Chapter 19
Semantic Web Applications to Enhance the Market Opportunities of SMEs:
The Case of NeP4B

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ABSTRACT

This chapter contributes to the debate on Semantic Web applications as business-enablers by focusing the perspective of smaller business users. A case study investigates the benefits and the challenges of adopting an inter-organisational Information System based on Semantic Web identified by the members of a consortium of small ICT firms which collaborate in the provision of end-to-end services to their clients. Besides the opportunity of increased turnover, also appropriate technical skills, availability of a critical mass of digitalised information, change management competencies and innovativeness play a crucial role in driving the success of Semantic Web applications. These dimensions should be carefully considered when assessing the benefits of technological innovations based on Semantic Web, especially when addressing smaller businesses.

INTRODUCTION

Inter-firm collaboration has become a recurrent leitmotiv in strategic management. Collaboration beyond the borders of a single organisation provides a solution for accessing specialised resources without incurring in high fixed costs and a tool for achieving otherwise precluded markets. Not surprisingly, firms have been devoting increasing efforts in developing dyadic or network relationships, eventually leading to a virtual or extended enterprise (Borders et al., 2001).

The development of collaborative capabilities is more critical for small and medium enterprises

(SMEs) than for larger firms, as the reduced availability of resources constraints the capability of SMEs to adjust to change and innovate (Ahern,1993). Internet and mobile technologies have soon been regarded as opportunities to increase inter-firm cooperation (Child & McGrath, 2001; Malone et al., 1994), especially in the case of SMEs (e-Business W@tch, 2007), because they reduce the costs of setting up and managing inter-organisational relationships by enabling information sharing and process integration and streamlining. Nevertheless, the early predictions based on theoretical comparisons between costs and benefits were not confirmed by facts. Nowadays, the adoption rate of inter-organisational information systems (IOISs) is consistently lower among SMEs compared with larger companies[1]. The advent of semantic web applications, i.e. methods and technologies by which automated agents use machine-readable metadata to locate, select and process information, promises to reduce several of the barriers that so far hampered the diffusion of IOISs among smaller companies (Kauremaa et al., 2009). Inter-organisational information systems potentially provide small businesses with the opportunity of reducing the costs of signalling and assessing reputation in business transactions with customers and partners, cutting control and communication costs, and augmenting the learning effects from inter-organisational relationships. In addition, IOISs based on semantic web allow the retrieval of integrated information from different sources and usually non interoperable systems, e.g. archives based on independent communication standard. By encouraging the development of cooperative relationships across and along the supply chain for the joint provision of goods and services to end clients, those benefits are expected to increase the turnover of SMEs (Garcia-Crespo et al., 2010). However, the implementation of semantic web applications requires specific investment in hardware and software that exposes firms to opportunistic behaviour by partners and clients and outlines important technological challenges,

such as data security concerns, or the definition of viable common standards and procedures.

This chapter explores the benefits and the challenges of NeP4B, an IT architecture based on semantic web developed by a pool of Italian research centres, as a means to enable and reinforce cooperation among smaller firms. NeP4B is an example of advanced e-business technology that supports direct search for one-spot or long-term partners, joint knowledge development, marketing and production partnerships, and strategic cooperation. By allowing the exchange of richer information from a variety of data sources, rather than mere textual data, the NeP4B technology supports inter-organisational teams collaborating in a distributed environment. Thanks to the easy customisation to specific application fields, the expected economic benefits of NeP4B are higher than those provided by other IOISs (Celino et al., 2006; De Paoli et al., 2006).

After surveying the pros and cons of traditional inter-organisational information systems in promoting cooperation along and across the supply chain, this chapter outlines the opportunities and challenges associated with the adoption of semantic web solutions by networks of SMEs and presents the peculiarities of the NeP4B architecture. The chapter subsequently illustrates the findings of an empirical case study about the implementation of the NeP4B architecture to support the activities of an ICT consortium established by seven Italian small firms to integrate their competencies and exploit business opportunities. The consortium carries out joint marketing activities and manages a Customer Relationship Management (CRM) platform based on a joint customers' database. The consortium has also been working on the integration of products and services provided by its members in order to supply complete ICT solutions and end-to-end services.

The consortium has been involved in the development of the NeP4B architecture since the beginning of prototypes development in 2007. The entrepreneurs of the participating firms have

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