

MANAGING SUSTAINABLE PRODUCTION THROUGH BUSINESS PROCESS-DRIVEN INFORMATION SYSTEM DESIGN

*Raul Carlson**, *Lennart Swanström*¹, *Richard Watson*², *Thomas Baumgartner*³

¹*ABB Corporate Research*, ²*The University of Georgia*; ³*ABB Ltd*,

**Viktoria Swedish ICT, Lindholmspiren 3A, 417 56 Göteborg, Sweden,*
raul.carlson@viktoria.se

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ABSTRACT

The use of corporate sustainability information tools and systems has grown organically to include a wide variety of solutions, from dedicated LCA tools to integrated, enterprise-wide sustainability systems. The discussion in this paper is based on an ABB Group internal case study of sustainability related information systems and ABB's business needs. The study concludes that to effectively manage sustainable production, all business process aspects of sustainability information management need to be taken into account, including a multi-stakeholder perspective and the cradle to grave life cycle of products. This paper discusses how to meet the information requirements for managing sustainable production by better integrating sustainability information systems and data with business processes and needs.

INTRODUCTION

ABB, a global leader in power and automation technologies based in Zurich, Switzerland, employs 145,000 people in about 100 countries. ABB's business is comprised of five divisions organized by customers and industries served. ABB was given its current form in 1988, but has an over 120 year long history. ABB is driven by a strong focus on technology and innovation, and therefore maintains seven corporate research centers around the world, and has continued to invest in R&D through all market conditions.

This paper presents results from a case study that has been performed within ABB to prepare the improvement of the information systems used to manage the sustainable production of the ABB business and business processes. The case study resulted in an extensive amount of information about both the current system and about the requirements on the new system and the processes that need to be executed to develop the new system. As an aid to interpret the results from the case study and to suggest a next step, an external expert was commissioned.

The background to this case study and the future development of the information system is that ABB has developed and used sustainability information system since the early 1990s. This includes life cycle based environmental information tools, ranging from dedicated life cycle analysis (LCA) tools and streamlined eco-design software to enterprise business integrated systems including life cycle management (LCM) functionality. The case study addressed the full range of information systems used by ABB for sustainability management. The main sustainability information systems are the environmental information systems,



occupational health and safety information systems, and the Corporate Responsibility information systems for decisions and reporting within these specific areas. Some specific information systems such as the Travel Information System, used globally to monitor the travel security of ABB employees, are not included in the discussions in this paper.

METHODOLOGY

A mainly qualitative and thorough case study was performed globally and internally within ABB, investigating performance aspects of the current sustainability information systems (Baumgartner, 2012). This was based on interviews and their consecutive after-analysis. Interview targets included the ABB Group Function Sustainability Affairs, the ABB Sustainability Network (employees in the countries and businesses with a sustainability-related job role), and other ABB Group Functions such as Quality and Operational Excellence, Supply Chain Management and Information Systems. Due to the exploratory nature of the case study, an open and flexible approach was chosen for the interviews, with open-ended questions that gave freedom to interviewees to express diverse views, and to researchers to react and follow up on answers. The open-ended questions also allowed interviewees to freely voice experiences and views with less bias due to guiding questions. In addition to the interviews many related documents were reviewed, to explore further views and aspects of the current ABB sustainability information systems. To facilitate the drawing of conclusions from the extensive result from the case study, an external expert was commissioned to investigate suggestions for how to move ahead. This was mainly based on the case study report but also on other internal ABB sustainability strategy reports.

RESULTS

The findings of the case study (Baumgartner, 2012) indicate that the current ABB sustainability information management works well for the targeted audience, but a wider audience for sustainability information has grown over the years. The system therefore needs to be improved and further developed. Previous incremental improvements have focused mainly on data collection, but the case study results show that a more holistic approach is needed. For example, there are issues with data completeness, consistency, intelligibility, validity and accuracy, as well as with timeliness of reporting, which compromises the usefulness of the information. Also, there are issues with data transfer between different parts of the system and the sustainability information could be better integrated into the plan-do-check-act loop of the sustainability management system. The case study results continue with that when developing the sustainability information system it is important to not only focus on the technical development, but to also look at the information itself, such as the processes to define, collect, report, validate, analyze, distribute and follow-up actions on data, as well as on how to educate people to govern the system. Key requirements on the new system should be flexibility and resilience, as well as integration of workflow and document management. Since sustainability is a wide area, there is also a need to define the scope of the sustainability information management, its data model, and of the sustainability reporting rules, roles, and responsibilities. As basis for a redevelopment and redesign of the system, it is necessary to improve the understanding of the many different requirements within the ABB group. It is suggested to redevelop the system evolutionary rather than revolutionary, since the majority

of the improvements need to be related to the integrated system of information, people, and governance of the ABB Group.

