Going Ahead in Harmonising XML-based DTDs for Corporate Environmental Reporting

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Abstract

Umweltberichte bilden die Kerninstrumente der betrieblichen Umweltberichterstattung. Angesichts steigender Anforderungen bzgl. Automatisierung, medialer Verfügbarkeit und Zielgruppenspezifizierung bietet der Einsatz des Internet in Verbindung mit der Auszeichnungssprache XML dabei große Gestaltungschancen und eröffnet wirksame Unterstützungspotentiale, sowohl für die Unternehmen selbst als auch für deren anvisierte Zielgruppen wie Mitarbeiter, Kunden und Investoren. Das konzeptionelle Herzstück für die informationstechnische Umsetzung einer internetbasierten Umweltberichterstattung ist in einer XML-basierten DTD für Umweltberichte zu sehen. Sie ermöglicht eine inhaltlich flexible, effizient durchzuführende und zielgruppenspezifische Umweltberichterstattung mit einer durchgängigen Prozeßunterstützung. Dieser Beitrag zielt auf die Harmonisierung solcher XML-basierter DTDs für Umweltberichte ab. Er knüpft dabei an grundlegende Überlegungen zur Standardisierung aus zwei vorausgegangenen Beiträge an, die auf der 16. Tagung „Informatik für den Umweltschutz“ 2002 in Wien sowie auf der 11. Tagung der Fachgruppe „Betriebliche Umweltinformationssysteme“ 2003 in Stuttgart vorgetragen wurden.

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Keywords

Automation, Customisation, Corporate Environmental Reporting, Document Type Definition (DTD), Environmental Markup Language (EML), eXtensible Markup Language (XML), Harmonisation, Internet, Standardisation

1 Introduction

Since its inception in the late 1980's and early 1990's, corporate environmental reporting has developed from a pioneering effort to a part of companies' daily affairs, even entering business mainstream (KPMG 2002): Today, for environmental pioneers and sector leaders, but also for global players, multinationals and an increasing number of small and medium-sized companies, it seems to be merely the question of how to report on environmental issues, and no longer whether to report at all (Marshall/Brown 2003). The question how companies are reporting involves several aspects of information and communication technologies (ICT), especially how to exploit the unique capabilities the internet and its associated technologies like the emerging eXtensible Markup Language (XML) carries for corporate environmental reporting.

The conceptual core when it is to exploit these media-specific benefits lies – among other aspects – in the development of a comprehensive and standardised XML-based document type definition (DTD) for environmental reports. Employing such an XML-based DTD represents a truly forward-looking reporting approach, intended to facilitating efficient preparation and comfortable administration as well as enabling customised distribution and target group tailored presentation, finally leading to the benefit of all groups involved in or affected by environmental reporting, inside and outside the companies, be they managers, accountants, employees, or customers, members of the financial community, standard setting institutions and organisations focused on benchmarking, rating and ranking. For example, on the basis of a standardised XML-based DTD, companies are in a position to provide target group tailored environmental reports and other communication vehicles that are exactly meeting the requirements of certain guidelines, while prepared by machine processing and generated in an efficient and automated manner.

2 Three proposals of an XML-based DTDs for environmental reporting: Kaiserslautern, Magdeburg, Berlin

The goal of this contribution is to promote and keep on going the harmonisation of three different approaches of an XML-based DTD for corporate environmental reporting. These approaches have been proposed in the scientific community as yet

(Lenz/Isenmann/Marx-Gómez/Krüger/Arndt 2003; Isenmann/Lenz/Marx-Gómez/ Amelung/Arndt 2003):

- The first DTD was developed by the Department of Business Information Systems and Operations Research (BiOR), University of Kaiserslautern.
- The second DTD was presented by the Institute for Technical and Business Information Systems, Otto-von-Guericke-Universität Magdeburg.
- The third DTD was proposed by the Institute of Information Systems, Humboldt University of Berlin.

All three DTDs proposed have been prepared autonomously and published more or less simultaneously. Due to the independent preparation from each other, at first glance, one may expect that an analysis of these DTDs would show a completely different result. On top level however, all three DTDs appear compatible, and even in a more detailed manner, the DTDs from Kaiserslautern and Magdeburg are looking quite similar to one another. Moreover, their really strong similarity has its roots in the same methodology, on which these two DTDs rest. This methodology initially proposed by Schraml (1997) consists of four stages: Primarily, the main target of the DTD has to be defined. Next, a pool of possible semantic components has to be identified and structured. Then, of this pool, the actually relevant semantic components are selected and arranged in a catalogue. Finally, the document type model could be designed.

