

Chapter 15

The Prosumer Paradigm for Life Cycle Assessment Services

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ABSTRACT

Enterprises, governments, and government agencies have started to publish their data on the Internet, especially in the form of open structured data sources. The real exploitation of these free, large open data sources is more and more becoming a crucial activity for obtaining information and knowledge (i.e. competitive elements) in several business sectors. In addition, with the proliferation of Web 2.0 techniques and applications such as blogs, wikis, tagging systems, and mashups, the notion of user-centricity has gained a significant momentum to put ordinary users in the leading role of delivering exciting and personalized content and services. The term “prosumer,” coined by the futurist Alvin Toffler in 1980, has been often referenced in business-related contexts to identify this situation. The chapter describes the application of the “prosumer paradigm” to a real data integration system of Life Cycle Assessment (LCA). ENEA, the Italian National Agency for new Technologies, Energy, and Sustainable Economic Development, promoted the adoption of such practice in small companies belonging to the industrial and agricultural sector supplying them with a simplified LCA system. In this chapter, the authors show how a domain expert user (the prosumer) can use the framework to easily map the classification of data flows and processes provided by the simplified LCA system into the ELCD database, containing a standard classification provided by the EU. This makes the proposal completely shareable with the whole thematic classification and vision promoted by the European Commission.

INTRODUCTION

Enterprises, governments, and government agencies have started to publish their data on the Internet, especially in the form of open structured data sources. The European Commission is con-

tributing to this process: several EU FP7 projects are developing tools enabling the publication, the interlinking of data on the Web (LATC, Planet-Data, LOD2). The “Digital Agenda for Europe 2010-2020”¹ is promoting the publication and the reuse of public sector information in the form of

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open data, publicly accessible by other Institutions and Enterprises². A recent study estimates the total market for public sector information in 2008 at € 28 billion across the EU. The same study indicates that the overall economic gains from further opening up public sector information by allowing easy access are in the order of € 40 billion a year for the EU. However, the total direct and indirect economic gains from easier PSI re-use across the whole EU economy would be in the order of € 140 billion annually³.

Therefore, the real exploitation of these free, large open data sources is more and more becoming a crucial activity for enterprises to obtain information and knowledge, i.e. competitive elements, in several business sectors. Nevertheless, the effective use of these data sources requires to take into account some challenges which have not been completely addressed by the research community. First, open data sources are largely heterogeneous, i.e. each source exposes contents according to a particular view of the matter. Consequently, users need to individually analyze the sources to understand how the information is represented in each data source and to implement specific customized approaches for each source. Second, data sources available in the Internet are usually dynamic: they often change data and structure, thus requiring the data source analysis to be frequently reiterated. Moreover, data sources typically do not have any information about the content or the structure of other related sources in the Web. Therefore, the process of finding data sources with related contents is completely in charge of the users. Only recently, the Linked Open Data initiative started to define links between data stored in different repositories, but, obviously, the plethora of specific data sources published by enterprises, governments cannot be completely involved.

In addition, with the proliferation of Web 2.0 techniques and applications such as blogs, wikis, tagging systems and mashups, the notion of user-centricity has gained a significant momentum to

put ordinary users in the leading role of delivering exciting and personalized content and services. The term “prosumer” coined by the futurist Alvin Toffler in 1980 has been often referenced in business-related contexts to identify this situation. A “Prosumer” describes a consumer and producer at the same time. By actively contributing to the requirements development, the customers actually become part of the value creation process. Prosumers also demonstrate an increased degree of interaction with products or services and may combine them to define new ones.

In this chapter, we describe the application of the “prosumer paradigm” applied to a real data integration system of Life Cycle Assessment (LCA). LCA is a technique to assess environmental impacts associated with all the stages of a product’s life from-cradle-to-grave (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling). The goal of LCA is to compare the full range of environmental effects assignable to products and services in order to improve processes, support policy and provide a sound basis for informed decisions. Life Cycle Assessment (LCA) is day by day spreading outside scientific circles to assume a key role in the modern production system. ENEA, the Italian National Agency for new Technologies, Energy and Sustainable Economic Development, supports the adoption of such practice in small companies supplying them with simplified LCA systems relying on a specific knowledge base. In particular, we present and demonstrate how a domain expert user (the prosumer) can use our framework to easily translate the LCA data classification adopted by ENEA into the European standard ELCD database.

In the following, we show how the MOMIS (*Mediator Environment for Multiple Information Sources*) data integration systems (Beneventano, Bergamaschi, Guerra, & Vincini, 2001; Beneventano, et al., 2000) coupled with RELEVANT (*RELEVant VALues generator*) (Bergamaschi, Sartori, Guerra, & Orsini, 2007) can provide a simple,

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