Analysis of the case study (Carlson, 2013): The case study was assessed to propose a next step towards implementation and further development of an ABB Sustainability information system. The work was condensed into a short report (Carlson, 2013). A key result from this work was a condensed draft list of information system requirements, together with a conceptual view presented in the discussion section below.

DISCUSSION

The case study shows that the ABB sustainability information system encompasses the framework for an environmental information system, with respect to users, organization and logical and technical content as described in (Carlson, 2010). Hence, as tool for discussing the status and vision of ABB’s sustainability information system, a conceptual view of ABB from the perspective of sustainable development and a sustainability information system was developed (Carlson, 2013).

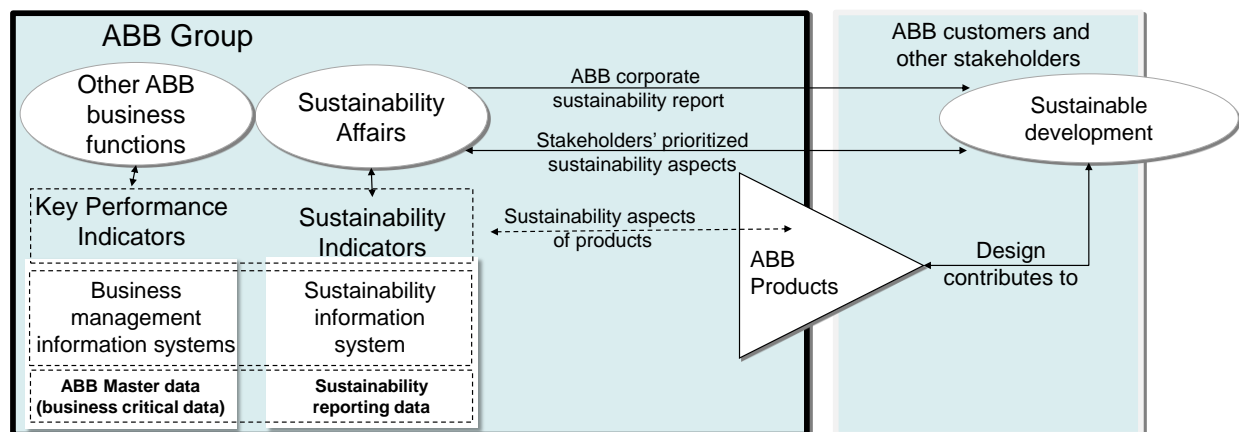


Figure 1. Conceptual view of ABB from the perspective of a sustainability information system (Carlson, 2013).

The conceptual view of ABB in figure 1 describes how the ABB *Sustainability information system* relates to other *ABB Group* and business functions, and the concept of *Sustainable development* at large. The dotted line boxes and the dotted line arrow are areas where integration may be suggested for increased efficiency and effectiveness of the ABB sustainability management. For example, the corporate *Sustainability indicators* and the environmental product design requirements and the product life cycle may be more clearly integrated. Also, the overall *Sustainability information system* may be integrated with the *Business management information systems*. Each of these integration aspects are understood to have many business imperatives, and therefore need careful consideration before implementation decisions are taken. For example, ABB may move more strongly towards an information system design mainly established on the logic dominated by sustainability (Watson, 2012). But regardless of level of ambition, it is suggested that the new system is designed on basis of available standards and guidelines, such as the newly released ISO 14033 – Quantitative environmental information (ISO, 2012). This will provide both a good information system structure and a basis for good quality sustainability data.

CONCLUSIONS

The ABB case study concludes that in order to effectively manage sustainable production, considering its multi-stakeholder perspective throughout the supply chain and life cycle, all business process aspects of sustainability information management need to be taken into account. The case study further concludes that it may be beneficial to hold a much broader approach when considering the sustainability information system, including information needs, technology, people, governance and business processes (including data definition, collection, reporting, validation, analysis, distribution and follow-up actions).

The conclusion from this work is that the task of managing sustainable production through business process-driven information system design is far more multifaceted than just monitoring the production processes. The three main faces of this information system design are, firstly the business processes, and secondly the sustainability management system that sets the aspects and indicators that defines sustainability, and thirdly the data acquisition and communication for measurement, reporting, and delegation of responsibilities.

Today, there is a gap between the information systems that govern business processes and the information systems used for the sustainability management. In the past, many aspects and indicators that guide the way towards sustainable development have been defined externally; by for example the GRI reporting schemes. Reporting of sustainability data from the business processes throughout ABB, have mainly been developed separately from each other, and from the ABB business information system. It has not been a systematic information system in place for target setting and delegation of responsibilities based on the reported sustainability performance data. ABB was a pioneer in sustainability reporting, and now has the opportunity to become a leader in integrating sustainability into business processes and decision making so that it successfully transitions to the era when designing and marketing ecological sustainable products and services will be a necessary core competency for competition.

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