3 Standardisation of XML-based DTDs for environmental reporting

This contribution is based on a sequence of papers already published, starting with an initial contribution presented at the 16th Conference “Informatics for Environmental Protection”, Sept. 25-27, 2002, Vienna, Austria and its follow up proposal that was presented at the 11th Workshop of the Special Interest Group “Corporate Environmental Information Systems” of the German Society for Informatics, April 1st, 2003, Stuttgart, Germany:

- According to the initial contribution presented in Vienna 2002, it was argued for more standardisation in the field, intended to exploit the huge benefits using up to date ICT, in particular the internet and XML for corporate environmental reporting (Lenz/Isenmann/Marx-Gómez/Krüger/Arndt 2002). As a result, a basic but essential approach for harmonising the three different approaches of an XML-based DTD on top level was proposed (fig. 1). This approach deals primarily with methodical aspects that should be applied for establishing a generally acceptable standardised XML-DTD.

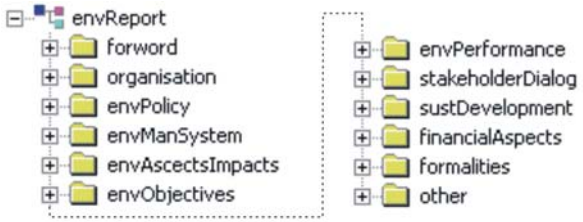

Fig. 1: Proposal of a harmonised DTD for environmental reporting on top level (Lenz/Isenmann/Marx-Gómez/Krüger/Arndt 2002, 422)

- Closely related to the initial contribution, the aim of the second paper – as the follow up proposal presented in Stuttgart 2003 – was to find out appropriate ways how to harmonise the three approaches in a more detailed and methodically based manner on the second level (Isenmann/Lenz/Marx-Gómez/Amelung/Arndt 2003). Such an effort was considered as the heart for providing an efficient, automated and target group tailored environmental reporting system at corporate level.

As a result of the second contribution, it was clear that a more detailed harmonisation is not as simple a process as it may look like at first glance. On the contrary, such a harmonisation on the second level appears to be more difficult as on top level because of certain differences, perhaps when defining which restrictions should be taken into account, or what procedure should be employed when selecting and arranging the relevant semantic components (fig. 1, 2, 3).

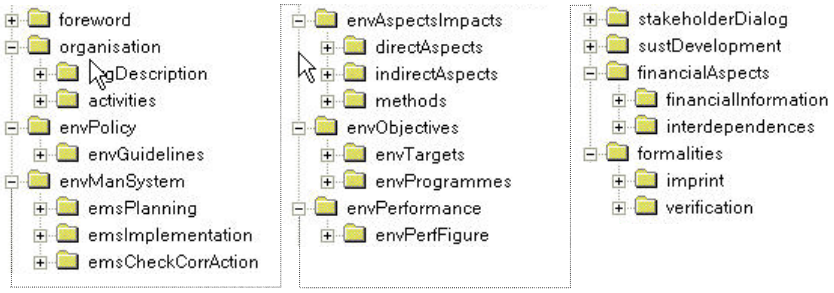

Fig. 2: DTD from Kaiserslautern, containing 16 semantic components on the second level

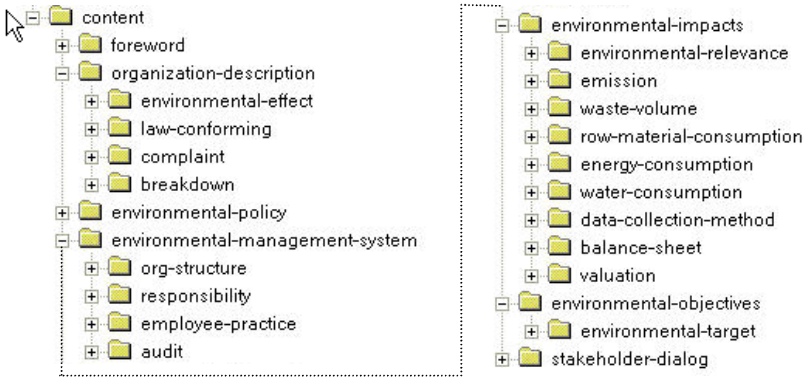

Fig. 3: DTD from Magdeburg, containing 18 semantic components on the second level (Krüger/Marx-Gómez/Rautenstrauch 2001)

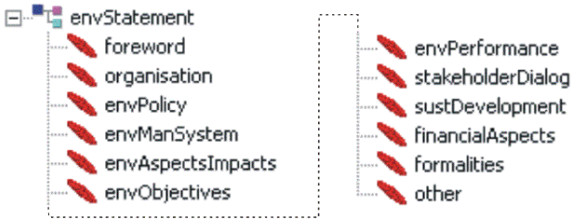

Fig. 3: DTD from Berlin, just containing 11 semantic components on top level

Together, the difficulties on the second level are rooted in the fact that every DTD obviously is influenced by a specific underlying design profile. Such a design profile may be characterised at least along four dimensions:

- definition of a specific purpose and a certain goal of using the DTD,
- decision which restrictions such as standards, guidelines, norms etc. are considered,
- determination to which extent the target groups' information needs are explicitly taken into account and
- sample of document instances that are analysed.

