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Enterprise Architecture as a Tool for Managing Corporate Social Responsibility

Potential Use of Enterprise Architecture for CSR Reporting

Bettina Horlach[1], Paul Drews[2] and Ingrid Schirmer[3]

Abstract: The need for acting sustainably is one of the most urgent, but challenging topics enterprises currently face. In order to implement corporate social responsibility (CSR) on each enterprise level, companies establish dedicated management structures. Notwithstanding that several tools are already available for managing CSR, there appears to be no tool which provides an integrated and transparent overview of CSR-relevant organizational units, processes and information systems within a company. In this paper, we propose enterprise architecture (EA) as a suitable tool to fill this gap and facilitate in turn CSR reporting. By drawing on the results of a literature review and an empirical study on CSR management, we first identify CSR management's information needs in this regard. In a second step, we map these needs using information provided by existing EA frameworks. In the outcome, we present a meta-model which provides a CSR-oriented EA view.

Keywords: Enterprise Architecture, Corporate Social Responsibility, Sustainability, Reporting

1 Introduction and motivation

In times of manifold global economic, ecological and social challenges due, inter alia, to an ongoing resource depletion and the speeding up of climatic change as result of industrialization and population growth, the need for a sense of sustainability is growing in society. Especially, the so-called "Generation Y" is actively seeking global sustainable development in private and professional life ([De09], [Pw08]). People urge enterprises to question their responsibility for creating a desired and sustainable world economy. Today, many companies introduce a specialized function within the company for managing the enterprise's corporate social responsibility [LR13]. Its task is to facilitate ecological, economic and social sustainability on the enterprise level.

There is a vast variety of methods, concepts and tools ([Ec07], [Ra11]) developed by academia and in practice to support CSR management in its daily operations. Analytical

[1] University of Hamburg, Department of Informatics, Vogt-Kölln-Str.30, 22527 Hamburg, horlach@informatik.uni-hamburg.de
[2] Leuphana University of Lüneburg, Institute of Electronic Business Processes, Scharnhorststr.1, 21335 Lüneburg, paul.drews@leuphana.de
[3] University of Hamburg, Department of Informatics, Vogt-Kölln-Str.30, 22527 Hamburg, schirmer@informatik.uni-hamburg.de

methods (e.g. ABC, cross impact and risk analysis), management systems (e.g. integrated management systems) [Ra11] and IT solutions for sustainability (e.g. Green IT/ IS) are already used by the CSR management ([De10], [Lo11], [Me10]) for sustainability planning, management as well as communication and reporting. However, none of the aforesaid tools provides an integrated overview of the structure and processes of the company and its ecosystem. Since CSR does not exist in isolation but is only working if it is integrated into the overall enterprise context and its ecosystem, such a holistic view is essential for implementing CSR successfully. Yet, CSR management can use such information to improve its CSR reporting and communication internally as well as externally by being able to clarify and visualize connections, dependencies and interrelations between CSR actions and its outcomes on the overall enterprise level and beyond to see the "big CSR picture". Planning and management as well as analyzing and controlling CSR management's activities and projects will be further facilitated.

EA with its multi-layered models of an organization [ARW08] can deliver such traceability and is therefore proposed in this paper as a potential tool for the CSR management. Based on the assumption that the CSR management is a stakeholder in terms of EA necessitating specific information, we propose a distinct architectural view on the enterprise and its ecosystem reflecting the information needs the CSR management has in order to fulfill its function. Thus, we explore how EA can help CSR management in fulfilling its information needs in this article.

2 Research Approach

In order to address the proposed research goal, we choose to follow the design science process by Peffers et al. [Pe07] as we seek to develop a new artifact that is able to solve the problem we identified in CSR practice (see section 4). For our motivation to research CSR and EA, we first compared the aims of the CSR and EA management disciplines in order to identify potential links between them [HP15]. The results show that there is ample room for integrating both disciplines. On this basis, we conducted a literature review in respect of CSR and EA in order to identify existing approaches linking these concepts [HP15]. In the third section, we present the results of this literature review.

Assuming that the CSR management is a stakeholder in terms of EA with a distinct view on the architecture, we consequently developed an EA meta-model describing CSR management's information needs following the approach by Aier et al. [Ai08]. Since the meta-model has to be adapted to the special concerns [Ai08], we collected those by conducting an empirical study with CSR management in the finance industry [HP15] and by considering additional literature. In the next step, we investigated the extent to which current EA frameworks already address these concerns by mapping the concerns with the existing information provided by the frameworks. The results of both steps are described in section 4. Based on the results, we finally propose an EA meta-model from the view of CSR management in section 5 in order to fill the information gaps.

