Chapter 6
Ontology-Based Registries: An E-Business Transactions’ Registry

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INTRODUCTION

In the dawn of 21st century, there has been substantial technological progress in the area of e-Business. However, despite the fact of e-Business evolution, the adoption of new internet-based technologies in the business environment is still limited, especially in the sector of small and medium (SMEs) or very small enterprises (VSEs), (Androutselis, 2005). In parallel, the to-date efforts for developing and adopting e-Business solutions has been targeted more towards the Business-to-Consumer (B2C) and the Business-to-Business (B2B) of same interests –same business sector– area and not so vitally towards the area, which this chapter addresses to. This area comprises the Business to Business (B2B), Business to Government (B2G) and Business to Intermediaries (B2I)—such as Banks and Public Insurance Institutions—transactions between Entrepreneurial, Governmental and Banking Organizations of different countries (cross-border) or of different interests/operation domains (cross-sector).

Background to Ontologies

abstract aspect of the real world that needs to be modelled and represented.

Last decades ontologies have entered the area of the Computer Science and nowadays comprise a manifold and effective approach for electronic information. The major sectors for potential commercial applications of ontologies are (TOVE Project):

- Information and Knowledge Management, such as World Wide Web, knowledge sharing etc.
- E-business, such as in the Supply Chain Management field.

The object-oriented software systems are usually based on an ontology. So, in the case of software tools and applications, Ontologies can be used at different levels (Gruninger, 1995), such as:

- During the design and development of application systems, contributing particularly to the specification, reliability and reusability of the systems.
- At the communication level providing easy data exchange.
- At the Interoperability level, facilitating Data, Function and Process Interoperability.

**Related Efforts and Scope**

As many renowned scientists and academics state, in modern economy the key question for an enterprise is not whether to deploy electronic transaction solutions and internet technologies – since this may already be considered a necessity – but how to deploy it in order to realize the biggest possible benefits (Porter, 2001).

Towards realizing this goal a number of research initiatives are already undergoing within the scope of the sixth and seventh framework programme (FP6, FP7) aiming at providing solutions in key areas, such as enterprise modelling, ontologies, enterprise applications, interoperability and information and communication technology (ICT) standards, that may enable electronic transactions. Such initiatives constitute the (INTEROP), (ATHENA) and (GENESIS) projects. Nevertheless, when it comes to developing such systems – both at research and industrial level – the focus remains concentrated in providing technological solutions that will cater for features such as the interconnection of heterogeneous IT infrastructures, the ability to execute static and dynamic workflows, the exchange of standardized or generic business documents and the incorporation of high security standards to the implemented systems, putting aside important semantics and key factors that influence and shape the functional operation of the enterprise.

Process modelling is a traditional topic in Information Systems research, thus the various possible motivations for modelling a process, the various sources of models, and the resulting variety of requirements on the formalisms used for representing processes are often not considered. This contributes to the dominance of a simplified, workflow-centric view on business processes, i.e. business processes are reduced to the sequencing of activities. Evidence of this workflow-minded notion of processes is that languages and tools for modelling business processes and also used for e-business transactions modelling focus on control flow patterns. (Hepp, 2007). Additionally, semantics and business knowledge cannot be clearly represented and managed.

For this reason, this chapter presents an ontology-based e-Business transactions’ Registry & Repository, devoted to the formal description, composition and publishing of traditional, electronic, or web services, together with the relevant documents, rules, resources and the process descriptions in an integrated schema of semantics and workflow notation. Through this repository, the discovery of e-business transactions by users –enterprises, government, intermediaries- or systems can be automated, resulting in an important tool for managing e-Business transformation.