making; and (viii) creation of open markets where suppliers can compete taking advantage of the government's ability to obtain dynamic prices of goods and services, improving efficiency [12][15]. These benefits may be financial gains and organizational gains, with impacts on governance refinement.

The European Commission [10] identifies a set of problems that create barriers to EPP adoption and to transnational participation: (i) inertia and fear of contracting entities and suppliers; (ii) lack of regulations in EPP processes; and (iii) costly technical requirements.

Effective use of EPP involves development of technological tools, namely EPP platforms, which are an IT infrastructure that supports pre-contractual procedure phases legally envisaged for public expenditure. Development of Public Procurement Platforms (PPP) is handled by platforms managing entities, which

are in charge of technical management of system and computer apps necessary for electronic formalities, guided by vectors of security and confidentiality, safeguarding public interest. They may be public, private or public/private entities.

Costs of technological development include costs of EPP platforms adoption by contracting entities and costs of adhesion by suppliers, plus maintenance costs, which may vary [10]. Also, costs of licenses, internal and external resources, security systems, implementation and maintenance, integration solutions, process design, configurations and customization, training and communication [9]. Financial risk, development risks and legal issues are crucial factors in EPP projects [16]. Amaral et al. [11] identify a set of factors for EPP to minimize the impact of those obstacles: (i) implementation of a purchasing reengineering model to achieve cost savings; (ii) integration of electronic purchasing systems with back-office systems; and (iii) business process redesign.

European Commission considers EPP technology has not provided expected solutions, however, investments in technological capacity for public procurement, like development of electronic platforms, have increased. Portugal is an exception on complete dematerialization of contract formation processes [10].

In Portugal, EPP introduction has brought gains [17]: (i) transparency; (ii) competitors trust; (iii) construction of organizational memory; (iv) competition; (v) information management; and (vi) cost reduction.

All technological development tasks are undertaken by private entities, which assume all risks of technological project development [16][17]. However, performance of management entities do not always act adequately and some platforms operate without GNS accreditation or IMPIC licensing.

Introduction of PPPs has led to organizational changes and adoption of new procurement methods and strategies. There are also constraints caused by limitations in existing platforms in the Portuguese market [4]. Limitations like: (i) restricted view of organizational competency "managing public procurement"; (ii) lack of a cross-cutting view of the "managing public procurement" competence; (iii) fragile organizational culture and understanding; (iv) disarticulation between legislation and platform functionalities; and (v) technological solutions. The technological pitfalls are: (i) direct adjustment procedure and transparency paradox; (ii) case of qualified digital signatures; (iii) unqualified digital certificates; and (iv) high costs in access of platforms, diversity of work environments and functionalities of support to proceedings.

The limitations create problems for the competition principle, with particular impact on small and medium-sized enterprises. Who loses is the public purse and public interest. When a contractual procedure is initiated there is public interest to be guaranteed. There must be instruments that allow better management of public resources, crucial for decision-making.

It is critical to implement measures capable of technologically develop solutions more appropriate to the real needs of contracting entities and suppliers, eliminating technological limitations and pitfalls. Changes introduced by CCP should also

be assessed, which is relevant especially at a time when Portugal is transposing the new Community Directive on EPP to a national level.

## 3 TRIVPLAT - A TOOL TO MONITOR, MANAGE AND EVALUATE ELECTRONIC PUBLIC PROCUREMENT

### 3.1 Background

Notwithstanding advances recognized in Portugal, some problems persist that are symptomatic of the fragility of the public purchasing platforms market in Portugal. Promotion of a more competitive and transparent market for platforms is therefore decisive for a more open competition and its direct consequences on the economy.

The objective of this project is the development of an electronic tool, of free access, to monitor, manage and evaluate electronic public procurement, TrivPlat, structured in the following aspects: (i) to compare and evaluate public procurement platforms operating in Portugal, based on pertaining information, namely the functionalities and services provided, usability, turnover, costs for contracting entities and suppliers, users degree of satisfaction (a form of a trivago of public procurement platforms); (ii) to provide information on public procurement (electronic public procurement observatory), namely: who buys; what one buys; how regularly one buys; types of procedures adopted; proposal evaluation models; suppliers evaluation; (iii) to create an index of electronic public procurement (electronic public procurement measurement instrument); and (iv) to establish and stimulate a network of good practices (case studies and tutorials).