3 Related Research/ Theoretical background

3.1 Corporate Social Responsibility management

Since enterprises are central actors in society, they are main contributors to the economic, ecological and social development [Me10]. Thus, they have a particular obligation for a society's sustainable development. Corporations have to ensure with appropriate management that the business operations do not harm the needs of the present and the future society and that they do not increase environmental problems [Wo87]. Recently, enterprises and research have recognized that an efficient CSR management is also an important component of business survival and success in the present and future ([KCW08], [Ec07], [Lo04]).

With new legal requirements like the EU directive for disclosure of non-financial and diversity information for large enterprises [Eu14] and under growing pressure from non-governmental organizations, the public and by employees, enterprises are nowadays more than ever forced to reveal their efforts and activities regarding the CSR management inside the organization and in relation to their ecosystem. In turn, enterprises mainly use their company's websites or specific CSR integrated reports for communicating such activities. With new standards like GRI 4 and the Integrated Reporting Framework by the IIRC, the extent of those reports have significantly increased. Companies no longer have to only report on more 'traditional' CSR topics like their approaches to environmental protection (biodiversity, waste, pollution) ([BE10], [Eu01], [In09], [LR13]) and employee engagement (health and safety, diversity, development of human capital, sustainable incentive schemes) ([BE10], [Eu01], [In09], [LR13], [Pe09]) inside the organization. A strategic CSR approach by integrating social, environmental, ethical, human rights and consumer concerns into the business model and the core strategy [In11] with creating a CSR-conform corporate governance ([In11], [Gl13]), CSR management systems, CSR performance controlling as well as sustainable knowledge management are now also crucial internal parts which need to be communicated. In addition, CSR and integrated reports are nowadays employed to address the need for disclosure of the sustainability of the value chain the enterprise is operating in. Extending the boundaries of the enterprise's responsibility with this approach, the ecological and social sustainability of the products [Gl13] along with the entire value chain and the improvement of this value chain's sustainability [In11] including environmental protection, human rights and business practices [Gl13] constitute further focal points for reporting.

In order to approach the challenge of CSR reporting, specialized reporting systems have been developed and have been available in the market for the past ten years [Kp12]. Mainly based on the reporting indicators provided by the GRI standards, these systems create the sustainability report by gathering and visualizing the existing information in a comprehensive manner based on predefined reporting limits and content. Therefore, a connection to manifold information systems such as, for example, environmental

management information systems (EMIS) for ecological information, to HR systems for social content and ERP systems are required as sources of information. With the new challenges arising with the Integrated Reporting Framework and GRI 4 by further extending the reporting scope to report on financial as well as dedicated external aspects and their interrelations, we propose that this approach by gathering isolated information is no longer sufficiently effective. Moreover, the visualization of the interdependencies of such information is nowadays crucial. Therefore, we propose to include the concept of enterprise architecture in sustainability reporting to clarify those complex coherences and to enable comprehensive and transparent sustainability reporting. Additionally, we suggest that EA can be applied in further CSR management and planning activities as well. In the following section, the concept of EA is explained.

3.2 Enterprise Architecture

Enterprises are highly complex socio-technical systems with manifold interrelations between their elements. In order to be able to manage this complexity, EA can be a helpful instrument due to its role of being *"a complete expression of the enterprise"* [Sc04]. EA consequently represents "*a master plan which acts as a collaboration force between aspects of business planning such as goals, visions, strategies and governance principles; aspects of business operations, processes and data; aspects of automation such as information systems and databases; and the enabling technological infrastructure of the business such as computers, operating systems and networks"* [Sc04]. By structuring the enterprise in different layers and by combining these layers with their respective elements, EA enables a holistic and transparent perspective on the enterprise. Pursuing the goal of business IT alignment, EA enables informed decision-making with regard to the complex interdependencies between processes, information systems and IT infrastructure. Furthermore, strategic alignment is pursued by embedding enterprise architecture insights in analytical and decision-making processes.

