Suppliers' E–Maturity for Public E–Procurement

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INTRODUCTION

Business transactions require involvement from both customers and suppliers. This is the case whether the transaction takes place on-line or off-line or whether the transaction is businesses to business (B2B), businesses to consumers (B2C), or businesses to administration (B2A). At the beginning of the e-commerce era attention focused mainly on business to business and business to consumer relations. Today attention has shifted and the possible commercial benefits resulting from e-commerce with the public sector are now also on the agenda (Andersen, 2004; Coulthard & Castleman, 2001). Regardless of whether e-commerce is performed in a private or a public context, it is commonly assumed that e-commerce can lead to shortening of transaction time, lowering of costs, increased transparency, improved sharing and maintenance of enterprise information, and an increased internal and external efficiency of the organization (Zwass, 2003).

In this article we will focus on and use the term e-procurement to refer to the use of electronic means in purchasing processes. These processes include seeking information about goods and services and ordering and paying of goods (Andersen, 2004). A number of issues concerning e-procurement have been studied recently. Among these issues is the required architecture of e-procurement systems (Liao et al. 2003), the tendering process in e-procurement (Liao et al., 2002), and the possible economic gains achieved from public procurement portals (Henriksen & Mahnke, 2005.

Common assumptions for these studies suggest a pool of suppliers willing to offer goods and services through e-procurement channels as well as a concurrent demand for goods and services in e-procurement channels among public sector institutions. In the Danish context there has been some reluctance to adopt e-procurement among the public sector institutions (Henriksen & Mahnke, 2005). Whether this reluctance to adopt e-procurement is caused by the classic problem of who is to embark the marketplace first: buyers or suppliers (Bakos, 1991) is still to be decided. In this article the focus is on the challenges that suppliers to public sector institutions face. In recognition of the broad scope of issues that suppliers have to consider when including e-procurement in their business activities, a model has been developed for assessing e-maturity. The model is designed to embrace two aspects of e-maturity: the technological aspect and the organizational aspect. Whereas this article is conceptual in nature, the proposed assessment model is empirical, estimated in earlier work by Henriksen, Kerstens and Andersen (2004b).

MATURITY MODELS FOR E-PROCUREMENT: FILLING THE ONTOLOGICAL VACUUM

The terms "maturity" and "immaturity" are often used to characterize a state of a given level in a continuous process. The terms are used relative to their objects, for example, "e-commerce is still in an immature state." This use of the term "immature" in relation to e-commerce creates an ontological vacuum since both the term and its object are somewhat fuzzy. The concept of e-commerce represents a plethora of aspects both related to organizational and technological issues as well as to business functions and supportive activities (Zwass, 2003). Adding the notion of maturity or immaturity does not strengthen the ontology of the concept. Some qualitative and/or quantitative measures to determine what characterizes different degrees of maturity are necessary.

There are a number of academic disciplines that use the term maturity and then develop maturity models as classification schemes. In the field of *software process improvement* the capability maturity model, a measure of maturity, is used to determine how structured the soft-

ware development process is (Paulk et al., 1995). Within the field of *business economics*, examples of explicit usage of the term maturity are found in the product life cycle concept (Lancaster & Massingham, 1993; Robson, 1997).

In the *information systems field* the term maturity is also familiar, for instance in the context of the "Stages of Growth model" (Galliers & Sutherland, 1991). The stages of growth model illustrates the organizational stage in a development process where the organizational usage of IT is measured. Whereas Galliers and Sutherland (1991) decomposed maturity into six stages with each stage characterizing the presence of particular attributes of the organization, the strength of the stages of growth model is in its focus on IT *and* organization. This overall typology of technology and organization is used as a point of departure in the further development of an e-maturity model where focus is on the organizational and technological capability and the readiness of suppliers to engage in e-commerce.

Before discussing some often used classification schemes based on maturity models, it should be acknowledged that not all researchers agree on the suitability of "evolutionistic" development models as a means for measuring IT capabilities in organizations (e.g., see King & Kraemer, 1984). Acknowledging this critique of maturity models, we stress that the four levels of our proposed model outlined in the following section do not appear as distinct stages in a practical setting. The four levels rather represent discrete points in a continuous development process in the organization. The four points should therefore be used as indicators for positioning the organization in the e-commerce landscape and not be regarded as absolute measures.

THE FOUR MATURITY LEVELS

Our proposed assessment tool has four levels reflecting the four *stages* of maturity. The first level of maturity refers to a situation where the supplier has not realized any need for e-commerce. No changes due to shifts in environment or technology developments have affected the behavior of the organization. However, due to pressure from business partners some e-commerce actions may have been implemented.

At the second level the supplier uses one e-commerce channel, often an e-shop. Limited resources are invested and only small organizational adjustments have been made. Most business routines are still carried out manually.

The third level is characterized by an explicitly formulated e-commerce strategy where critical success factors have been outlined. More channels are used and the organization has changed some business routines. In-

vestments in e-commerce are seen as opportunities for cost reduction and, at the same time, seen as a way to free resources for more service oriented tasks.

At the fourth level, the supplier uses several e-commerce channels. Individual customer support has a high priority. Manual routines are replaced by fully automated procedures. The aim is to achieve full integration of data internally in the organization and also to be able to provide integration of data to customers. E-commerce is now seen as a tool to increase customer and employee satisfaction.

THE PARAMETERS OF THE ASSESSMENT TOOL

Each of the four maturity levels is assessed through estimation of a series of parameters. In the subsequent sections the seven parameters of the tool for assessment of e-maturity of a supplier are presented. The parameters are primarily based upon Galliers's *stages of growth model* (Galliers & Sutherland, 1991) and upon the *CIVO-VIDS (abbreviations for capabilities, interactivity, values, orientation-volume, integration, depth, spread) variables* (Andersen, Juul, & Larsen, 2001; Andersen, Juul, Henriksen, Bjørn-Andersen, & Bunker, 2000). The parameters have subsequently been adjusted specifically to assess e-maturity with respect to e-procurement. Each of the seven parameters is divided into four levels of e-maturity where each level represents a certain degree of maturity ranging from *immature* to *mature* e-commerce commitment. The seven parameters are described briefly in the following sections.

The parameter *strategy* relates to the visions and goals of the organization. Strategy is typically outlined by top-management with explicit expectations towards e-commerce. *Strategy* is thus an indication of the ambitions of a supplier with respect to e-commerce. A clear strategy is essential for achieving success in connection with all projects involving major organizational change (Davenport & Short, 1990), especially in connection with e-commerce projects (Rajkumar, 2001; Kalakota & Robinson, 2001; Neef, 2001). Kalakota and Robinson (2001) suggest a classification of strategy based upon the attitude of management towards technological advances and new market opportunities. According to this classification, the attitude can be categorized as: *visionary*, *pragmatic*, *conservative*, and *skeptical*. These correspond to the four strategies outlined by Ackoff (1974).

The parameter *e-commerce model* is defined as the specific electronic relation used to connect suppliers to customers. Based on the degree of innovativeness and the extent to which the applied *e-commerce model* is

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