

Sustainability Reporting in Networks

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Abstract

The current development in the field of sustainability reporting and the rise of environmental information systems in organizations require a redevelopment of sustainability standards. Nowadays, companies are sharing information in increasingly higher amounts than in the 1990s. This leads to a demand for harmonization and support for automated information processing. Financial reporting faces this development e.g. by analyzing information demands of networks, analyzing requirements and interests for a network publicity. Network publicity in financial reporting provides the idea of adapting such developments for sustainability reporting as well. The objective of this paper is to describe and integrate approaches from different fields of research e.g. financial reporting, sustainability reporting, business informatics, environmental business informatics, which will serve as the basis for a later case study of the Eco-industrial park Bremen to be adapted for developing sustainability reporting in networks. In this case study, environmental business informatics with environmental information management and material flow management are used as environmental information sources. Research will finally lead to a reference architecture which will be evaluated in the case study Eco-industrial Park Bremen. The paper highlights different fields of research and approaches used to adopt sustainability reporting for networks.

Keywords: *sustainability reporting, networks, network publicity, environmental information systems, supply chain*

1. Introduction

Since the 1990s the rise of environmental information in organizations reflects the environmental demands pointed out in the United Nations Conference on Environment and Development in 1992. Businesses have accepted the use of environmental performance indicators to identify impacts to environment. The first approach to develop a standard with environmental impact as a main topic is the norm ISO 14031 “Environmental Performance Evaluation (EPE)”. A study from corporateregister.com and Association of Chartered Certified Accountants from 2004 (CorporateRegister.com 2004) highlights this development by analyzing corporate non-financial reporting around the world from 1993 to 2003. According to this study, annual reports have increased from fewer than 100 reports in 1993 to more than 1,500 companies nowadays.

At the same time demands towards reporting increased, to deal with economical, environmental, and social aspects and added these aspects to financial reports (Innovations report 2009). These three aspects are called the “triple bottom line” and serve as the basis for the sustainability reporting approach, as well as their interrelations. Companies such as Nestlé Deutschland AG express their aim to publish and generate the sustainability report for all subsidiaries and in a next step include supply chains of suppliers and joint ventures which can be seen as a sustainability reporting in networks (Kranke 2008). Environmental

Management Information Systems (EMIS) provide environmental information inside companies and exchange these with industrial partners or other stakeholders. The exchange of information includes product, process, or financial information, which required the use of EMIS and other information systems e.g. material flow systems or data warehouses.

Nowadays, reporting businesses have started to adapt their procedures to this development by adapting them towards a network publication standard. By analyzing the current adaptations and aspects of network publicity for financial reports, sustainability reporting could be extended to cover these networks aspects and use the information of supply chains. In this development, EMIS could be used as one step in the supply chain to support the exchange of environmental information required for sustainability reporting.

The aim of this paper is to present the current state of the art in different fields of research and trends of sustainability reporting towards sustainability reporting in networks.

2. Sustainability Reporting

From the beginning of sustainability reporting in the 1990s, reports changed from paper-based media over simple electronic copies to the current reports. Standards such as G3 from the Global Reporting Initiative (Global Reporting Initiative G3 2006) define how a sustainability report should be structured. Current research is in a process of developing standards to define computerized languages, added-values (e.g. predefined reports for different stakeholder groups), and other approaches to increase harmonization, automation and visualization of content for different types of stakeholders (Isenmann et al. 2008c). This research of defining computerized languages focuses on developing languages, taxonomies or schemas using the extensible markup language (XML) as basis. Using extensible sustainability report formats such as XML or the later introduced extensible business reporting language (XBRL) allows using an extendible format based on tags. Instead of only identifying environmental performance indicators solely by the GRI number as tag e.g. EN 8 which means total water withdrawal by source, the extendible format offers the possibility to give an overview for non ICT-skilled users or environmental reporting experts by using description such as total water withdrawal by source.

Nowadays, first approaches are discussed at conferences and workshops, demonstrating a strategical focus on automation and added-values of sustainability reporting. Exemplary, using XBRL as a source to harmonize financial and environmental reporting can be seen in the first draft of an XBRL taxonomy of G3 from the Global Reporting Initiative (Global Reporting Initiative G3 XBRL 2006) or a proposal of “Harmonizing Document Structure for the Online Communication of Organization” (Isenmann et al. 2008a). By using an XML-based approach the proposals support the automation demand for sustainability reporting with benefits from an extendible and flexible format to decrease the cost of organization in the extraction, processing and gathering of environmental information.