EA has a variety of business-related as well as IT-related stakeholders including senior management, the CIO, program managers and project managers ([Ha11], [VSV08]). Since some of the involved and affected stakeholders have conflicting interests, EA also acts as „*a medium to achieve a shared understanding and conceptualizing among all stakeholders involved and govern enterprise development based on this conceptualization*" [Op09]. Thus, enterprise architects have to find balanced solutions for conflicting problems [Ke12].

Various approaches and frameworks have been published for the structuring of an enterprise, its components and their various relationships ([Ma11], [Sc04]). While some of these approaches solely focus on the IT level and their alignment to the business without considering the business needs, the majority of frameworks enforces strategic alignment by taking the whole enterprise into account. Furthermore, a new stream of EA research proposes the extension of EA's scope to the enterprise environment including business partners, competitors and customers [DS14]. EA is consequently not only

useful for business IT alignment and strategic alignment, but it also – in line with its function as enterprise ecological adaptation – provides "*the means for organizational innovation and sustainability*" [La12] in the market. Thus, EA management also involves analyzing internal contradictions as well as identifying incoherencies in the relationships with external stakeholders [La12].

3.3 Existing approaches regarding the use of EA in CSR management

As stated in the introduction, CSR management is a potential stakeholder for EA management since it may use EA as an instrument for sustainability reporting as well as planning, management, analyzing and monitoring. A comparison of the goals of the EA management and the CSR management is underpinning this assumption [HP15]. For analyzing this assumption, we conducted a systematic literature review and analysis based on the methodology of vom Brocke et al. [Vo09]. With this step, we seek to investigate the coverage of this topic in the existing literature.

In the first iteration, we conducted a literature search focused on the interconnection of CSR and EA. We analyzed the leading journals on information systems (IS) of the AIS Senior Scholars' Basket Journals, the four leading IS conferences (AMCIS, ECIS, HICSS and ICIS) and several online literature databases and search engines (including *AIS electronic library, ACM Digital Library, EBSCOhost Online Research Databases, Emerald Insight, Google Scholar, IEEE Xplore Digital Library, JSTOR, ProQuest, SpringerLink, Wiley Online, wiso, and Web of Knowledge*). In a second iteration, we conducted a search in a set of leading CSR and business ethics journals and conferences (including *Business Ethics Quarterly, Business Strategy and the Environment, Corporate Social Responsibility & Environmental Management, Corporate Responsibility Management, Ethics and Information Technology, International Journal of Sustainable Strategic Management, International Journal of Value-Based Management, Journal of Business Ethics, Journal of Global Responsibility, Journal of Management and Governance and Social Responsibility Journal)* [Un11]. Finally, a structured google search has been conducted in order to find 'grey' literature and archival data produced by practice and academia.

Our literature review aimed at uncovering existing publications which explicitly discuss the realization of CSR in or with the aid of enterprise architecture. We used the general search term "(Corporate Social Responsibility OR Sustainability OR Sustainable Development) AND (Enterprise Architecture)" and searched the described list of journals, conferences and literature databases for articles containing the terms in the title, abstract, keywords or full text. For these publications, a forward and a backward search was conducted [WW02]. After scanning title, abstract and full text of the identified articles, we soon discovered that existing literature is predominantly either addressing the sustainability of EA itself based on flexibility, modularity [AD05] and adaptability to internal and external changes [Ma12]. Another set of literature promotes the planning and implementation of CSR with regard to EA inside the enterprise on two levels: either

solely focusing on sustainable IT or addressing the sustainability of the organization in total. The IT-centric position promotes sustainable "*enterprise IT architecting*" [La12] by employing EA for an optimized use of IT assets in a sustainable manner [Pa13]. This is realized by selecting and enforcing IT projects, mainly with regard to environmental topics ([No10], [Pa13], [Un11]), in the EA management process. These IT projects address on the one hand the idea of "Greening of IT" [PRS13] in the form of, for example, the introduction of less energy consuming hardware. On the other hand, these projects focus on using IT in order to enhance sustainability under the slogan of "Greening through IT" [PRS13] by e.g. enforcing video communication. The enterprise-centric literature enriches these thoughts by extending the use of EA for planning sustainable transformation on a functional level. EA management therefore does not only let ecological and social aspects influence its decision as to which IT projects are to be implemented in the future. The planning and decision-making in a sustainable manner also effects business-related initiatives. EA is in this regard to be envisioned as the "link between strategy development and execution" [Me10] by deciding which projects are to be implemented in order to reach the desired target architecture. These approaches thus view EA as a sustainability planning instrument on company level ([Ev11], [Me10], [No10], [SCC13]). Communication and reporting are however only mentioned by Scholtz [SCC13] in the context of environmental reporting as providing a source of information without going into depth.