### 3.2 Research plan and methods

To achieve the desired result, and in order to guarantee discipline, accuracy and transparency, it is adopted the design research as the research methodology [18][19][20][21][22][23]. Design Research is a form of research that aims to add knowledge associated with artifacts created, oriented to a purpose, answering to a felt necessity in real context [18]. Offermann et al. formalized a research process, structured in three stages: (i) identification and understanding of the phenomenon; (ii) solution design; and (iii) evaluation and construction of the artifact [24].

Thus, based on (i) the motivations for the study in this project; (ii) the objectives; and (iii) the expected result; and in order to guarantee accuracy and practical relevance following the guidelines presented by Offermann [24], the research project is structured in three main phases combined to obtain empirical evidence: a qualitative multi-method approach, information collection and analysis techniques. In a simplified way, TrivPlat platform development will occur in 3 major activity phases that will follow each other during the period of 36 months: diagnosis of the public procurement process in Portugal with focus on public procurement platforms; platform conception and its implementation.

This approach of phases and activities is presented in the following three phases:

### 3.2.1 1st phase − Diagnosis:

EPP generally means substituting paper-based pre-contractual procedures for communication and processing based on information technologies and systems [10][14]. However, there are also potential problems that may hinder electronic public procurement adoption and, hence, transnational participation in electronic public procurement procedures [10]: (i) inertia and fear by contracting authorities and suppliers; (ii) lack of standards in electronic public procurement processes (suppliers confronted with an electronic public procurement architecture composed by different platforms and devices); and (iii) costly technical requirements, especially for tenderers authentication.

The goal of this diagnosis phase is to achieve detailed knowledge of public procurement procedures, on the one hand, and of electronic platforms effectiveness to achieve their ends, on the other. In methodological terms, this knowledge will pass by the usage of 3 methods: i) collection and systematization of legal rules that govern public procurement procedures; ii) 15 structured interviews with key players in the procurement process; iii) collection and comparative analysis of public procurement data in EU countries.

Qualitative research interviews are presented as a specific form of conversation on a particular topic. They are one of the most crucial data collection techniques in qualitative research. Interviews allow, through human interaction, the attainment of information on what interviewees think about a real specific subject and/or organizational subject, which allows learning from their descriptions and experiences. It is the researcher's responsibility to interpret and to respect the meaning associated with their descriptions and language. The role of the interviewer is to listen, encourage, register and interpret [25][26][27][28].

### 3.2.2 2nd phase - TrivPlat Platform Design:

Based on results obtained and knowledge generated during the diagnosis phase, the second phase focuses on model design, supporting a creative process of detection of fundamental themes and categories, based on careful judgments about what really is relevant and meaningful on empirical evidence [28].

Model definition and knowledge collection associated with the research purpose inherent to this research stage are presented as the main results of this research process, in design research. Following the assumptions inherent to the adopted strategy, to make the generated knowledge scientific, it is crucial to proceed with its model validation and, later, artifact construction (TrivPlat platform).

In order to validate the model, semi-structured interviews, conducted to entities of renowned professional and academic experience in the area of electronic public procurement, are conducted [25][26][27][28].

Technically, a semi-structured joint interview was conducted, i.e., the conversation was not conducted in a total open or strongly structured manner, as in a questionnaire. It was thus conducted focusing on the research theme and practical relevance of its study, including some previously defined issues, while new issues were emerging during the conversation [25][26].

In this context, based on the model created as well as the knowledge oriented to the purpose of investigation, conduction of interviews is based on observation of the following elements of validation: (i) success of the artefact; (ii) generality; (iii) novelty; and (iv) explanatory ability [18].

### 3.2.3 3rd Phase - TrivPlat platform implementation

The implementation phase involves development of the computer application according to requirements defined during the previous phase, by its test through a pilot study in a public organization to be identified. Implementation will continue with platform certification and patent registration.

Once validated its operation, the platform will be presented publicly.

## 4    MAIN RESULTS AND DISCUSSION

TrivPlat is a project defined and presented by the authors of this paper, from differents fields of research, to the european funding throught Portugal2020 programm. It is a tool of free access for monitoring, managing and evaluating electronic public procurement in Portugal. Structured in three phases of intervention, TrivPlat may contribute to improve provision of information related to electronic public procurement and its perception, increasing transparency, promoting the rational management of public resources and fighting corruption. Thus, it will contribute to more efficient public procurement, increasing confidence in public services and improving information on public procurement, key elements for a more informed, open and participatory society, responding to one of the current concerns of citizens, whether if their money is well spent.

In addition, it promotes innovation in the public sector and social innovation, since it is a tool for enhancing transparency and economic competitiveness.

## ACKNOWLEDGMENTS

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