Chapter 12
Critical Success Factors to Yield Business Benefits from Semantic Technologies

Ronald C Beckett
University of Western Sydney, Australia

Anni Rowland-Campbell
Semantic Transformations Pty Ltd, Australia

Paul Strahl
Semantic Transformations Pty Ltd, Australia

ABSTRACT

The purpose of this chapter is to explore opportunities offered by and issues associated with the use of emergent semantic technologies in enhancing an enterprise's business position. These technologies include a foundation level set of standards and descriptive languages supporting interpretive connections to applications. The chapter is more oriented towards applications and the human side of the human/machine interface. We draw on both the literature and case material available to us as active practitioners to illustrate benefits realized and potential barriers to the uptake of semantic technologies. Critical success factors are related to user learning capabilities, the establishment of trust in the technology and its providers, and factors influencing the nature of potential engagement with users and markets.

INTRODUCTION

The word *semantic* relates to the meaning of words, or more broadly to philosophy concerned with meaning. Meaning can be context-specific. For example the word 'field' can have a variety of lay-person and professional community meanings, depending on the context in which it is used (e.g. agriculture, sport, or IT usage). The internet provides a fast communication pathway to large volumes of information, but it is up to the user to decide what information is relevant and how it might be interpreted and used – matters of context. The concept of a *semantic web* involves making this information understandable by computers (linked via the internet) in a generic way so rel-

DOI: 10.4018/978-1-60960-765-4.ch012

evant data sub-sets can be rapidly found, shared and combined in an appropriate context.

At a conceptual level, the possibilities offered by the semantic web are not new – we already use some relatively simple ideas to access large amounts of data. Here are some examples.

Consider a street directory where a relatively small number of icons having specific meanings are used to map a vast amount of information on to a grid to form a map. The information can be presented at higher or lower levels of detail and when specific instances of an icon or region are named, they can be linked to a key-word search facility. Other information such as height contours can be added to the grid. Google maps provide an on-line version. Combining machine-readable versions of the information with satellite navigation data has resulted in a new family of sat-nav products. Another example - libraries round the world use a common categorisation system to help store and find books and articles. One can search for a book by author, by name, or simply browse around one part of the library. In a similar way, Tufts University is using software called VUE (Visual Understanding Environment) to map key concepts and linkages between them to connect with vast amounts of multi-media data used in teaching (http://vue.tufts.edu/about/index.cfm). Going in the other direction, social scientists are using Leximancer software to scan substantial bodies of text and rapidly consolidate it into meaningful 'Themes', 'Concepts' and their associated relationships (http://leximancer.com). A common requirement is an ability to navigate a journey to new places in a complex data environment. Imagine having a "map" of some important aspect of a business that is easily interpreted and automatically updated.

Consider the data-bus technology being used on modern aircraft. A relatively simple but dynamically changing data set managed by on-board computers is accessed by many functional devices via a communication system. Redundancy in the data and the communication pathways plus data interrogation by the data bus management system assure the availability and quality of data. Connected functional devices draw data off the bus and update some of the data in real time. As long as the data exchange protocols are honored each device can be independently changed. Imagine if, in an analogous way, semantic technologies could be used to link together disparate data-bases, and kept up-to-date through RSS feeds uniquely specified by individual users.

The ability to work with large volumes of data is becoming increasingly important as enterprises become more information and knowledge driven. Current internet search tools use key words to assemble a sub-set of information that may be useful in a particular context, but there may still be a large volume of information to sort through manually. In addition, the nature of the subset obtained depends on the search strategy adopted. In other words, there is know-how associated with the use of the tool, and we have to think about the best way to characterize what we are searching for. Analogous practices have emerged in the world of semantic technologies.

In this chapter we draw on the functional level (as compared with foundation level) concepts behind semantic technologies to frame ways in which people can beneficially use them without getting into matters of data interface standards, particular ontology languages and the like. Our objective is, through the use of case examples, to illustrate some of the benefits obtained using this approach and some of the potential barriers to utilization of the concept of the semantic web. As well as considering opportunities associated with semantic technologies, we also consider some critical success factors supporting their adoption. We draw on ideas from the organizational learning, technology diffusion, and market characterization literature on the basis that one must firstly understand what is on offer and its significance, then be able to use it within the enterprise and/or to better access market opportunities. Our objective is to