Since the CSR management extends the external sustainability view seeking to foster the stakeholder dialogue and consequently transform the value chain in a sustainable manner, the scope of EA needs to cover the information about the enterprise environment as well. However, none of the researched articles is taking this external perspective into consideration with regard to CSR. Although e.g. Medini and Bourey [MB12] propose an approach for supply chain management in the context of EA and EA management, CSR related aspects have not been addressed. Furthermore, though this approach uses an external EA perspective by involving the supply chain into internal business processes and capabilities, the architectural representation of the stakeholders in the supply chain and their involvement remains unclear. For instance, information about the current supply chain structure is not integrated in the EA model. This limits the possibilities for analyzing the supply chain including its collaboration and working relationships with existing and future suppliers and business partners. The question, whether EA in the function of "*enterprise ecological adaptation*" [La12] could also be involved in identifying these aspects instead of solely representing current internal processes, applications and capabilities is therefore not answered in the literature. Since the CSR management however needs information on both the internal structure and the environment, we propose a design solution overcoming the shortcoming in the literature. By identifying CSR management's concerns first and consequently building the architectural representation of the information needed for realizing these concerns, we developed an extended EA meta-model representing both internal and external CSR related aspects. The process of development and the evolved meta-model are described in the following sections in extent.

4 Identifying CSR management's EA concerns

The initial step of the approach proposed by Aier et al. [Ai08] contains the elicitation of concerns by the respective stakeholders in order to identify the distinct information needs. In order to identify these needs, we conducted a qualitative-empirical study with 13 CSR managers in the German-speaking finance industry. We analyzed their scope of activity and the challenges they currently have to face. The detailed results of this empirical study will be published in [HP15]. Since enterprise architecture has no or only minor influence on some CSR concerns in the empirical study (e.g. a missing common definition of CSR or a lacking external pressure to pursue CSR inside the organization), we excluded these issues from the further analysis. The remaining topics were then analyzed for stakeholder concerns addressed by the interviewees. Based on the results, we identified 11 EA-relevant CSR management concerns (see table 1).

	Internal Perspective	**External Perspective**
Economic Sustainability	• CSR risk dashboard • Integrated reporting • CSR management system	• Big data usage for real-time CSR analyses • Sustainable investments
Ecological Sustainability	• Product lifecycle analyses • Digitalization of information • Printer reduction	• Supply chain analyses
Social Sustainability	• Product lifecycle analyses • Occupational safety app	• Supply chain analyses • Cloud solution for collaborative stakeholder dialogue

Tab. 1: Stakeholder concerns by CSR management

The concerns show that the use of IT is a focal point in CSR management. In the majority of the enterprises we interviewed, the management is using IT for their daily operations like measuring, reporting, stakeholder collaboration or cross-cutting management tasks like risk, product or supply chain management. CSR managers also see that the digitization of data for storage and analyses results in positive environmental effects. Initial CSR aspects like occupational safety, ecological action (e. g. reduction of printers to reduce emissions), and analyses on the supply chain are also still relevant topics for CSR management.

The current challenge addressed most often is the CSR reporting both in- an external with the goal of establishing an integrated report. Since this report aims at integrating sustainability aspects with the financial performance of the enterprise, it reveals how a company creates financial and non-financial value with its business activities and outputs [19]. The contribution of sustainable business habits on the enterprise's financial state is explained by showing their interrelations. Since such a report covers the overall

sustainability and financial performance, it influences and is highly being influenced by all other topics addressed by the interviewees. Integrated reporting can thus be seen as the overall CSR management frame. Since an integrated and holistic thinking in regard to the internal structure as well to the environment of the enterprise is especially important for successfully fulfilling this task, we propose that enterprise architecture can in particular be useful for the reporting internally and externally. Hence, we will further suggest how its information needs can be facilitated by EA.