Possible added-values aspect of online reporting are demonstrated in papers such as “Sustainability reporting à la carte – concept and implementation of a software tool with shopping cart functionality” from Isenmann et al. (Isenmann et al. 2008b) and “Web 2.0 Driven Sustainability Reporting” (Süpke et al. 2008). These approaches and the developments in environmental information management reflect the demand expressed by Kranke (Kranke 2008) that companies such as Nestlé Deutschland AG want to announce and to generate sustainability reports for all subsidiaries in a whole, and in a next step even want to include the supply chain of suppliers and joint ventures as information sources.

This development, however, raises a question: How can the current standards and methods for sustainability reporting support harmonized and automated sustainability reporting along a supply chain?

3. Financial Reporting Approaches

The progress of environmental network publicity is hindered by the fact that no standards or tools fulfill requirements specific for sustainability reporting in networks along a supply chain. Network publicity of environmental reporting is still at its beginning. The current phase has to identify requirements of different participants (subsidiaries, stakeholder, government...). Trends to use standards and requirements from business communication as financial reports, XBRL, syntax and semantic opened a chance to benefit from trends in financial reporting. Using approaches and analyses already done in the business environment allow adapting approaches for environmental sustainability reporting. Adapting XBRL for environmental reporting requires an overview about structure, criteria, and concepts of XBRL which are important and can be seen in "XBRL in der betrieblichen Praxis" from Norbert Flickinger (Flickinger 2007). The next step will be to use XBRL for the financial reporting of enterprise groups (Ramin et al. 2006) and to adapt it for network publicity as described by Kasperzak (Kasperzak 2003). Kasperzak described network publicity in financial reporting, requirements, and different demands of the stakeholders. The term "network publicity" means to announce general information (signal, news and information) while at the same time adapting to network announcements. A main aspect will be how reporting in a specified document can merge information of several business partners while the general information of the single companies will not be changed. The information of a unique company has to be identifiable in the whole process. In his work the author identifies the following stakeholder groups: investors, creditors, and network partners. As the main problem neighbor borders were identified which have to be defined clearly to allow the identification of e.g. assets. A problem of network publicity and especially for environmental sustainability reporting is demonstrated in "Building Public Trust" from DiPiazza Jr. and Eccles (DiPiazza 2002). Environmental information as financial information requires to be identified all the time without the possibility that the information have been changed in the process. The questions how to assure that all environmental or financial information have been used in a proper way and can be traced to companies involved in the network need to be answered. DiPiazza Jr. and Eccles used a so-called "Corporate Reporting Supply Chain" to increase the transparency for stakeholders which has to be adopted to support generating sustainability reports in networks. In summary, approaches of financial reporting can be used as a basis for environmental network publicity.

4. Business Informatics and Environmental Business Informatics ICT-based Approaches for Sustainability Reporting in Networks

The next step to answer the question how sustainability reporting for a supply chain or a network can be supported is to analyze the business informatics and corporate environmental approaches to disseminate environmental information in a network (see figure 1).

From the business informatics point of view, sustainability reporting in a network demands an analysis of corporate information system, production, planning, and controlling and the ICT-infrastructure. The information technology organization of the participating companies has to be analyzed to identify the access points. Therefore several architectural designs will be checked compared to the requirements of sustainability and criteria's from the network publicity to generate reference architecture of a network which focuses on the creating of one sustainability report for the whole (e.g. supply chain).

