

Chapter 5

An Open Source E–Procurement Application Framework for B2B and G2B

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ABSTRACT

Since the early 1980s, Open Source Software (OSS) has gained a strong interest and an increased acceptance in the software industry that has to date initiated a “paradigm shift” (O’Reilly, 2004). The Open Source paradigm has introduced wholly new means of software development and distribution, creating a significant impact on the evolution of numerous business processes. In this chapter we examine the impact of the open source paradigm in the e-Procurement evolution and identify a trend towards Open Source e-Procurement Application Frameworks (AFs) which enable the development of tailored e-Procurement Solutions. Anchored in this notion, we present an Open-Source e-Procurement AF with a two-phase generation procedure. The innovative aspect of the proposed model relates to the combination of the Model Driven Engineering (MDE) approach with the Service-Oriented Architecture (SOA) paradigm for enabling the cost-effective production of e-Procurement Solutions by facilitating integration, interoperability, easy maintenance, and management of possible changes in the European e-Procurement environment. The assessment process of the proposed AF and its resulting e-Procurement Solutions occurs in the context of G2B in the Western-Balkan European region. Our evaluation yields positive results and further enhancing opportunities for the proposed Open Source e-Procurement AF and its resulting e-Procurement Solutions.

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INTRODUCTION

Internet mediated purchase of goods and services has shown to contribute to increased transparency in private and public money spending, increased and open access to tendering information, faster processing of tenders, paperwork reduction, easier management of purchasing, and most importantly cost decrease of the purchased goods and services. According to market research reports e-Procurement can provide savings to the private sector (B2B) that account for 10% to 50% (Peria, 2003) where in the public sector these savings are escalated given the high purchasing volume associated with the public procurement. According to the European Commission during 2002, total public procurement (G2B) in the EU (i.e. the purchases of goods, services and public works by governments and public utilities) was estimated at about 16% of the European Union's GDP, equivalent to 1500 billion Euros (Europa, 2009).

However, although the automation, optimization and electronic mediation of the internal and external processes associated with the purchase of goods and services holds great potential both for the private (B2B) and public (G2B) sector, e-Procurement practices do not yet prevail today's economic system (Stephens, 2008). Research indicates that the expenditure related to the purchase, ownership and operation of such a system has and continues to be a key adoption barrier (Stephens, 2008; Kauffman and Mohtadi, 2004). Additionally, capital investment associated with software development has been identified as another significant barrier for the implementation of e-Procurement Solutions (Tanner et al., 2007) across B2B and G2B markets. In particular, electronic Public Procurement Solutions (ePP) in contrast to the private e-PP Solutions tend to be much more complex and advanced due to the fact that after a given procurement threshold value they must adhere to the legal and policy framework as this is defined by the European Commission (EC). This increases the required capital investment which

may be prohibiting Public Organisations with less available budget for internal development, such as local authorities, hospitals, education establishments, public museums, public agents in tourism or commerce, NGOs and other civic society associations, unless means for reducing it are found. Thus, if the capital investment associated with the development time and costs is reduced, then the production and adoption of e-Procurement Solutions would be accelerated by SMEs and Public Organisations.

Thus, could the software development process and underlying open innovation characteristics of the software technology used to deliver an e-Procurement Solution and enhance the lag in the adoption of such systems?

In this chapter we argue that both principles are critical and we propose a generic software development approach for e-Procurement practices which adopts Open Source standards and addresses the needs of the private (B2B) and the public (G2B) sector.

The remaining of this chapter is organized in seven sections. Section two describes the impact of the open source paradigm in the e-Procurement evolution, and considers the differences between e-Procurement Solutions and Application Frameworks (AF) under the open and closed source perspectives. The third section provides an overview of the traditional approaches of software development with focus to Model-Driven Engineering methodology. Section four introduces the reader to the proposed Open Source e-Procurement AF, which enables the development of Open Source e-Procurement Solutions. The fifth section provides the rational and a detailed description for the proposed AF pertinent to e-Procurement domain, following a hybrid approach of MDE, for the cost-effective and rapid development of e-Procurement Solutions. A process which entails a two-phase generation procedure is described in detail in section five. Section six presents the evaluation performed on the utilisation of the approach of software development followed by

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