5 An EA meta-model for supporting CSR management

5.1 Selecting appropriate meta-models for modelling CSR concerns

For investigating the extent to which the CSR reporting and the further concerns are already addressed by current EA frameworks, we analyzed five selected approaches by The Open Group [Th11], Krcmar [Kr10], Dern [De09], Winter and Fischer [WF06] and Hanschke [Ha11] if they meet the following set of criteria: Since CSR is a holistic integrated concept affecting both the business and the IT inside the organization as well as externally, an approach has to reflect this accordingly. All impacts of CSR strategies and activities on the enterprise shall be taken into account. Furthermore, the existence of a strategy layer in the approach is required since sustainability is directly influencing and occasionally transforming the enterprise strategy due to its integrating character [In11]. Finally, the approach has to provide architectural layers, architectural elements belonging to the respective layers as well as relations between these elements.

Based on these criteria, none of the approaches matches all required demands. Although the frameworks can represent the internal enterprise view in a comprehensive way, the external dimension is underrepresented in the approaches. Concerns requiring manifold external information like product lifecycle or supply chain management are not fully captured by the frameworks since crucial stakeholder information as well as relevant business architecture elements are missing. Nevertheless, their results are essential prerequisites for integrated reporting [In11] representing the current state of the company's internal and external CSR performance. Furthermore, we concluded that the corporate strategic approach of CSR, which is compulsory for the integrated CSR reporting, has to be extended as well since crucial strategic architectural elements for CSR like the corporate mission and vision are missing in the identified approaches. In contrast, the IT-related concerns like extending an IT-based enterprise risk dashboard to also include ecological and social risks for calculating their possibilities of occurrence and repercussions can already be realized by the analyzed approaches because they contain all relevant information on application systems, data and infrastructure.

Based on these results, we propose an EA meta-model from the view of CSR management overcoming these shortcomings. For constructing our meta-model we use

selected frameworks in order to use the experience/knowledge of the existing approaches. Therefore, Winter and Fischer's model [WF06] was selected since it fulfills most of the listed requirements except the missing external orientation and the non-existing representation of the relations between architectural elements. Since relations are however relevant for allowing the investigation of CSR measures and their impact on the sustainability performance, we additionally used TOGAF and its full content meta-model [Th11] with all proposed extensions. This meta-model represents the interrelations between architecture elements in a comprehensive way. The practice-orientation of TOGAF, being based on the experience of a manifold number of enterprise architecture practitioners, supports our decision for selecting this framework as a second source.

5.2 An EA metal-model for supporting CSR management

Based on our understanding of CSR, we created a meta-model that includes the information needed for supporting the CSR management's concerns (see figure 1). This meta-model uses the architectural layers and selected elements from Winter and Fischer's approach (e.g. organizational unit, business function, strategy) [WF06] as well as selected elements (e.g. business capability, business process, business service, data object) [Th11] and relations from the TOGAF content meta-model as described above. It has been extended by additional layers and elements, which support the CSR management's concerns. The extensions address three major areas: (1) additional elements in the "environment layer", (2) the business architecture and (3) the process architecture.