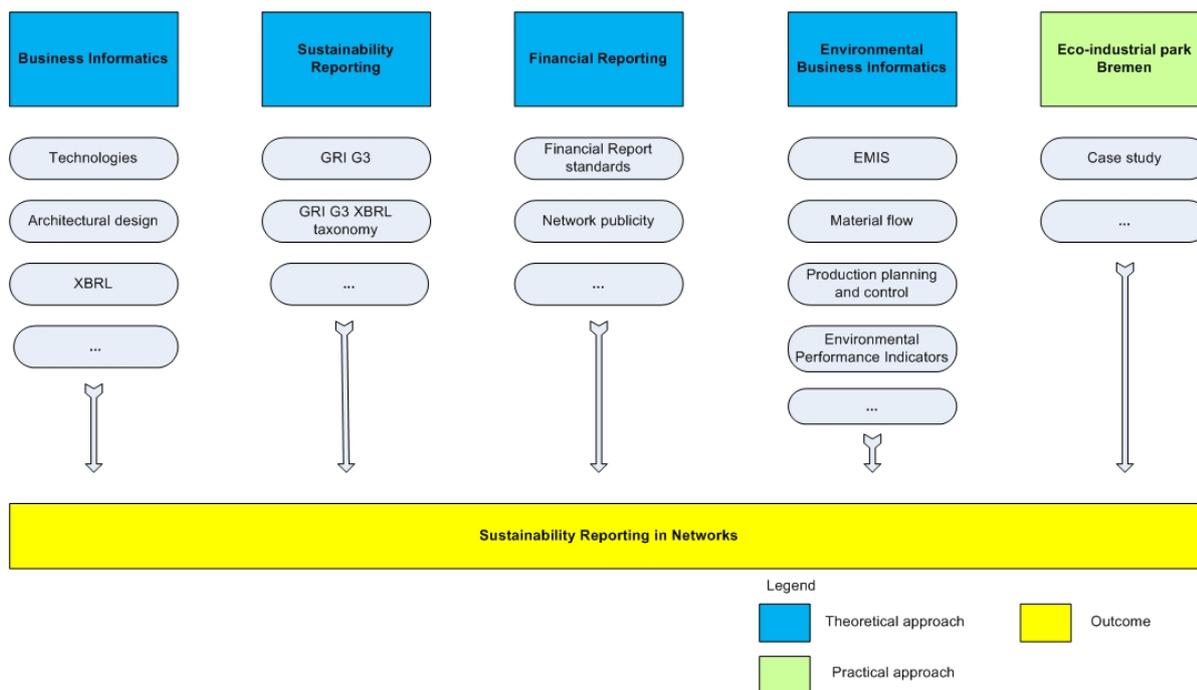


Figure 1: Approach for Sustainability Reporting in Networks

Environmental business informatics impact will be to extend the network by using environmental information management systems and other information systems from the Life Cycle Assessment topic. Material flows as presented in software tools as Umberto® can be a source of environmental information which has to be harmonized and automatically processed in the network. The outcome of this analysis will help to identify technologies and architecture designs e.g. service-oriented architecture to create such a network and a sustainability report in networks.

5. Outlook: Case study “Eco-industrial Park Bremen”

The theoretical aspects will be based on the deductive approach to lay the general theoretical background in the first place, afterwards network publicity as theoretical approach and case study “Eco-industrial Park Bremen” will use an inductive approach to identify the requirements for a set of companies of the eco-industrial park Bremen. These approaches will be used to develop reference architecture for supporting sustainability reporting in a network and to evaluate the adapted sustainability reporting guideline.

An eco-industrial park attempts to cooperate with each other in the local community to benefit from network effects. The eco-industrial park Bremen covers an area of 140 hectare with around 300 companies from different sectors such as harbor, industry, and service industries. The eco-industrial park is located in the north-west of Bremen and will provide an example of different kinds of environmental information sources which have to be harmonized and automatically processed to generate a sustainability report for the network.

Other goals of the case study “Eco-industrial Park Bremen” are to identify environmental information sources and to increase public perception of business actions by enabling a reporting of companies in a whole. Network effects of an eco-industrial park are mainly not in information technology field e.g. environmental field such as reducing waste, decreasing energy costs... The case study should identify how an information network can be established and used to support sustainability reporting. The network has to be cost efficient and suitable to be accepted from the companies in the eco-industrial park by identifying net-

work effects. Another aspect is to highlight the generality of the proposed approach which is able to cover different kind of networks such as eco-industrial parks, supply chains...

6. Conclusions

This paper highlights the current state of the art of sustainability reporting in businesses from a business informatics, corporate, and environmental informatics point of view towards a reporting in networks. Also, the paper presents the current approaches in financial reporting towards network publicity. The questions mentioned in this paper have to be researched in further steps to present requirements, technologies and architectural design methods to find solutions for the raised topics.

The figure 1 “Sustainability Reporting in Networks Approach” presents the different research fields involved in the “sustainability reporting in networks” approach. It will use the business informatics field, its technologies, and the architectural design approaches to develop a network which supports the automation of the processes. XBRL as one of these technologies will provide a link to the field of sustainability reporting with the GRI G3 guidelines and the beta version of the XBRL G3 taxonomy. From the financial reporting field, network publicity approaches such as adopted financial reporting standards for networks will be used. The technologies and approaches of business informatics (harmonization by using XBRL approaches) will support the approach by creating the required architecture for the network. The approach will use the identified requirements in financial reporting network publicity to identify comparable requirements for the sustainability reporting in networks. Environmental business informatics will support the automation of the processes by providing interfaces and extensible formats to exchange environmental performance indicators collected in the companies from several information sources (e.g. EMIS which are mentioned in the GRI G3 guidelines).

Finally, a reference architecture has to be investigated and checked against the requirements explored in the case study eco-industrial park Bremen for evaluating the theoretical approaches in the industry.

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