Going ahead in the process of harmonisation, it is argued to make the DTDs' design profiles more transparent. Such an analysis may provide a suitable working result on which further steps of a harmonisation could be built up (fig. 4).

	Kaiserslautern	Magdeburg	Berlin
Main target	– Academic approach – Standardisation – Sustainability reporting – Stakeholder dialogue – Target group tailoring – Multiple media publishing	– Case study: Hasseröder brewery – Automation – Life cycle analysis – Target group tailoring – Integrated communications – Multiple media publishing	– Meeting EML-requirements – Using metadata
Restrictions to be considered	– EMAS II – EN ISO 14001 – DIN ISO 33922 – National guideline of future e.V. – International guideline of UNEP	– EMAS I – DIN ISO 33922	– DIN ISO 33922
Information needs taken into account	– Employees – Customers – Suppliers – Government/local authorities – Neighbours – Environmental pressure groups – Investors – Journalists – Public	– Customers – Employees – Government/local authorities – Neighbours	
Document instances	– Print media – Computer-based media	– Print media – Computer-based media	

Fig. 4: Analysis of the DTDs' underlying design profile
(Isenmann/Lenz/Marx-Gómez/Amelung/Arndt 2003, 77)

Based on the insights above, any proposal of a harmonised DTD for environmental reporting on second level should fulfil the following basic criteria:

- recommendations proposed by the EML initiative (Arndt/Günther 2000),
- clarification of aspects that are crucially important for the definition of a DTD's underlying design profile: Concerning the main target, we propose a general, flexible and comprehensive approach. Regarding the identification of possible semantic components, we recommend the inclusion – at least – of EMAS II (EC 2001), DIN EN ISO 14031 (CEN 1999), DIN 33922 (DIN 1997), widely accepted guidelines like future/IÖW (1994) and UNEP (1994), other ISO-standards and relevant recommendations on environmental communication that probably will pass their early draft status in the near future. Further, we argue to analyse a number of document instances on print media and on the WWW, perhaps to identify also logical components like heading, paragraph, abstract, chart etc. When it is to select the pool of relevant semantic components, Schraml's methodology is seen appropriate, providing a suitable tool for this sophisticated task.

As a result of all these efforts, our proposal of a harmonised DTD for environmental reporting on second level looks like the following (fig. 5).

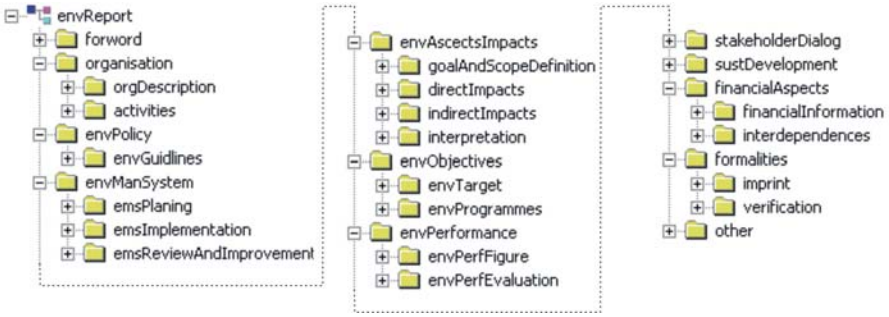

Fig. 5: Proposal of a harmonised DTD for environmental reporting on second level

On this second level, the DTD consists of a total of 18 semantic components, including: “orgDescription” and “activities” describing the organisation in a more detailed manner, “envGuidelines” indicating principles, procedures and methods underlying the report, “emsPlaning”, emsImplementation” and “emsReviewandImprovement” illustrating the management system, “goalandScopeDefinition”, “directImpacts”, “indirectImpacts” and “interpretation” making impacts more transparent, “envTarget” and “envProgrammes” highlighting the objectives, “envPerfFigure” and “envPerfEvaluation” emphasizing the aspects of environmental performance, “financialInformation” and “interdependences” underlining the relevance of financial aspects, and last but not least, “imprint” and “verification” shedding more light on reporting formalities and transparency.

4 Conclusions

From an academics’ point of view, stimulating the harmonisation of an XML-based DTD for environmental reporting is thought of to be a considerable and crucially important effort: firstly, to contribute to the discussion of standardising corporate environmental reporting taken as a whole, and secondly, to promote the initiatives towards shaping a unifying markup language within the emerging field of environmental informatics, perhaps in the sense of an Environmental Markup Language (EML).

From a practitioners’ perspective, such a standardised XML-based DTD may contribute to employing internet and XML for environmental reporting. Companies and their target groups as well are enabled to exploit the huge opportunities and media-specific technical benefits taken as a whole. For example, on the basis of such a DTD companies could provide a fine-tuned, target group tailored environmental reporting system, prepared by machine processing and generated in an efficient and automated manner.

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