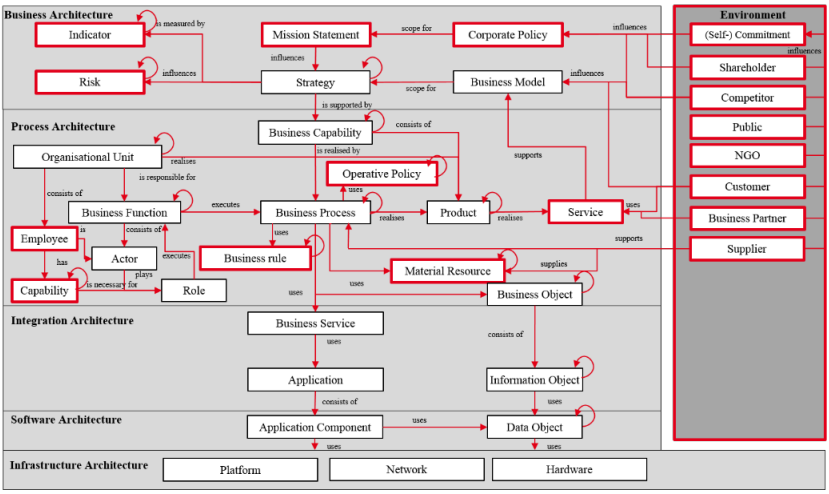

Fig. 2: Enterprise architecture meta-model for supporting CSR management

In contrast to the analyzed meta-models, our approach models the enterprise as an open socio-technical system, which is interrelated with its various **external stakeholders** [Rh13]. This external layer ("environment") follows the approach of integrated reporting since a major part of an integrated report contains the "insight into the nature and quality of the organization's relationships with its key stakeholders, including how and to what extent the organization understands, takes into account and responds to their legitimate needs and interests" [In11]. Since suppliers for instance provide resources like raw or prefabricated components to the enterprise, they directly influence the enterprise sustainability performance on the product level as well as with their business practices and behavior. Furthermore, the customers are a focal topic for reporting, as they influence the business model, processes and products with their habits and needs [Bi09]. The same is true for business partners as they act as distribution channels towards the customers. Finally, legislation and the public (including non-governmental organizations as "watchdogs" [Rh13]) have to be taken into account. They analyze the company's sustainability performance with regard to its behavior in general and seek information on compliance and trace self-imposed external and internal commitments. This leads to a new vertical layer, which we call "environment". This layer is only of preliminary nature and should be refined and split up to also consider other layers like processes or IT of the external actors in the future. Accordingly, the CSR management perspective supports the call for modeling the extended enterprise or business ecosystem architecture [DS14]. This step is e. g. required to keep track of impact from external actors and to integrate relevant information in complex supply chains.

Additionally, we propose to extend the **business architecture layer** towards **the strategic and normative dimension of CSR**. We argue that the consideration of the corporate strategy, business models, the normative elements (corporate policy, mission statement, corporate values) guiding the conduct towards employees and environment [BE10] is crucial for CSR management by acting as the starting point for all CSR activities. Analyses about the impact and conformance of specific actions cannot be conducted without determined policies and strategies. Furthermore, the integrated picture of the combination, interrelatedness and dependencies between strategy and the operational CSR actions is mandatory in the integrated report [In11]. Therefore, we propose to use Winter and Fischer's strategy layer for extending the architecture by adding the respective elements. The additional elements "risk" and "indicator" in this layer represent the effects of CSR on risk and cost management. Adding these elements fulfils the need of CSR reporting to identify the "risks and opportunities that affect the organization's ability to create value over the short, medium and long term" [In11]. However, risks and indicators have to be applied to all architectural layers in order to raise individual threats and to identify room for improvement.

In the final extension regarding CSR-relevant components, we propose to **enrich the process architecture layer**. This is necessary due to the important role of resources in the CSR context. The raw and prefabricated components provided by suppliers, the resulting finished product, but e. g. also human resources (employees and their capabilities) are seen as forms of capital for CSR management realizing the financial and

non-financial value for the organization [In11]. Here, the degree of a supplier's involvement in production processes is an essential information in case the supplier or his materials does not comply with mandatory supplier CSR policies or other obligations. In such a case, it is not contributing to creating value and consequently has to be replaced. By further separating the product resulting from executing a process and the final service, analyses can be accomplished in greater detail. But also the employees as social capital are a focal point to be analyzed and reported on from the CSR perspective as a contributor to service production and stakeholders of CSR. Therefore, the workforce is represented in our model by an actor with allocated roles and corresponding capabilities. Finally, normative elements like business rules and operational policies as the elements operationalizing the corporate strategy and normative values and guiding the business operations are also lacking. Since the business operations have to be compliant to the enterprise strategic direction [In11], information about the resources and their contributions to value delivery in form of services as well as the process organization have to be ascertained and modelled.

6 Conclusion and outlook

In this paper, we have argued that the use of enterprise architecture as an instrument for CSR management can support its operationalization. It allows to better understand the enterprise and its ecosystem and therefore helps to identify useful CSR activities and projects. Furthermore, it allows to improve the reporting of an enterprise's sustainability performance internally and externally by proposing the necessary information and their existing interrelations.

Our literature review and the comparison of five well-known existing architecture frameworks revealed that enterprise architecture approaches are insufficiently addressing the external dimension of CSR so far. Therefore, we compared information items derived from CSR management concerns with existing architecture frameworks. In the next step, we integrated architectural layers and elements based on the mapping into an architectural meta-model.

Our research is limited as the meta-model only gives a broad outline on how the application of enterprise architecture could support CSR management and CSR reporting in particular. Therefore, it has to be applied in a practical environment and needs to be enriched with additional concerns and information items. For future research, the criteria we used to enrich the existing meta-models therefore have to be extended in number and refined in detail. Additionally, the comparison of the information demand and the supply by existing enterprise architecture approaches has to further be extended as well in order to identify potentially suitable existing frameworks supplying CSR management's information needs.

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