Fostering Networked Business Operations: A Framework for B2B Electronic Intermediary Development

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ABSTRACT

Long being seen as commercially unsuccessful after the dot-com era, interest in web-based B2B electronic intermediaries is again increasing in the light of globalization and cost-pressure on procurement departments of enterprises. Driven by increased profitability, these systems are getting more sophisticated. Based on a thorough literature-driven requirements analysis, this paper presents a state-of-the-art service-oriented reference architecture for B2B electronic intermediaries and provides scientifically grounded recommendations for developing such systems. The framework supports practitioners to create and further develop B2B electronic intermediary systems. It also serves as a basis for future design-oriented research endeavors in the field. The value of the presented artifacts is demonstrated by means of two use cases.


1. INTRODUCTION

In 2001, more than 1500 B2B electronic intermediaries were in operation (Ravichandran, Pant, & Chatterjee, 2007). However, many of them have since gone out of business or were sold to competitors. Day and Fein (2003) report that only 43% of the B2B electronic intermediaries in operation in 2000 survived and functioned in 2002. These survivors, however, have since become an indispensable component of various industry supply networks such as in the car, metal or chemical industry (Son & Benbasat, 2007a). Further, a recent report on the SCM software market of the Gartner Group states that market leader SAP had to accept a decline of 8.8% in revenues generated from SCM software in 2009, whereas Ariba, an operator of an industry-independent B2B electronic intermediary, managed to increase its respective revenue by 8.8% (Gartner, 2010), and is now operating profitable. Vendors such as Ariba are getting more experienced, and, as a result, their systems are getting more sophisticated almost by the day. In order to foster a more rapid development of state-of-the-art B2B electronic intermediaries in diverse environments, the work at hand presents a corresponding reference architecture based

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on a thorough literature-driven requirements analysis, and provides recommendations for the development of such systems. The framework provided by the work at hand supports practitioners to rapidly create and further develop B2B electronic intermediary systems. Besides, it serves as a basis for future design-oriented research endeavors in the field.

After this introduction, the next section details the research methodology. The section that follows provides a transitive closure of requirements on B2B electronic intermediaries. Based thereupon, a reference architecture for this class of systems is presented. Scientifically grounded recommendations for the development of B2B electronic intermediaries are then given. Two possible use cases for the presented framework are described. Finally, conclusions and limitations of the work are briefly described in the last section.

2. RESEARCH METHODOLOGY

As also depicted in Figure 1, the work at hand follows a design science research methodology (Hevner, March, Park, & Ram, 2004; Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007). Thereby, in the first step, a transitive closure of requirements on B2B electronic intermediaries was derived based on a structured Information Systems (IS) literature review. Peffers and Ya (2003) identified 326 journals that publish IS research articles, and the Index of Information Systems Journals (http://lamp.infosys.deakin.edu.au/journals/) lists 649 respective journals. Thus, due to the high amount of respective publication outlets in the field, a comprehensive literature analysis is illusive. In order to achieve a set of high-quality publication outlets to be considered for the requirements analysis of the work at hand, both the German Academic Association for Business Research’s JOURQUAL2 (http://vhbonline.org/en/service/vhb-jourqual/jq2/) and the official AIS ranking (http://ais.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=432) were used. Thereby, the 15 highest ranking journals of the JOURQUAL2 IS and Information Management and Electronic Commerce rankings were intersected with all AIS-listed journals that have 20 average rank points or less. The resulting set of journals includes ISR, MISQ, SIAM Journal on Computing, JMIS, ISJ, JAIS, INFORMS Journal on Computing, IEEE Transactions on Engineering Management, ACM/TDS, IEJEC and DATABASE. As the AIS does not include conferences into its ranking, the three highest ranking conferences of the JOURQUAL2 IS and Information Management and Electronic Commerce rankings were directly included. These conferences are the ICIS, ECIS and the ER Conference. The actual literature search covered the period from 2005 to 2009 and was conducted by searching the archives of each selected journal and conference manually. Thereby, every article potentially relating to B2B electronic intermediaries was included into a preliminary literature index covering most aspects of electronic commerce, e-business and inter-organizational systems. This rather broad index was first reduced by eliminating all articles with B2C or C2C focus, and then further narrowed by removing all articles not explicitly referring to B2B electronic intermediaries or respective synonyms (e.g., B2B electronic marketplace, e-market, B2B exchange, B2B electronic trading system, e-procurement system). The resulting set of 77 papers (Pflügler & Turowski, 2010) was then analyzed in search of requirements on B2B electronic intermediaries. If requirements were found, respective notes were taken. In a second iteration, for each note taken, the respective text passage was revisited, and the identified requirement was registered. Subsequently, the resulting set of requirements was consolidated. Thereby, multiple occurrences of a certain requirement as well as very similar requirements were aggregated. The resulting set of requirements was then structured as described previously. The results of the requirements analysis can also be found in Pflügler (2011). Based on the results of the requirements analysis, a reference architecture for B2B electronic intermediaries was developed. Thereby, Service-oriented Computing
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